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GENERAL STUDIES

2019-2020 | BULLETIN AND ACADEMIC POLICIES

Academic policies are set by the Faculty of Arts and Sciences and the academic administration of individual schools within the Arts and Sciences. Students in the School of General Studies are expected to familiarize themselves with GS policies. Students seeking clarity on academic policies relevant to or beyond those stated on the GS website should consult with their respective GS advisors.

In light of the circumstances caused by COVID-19 during the Spring 2020 semester, the Columbia College - School of General Studies Committee on Instruction has revised certain academic policies.

Therefore, as of March 24, 2020, The School of General Studies has temporarily revised the following academic policies for the duration of the Spring 2020 semester.

MANDATORY PASS/FAIL SYSTEM OF GRADING

Spring 2020 will be a mandatory pass/fail term—*i.e.*, all final grades for Spring 2020 will be either “pass” or “fail.”

While working within this new grading system, we remain committed to engaging our students and guiding their learning. Faculty should therefore continue to measure student progress in their courses and to provide evaluative feedback on all course requirements, in order to help students gauge the success of their understanding and application of course material. Faculty, individually and in consultation with colleagues in their departments or programs, should consider and communicate to students their criteria for the grade of “pass” and for the grade of “fail” in this grading system.

Faculty are encouraged to consider various ways to provide clear guidance to students about their level of achievement of course learning goals. For example, some faculty may wish to assign grades on individual assignments in order to reflect the level of mastery a student has shown (although faculty should keep in mind that a final grade will not be awarded on the student’s transcript), while other faculty may wish to move to narrative feedback only in order to convey the level of mastery achieved. In any case, faculty are encouraged to keep their own personal records of student progress, so that they are prepared to write detailed letters of recommendation in the future for students who may need faculty support for applications to graduate school, professional schools, competitive opportunities, etc.

[Note: Some graduate schools and professional schools have already stated that they will accept grades of “pass” in Spring 2020 from schools who have declared a mandatory pass/fail

system this semester, and that they will also consider students’ cumulative GPAs with the current disruption in mind. We hope that even more schools will soon follow suit. So your letters of recommendation will be read in this larger context as well.]

To reiterate earlier guidance: **Faculty are encouraged to have explicit conversations with students about the goals of their classes for the second half of the semester, so that faculty and students alike continue to be engaged with the course material.** A pass/fail semester offers the opportunity for the academic community to put aside pressures associated with assigning or receiving letter grades and to focus even more on the learning process; open communication may help this experience online to be productive and beneficial for faculty and students alike.

REMOTE LEARNING AND PROVIDING COURSE INSTRUCTION IN THE MOST EQUITABLE WAYS POSSIBLE

Many of our students are now living in very different conditions from those in which they began the semester. Some students are in different time zones; some students have technological challenges in connecting to online courses; some students have work schedules or sleep schedules that are now at odds with course meeting times; some students are caring for young children whose schools are closed. It is incumbent on every faculty member to make their instruction and their course materials available to all enrolled students.

Faculty are asked to expand their instruction as necessary so that students who face such challenges can participate more fully in our online instruction. Faculty can consider the following strategies, among others:

- Recording class sessions through Zoom and providing the recording files to students in the course for asynchronous viewing (*strongly recommended*);
- Conducting class sessions two times per day (especially in the case of seminars in which participation in discussion is expected);
- Developing small group projects that allow all students to be engaged with other students (particularly those who may be in close time zones), the results of which can be brought into full class sessions;
- Posting course materials on Courseworks;
- Giving oral exams instead of written exams, where practicable;
- Asking for student volunteers, or creating group projects that ask students, to take and post robust class notes (see the “[CC]” function in Zoom); and
- Offering additional office hours and/or individual conferences.

TO REPEAT EARLIER GUIDANCE TO THE FACULTY:

Given these extraordinary circumstances, we have the flexibility to alter our expectations of contact hours and workload hours, as long as we fulfill the overall expected course hours and that we have achieved reasonable learning goals in our courses. We must complete all courses, even if we can do so only by changing the learning goals for a class radically. In other words, we have to determine what learning looks like in the time of a global pandemic so that we are serving our students as well as possible while adjusting our shared expectations of what constitutes reasonable content and a reasonable timeline.

Faculty are strongly urged to show flexibility to their students and to reconsider their course requirements in light of our new instructional environment. Students may feel ill-equipped to contribute to class discussion if they are unable to attend class sessions or must participate at odd hours. **Therefore, class participation, in particular, may need to be redefined** for students to include such things as posting on class discussion boards, contribute to class chats, working in small student groups on projects, and more. In general, faculty should strive to maintain frequent student engagement in order to help students feel connected to their Columbia community during this period of physical separation.

If students become ill, or if they have responsibility for others who are ill, faculty should be aware that, even in mild cases, the COVID-19 virus can produce severe symptoms, and people who fall ill from the virus may be incapacitated for multiple weeks. So faculty are asked to be flexible with students in such cases and should provide course materials and other support to help the students complete the course. Incompletes will be supported by the schools in these circumstances.

As an academic community, we want to support our students' progress toward the successful completion of this semester and toward the next stage of their studies or careers, so we will want to consider all possible ways we can show flexibility to affirm academic achievement before assuming that an incomplete or other postponement of work is approved. But of course, extenuating circumstances will be taken into account, and **faculty are encouraged to consult with students' advising deans to determine the best course for difficult situations.**

EVALUATING SENIOR THESES

The senior thesis represents a tremendous academic achievement for some of our graduating seniors. Therefore, although the final grade for a senior thesis course must be either "pass" or "fail," the Columbia College - School of General Studies Committee on Instruction recommends that any faculty member who is advising a senior thesis provides a robust evaluative summary of the level of achievement, which can be shared both with the student and with the sponsoring academic unit. This evaluative summary should reflect in specific

narrative terms whether the faculty advisor recommends the student for relevant graduation honors and prizes; academic units will then be able to take into account the achievement of the senior thesis when determining departmental honors.

The Columbia College - School of General Studies Committee on Instruction recommends that faculty do not give letter grades to the thesis itself, since that thesis grade will not translate to a final grade for a thesis course. Faculty are encouraged, though, to keep records for themselves of the thesis evaluation, so that they are prepared to write detailed letters of recommendation in the future for students who may need faculty support for applications to graduate school, professional schools, competitive opportunities, etc.

AWARDING HONORS, AWARDS AND PRIZES

During this time when all students are working under unusual duress, it is more important than ever that we recognize, whenever possible, the talent and perseverance of our students through the awarding of honors, awards, and prizes that permanently commemorate their academic achievements. Given the unusual exigencies of this term, the Columbia College - School of General Studies Committee on Instruction offers the following guidance for graduation honors for Spring 2020.

To allow faculty to have more access to academic work that they are evaluating for honors, awards, and prizes, the announcement of most honors, awards, and prizes will be delayed until mid- to late May. School administrators will communicate revised deadlines for soliciting faculty evaluations accordingly.

Valedictorian and Salutatorian: Valedictorians and Salutatorians for both CC and GS will be selected according to standard school policy and process.

Academic Prizes and Awards: Recipients of academic prizes and awards will be selected according to standard school or department processes.

Dean's List: Because we have moved to a mandatory Pass/Fail grading system for the term, and the awarding of Dean's List is based solely on GPA, Dean's List will not be awarded for the Spring 2020 term.

Latin Honors: Latin Honors will be awarded according to standard school policy, with the understanding that grades for Spring 2020 will not be taken into account in calculating Latin Honors.

Phi Beta Kappa: Phi Beta Kappa will be awarded according to standard school policy, in which grades and faculty evaluations are considered for each eligible student. The national Phi Beta Kappa Society has confirmed that students can be elected to Phi Beta Kappa even in the absence of an in-person induction ceremony.

Departmental Honors: Under normal circumstances, departmental honors are awarded to no more than 10% of graduating seniors. In acknowledgement of the challenges and resilience of our students this semester, academic units may extend departmental honors to up to 20% of graduating seniors.

ARCHIVED BULLETIN AND ACADEMIC POLICIES

- 2018-2019 General Studies Academic Policies (<http://bulletin.columbia.edu/general-studies/2018-2019-generalstudies.pdf>)
- 2017-2018 General Studies Academic Policies (<http://bulletin.columbia.edu/general-studies/gspolicies-2017-2018.pdf>)
- 2016-2017 General Studies Academic Policies (<http://bulletin.columbia.edu/general-studies/2016-2017-generalstudies.pdf>)
- 2015-2016 General Studies Academic Policies (<http://bulletin.columbia.edu/general-studies/2015-2016-generalstudies.pdf>)
- 2014-2015 General Studies Academic Policies (http://bulletin.columbia.edu/general-studies/policies_2015.pdf)

KEY TO COURSE LISTINGS

Each course number consists of one or two letters denoting the offering university division or target population, as shown in the chart below, followed by four digits denoting the course number (e.g., ENGL GU4103).

For GS students, the most common course prefixes are GS, GU, and UN.

Code Description

A	Architecture, Planning, and Preservation
AF	School of the Arts (SoA)-Film
AR	School of the Arts (SoA)- open to all SOA (interdisciplinary)
AS	School of the Arts (SoA)- Sound Arts
AT	School of the Arts (SoA)- Theatre
AV	School of the Arts (SoA)- Visual Arts
AW	School of the Arts (SoA)- Writing
BC	Barnard College
CC	Columbia College students only
E	Engineering and Applied Science
GR	Graduate Students
GS	General Studies students only
GU	Undergraduate and Graduate Students
H	Reid Hall Programs in Paris
I	Berlin Consortium for German Studies

OC	For courses taught off the Columbia NYC campus and open to multiple student populations
P	Public Health
PS	School of Professional Studies
S	Summer Session
U	International and Public Affairs
UN	Undergraduate Students
Z	American Language Program
0	Course that cannot be credited toward any degree

In the four-digit course number, the first digit signifies the level of the course, as follows:

- 1000s: Introductory undergraduate course
- 2000s: Intermediate undergraduate course
- 3000s and 4000s: Advanced undergraduate course
- 5000-9000s: Graduate-level courses

Two consecutive numbers joined by a hyphen show that the course runs through both the fall and spring terms (e.g., HIST UN1091-1092).

The courses offered by each department are arranged in ascending numerical order, with the number of points of academic credit following the title of the course.

EVENING COURSES

The School of General Studies shares its courses with the other Arts & Sciences divisions of the University. The majority of the courses are day classes, although there are significant evening offerings as well. Students can find both introductory and advanced courses offered in the evening, many of which will fulfill core requirements or count toward major requirements. While every Arts & Sciences department offers some evening courses, including sequences of courses in the sciences and some foreign languages, in general it is not possible to fully complete a major by attending evening classes only, and GS students should not count on this as a viable option.

IDENTIFYING EVENING COURSES

Students can search for courses that meet at particular times on specific week days by using the course search tool (<http://bulletin.columbia.edu/general-studies/courses/>).

NEWLY APPROVED COURSES

Summer 2020 Newly Approved Courses (p. 5)
| Spring 2020 Newly Approved Courses (p. 5)
| Fall 2019 Newly Approved Courses (p. 5)

Hundreds of new courses are added to the Columbia undergraduate curriculum each year. So that students may be

apprised of these offerings, new courses are collected on this page. Students are encouraged to check back periodically to review these new offerings.

SUMMER 2020 NEWLY APPROVED COURSES

Last update: 4/15/20

African American and African Diaspora Studies

AFAM GU4000 Gospel Music in Modern America

Art History and Archaeology

AHIS S4654 Painting in the Mid-Twentieth Century, 1929-1980

AHIS S4655 Performing the City

Classics

CLCV UN3059 WORLD OF ALEXANDER THE GREAT

CLCV UN3111

Earth and Environmental Sciences

EESC UN1004 Dinosaurs and the History of Life

English and Comparative Literature

CLEN OC3245 Black Americans and the City of Light

ENGL S3826 Jane Austen and the Poets

CLEN S3484 Inventions of the Self: Autofiction, Therapy, and Neuroplasticity

CLEN S3987Q Narrative Forms of Medicine: Forms of Autobiography

CLEN S4521 Topics in Comparative Literature: Defining Life

History

HIST UN2478 U.S. Intellectual History, 1865 To the Present

HIST UN3335 20th Century New York City History

Italian

ITAL UN3643 History of Italian Cinema

Music

AHMM UN3320 Introduction To the Musics of East Asia and Southeast Asia

Philosophy

PHIL UN3800 Philosophy, Justice, and Social Activism

Political Science

POLS UN3260 The Latino Political Experience

POLS UN3720 Scope and Methods

POLS UN3704 Data Analysis and Statistics for Political Science Research

POLS UN3671 China's Foreign Relations

POLS GU4835 FORMAL&INFORMAL TERRORIST ACTORS

Religion

RELI S2335 Religion in Black America: An Introduction

RELI S4619 Islam in Popular Culture

Writing

WRIT UN3215 Nonfiction Seminar: Learning to See: Writing The Visual

SPRING 2020 NEWLY APPROVED COURSES

Last update: 11/25/19

Anthropology

ANTH UN2019 Documentary/Ethnography/Film: Exploration and Experimentation

ANTH UN3893 The Bomb

Art History and Archaeology

AHIS UN2317 Renaissance Architecture

AHIS UN3012 Restitution or Repatriation of Culture Heritage: New Directions?

AHIS UN3446 Contemporary Queer Art Practices: Subculture, Sexuality, and the Politics of Performance

AHIS UN3612 Body, Camera, Action: Japan in Conversation with the Global Avant-Garde

AHIS GU4023 Medieval Art II: From Pope Gregory to the Eve of the Reformation

AHIS GU4520 Gothic Nature

AHIS GU4585 The Early Mosque: Shaping Sacred Space

Biology

BIOL GU4002 Macromolecular Structure and Interactions

Center for the Study of Ethnicity and Race

C SER UN3934 Black/Brown History of Rock and Roll

Classics

CLCV UN3005 RACE AND ETHNICITY IN THE GRECO-ROMAN WORLD

CLCV UN3007 Pagans and Christians in the Later Roman Empire

CLCV UN3220 War, reality and truth in Thucydides

CLGM GU4300 Retranslation: Worlding C. P. Cavafy

CLGM GU4450 How to do things with Homosexual #odies

Comparative Literature and Society

CLPS GU4220 Psychoanalysis and Writing (Freud, Schreber, Lacan)

CPLS GU4315 Multilingual Technologies and Language Diversity

CLPS GU4510 Jacques Lacan: An introduction to his work

CPLS GU4892 Subaltern Urbanism

Earth and Environmental Sciences

EESC GU4009 Chemical Geology

Earth Institute

ENVB OC2160	SEE-U Costa Rica: Forest and Agroforest Systems	HIST UN2298	The Soviet Century: Russia and Eurasia 1917-present
East Asian Languages and Cultures		HIST UN2323	Nineteenth-Century Britain
KHMR UN2102	Intermediate Khmer II	HIST UN2336	Everyday Communism
EAAS UN3116	Supernatural in East Asia	HIST UN2897	Topics in Modern Ukrainian History
HSEA UN3120	Borderland Economies of China	HIST UN2987	Technology and US Politics
EAAS UN3122	Modern Chinese Poetry in a Global Context	HIST UN3113	Popular Culture in the Late Medieval Low Countries
EAAS UN3206	Migrant Literature: From China to a Global World	HIST UN3171	Who Counts?: U.S. Census and Politics
VIET UN3102	Third Year Vietnamese II	HIST UN3268	The Critique of Curiosity
JPNS UN3611	Tokyo Olympics Japanese II- N2 Proficiency Level	HIST UN3277	History of Urban Crime and Policing in Latin America in Global Perspective
JPNS GU4013	Fourth Year Business Japanese II	HIST GU4263	Monuments and Memories in 20th Century Europe
HSEA GU4231	Transpacific Empires	HIST GU4278	Men in Crisis: Europe, 1890-1945
EAAS GU4233	Sonic Modernity in East Asia	HIST GU4522	Jews, Magic, and Science in Premodern Europe
JPNS GU4611	Tokyo Olympics Japanese II- N1 Proficiency Level	HIST GU4699	Medieval Franciscans and their World
HSEA GU4891	LAW IN CHINESE HISTORY	HIST GU4773	American Women's History; Society, Politics, & the State, 1968-2008
HSEA GU4816	Comparing Indigeneities	HIST GU4935	Science and Art in Early Modern Europe
Ecology, Evolution, and Environmental Biology		Human Rights	
EEEE OC3021	Adapation to Changing Climates	HRTS GU4195	Topics in History, Memory and Transitional Justice
English and Comparative Literature		HRTS GU4360	Menstruation, Gender, and Rights: Interdisciplinary Approaches
ENGL UN3042	Ulysses	HRTS GU4380	Advocating and Campaigning for Social and Economic Rights
CLEN UN3125	Medieval Encounters	Italian	
ENGL UN3241	African American Literature: The Essay	ITAL GU4019	TOPICS in MICROHISTORY
ENGL UN3255	Victorian Relations	Jewish Studies	
CLEN UN3335	Poetry and Philosophy	JWST GU4145	Introduction to Israeli Cinema
CLEN UN3360	Theaters of Gods and Heroes	JWST GU4990	Topics in Jewish Studies
ENTA UN3786	Studies in Drama: Women on Center Stage	Latin American and Iberian Cultures	
CLEN GU4075	Occultism, Postcoloniality, and Modernism	SPAN UN3533	Women, Culture, Activism & Gender in Latin America
ENGL GU4110	Avant-Garde Feminist Poetry	Middle Eastern, South Asian, and African Studies	
ENGL GU4215	Epic Histories: Gibbon/Benjamin	MDES UN2004	Conflicts: Regions and Religions
ENGL GU4248	Literature and Science in Early Modern England	MDES UN3046	The Intersectional Politics of Religion
CLEN GU4335	Poetry and Philosophy	MDES GU4049	Climate and Empire
ENGL GU4415	Victorian Novel	MDES GU4649	Political Economy of South Asia
CLEN GU4728	Literature in the Age of Artificial Intelligence	Music	
ENGL GU4750	Clarissa	MUSI GU4109	Music, Musicians and Mobility in the Early Modern Period
French		MUSI GU4308	Theory and Analysis of Jazz and Improvisation
FREN UN3241	French Language and Culture through Theater and Performance		
FRST OC3827	Politics in Europe- European Politics		
CLFR GU4720	History & Literature: Going Micro		
FREN GU4426	Rousseau, Women and Gender		
History			
HIST UN2235	The First American Gilded Age, 1870-1919		

MUSI GU4325	Introduction to Cognitive Musicology
MUSI GU4406	Acoustic Ecologies
Political Science	
POLS GU4112	Theories of Political Action
POLS GU4412	ENVIRONMENTAL POLITICS IN LATIN AMERICA
POLS GU4436	POPULISM IN EUROPE AND THE WORLD
POLS GU4716	QUANT METH 2 APPL REG CAUS INF
POLS GU4848	ISRAELI NATL SEC STRAT POL DEC
POLS GU4863	INTERNATIONAL POLITICAL ECONOMY OF DEVELOPING COUNTRIES
POLS UN3225	American Constitutional History
POLS UN3245	Race and Ethnicity In American Politics
POLS UN3591	CIVIL WARS & POLITICAL VIOLENCE
POLS UN3871	CHINA'S FOREIGN RELATIONS
POLS UN3912	Seminar in Political Theory (Nonviolence)
Psychology	
PSYC GU4482	Neural Plasticity
PSYC GU4646	Socio-Ecological Psychology
PSYC GU4673	Political Psychology
PSYC UN1420	RESEARCH METHODS - HUMAN BEHAVIOR
PSYC UN1990	Global Behavioral Science
PSYC UN2470	Fundamentals of Human Neuropsychology
PSYC UN3693	Stress in an Interpersonal Context
Religion	
RELI GU4204	Religions of the Iranian World
RELI GU4221	Hegel and Kierkegaard
RELI UN1612	Religion and the History of Hip Hop
Slavic Languages	
CLRS UN3311	Stalin's Heirs: The Literature of the Thaw
UKRN GU4007	Advanced Ukrainian Through Literature, Media and Politics II
SLCL GU4059	Periphery and Its Empires: Ukrainian and Russian Art from Peter the Great to the Present
CLRS GU4191	A Specter Haunting Europe: Radical Thought from the French Revolution to Russian
CLGR GU4251	Fascism by the Book: Literature, Culture and Politics in Nazi Germany
Sustainable Development	
SDEV GU4240	Science Communication

Writing	
WRIT UN3017	Incarcerated Yet Inspired: Exploring Criminal Justice Through Creative Writing
WRIT UN3126	Animal Tales
WRIT UN3127	Time Moves Both Ways
WRIT UN3018	Inhabiting Form: Writing the Body

FALL 2019 NEWLY APPROVED COURSES

Last update: 6/13/19

African American and African Diaspora Studies

AFAS UN3943	Senior Pro Seminar
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Anthropology

ANTH UN3662	Principles of Art in Archaeological Practice
ANTH UN3763	AIDS, The Arts, Body Cultures
ANTH GU4142	Language, Culture, Power

Art History and Archaeology

AHIS UN2105	Greek Myths Seen Through Ancient Greek and Roman Art
AHIS UN2427	Twentieth-Century Architecture
AHIS UN3100	Hellenistic Sculpture: Intellectuals, Gods, Kings & Fishermen
AHIS UN3314	Inganno and Engaño: Art and the Rhetoric of Deceit between Spain and Italy
AHIS UN3450	Art and Empire
AHIS UN3611	Korean Art in the Age of Global Encounters
AHIS GU4150	Tourism, Nature, and the North American Landscape
AHIS GU4748	A History of Architectural Theory
AHIS GU4749	Bauhaus and Architecture

Classics

CLCV GU4106	Religions of the Roman world
CLST UN3104	The Early Silk Road and World of the Indian Ocean (2500 BCE–1000 CE)

Committee on Global Thought

CGTH GU4100	Diaspora and Transnationalism: Critical Reflections on the Politics of Homeland
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Comparative Literature and Society

Advanced Topics in Medical Humanities: Body, Blood, Race, and Culture

East Asian Languages and Cultures

VIET UN3101	Third Year Vietnamese I
EAAS UN3124	The Supernatural and Boundaries in East Asian Literature and Performance
JPNS UN3610	Tokyo Olympics Japanese - N2 Level Proficiency

JPNS GU4012	Fourth Year Business Japanese I
EAAS GU4123	Japanese Documentary Films
HSEA GU4222	China's Global Histories: People, Space, and Power
JPNS GU4610	Tokyo Olympics Japanese - N1 Level Proficiency
EAAS GU4810	Women and Literary Culture in Japan
HSEA GU4814	Space and Place in Urbanizing Tibet: Indigenous Experiences in China
HSEA GU4815	Faith and Empire: Art and Politics in Tibetan Buddhism
Ecology, Evolution, and Environmental Biology	
EEEB UN3023	Scientific Analysis and Presentation
EEEB GU4005	Conservation Policy
EEEB GU4129	Zoo Conservation
English and Comparative Literature	
ENTA UN3340	Environmental crisis on the Shakespearean Stage
ENGL UN3351	SEVENTEENTH CENTURY POETRY (DONNE, HERBERT, MARVELL)
ENGL UN3398	Odd Women in Victorian England
ENGL UN3579	Castaways and Containers: Modernity at Sea
ENGL UN3629	American Nature Poetry: Whitman, Dickinson, Stevens, Frost, Moore
ENGL UN3637	Poetry and Catastrophe
ENGL UN3722	Hollywood's Countercultural Cinema: Movies of the 1970's
ENGL UN3791	True Crime: Fact and Feeling
ENTA UN3942	Drama and the American Dream
CLEN GU4015	Vernacular Paleography
ENGL GU4213	Staging Early Modern London
ENGL GU4391	Nineteenth-Century Thrillers
ENGL GU4400	Romanticism
ENGL GU4506	Post-War American Literature: 1945-1985
CLEN GU4567	Du Bois, Gramsci, Ambedkar: Three Men on Emancipation
ENGL GU4636	Science Fiction
ENGL GU4637	Literature and Health Humanities
CLEN GU4723	18th C Comparative Novel
ENTA GU4725	Technologies of Modern Drama
CLEN GU4771	The Literary History of Atrocity
ENGL GU4794	Heroes, Lovers, and Visionaries: English Literature to 1500
ENGL GU4913	The Novel Now: Contemporary Fiction in English
Film	
FILM UN2190	Topics in American Cinema

FILM UN2296	Arab and African Filmmaking
FILM UN3931	French Queer Cinema
FILM GU4952	Film TV and Internet in Brazilian Re-democratization: 1984-2014
French and Romance Philology	
FREN UN3883	French Civilization through Graphic Novels and Cinema
FREN UN3920	"Blanchite" Thinking Whiteness in French
CLFR GU4716	FRANCOPHONE ROMANCE LOVE, SEX, INTIMACY IN THE FRENCH COLONIAL WORLD
FREN GU4627	Communism or Democracy? A French Debate at the end of the 20th Century
History	
HIST UN1786	History of the City in Latin America
HIST UN3019	Rivers, Politics, and Power in the United States
HIST UN3069	History of the American Middle Class
HIST UN3087	Madness to Prozac: The Sciences of the Self in the Modern Era
HIST UN3562	The Seven Years' War (1754-1763), Global Perspective: Europe, Asia, Africa, and Americas
HIST GU4085	Slavery in the Roman World
HIST GU4121	MARGINS OF HISTORIOGRAPHY:
HIST GU4562	Black Britain, 1919-2019
Institute for Israel and Jewish Studies	
JWST GU4510	Rules and Reasons: Israeli Law vs. Jewish Law
Italian	
ITAL UN3341	Art Itineraries: Italian through Art
ITAL UN3660	Terrorism in Literature and Film: Cultural Reflections between Italian Red Brigades & 9/11
ITAL UN3865	Introduction to Fashion Studies
ITAL GU4068	Out of Italy: The Italian Language Across Europe and the Mediterranean (1200-1700)
Linguistics	
LING UN3102	Endangered Languages in the Global City: Lang, Culture, and Migration in Contemporary NYC
Middle Eastern, South Asian, and African Studies	
MDES UN3046	The Intersectional Politics of Religion
MDES UN3263	Cannabis and Culture: Hashish, Law and Social History in Egypt
MDES GU4640	Advanced Urdu
Music	

MUSI UN3343	Shades of Brown: Music in the South Asian Diaspora
MUSI UN3344	Curating Popular Music: From Song Pluggers to Spotify
MUSI UN3346	REIMAGINING RESISTANCE:SOUND AS SUBVERSION IN 20TH & 21ST CENTURY AMERICAN EXPERIMENTALISM
MUSI GU4801	Music and the Electrical Imaginary
MUSI GU4802	Sound, Music and Death
MUSI GU4810	Sound: Foundations
Physical Education	
PHED UN1111	Cardio Fitness - Hybrid
PHED UN1112	Mindful Walking
PHED UN1113	Yoga and Meditation
PHED UN1114	The Mindful Student
Political Science	
POLS GU4403	The Political Economy of China
Psychology	
PSYC UN3621	Creativity and the Good Life
PSYC UN3624	Adolescent Mental Health: Causes, Correlates, Consequences
PSYC GU4242	Evolution of Language (Seminar)
PSYC GU4281	The Psychology of Curiosity
PSYC GU4627	Seminar in Anxiety, Obsessive-Compulsive, and Related Disorders
Religion	
RELI UN3309	Modern Islamic Thought
RELI GU4206	HISTORY, TIME, AND TRADITION
RELI GU4311	Fanon: Religion, Race, Philosophy in Africa and beyond
RELI GU4613	Silence
RELI GU4617	Image Theories in Chinese Religions
Slavic Languages	
CLRS UN3310	Crime, Punishment and Redemption: Russian Literature on Trial
UKRN GU4006	Advanced Ukrainian Through Literature, Media, and Politics
Sociology	
SOCI UN1203	The Social Animal in the Digital Age
SOCI UN2235	Sexuality in Social Context
SOCI UN3937	Sociology of Human Rights
SOCI GU4411	Politics and Society in Central Eastern Europe
SOCI GU4982	Risk and Intimacy
Statistics	
STAT UN1010	Statistics for Activists
Sustainable Development	

SDEV GU4101	Qualitative Research Methods for Sustainable Development
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Visual Arts

VIAR UN3133	Color: Theory and Practice
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Women's and Gender Studies

WMST GU4350	Performing feminist activism in Contemporary Latin America
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SUMMER COURSES

Students may accelerate their progress to the degree by taking required and/or elective courses during Columbia's Summer Term (<http://ce.columbia.edu/summer/columbia-students/>), which runs from late May through mid-August. Given the intensive nature of these courses, and the fact that the summer term includes courses that do not count toward the degree, GS students are urged to choose their summer term classes in consultation with their GS academic advisors, who will provide advance approval of their summer course selections.

GS students may take a maximum of 15 points for the entire summer term, with no more than nine points in either of the six-week sessions or in overlapping sessions. Students should consult with their departments for specific policies or course restrictions when taking courses to be applied toward the major.

With the exception of a small number of courses approved by the Premedical Committee, premedical students are strongly advised against taking the required science courses in the summer. Medical schools generally prefer that coursework be completed during the regular terms of enrollment. The Postbaccalaureate Premedical Program does not permit students to enroll in science classes in the summer, except to take preparatory courses, math, laboratory courses, and the twelve-week Physics II and General Chemistry II courses. The reason for this restriction is that the compressed summer term schedule is a less effective way to learn and leaves students ill-prepared for subsequent courses and for the MCAT. Premedical students should make sure they have the approval of their premed advisors prior to enrolling in summer term science courses.

For more information about taking summer courses as a GS student, including information about fulfilling core and major requirements, please see below.

CURRENT LIST OF SUMMER SESSION COURSES

Summer Session Course Guidelines (http://bulletin.columbia.edu/general-studies/courses/summer-courses/2020_Summer_Session_Guidelines.pdf) (updated 2/26/20)

HISTORY AND PHILOSOPHY OF SCIENCE

The University offers a number of courses in the history and philosophy of science, although it does not, at this time, offer a major or concentration to undergraduates in Columbia College or General Studies. The course listings bring together a variety of courses from different disciplines, which should be of interest to anyone wishing to pursue work in the history and philosophy of science. The list is not intended to be all inclusive; students interested in the history and philosophy of science should speak to members of the committee.

INTERDEPARTMENTAL COMMITTEE ON HISTORY AND PHILOSOPHY OF SCIENCE

David Albert
Philosophy
706 Philosophy; 212-854-3519

Walter Bock (*emeritus*)
Biology
1106 Schermerhorn; 212-854-4487

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History
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Karl Jacoby
History
424 Hamilton; 212-854-3248

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History
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Matthew Jones
History
514 Fayerweather; 212-854-2421

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History
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Philosophy
717 Philosophy; 212-854-4884

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Samuel Roberts
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322 Fayerweather; 212-854-2430

David Rosner
History/Sociomedical Sciences
420 Fayerweather; 212-854-4272

David Rothman
History/Sociomedical Sciences
622 West 168th Street; 212-305-4096

George Saliba (*emeritus*)
Middle Eastern, South Asian, and African Studies
312 Knox; 212-854-4166

Pamela Smith
History
605 Fayerweather; 212-854-7662

COLLOQUIA, INTERDEPARTMENTAL SEMINARS, AND PROFESSIONAL SCHOOL OFFERINGS

Occasionally, and for a variety of reasons, faculty offer courses outside of the existing structure of Arts and Sciences academic departments. Such courses may be colloquia: team-taught interdisciplinary courses; interdepartmental seminars explicitly offered by two or more academic departments; or undergraduate-specific courses offered by faculty outside of the Arts and Sciences. All of these courses may be counted toward the undergraduate degree, but it is for the faculty of each department or program to determine whether or not they can count toward a major or concentration.

DEGREE FULFILLMENT THE BACHELOR'S DEGREE

General Studies students earn a Bachelor of Arts degree (BA). The Bachelor of Arts combines breadth of study in a range of subjects and disciplines, represented by the core requirements, with specialization in a major field of study. Whether they

major in the sciences, humanities, or social sciences, all undergraduate GS students receive a BA degree.

To qualify for a bachelor's degree, students are required to complete 124 points with a minimum grade point average of 2.0. The 124 points are distributed among three general categories: core requirements, major requirements, and electives. GS undergraduates are required to complete a major in order to graduate. See *Majors and Concentrations* (<http://bulletin.columbia.edu/general-studies/majors-concentrations/>) for details about individual major programs.

THE MAJOR

In addition to the Core, all undergraduate GS students must fulfill the requirements for a major to qualify for a bachelor's degree from Columbia. The purpose of a major is to provide students with an opportunity to delve deeply into the study of a particular subject, developing expertise and critical thinking through sustained and advanced work. Students may declare their respective majors as early as their first semester at GS provided they have completed at least 45 points toward the degree, with at least 12 points in progress at Columbia. Majors are noted on the Columbia transcript.

Policies Governing Majors and Concentrations

Students should consider various options and become familiar with the requirements for a particular major before filing a major declaration. In most cases, students should have begun coursework in the discipline before declaring the major. Faculty members are often excellent resources for discussing possible majors. Many departments sponsor open houses for potential majors during the academic year.

Students may also link to department websites to obtain additional information. It is recommended that students also attend a department open house to obtain more information about the major from faculty and students in the major department. Major open houses are usually held in the spring term and are publicized through the DOS News & Announcements newsletter. Many departments also have informational handouts for potential majors in their departmental offices. Certain majors require an application process and approval by the department.

Students eligible to declare a major may do so during designated major declaration periods, namely October 7 - 21 in the fall, and February 15 - March 15 in the spring.

Students are expected to meet the requirements for the major that are in place at the time they declare their majors. Students who do not complete the major requirements within five years of declaring the major may be expected to comply with any new requirements that have been subsequently established.

The following rules pertain to all majors; exceptions to any of these rules are noted by individual departments on their official websites:

1. No course with a grade of D will be credited toward the major.
2. No course with the mark of P (Pass) will count toward the major.
3. No more than two courses may overlap with GS core requirements.
4. Students must check with departments for permission to count summer session classes and courses taken while studying abroad toward the major.
5. No more than 12 transfer credits may count toward the major (some departments have a different limit).
6. Students must submit all required paperwork relevant to petitioning major departments for transfer credit toward the major in the same semester in which the major is declared; failure to meet this deadline may result in the loss of eligibility to transfer credit toward the major.
7. At least 18 points of coursework toward the major must be taken at Columbia.
8. Students who have not declared a major prior to earning 90 points will be placed on Registration Hold and be subject to Academic Warning.

Concentrations

Concentrations are optional and provide students with the opportunity to develop a deeper understanding of a secondary field of study in addition to the major. Most departments and programs offer a concentration. Some programs offer only a concentration. See *Major Fields of Study* (<http://bulletin.columbia.edu/general-studies/majors-concentrations/>) for more information about concentrations and requirements.

Choosing a Concentration

Courses counted toward a departmental concentration may simultaneously fulfill core requirements as long as the total number of overlapping courses from the major and/or concentration counted to the core does not exceed two.

Students interested in choosing a concentration in addition to a major must do so before completing 80 points toward the degree and must have a minimum GPA of 3.2. In order for a concentration to appear on the Columbia transcript, students must file paperwork with their GS advisor.

Transfer Credit Toward the Major and Concentration

The director of undergraduate studies (DUS) in each department is authorized to accept up to 12 GS-approved transfer credits toward the major; some departments have a different limit. The limit on transfer credits toward a concentration is six. Students must check individual

department policies concerning transfer credits. Credits from other institutions of higher education do not automatically transfer—and in some cases are not approved—toward the Columbia major or concentration, although they may count as electives or core requirements.

It is the student's responsibility to discuss with the DUS the possibility of counting transfer credits toward the major or concentration and to provide the department with any materials needed in order to make a decision about transfer credits. When reviewing transfer credits the DUS needs copies of official transcripts from the other institutions and often the syllabus for the course in question (supplied by the student).

Note: Students must submit all required paperwork relevant to petitioning major departments for transfer credit toward the major or concentration in the same semester in which the major or concentration is declared; failure to meet this deadline will result in the loss of eligibility for transfer credit toward the major or concentration.

Double Majors

Students should have a strong academic record, and excellent academic reasons for choosing to declare two programs (majors and concentrations). Students who wish to pursue two programs must declare both programs prior to completing 80 points toward the degree. Students who wish to declare two programs must have a minimum GPA of 3.2.

Students cannot declare two programs owned by the same offering unit (department, institute, or center). For example, a student may not declare programs in Russian Language and Culture and in Slavic Studies, both of which are owned by the Department of Slavic Languages; similarly, a student may not declare programs in Mathematics and in Applied Mathematics, both of which are owned by the Department of Mathematics. All joint majors (e.g., Economics-Political Science) will be considered as owned by both offering units, so that a student may not, for example, major in both Political Science and Economics-Political Science.

Double Counting

Students who declare two programs may, in some cases, overlap requirements for the two programs. There are three scenarios in which students may double-count program requirements; students may take advantage of any or all of these scenarios:

- If two programs both require the same coursework to teach fundamental skills needed for the field, those courses may be applied to both programs; specifically: (1) elementary and intermediate foreign language courses, (2) the calculus sequence (I through IV, or Honors A and B), (3) introductory courses in Statistics (STAT UN1101 Introduction to Statistics or STAT UN1201 Calculus-Based Introduction to Statistics), and (4) the introductory course in computer programming (COMS W1004 Introduction to Computer Science and Programming in Java).

- Students may also apply a maximum of two courses to both programs, if each course is already approved toward the fulfillment of the student's two declared programs. Offering departments, institutes, or centers may choose to restrict the double-counting of particular courses, and such restrictions cannot be appealed.
- As with students with one declared program, the maximum number of courses students with two declared programs may overlap to the Core is two. Students may not overlap core courses with both of their programs (triple-counting).

DECLARING A MAJOR OR CONCENTRATION

From anthropology to astronomy, from economics to ethnicity and race studies, Columbia offers over eighty majors across foundational disciplines in the liberal arts. We encourage you to explore the many fields of study in the Arts and Sciences. Whichever department you choose as your academic home, you will have the opportunity to develop your critical thinking, refine your research skills, challenge your intellectual presuppositions, and expand your cultural horizons.

Beginning the Major Declaration Process

GS students may declare a major or concentration online (<https://majordec.college.columbia.edu/gs/>) during the following designated periods. Please refer to the GS Academic Calendar (<https://gs.columbia.edu/content/academic-calendar-undergraduate/>) for specific dates.

- October 7 - 21 for the fall term
- February 15 - March 15 for the spring term

GS students must fulfill the requirements for a major to receive a bachelor's degree from Columbia, and must formally declare a major program before completing 90 points towards the degree; concentrations must be declared prior to completing 80 points. Ideally students should declare a major after completing 45 points of coursework toward the degree. Students who matriculate with at least 45 transfer credits may declare their respective majors in their first term at GS as long as they have 12 points in progress.

Before declaring a major, students should read the information on majors and concentrations on the Degree Fulfillment page in order to understand the choices and policies relevant to these academic programs. Students may also wish to consult with GS academic advisors, faculty members, department websites, and the department descriptions on the GS website when deciding on a major.

Criteria for Declaring a Major

In order to declare a major students must meet the following criteria:

- Enrollment in at least one semester at GS with a minimum of 12 points completed or in progress
- Completion of at least 45 points toward the bachelor's degree (including transfer credit)
- Regular and satisfactory progress toward fulfilling the GS core requirements

Students who have completed 90 or more cumulative points without a major on record will be placed on registration hold and may receive an Academic Warning. Additionally, students who wish to make any changes to their declared major and/or concentration must see their academic advisor.

Policies Governing Major Declaration

Before using the online major declaration system to declare an academic program, GS students should review the following academic policies, if applicable:

Major/Concentration Degree Requirements

All students must complete at least one major to fulfill the degree requirements, and may select a second major, concentration, or special concentration in addition to this first selection. Selecting only a concentration will not fulfill the requirements for the bachelor's degree.

Using the Online Major Declaration System

The online major declaration system (<https://majordec.college.columbia.edu/gs/>) will be available on the first day of each major declaration period.

Students who use the system must declare at least one major and are limited to a maximum of two program selections (the second choice of program may be either a major or a concentration).

Students will receive an email confirming their academic program and providing information about their department's practice for advising new majors.

Students with questions about declaring a major, or who experience any technical difficulties with the online major declaration system, should email gsmajordeclaration@columbia.edu.

Majors Requiring Departmental Approval

While most majors can be officially declared using the online system, the departments listed below require written departmental approval.

Students selecting a major from any of the departments listed below must print and fill out the GS Major Declaration Form (<https://gs.columbia.edu/sites/default/files/content/Documents/columbia-gs-major-concentration-and-declaration-form.pdf>) (also available from the GS Dean of Students Office) and take it to the appropriate department (addresses listed below). Once departmental approval has been obtained,

students should bring the form to 403 Lewisohn to finalize the major declaration process.

- Architecture (<http://www.columbia.edu/cu/archprogram/>) (500 Diana Center, Barnard College)
- Astronomy (<http://www.astro.columbia.edu/>) (1328 Pupin Hall)
- Astrophysics (<http://www.astro.columbia.edu/>) (1328 Pupin Hall)
- Biological Sciences (<http://www.columbia.edu/cu/biology/>) (Last Name A-L: 744 Fairchild Extension; Last Name M-Z: 716 Fairchild Extension)
- Chemistry (<http://www.columbia.edu/cu/chemistry/>) (340 Havemeyer Hall)
- Comparative Literature and Society (<http://www.columbia.edu/cu/icls/>) (Heyman Center)
- Creative Writing (<http://www.columbia.edu/cu/writing/>) (617 Kent Hall)
- Dance (<http://www.barnard.edu/dance/>) (204 Barnard Annex, Barnard College)
- Earth and Environmental Sciences (<http://eesc.columbia.edu/>) (557 Schermerhorn Extension)
- East Asian Languages and Cultures (<http://www.columbia.edu/cu/ealac/>) (Contact John Phan, jp3720@columbia.edu (pja1@columbia.edu))
- Film Studies (<http://arts.columbia.edu/>) (513 Dodge Hall)
- Italian (<http://www.columbia.edu/cu/italian/>) (502 Hamilton Hall)
- Latin American and Iberian Cultures (<http://www.columbia.edu/cu/spanish/>) (101 Casa Hispánica)
- Mathematics (<http://www.math.columbia.edu/>) (410 Mathematics Hall)
- Middle Eastern, South Asian, and African Studies (<http://www.columbia.edu/cu/mesaas/>) (401 Knox Hall, Union Theological Seminary)
- Physics (<http://www.columbia.edu/cu/physics/>) (704 Pupin Hall)
- Religion (<http://www.columbia.edu/cu/religion/>) (80 Claremont Avenue, Room 103)
- Sociology (<http://www.sociology.columbia.edu/>) (501 Knox Hall, Union Theological Seminary)
- Sustainable Development (<http://sdev.ei.columbia.edu/>) (The Earth Institute)
- Drama and Theatre Arts (<http://arts.columbia.edu/undergraduate-theatre-program/>) (507 Milbank)
- Urban Studies (<http://www.barnard.edu/urban/>) (236 Milbank Hall, Barnard College)
- Visual Arts (<http://arts.columbia.edu/undergraduate-visual-arts-program/>) (310 Dodge Hall)

Before visiting the departmental advisor, students should create a plan of study based upon the major's prerequisites,

requirements, and course offerings, and bring this plan to the meeting with the departmental advisor.

Frequently Asked Questions

Can I take courses that may count toward my major prior to declaring the major?

In sampling courses across the curriculum, many students end up taking courses that will count toward their major prior to actually declaring the major. This is a good way to receive an introduction to a major and to get an early start on some of the major requirements prior to declaring. However, students should be aware of the following:

1. Most departments do not allow a student to count toward the major or concentration courses in which the final grade earned is a “D” or a “P”. (Exceptions are noted in departmental guidelines for the major.)
2. Some Columbia departments have restrictions on the number or kind of Barnard courses that will count toward the Columbia major or concentration.
3. Some departments, like Economics, will not count courses taken out of sequence.
4. When in doubt, check the department website.

What if I cannot decide among several different options?

Students are urged to schedule an advising appointment with their GS advisor to discuss their interests and options. A student’s advisor can help in thinking about the important questions to consider when choosing a major. Students are also encouraged to visit departments, attend Major Open Houses, review their undergraduate handbook (several departments have these), meet with the Director of Undergraduate Studies or another faculty member in the department, and review the departmental websites. Many departments and programs host open houses for potential majors during February and March; watch for announcements in the GS weekly newsletters, or contact a department directly to find out if/when an open house is scheduled.

For tips on exploring majors and how a major may relate to a future career, visit the Career Exploration (<https://www.careereducation.columbia.edu/career-exploration/majors/>) page to learn more.

What if I am interested in a concentration?

All GS students must complete a major in order to graduate from GS. Concentrations are optional but, if pursued, should be declared. Students who want to declare a concentration must do so before completing 80 points of coursework toward the degree. Prior to declaring a concentration, students must declare (or have declared) a major. In some cases, students who have attempted a double major choose, later in the process, to change the second major to a concentration.

What if I want to pursue a double major?

Students interested in double-majoring should discuss the viability of this with their respective GS advisors. Students may

also consider doing a concentration in one area and a major in the other. Students who are interested in double-majoring must declare both majors before completing 80 points toward the degree; exceptions to this rule may be made if the student has already made significant progress toward major completion prior to the formal declaration.

What happens if I do not declare a major?

Students who do not declare a major by the time they have earned 90 points toward the degree will be placed on registration hold.

What if I want to change my major or concentration after one or both have been declared?

Students should schedule an appointment with their GS advisor to discuss why they want to change their major as well as the new major they are considering. The student and advisor will then complete the necessary paperwork for deleting the old major and declaring a new one, as this cannot be done online. Students normally are not permitted to declare a new major after earning more than 90 points toward the degree, but for compelling reasons exceptions can be made. Students should follow a similar process for changing or dropping a concentration.

Can any of my transfer credits count toward my major?

1. Each department has the discretion to count up to 12 credits in transfer toward the major; some departments have a different limit and may accept a different number of credits. Approval by GS of transfer credit toward the degree does not mean that this credit will automatically count toward the major.
2. At least 18 points toward the major must be taken at Columbia.
3. Students should consult with the Director of Undergraduate Studies (DUS) about which transfer courses may count toward the major and satisfy existing departmental requirements.
4. Directors of Undergraduate Studies usually require transcripts and syllabi to make decisions about whether transfer credits will count toward the major.

Can courses taken as part of study abroad count toward the major?

Students who are approved for study abroad by GS must receive approval from their major department with respect to any courses taken abroad that may be counted toward the major.

Can summer term courses count toward the major?

Students must make sure that summer term courses at Columbia will count toward the major. This permission comes from the department, not the student’s GS advisor.

Any other exemptions to the above rules are clearly articulated on the GS website or on departmental websites.

ELECTIVES

Professional Courses

GS students are permitted only 6 points of professional studies coursework toward their GS degrees. These six points may be counted in transfer credits or courses taken at Columbia, or a combination thereof. “Professional studies” include professional-level courses in law, business, journalism, or any of Columbia's other professional schools, as well as any comparable courses clearly professional in orientation.

GS students are not allowed to count professional courses in any of the professional studies programs offered through Columbia's School of Professional Studies toward the degree. Undergraduate cross-registration (<http://bulletin.columbia.edu/general-studies/degree-fulfillment/> <http://bulletin.columbia.edu/general-studies/academic-policies/study-within-graduate-professional-schools/>) in courses offered by Columbia's graduate and professional schools is restricted and requires special approval.

Any professional course that is listed or cross-listed as an undergraduate course in business, public health, international and public affairs, journalism, or within a Columbia Arts and Sciences department is excluded from the six-point limit. The final decision of whether or not a course is professional rests with the GS Committee on Academic Affairs.

Physical Education Courses

The Physical Education (P.E.) Department offers a variety of courses in the areas of aquatics, dance, fitness, martial arts, individual and dual “lifetime” sports, team sports, and outdoor education which are available for academic credit. Since P.E. is a requirement for undergraduates in Columbia College and the School of Engineering and Applied Science, preference is given to CC and SEAS students when registering for P.E. classes. If space is available, undergraduate General Studies students are permitted to take courses in the Physical Education academic credit program. The grading in all physical education courses is Pass/Fail. Students who fulfill the attendance and participation requirement receive a Pass.

Normally students may take only one P.E. course per semester; enrollment in more than one P.E. course per semester requires the approval of the Director of Physical Education Programs, to whom students should submit a petition. GS students may count up to two points of Physical Education toward the degree requirements.

Dance Technique Courses

A maximum of six (6) points of dance technique courses may count to the degree for GS non-dance majors. GS students registering for a dance technique class must register for at least one point. GS students may not register for a 0-point dance technique class.

ELECTIVES

In addition to the core requirements and the major requirements, many students will meet part of the 124 points required for the bachelor's degree with elective courses chosen from a range of programs and departments.

Students are encouraged to choose as electives those courses that will broaden their knowledge base, provide an opportunity to acquire or improve certain skills, introduce them to a new field of inquiry, or give them access to a unique Columbia strength or resource.

Personal interests as well as professional objectives often inform the selection of elective courses.

Electives may be taken Pass/D/Fail (p.); however, GS students may only elect the P/D/F option six times, for a total of eighteen points, during their undergraduate careers at Columbia and may only choose the P/D/F option in one course per term.

PROFESSIONAL COURSES

GS students are permitted only 6 points of professional studies coursework toward their GS degrees. These six points may be counted in transfer credits or courses taken at Columbia, or a combination thereof. “Professional studies” include professional level courses in law, business, journalism or any of Columbia's other professional schools, as well as any comparable courses clearly professional in orientation.

GS students are not allowed to count professional courses in any of the professional studies programs offered through Columbia's School of Professional Studies toward the degree. Undergraduate cross-registration (<http://bulletin.columbia.edu/general-studies/undergraduates/additional-academic-opportunities/study-within-graduate-professional-schools/>) in courses offered by Columbia's graduate and professional schools is restricted and requires special approval.

Any professional course that is listed or cross-listed as an undergraduate course in business, public health, international and public affairs, journalism, or within a Columbia Arts and Sciences department is excluded from the six-point limit. The final decision of whether or not a course is professional rests with the GS Committee on Academic Affairs.

PHYSICAL EDUCATION COURSES

The Physical Education (P.E.) Department offers a variety of courses in the areas of aquatics, dance, fitness, martial arts, individual and dual “lifetime” sports, team sports, and outdoor education which are available for academic credit. Since P.E. is a requirement for undergraduates in Columbia College and the School of Engineering and Applied Science, preference is given to CC and SEAS students when registering for P.E. classes. If space is available, undergraduate General Studies students are

permitted to take courses in the Physical Education academic credit program. The grading in all physical education courses is Pass/Fail. Students who fulfill the attendance and participation requirement receive a Pass.

Normally students may take only one P.E. course per semester; enrollment in more than one P.E. course per semester requires the approval of the Director of Physical Education Programs, to whom students should submit a petition. GS students may count up to two points of Physical Education toward the degree requirements.

DANCE TECHNIQUE COURSES

A maximum of six (6) points of dance technique courses may count to the degree for GS non-dance majors. GS students registering for a dance technique class must register for at least one credit. GS students may not register for a 0-credit dance technique class.

THE MAJOR

Concentrations (p. 17) | Transfer Credit Toward the Major (p. 18) | Double Majors (p. 18)

POLICIES GOVERNING MAJORS AND CONCENTRATIONS

In addition to the Core, all GS students must fulfill the requirements for a major to qualify for a bachelor's degree from Columbia. The purpose of a major is to provide students with an opportunity to delve deeply into the study of a particular subject, developing expertise and critical thinking through sustained and advanced work. Students may declare their respective majors as early as their first semester at GS provided they have completed at least 45 points toward the degree, with at least 12 points in progress at GS. Majors are noted on the Columbia transcript.

Students should consider various options and become familiar with the requirements for a particular major before filing a major declaration. In most cases, students should have begun coursework in the discipline before declaring the major. Faculty members are often excellent resources for discussing possible majors. Many departments sponsor open houses for potential majors during the academic year.

For information about specific majors and their requirements, see Major Fields of Study.

Students may also link to department websites to obtain additional information. It is recommended that students also attend a departmental open house (<https://gs.columbia.edu/content/departmental-events-deadlines/>) to obtain more information about the major from faculty and students in the major department. Major open houses are usually held in the spring term and are publicized through the GS Weekly newsletter. Many departments also have

informational handouts for potential majors in their departmental offices. Certain majors require an application process and approval by the department.

Students eligible to declare a major may do so during designated major declaration periods, namely October in the fall, and February 15 - March 15 in the spring.

Students are expected to meet the requirements for the major that are in place at the time they declare their majors. Students who do not complete the major requirements within five years of declaring the major may be expected to comply with any new requirements that have been subsequently established.

The following rules pertain to all majors; exceptions to any of these rules are noted by individual departments on their official websites:

1. No course with a grade of D will be credited toward the major.
2. No course with the mark of P (Pass) will count toward the major.
3. No more than two courses may overlap core requirements.
4. Students must check with departments for permission to count summer session classes and courses taken while studying abroad toward the major.
5. No more than 12 transfer credits may count toward the major (some departments have a different limit).
6. Students must submit all required paperwork relevant to petitioning major departments for transfer credit toward the major in the same semester in which the major is declared; failure to meet this deadline may result in the loss of eligibility to transfer credit toward the major.
7. At least 18 points of coursework toward the major must be taken at Columbia.
8. Students who have not declared a major prior to earning 90 points will be placed on Registration Hold and be subject to Academic Warning.

CONCENTRATIONS

Concentrations are optional and provide students with the opportunity to develop a deeper understanding of a secondary field of study in addition to the major. Most departments and programs offer a concentration. Some programs offer only a concentration. See Major Fields of Study for more information about concentrations and requirements.

Choosing a Concentration

Courses counted toward a departmental concentration may simultaneously fulfill core requirements as long as the total number of overlapping courses from the major and/or concentration counted to the Core does not exceed two. (Since the premedical concentration is not considered a departmental concentration, it is exempt from this policy.)

Students interested in choosing a concentration in addition to a major must do so before completing 80 points toward the degree and must have a minimum GPA of 3.2. In order for a concentration to appear on the Columbia transcript, students must file paperwork with their GS advisor.

TRANSFER CREDIT TOWARD THE MAJOR AND CONCENTRATION

The director of undergraduate studies (DUS) in each department is authorized to accept up to 12 GS-approved transfer credits toward the major; some departments have a different limit. The limit on transfer credits toward a concentration is six. Students must check individual department policies concerning transfer credits. Credits from other institutions of higher education do not automatically transfer—and in some cases are not approved—toward the Columbia major or concentration, although they may count as electives or core requirements.

It is the student's responsibility to discuss with the DUS the possibility of counting transfer credits toward the major or concentration and to provide the department with any materials needed in order to make a decision about transfer credits. When reviewing transfer credits the DUS needs copies of official transcripts from the other institutions and often the syllabus for the course in question (supplied by the student).

Note: Students must submit all required paperwork relevant to petitioning major departments for transfer credit toward the major or concentration in the same semester in which the major or concentration is declared; failure to meet this deadline will result in the loss of eligibility for transfer credit toward the major or concentration.

DOUBLE MAJORS

Students should have a strong academic record, and excellent academic reasons for choosing to declare two programs (majors and concentrations). Students who wish to pursue two programs must declare both programs prior to completing 80 points toward the degree. Students who wish to declare two programs must have a minimum GPA of 3.2.

Students cannot declare two programs owned by the same offering unit (department, institute, or center). For example, a student may not declare programs in Russian Language and Culture and in Slavic Studies, both of which are owned by the Department of Slavic Languages; similarly, a student may not declare programs in Mathematics and in Applied Mathematics, both of which are owned by the Department of Mathematics. All joint majors (e.g., Economics-Political Science) will be considered as owned by both offering units, so that a student may not, for example, major in both Political Science and Economics-Political Science.

Double Counting

Students who declare two programs may, in some cases, overlap requirements for the two programs. There are three scenarios in which students may double-count program requirements; students may take advantage of any or all of these scenarios:

- If two programs both require the same coursework to teach fundamental skills needed for the field, those courses may be applied to both programs; specifically: (1) elementary and intermediate foreign language courses, (2) the calculus sequence (I through IV, or Honors A and B), (3) introductory courses in statistics (STAT UN1101 or 1201), and (4) the introductory course in computer programming (COMS W1004).
- Students may also apply a maximum of two courses to both programs, if each course is already approved toward the fulfillment of the student's two declared programs. Offering departments, institutes, or centers may choose to restrict the double-counting of particular courses, and such restrictions cannot be appealed.
- As with students with one declared program, the maximum number of courses students with two declared programs may overlap to the Core is two. Students may not overlap core courses with both of their programs (triple-counting).

THE CORE THE CORE REQUIREMENTS

When today's GS students enroll in core courses, they know they are taking part in one of the University's longest standing educational traditions. With courses focusing on philosophical inquiry, artistic expression, and scientific investigation, the Core transcends disciplinary boundaries and asks students to pursue themes across national frontiers and historical epochs. It provides the foundation for a traditional liberal arts degree, assuring that students develop their critical and analytical skills by exposing them to a broad range of requirements from multiple disciplines. Flexibility within the Core allows students to choose from several departments to fulfill specified core requirements in science, literature, humanities, foreign language, quantitative reasoning, and social sciences, thereby encouraging them to explore new areas of inquiry, develop their intellectual interests, and situate their knowledge within the age-old tradition of Western thought while reflecting critically about this tradition and its place in global history.

Resources on The Core

The Core Pre-Summer 2012 (http://bulletin.columbia.edu/general-studies/the-core/Pre-Summer_2012_Core.pdf)
Distribution Requirements Before 2003 (http://bulletin.columbia.edu/general-studies/the-core/Columbia_GS_Distribution_Requirements_Before_2003.pdf)

Core Requirements Checklist (<http://bulletin.columbia.edu/general-studies/the-core/core-requirement-checklist.pdf>)

GENERAL RULES

1. Only courses of 3 or more points taken for a letter grade can fulfill core requirements.
2. Courses used to satisfy a core requirement must be completed with a letter grade of D or above; courses graded “Pass” do not fulfill core requirements.
3. Independent study cannot be used to fulfill a core requirement.
4. AP credit cannot be used to fulfill a core requirement, except for foreign languages.
5. GS advisors determine whether a transfer course satisfies a core requirement.
6. GS advisors must approve all courses, including summer-term courses, used to fulfill a core requirement.
7. No single course may be used to satisfy more than one core requirement, with the following exceptions:
 - a. Frontiers of Science (SCNC CC1000)
 - b. Foundations of Science (SCNC UN1212)
 - c. Symbolic Logic (PHIL UN3411)
 - d. Courses in computer science, mathematics, and statistics, which may be used to fulfill both the science and quantitative reasoning requirements
8. Students may count two courses from their major department toward the fulfillment of the core requirements; the limit on overlaps is two, even if a student is a double major. Courses counted toward a departmental concentration may simultaneously fulfill core requirements as long as the total number of overlapping classes from the major and/or concentration counted to the core does not exceed two.
9. No more than two courses from any one department may be used to fulfill core requirements.
10. Students must take at least one course toward fulfillment of core requirements each semester until the core requirements are completed.
11. Students may not drop the University Writing, Contemporary Civilization, Literature, Art, or Music Humanities courses after the end of the Change of Program Period without a special petition to the GS Committee on Academic Standing. Students who wish to discuss the petition process should consult their GS advisor. Students will be billed for courses dropped after the Change of Program Period deadline—the second Friday of each semester—at the full-tuition rate (https://gs.columbia.edu/content/cost-attendance/#cu_accordion_item-1376).

WRITING

University Writing Course GS1010 is required of all GS students in their first year as it facilitates students' entry into

the intellectual life of Columbia by helping them become more capable and independent academic readers and writers. With its small section size and emphasis on the writing process, revision, critical analysis, collaboration, and research, the course provides an occasion for students to develop academic habits and skills important to their success in future courses. Students learn how to formulate arguments, support them with evidence, and set them down in clear and persuasive prose.

In planning their first semesters of study at Columbia, GS students should start by choosing a section of University Writing that fits their schedules. Themed sections are designated by the unique section numbers outlined below.

Non-native English speakers must reach level 10 in the American Language Program prior to registering for University Writing.

Courses of Instruction

- *Sections below 100: UW: Contemporary Essays, GS1010.0xx*
- *Sections in the 100s: UW: Readings in American Studies, GS1010.1xx*
- *Sections in the 200s: UW: Readings in Gender and Sexuality, GS1010.2xx*
- *Sections in the 300s: UW: Readings in Sustainable Development, GS1010.3xx*
- *Sections in the 400s: UW: Readings in Human Rights, GS1010.4xx*
- *Sections in the 500s: UW: Readings in Data Sciences and Engineering, GS1010.5xx*
- *Sections in the 600s: UW: Readings in Medical Humanities, GS 1010.6xx*
- *Sections in the 900s: University Writing for International Students, GS1010.9xx* (special permission required)

LITERATURE/ HUMANITIES

Courses in the humanities immerse students in literature, language, and culture, and explore the meaning of humanity across time and place. All GS students must have two courses in this area, with at least one course specifically in literature. GS students may elect to take the two-semester Columbia Core sequence in Masterpieces of Western Literature and Philosophy, HUMA GS1001 (<http://bulletin.columbia.edu/search/?P=HUMA%20GS1001/>)-HUMA GS1002 (<http://bulletin.columbia.edu/search/?P=HUMA%20GS1002/>) (commonly known as “Lit Hum”), to fulfill the literature/humanities requirement. The acclaimed Literature Humanities core sequence exposes students to some of the most influential literary works in the Western tradition. In works of drama, history, and epic, among other genres, students see how writers across the centuries have explored the great themes of human life. The course's chronological approach introduces

students to literary works in the order that they were written, allowing them to trace the development of philosophical ideas alongside the development of literary forms, and to discover how the works of one era will often anticipate the concerns and achievements of a later age.

This year-long course is particularly recommended for students who are planning to major in English literature or philosophy, and it is required for students entering with under 30 transfer credits in fall 2020 and after who have not already fulfilled this requirement through transfer credits. (The full course is required for students without transfer credits in the humanities, and one term is required for students with three or more transfer credits in the humanities.) Refer to/print (<http://www.college.columbia.edu/core/sites/core/files/pages/2017-18%20LIT%20HUM%20SYLLABUS.pdf>) the 2019-2020 Masterpieces of Western Literature and Philosophy syllabus.

Literature Requirement

All GS students must take a literature course at Columbia. To fulfill the literature requirement, a course must focus on the study of poetry, fiction, drama, or related genres. Typically, such courses include the majority of offerings in the Columbia Department of English and Comparative Literature. Courses on literature in translation, as well as literature courses in foreign languages at the 3000 level or above, can satisfy the literature requirement. Students may also fulfill the requirement by taking one semester of Literature Humanities. Courses that focus primarily on literary theory, film, music, creative writing, or other non-literary interdisciplinary topics do not count for the literature requirement.

Humanities Requirement

Humanities courses offer ways to understand the development of cultures and how the human experience is expressed. A course from one of the following departments or interdisciplinary programs may count towards the humanities requirement. In foreign language departments, only courses at the 3000 level or above, excluding courses focused on language instruction, may apply.

- Archaeology
- Architecture
- Art History and Archaeology
- Classics
- English and Comparative Literature
- Film Studies
- French
- Germanic Languages
- History*
- Italian
- Latin American and Iberian Cultures
- Linguistics
- Music

- Philosophy
- Religion
- Slavic Languages

*Courses from the Department of History may be counted toward the social science or the humanities requirement, but in no case may more than two courses from one department be used to fulfill Core requirements

Interdisciplinary Programs

The following interdisciplinary programs offer courses in both humanities and social sciences. GS advisors must determine the appropriate category for a course when taken to satisfy a Core requirement.

- African-American Studies
- American Studies
- Ethnicity and Race Studies
- Comparative Literature and Society
- East Asian Languages and Cultures
- Hispanic Studies
- Human Rights
- Jewish Studies
- Latin American and Caribbean Studies
- Linguistics
- Medicine, Literature, and Society
- Middle Eastern, South Asian, and African Studies
- Women's and Gender Studies

Note: Only the first semester of Contemporary Civilization may be applied to either the humanities requirement or the social science requirement (but not both). The second semester may only be applied to the social science requirement

FOREIGN LANGUAGE

The study of a foreign language often opens up a whole new way of seeing, understanding, and describing the world. Today's students should not be limited by a single language, but should be able to think and communicate in a language other than their native tongue. The Core requires that all candidates for the bachelor's degree demonstrate competence in a second language at or beyond the intermediate level. In order to achieve this level of fluency and encourage more advanced language study, students are expected to reach intermediate-level proficiency by the time they have reached senior standing. Intermediate-level proficiency in a foreign language is assessed in one of the following ways:

- An appropriate score on the SAT II subject test or Advanced Placement test, taken before matriculation to GS, as determined by relevant departments for specific languages
- Demonstrating intermediate-level competence on the language placement test administered by relevant

departments or programs. Language placement tests must be taken within the first two semesters of study at GS, or, in cases where a student undertakes language study as part of a Columbia-approved study abroad program, at the beginning of the next term of enrollment after returning from study abroad.

- Approved transfer credits in foreign language study showing intermediate-level proficiency (usually two years of study)
- Approved transfer credit in foreign language showing intermediate-level proficiency (must also have a score of 6 or 7 at the Higher Level of the International Baccalaureate exam or a grade of C or better for the A-level results)
- The satisfactory completion of the intermediate level of a language sequence at Columbia, as determined by the relevant department (the fourth term of a language, usually denoted as course number “1202”)
- Completing secondary education in another country in a language other than English

Native speakers of languages other than English must take a language placement test within two semesters of matriculating at GS to demonstrate their language proficiency. If a placement test in a particular language is not available at Columbia, students should speak with their respective GS advisors about alternative testing arrangements. Students diagnosed with a language learning disability must register with the Office of Disability Services (<http://health.columbia.edu/disability-services/>) in order to be considered for an accommodation for the foreign language requirement.

Students should speak with their GS advisors soon after matriculating at GS to discuss how they will satisfy this requirement. Because the language requirement may take four semesters to fulfill, students who have not satisfied the requirement by placement test, AP score, or transfer credit are required to begin their language study no later than their second year at GS, and to continue enrollment in language courses each semester until the requirement has been met.

Students interested in study abroad may also begin or complete their core foreign language study in numerous summer study abroad foreign language immersion programs.

ART HUMANITIES

Embracing architecture, sculpture, and painting, the Art Humanities core courses teach students how to view and discuss the visual arts and their place in the history of civilization. Frequent visits to New York’s museums, private collections, and architectural sites bring students face to face with many of the world’s most celebrated masterpieces. Students learn to respond intelligently to a variety of artistic genres by developing analytical skills and a conceptual framework for interpretation.

GS students must fulfill the Art Humanities requirement by taking one of the following:

- HUMA UN1121 (<http://bulletin.columbia.edu/search/?P=HUMA%20UN1121/>) Masterpieces of Western Art (Master Syllabus (https://arthum.college.columbia.edu/sites/default/files/arthum_master_syllabus.pdf))
- AHUM UN2604 (<http://bulletin.columbia.edu/search/?P=AHUM%20UN2604/>) Art In China, Japan, and Korea
- AHUM UN2901 (<http://bulletin.columbia.edu/search/?P=AHUM%20UN2901/>) Masterpieces of Indian Art and Architecture
- AHUM UN2800 (<http://bulletin.columbia.edu/search/?P=AHUM%20UN2800/>) Arts of Islam: The First Formative Centuries (circa 700-1000)

Note: If the art humanities requirement is fulfilled with Masterpieces of Western Art (UN1121), students should not take Barnard Art History 1001 or 1002, as this constitutes a duplication of coursework and thus would not count toward the GS degree.

Exemption from the Art Humanities Requirement

All Columbia College and General Studies students are required to take Art Humanities. In limited circumstances, however, students may be eligible for an exemption from this requirement.

Students requesting an exemption must have completed at least four semester-length, college-level Art History Courses with a grade of C or higher. (Please note that visual arts courses do not qualify.) Coursework must cover multiple historical periods, with at least one course on art of the Renaissance era (or an earlier era) and one course on art of a post-Renaissance era.

Students who meet these requirements should submit to their advisers a transcript of previous coursework, a statement explaining why the exemption is requested, and copies of the syllabi for all Art History courses completed. The exemption request must be made during the student’s first semester of enrollment at Columbia. Deadlines: November 1 for Fall matriculates; March 1 for Spring matriculates.

MUSIC HUMANITIES

Music Humanities fosters students’ appreciation of music as a distinctive art form with its own expressive resources, evolution, and national traditions. By listening to recordings and attending live performances in New York’s famous concert venues, students gain exposure to a wide range of forms. Students learn to respond intelligently to a variety of musical idioms by developing analytical skills and a conceptual framework for interpretation while engaging in discussions about the character and purpose of music throughout human history.

GS students must fulfill the music humanities requirement by taking one of the following:

- Masterpieces of Western Music (HUMA UN1123)
- Introduction To the Musics of East Asia and Southeast Asia (AHMM UN3320)
- Introduction To the Musics of India and West Asia (AHMM UN3321)

Exemption from the Music Humanities Requirement

Although all Columbia students are required to take Music Humanities, there are some students who may obtain an exemption by filing a course substitution request. Although rare, exemption from music humanities may be obtained by passing an exemption exam.

Music Humanities Exemption Request Form (http://bulletin.columbia.edu/general-studies/the-core/music-humanities/MH_Exemption_Request_Form.pdf)

Exemption Exam

The music humanities exemption exam is offered on the first Friday of the fall semester by the Music Department (621 Dodge Hall). Students who matriculate in the spring semester should take the exam in the following fall term. Students may take the exam only once during their first year at Columbia. If they do not pass the exam, they must enroll in a section of Music Humanities.

Course Substitution

In addition to the exemption exam, students with approved transfer credit have the option of requesting exemption on the basis of a similar music course passed with a grade of B or higher at another college or university. This exemption must be requested during the student's first semester at Columbia. Petitions submitted in subsequent semesters will not be considered by the Core Curriculum Office. Deadlines: November 1 for Fall matriculates, March 1 for Spring matriculates.

GLOBAL CORE

The Global Core courses ask students to stand outside the Western tradition and encounter cultures that have flourished in other parts of the world, including Africa, Asia, the Americas, and the Middle East. Drawing on primary texts and artifacts—including texts, films, ritual performances, and oral sources—the offerings in the Global Core invite students to think deeply about the predicates and values of different societies and systems of belief.

Global Core courses fall into two categories: those that focus on a specific culture or civilization, tracing its appearance and/or existence across a significant span of time and sometimes across

more than one present-day country or region, and those that address several world settings or cultures comparatively (which may include Europe and the West), in terms of a common theme, a set of analytic questions, or interactions between different world regions that are interdisciplinary, temporally or spatially expansive.

All GS students must complete two courses from the Global Core List of Approved Courses for a letter grade. Columbia students who study abroad in an approved program and who take a course that fulfills the aims of the Global Core may petition to have the course count toward the Global Core requirement (https://www.college.columbia.edu/sites/default/files/global_core_petition_form_04.07.16.pdf).

CURRENT LISTS OF APPROVED GLOBAL CORE COURSES

Summer 2020 Approved Courses

Last update: 4/15/20

Art History- Asian Humanities

AHUM S2604D	Arts of China, Japan, and Korea
AHUM S2901D	Masterpieces of Indian Art and Architecture

Classics

CLCV UN3059	WORLDS OF ALEXANDER THE GREAT
CLCV UN3111	
GRKM S3935D	Hellenism and the Topographical Imagination

English and Comparative Literature

CLEN OC3245	Black Americans and the City of Light
CLEN S3829	

East Asian Languages and Cultures

AHUM S1400D	Colloquium on Major Texts: East Asia
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Film

FILM S2295D	World Cinema: Mexico
FILM S4215	Contemporary Global Documentary

Music

MUSI S2020D	Salsa Soca Reggae
AHMM UN3320	Introduction To the Musics of East Asia and Southeast Asia

Religion

RELI S2305D	Islam
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Spring 2020 Approved Courses

Last update: 3/4/20

Anthropology

ANTH UN1008	The Rise of Civilization
ANTH UN3465	Women and Gender Politics in the Muslim World
ANTH UN3821	Native America

Art History and Archaeology

AHIS UN2119	Rome Beyond Rome: Roman Art and Architecture in a Global Perspective
AHUM UN2604	Art In China, Japan, and Korea
AHUM UN2901	Masterpieces of Indian Art and Architecture

Center for the Core Curriculum

AFCV UN1020	African Civilizations
LACV UN1020	Primary Texts of Latin American Civilization

Center for the Study of Ethnicity and Race

CSER UN1010	Introduction to Comparative Ethnic Studies
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Classics

CSGM UN3567	Thessaloniki Down the Ages
CLCV GU4411	Egypt in the Classical World (Effective beginning Spring 2020)

Colloquia and Interdepartmental Seminars

INSM UN3921	Nobility and Civility II
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Committee on Global Thought

CGTH UN3402	Topics in Global Thought: Global 20-Youth in an Interconnected World
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Comparative Literature and Society

CLGM UN3110	The Ottoman Past in the Greek Present
CPLS UN3454	Blood/Lust: Staging the Early Modern Mediterranean [in English]
CLGM UN3920	WORLD RESPONDS TO THE GREEKS

Dance- Barnard

DNCE BC2565	World Dance History
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East Asian Languages and Cultures

ASCE UN1359	Introduction to East Asian Civilizations: China
ASCE UN1361	Introduction to East Asian Civilizations: Japan
ASCE UN1363	Introduction to East Asian Civilizations: Korea
AHUM UN1400	Colloquium on Major Texts: East Asia
EAAS UN3116	Supernatural in East Asia (Effective beginning Spring 2020)
AHUM UN3830	Colloquium On Modern East Asian Texts
EAAS GU4233	Sonic Modernity in East Asia (Effective beginning Spring 2020)
EARL GU4310	Life-Writing in Tibetan Buddhist Literature
HSEA GU4816	Comparing Indigenities (Effective beginning Spring 2020)

English and Comparative Literature

CLEN UN3360	Theaters of Gods and Heroes (Effective beginning Spring 2020)
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ENGL UN3851	Indian Writing in English
CLEN GU4644	Revolution in/on the Caribbean

History

HIST UN1004	Ancient History of Egypt
HIST UN2336	Everyday Communism (Effective beginning Spring 2020)
HIST UN2661	LATIN AMERICAN CIVILIZATION II
HIST UN2764	East African History
HSME UN2811	South Asia: Empire and Its Aftermath
HIST UN2881	Vietnam in the World
HIST UN3779	Africa and France
HSEA UN3898	The Mongols in History
HIST GU4811	Encounters with Nature: The History of Environment and Health in South Asia and Beyond

Jewish Studies

JWST GU4145	Introduction to Israeli Cinema (Effective beginning Spring 2020)
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Latin American and Iberian Cultures

SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
PORT UN3350	Lusophone Africa and Afro Brazilian Culture
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present
SPAN UN3361	Artistic Humanity
PORT UN3490	Brazilian Society and Civilization

Middle Eastern, South Asian, and African Studies

MDES UN1001	Critical Theory: A Global Perspective
AHUM UN1399	Colloquium on Major Texts: Middle East and South Asia
ASCM UN2008	Contemporary Islamic Civilization
MDES UN3260	Rethinking Middle East Politics
CLME GU4226	Arabic Autobiography: Global Dimensions
CLME GU4231	Cold War Arab Culture
CLME GU4272	(formerly CLME UN3221- course number change effective Spring 2020)

Music

AHMM UN3320	Introduction to the Musics of East Asia and Southeast Asia
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Religion

RELI UN2309	Hinduism
RELI UN2405	Chinese Religious Traditions (same as RELI UN2307)
RELI UN3407	Muslims in Diaspora
RELI GU4204	Religions of the Iranian World (Effective beginning Spring 2020)

Slavic Languages

GEOR GU4042 Cultural History: A Georgian Case Study (Effective beginning Spring 2017)

Fall 2019 Approved Courses

Last update: 11/12/19

African-American Studies

AFAS UN1001 Introduction to African-American Studies

Anthropology

ANHS GU4001 The Ancient Empires

Art History and Archaeology

AHUM UN2604 Art In China, Japan, and Korea

AHUM UN2901 Masterpieces of Indian Art and Architecture

Center for the Core Curriculum

AFCV UN1020 African Civilizations

LACV UN1020 Primary Texts of Latin American Civilization

Center for the Study of Ethnicity and Race

CSER UN3922 Race and Representation in Asian American Cinema

CSER UN3926 Latin Music and Identity

CSER UN3928 Colonization/Decolonization

Classics

CLCV UN3059 WORLDS OF ALEXANDER THE GREAT

GRKM UN3935 Hellenism and the Topographical Imagination

Colloquia and Interdepartmental Seminars

INSM UN3920 Nobility and Civility

Comparative Literature and Society

CPLS GU4111 World Philology

Committee on Global Thought

CGTH UN3401 Seminar in Global Thought: Inquiries into an Interconnected World

East Asian Languages and Cultures

ASCE UN1359 Introduction to East Asian Civilizations: China

ASCE UN1361 Introduction to East Asian Civilizations: Japan

ASCE UN1365 Introduction to East Asian Civilizations: Tibet

ASCE UN1367 Introduction to East Asian Civilizations: Vietnam

AHUM UN1400 Colloquium on Major Texts: East Asia

EAAS UN3322 East Asian Cinema

EAAS UN3338 Cultural History of Japanese Monsters

EAAS UN3844 Culture, Health and Healing in East Asia

HSEA GU4222 China's Global Histories: People, Space, and Power (Effective beginning Fall 2019)

HSEA GU4880 History of Modern China I

Economics

ECON GU4325 Economic Organization and Development of Japan

Film

FILM UN2296 Arab and African Filmmaking

French

CLFR GU4716 FRANCOPHONE ROMANCE LOVE, SEX, INTIMACY IN THE FRENCH COLONIAL WORLD

Germanic Languages

GERM UN3780 Berlin/Istanbul: Migration, Culture, Values (GER)

History

HIST UN2377 INTERNATIONAL & GLOBAL HISTORY SINCE WWII

HIST UN2580 THE HISTORY OF UNITED STATES RELATIONS WITH EAST ASIA

HIST UN2618 The Modern Caribbean

HIST UN2719 History of the Modern Middle East

HIST UN2772 West African History

HSME UN2810 History of South Asia I: al-Hind to Hindustan

HIST UN3298 Popular Culture in Modern African History (Effective beginning Fall 2019)

Latin American and Iberian Cultures

SPJS UN3303 Jewish Culture in Translation in Medieval Iberia

SPAN UN3349 Hispanic Cultures I: Islamic Spain through the Colonial Period

SPAN UN3350 Hispanic Cultures II: Enlightenment to the Present

Linguistics

LING UN3102 Endangered Languages in the Global City: Lang, Culture, and Migration in Contemporary NYC

Middle Eastern, South Asian, and African Studies

AHUM UN1399 Colloquium on Major Texts: Middle East and South Asia

ASCM UN2003 Introduction to Islamic Civilization

ASCM UN2357 Introduction to Indian Civilization

MDES UN2650 Gandhi and His Interlocutors

MDES UN3000 Theory and Culture

MDES UN3445 Societies & Cultures Across the Indian Ocean

CLME UN3928 Arabic Prison Writing

CLME GU4241	Sufism: Primary Texts and Contexts
MDES GU4259	Arabic War Narrative (Effective beginning Fall 2019)
CLME GU4262	Themes in the Arabic Novel
Music	
AHMM UN3321	Introduction To the Musics of India and West Asia
Religion	
RELI UN2305	Islam
RELI UN2308	Buddhism: East Asian
RELI UN3521	Muslim Masculinities
RELI GU4215	Hinduism Here
RELI GU4304	Krishna
Slavic Languages	
SLCL UN3001	Slavic Cultures
Sociology	
SOCI UN3324	Global Urbanism

All Approved Courses: Morningside Campus

Last update: 4/15/20

Note: Not all courses are taught each academic year. Below is the full list of all courses offered on the Morningside Campus that are approved for the Global Core requirement, regardless of semester offered.

African-American Studies

AFAS UN1001	Introduction to African-American Studies
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Anthropology

ANTH UN1008	The Rise of Civilization
ANTH V1130	Africa and the Anthropologist
ANTH UN2007	Indian and Nigerian Film Cultures
ANTH V2013	Africa in the 21st Century: Aesthetics, Culture, Politics
ANTH V2014	Archaeology and Africa: Changing Perceptions of the African Past
ANTH V2020	Chinese Strategies: Cultures in Practice
ANTH V2027	Changing East Asia Foodways
ANTH UN2031	Corpse Life: Anthropological Histories of the Dead [Previously Archaeologies of Death and
ANTH V2035	Introduction to the Anthropology of South Asia
ANTH V2100	Muslim Societies
ANTH UN3300	Pre-Columbian Histories of Native America
ANTH UN3465	Women and Gender Politics in the Muslim World
ANTH V3525	Introduction to South Asian History and Culture
ANTH UN3821	Native America

ANTH V3892	Contemporary Central Asia (formerly ANTH V2029)
ANTH UN3933	Arabia Imagined
ANTH UN3947	Text, Magic, Performance
ANHS GU4001	The Ancient Empires
ANTH G4065	Archaeology of Idols

Art History and Archaeology

AHIS UN2119	Rome Beyond Rome: Roman Art and Architecture in a Global Perspective
AHIS UN2500	The Arts of Africa
AHIS UN2600	Arts of China
AHUM UN2604	Art In China, Japan, and Korea
AHUM UN2800	Arts of Islam: The First Formative Centuries (circa 700-1000)
AHUM UN2802	Arts of Islam: Realignment of Empire and State (ca. 1000-1400)
AHUM UN2901	Masterpieces of Indian Art and Architecture
AHIS W3500	Yoruba and the Diaspora
AHIS UN3501	African Art: The Next Generation. Focus: Congo
AHIS W3832	Sacred Landscapes of the Ancient Andes
AHIS Q4570	Andean Art and Architecture
AHIS GU4584	Critical Approaches to Persianate Painting

Center for the Core Curriculum

AFCV UN1020	African Civilizations
LACV UN1020	Primary Texts of Latin American Civilization

Center for the Study of Ethnicity and Race

CSER UN1010	Introduction to Comparative Ethnic Studies
CSER W3510	Novels of Immigration, Relocation, and Diaspora
CSER UN3922	Race and Representation in Asian American Cinema
CSER UN3926	Latin Music and Identity
CSER UN3928	Colonization/Decolonization

Classics

CLCV UN2441	Egypt in the Classical World
CLCV UN3059	WORLDS OF ALEXANDER THE GREAT
CLCV W3111	Plato and Confucius: Comparative Ancient Philosophies
CLCV W3244	Global Histories of the Book
CSGM UN3567	Thessaloniki Down the Ages
CLGM UN3920	WORLD RESPONDS TO THE GREEKS
GRKM UN3935	Hellenism and the Topographical Imagination
CLCV GU4411	Egypt in the Classical World (Effective beginning Spring 2020)

Colloquia and Interdepartmental Seminars

INSM UN3920	Nobility and Civility	EAAS UN3844	Culture, Health and Healing in East Asia
INSM UN3921	Nobility and Civility II	HSEA Q3870	Japan Before 1600
INSM C3940	Science Across Cultures	EAAS UN3927	China in the Modern World
INSM W3950	Friendship in Asian and Western Civilization	EARL W4127	Mediations, Perceptions, Words: Poetry in Buddhist Literature
Committee on Global Thought		EAAS W4160	Cultures of Colonial Korea
CGTH UN3401	Seminar in Global Thought: Inquiries into an Interconnected World	EAAS GU4277	Japanese Anime and Beyond: Gender, Power and Transnational Media
CGTH UN3402	Topics in Global Thought: Global 20-Youth in an Interconnected World	HSEA GU4222	China's Global Histories: People, Space, and Power (Effective beginning Fall 2019)
Comparative Literature and Society		EAAS GU4233	Sonic Modernity in East Asia (Effective beginning Spring 2020)
CLGM UN3110	The Ottoman Past in the Greek Present	EARL GU4310	Life-Writing in Tibetan Buddhist Literature
CPLS UN3333	East/West Frametale Narratives	EARL GU4312	Tibetan Sacred Space (in Comparative Context)
CPLS UN3454	Blood/Lust: Staging the Early Modern Mediterranean [in English]	HSEA GU4822	Troubled Islands of the Indo Pacific
CLGM UN3920	WORLD RESPONDS TO THE GREEKS	HSEA GU4847	Modern Japan
CPLS W3945	Transnational Memory Politics and the Culture of Human Rights	HSEA GU4816	Comparing Indigenities (Effective beginning Spring 2020)
CPLS W3955	The West in Global Thought	HSEA W4866	Competing Nationalisms in East Asia: Representing Chinese and Tibetan Relations in History
CPLS W3956	Postcolonial Narrative and the Limits of the Human	HSEA GU4880	History of Modern China I
CPLS W4100	Andalusian Symbiosis: Islam and the West	Economics	
CPLS GU4111	World Philology	ECON GU4325	Economic Organization and Development of Japan
Dance (Barnard)		English and Comparative Literature	
DNCE BC3567	Dance of India	CLEN UN3360	Theaters of Gods and Heroes (Effective beginning Spring 2020)
DNCE BC2565	World Dance History	CLEN S3829	(Effective beginning Summer 2020)
East Asian Languages and Cultures		ENGL UN3851	Indian Writing in English
ASCE UN1002		CLEN UN3933	Postcolonial Literature
ASCE UN1359	Introduction to East Asian Civilizations: China	ENTA UN3948	African Drama
ASCE UN1361	Introduction to East Asian Civilizations: Japan	CLEN W4200	Caribbean Diaspora Literature
ASCE UN1363	Introduction to East Asian Civilizations: Korea	CLEN GU4644	Revolution in/on the Caribbean
ASCE UN1365	Introduction to East Asian Civilizations: Tibet	ENGL GU4650	Novels of Immigration, Relocation, Diaspora
ASCE UN1367	Introduction to East Asian Civilizations: Vietnam	Film	
AHUM UN1400	Colloquium on Major Texts: East Asia	FILM UN2292	Topics in World Cinema: China
EAAS UN2342	Mythology of East Asia	FILM UN2294	World Cinema: Latin America
EAAS UN3116	Supernatural in East Asia (Effective beginning Spring 2020)	FILM S2295Q	World Cinema: Mexico
EAAS UN3121	Minority Literature in Modern China	FILM UN2296	Arab and African Filmmaking
EAAS UN3322	East Asian Cinema	FILM S4215D	Contemporary Global Documentary (Effective beginning Summer 2019)
EAAS UN3338	Cultural History of Japanese Monsters	French and Romance Philology	
EAAS V3350	Japanese Fiction and Film	CLFR UN3716	Francophone Romance : Love and Desire in French Colonial and Post-Colonial Literatures

CLFR GU4716 FRANCOPHONE ROMANCE
LOVE, SEX, INTIMACY IN
THE FRENCH COLONIAL
WORLD

Germanic Languages

GERM UN3780 Berlin/Istanbul: Migration,
Culture, Values (GER)

History

HIST UN1004 Ancient History of Egypt
HIST W1054 Introduction to Byzantine History
HIST UN2336 Everyday Communism (Effective
beginning Spring 2020)
HIST UN2377 INTERNATIONAL & GLOBAL
HISTORY SINCE WWII
HIST UN2444 The Vietnam War
HIST UN2580 THE HISTORY OF UNITED
STATES RELATIONS WITH
EAST ASIA
HIST UN2618 The Modern Caribbean
HIST UN2657 Medieval Jewish Cultures
HIST UN2660 Latin American Civilization I
HIST UN2661 LATIN AMERICAN
CIVILIZATION II
HIST UN2701 Ottoman Empire
HIST UN2719 History of the Modern Middle
East
HSWM UN2761 Gender and Sexuality in African
History
HIST UN2764 East African History
HIST UN2772 West African History
HIST W2803 The Worlds of Mughal India
HSME UN2810 History of South Asia I: al-Hind
to Hindustan
HSME UN2811 South Asia: Empire and Its
Aftermath
HIST W2880 Gandhi's India
HIST UN2881 Vietnam in the World
HIST Q2900 History of the World to 1450 CE
HIST W2943 Cultures of Empire
HIST UN3152 Byzantine Encounters in the
Mediterranean and the Middle
East
HIST UN3298 Popular Culture in Modern
African History (Effective
beginning Fall 2019)
HIST Q3400 Native American History
HIST UN3601 Jews in the Later Roman Empire,
300-600 CE
HIST W3678 Indigenous Worlds in Early Latin
America
HIST UN3766 African Futures
HIST UN3779 Africa and France
HSEA UN3898 The Mongols in History
HIST Q3933 Empires and Cultures of the Early
Modern Atlantic World

HIST GU4811 Encounters with Nature: The
History of Environment and
Health in South Asia and Beyond

Italian

ITAL GU4022 The Qur'an in Europe

Latin American and Caribbean Studies

Jewish Studies

JWST GU4145 Introduction to Israeli Cinema (Effective
beginning Spring 2020)

LCRS UN3500 Latin American Cities

Latin American and Iberian Cultures

SPJS UN3303 Jewish Culture in Translation in
Medieval Iberia
SPAN UN3349 Hispanic Cultures I: Islamic Spain
through the Colonial Period
PORT UN3350 Lusophone Africa and Afro
Brazilian Culture
SPAN UN3350 Hispanic Cultures II:
Enlightenment to the Present
SPAN UN3361 Artistic Humanity
PORT UN3490 Brazilian Society and Civilization
SPAN W3490 Latin American Humanities I:
From Pre-Columbian Civilizations
to the Creation of New Nations
SPAN W3491 Latin American Humanities II:
From Modernity to the Present [In
English]

Linguistics

LING UN3102 Endangered Languages in the
Global City: Lang, Culture, and
Migration in Contemporary NYC

Middle Eastern, South Asian, and African Studies

MDES UN1001 Critical Theory: A Global
Perspective
AHUM UN1399 Colloquium on Major Texts:
Middle East and South Asia
ASCM V2001 Introduction to Major Topics in
the Civilizations of the Middle
East and India
ASCM UN2003 Introduction to Islamic
Civilization
ASCM UN2008 Contemporary Islamic Civilization
MDES UN2030 Major Debates in the Study of
Africa
MDES W2041 Introduction to Indian Philosophy
ASCM UN2357 Introduction to Indian
Civilization
MDES UN2650 Gandhi and His Interlocutors
MDES UN3000 Theory and Culture
CLME W3032 Colonialism: Film, Fiction,
History & Theory
HSME UN3044 From Colonial to Global Health
MDES UN3121 Literature and Cultures of Struggle
in South Africa
MDES UN3130 East Africa and the Swahili Coast

CLME UN3221	Arabic Literature As World Literature (renumbered to CLME GU4272- course number change effective Spring 2020)
MDES UN3260	Rethinking Middle East Politics
CLME UN3928	Arabic Prison Writing
MDES UN3445	Societies & Cultures Across the Indian Ocean
CLME GU4031	Cinema and Society In Asia and Africa
MDES G4052	Locating Africa in the Early 20th Century World
MDES GU4150	Introduction to African Philosophy
CLME GU4225	New Millenium Challenges in Arabic Literary Production
CLME GU4226	Arabic Autobiography: Global Dimensions
CLME GU4229	Afro-Mediterranean Cultural Geographies: Ifriqiya-Tunis
CLME GU4231	Cold War Arab Culture
CLME GU4241	Sufism: Primary Texts and Contexts
CLME G4261	Popular Islam: Asia and Africa
MDES GU4259	Arabic War Narrative (Effective beginning Fall 2019)
CLME GU4262	Themes in the Arabic Novel
CLME GU4272	(formerly CLME UN3221; course number change effective Spring 2020)
MDES G4326	The Armenian Genocide and the Holocaust: Memory and Representation
MDES GU4637	Cinema and Colonialism in South Asia

Music

MUSI UN2020	Salsa, Soca, and Reggae: Popular Musics of the Caribbean
MUSI V2430	Listening and Sound in Cross-Cultural Perspective
AHMM UN3320	Introduction To the Musics of East Asia and Southeast Asia
AHMM UN3321	Introduction To the Musics of India and West Asia
MUSI GU4466	Sound and Image in Modern East Asian Music

Physics

SCNC UN3001 Nuclear Weapons and Nuclear Testing (Effective beginning Spring 2021)

Religion

RELI UN2205	Buddhism: Indo-Tibetan
RELI UN2305	Islam
RELI UN2306	Intro to Judaism
RELI UN2307	Chinese Religious Traditions
RELI UN2308	Buddhism: East Asian
RELI UN2309	Hinduism

RELI V2335	Religion in Black America: An Introduction
RELI UN3303	Judaism and Translation in the Medieval and Early Modern Mediterranean
RELI UN3407	Muslims in Diaspora
RELI UN3425	Judaism and Courtly Literature in Medieval and Early Modern Iberia and Italy
RELI Q3511	Tantra in South Asia, East Asia & the West
RELI UN3521	Muslim Masculinities
RELI GU4215	Hinduism Here
RELI GU4204	Religions of the Iranian World (Effective beginning Spring 2020)
RELI GU4304	Krishna
RELI GU4322	Exploring the Sharia: Topics in Islamic Law
RELI GU4418	On African Theory: Religion, Philosophy, Anthropology

Slavic Languages

SLCL UN3001	Slavic Cultures
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism
GEOR GU4042	Cultural History: A Georgian Case Study
CLRS W4190	Race, Ethnicity, and Narrative, in the Russian/Soviet Empire

Sociology

SOCI UN3324	Global Urbanism
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Theatre

THTR UN3154	Theatre Traditions in a Global Context
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All Approved Courses: Offered Abroad

Last update: 3/4/20

Note: Not all courses are taught each academic year. Below is the full list of all courses offered abroad through Columbia-sponsored programs that are approved for the Global Core requirement, regardless of semester offered. For more information, consult the Office of Global Programs (<http://ogp.columbia.edu/>).

Columbia in Amman and Paris: Middle Eastern and North African Studies (MENA) Program

MENA OC4100	Maghreb-Mashrek, East and West
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Columbia Summer in Amman and Tunis: Middle Eastern and North African Studies

MENA OC4101	Culture/History Seminar of the Middle East-North Africa Summer Program in Amman & Tunis
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Columbia Global Seminar in Istanbul

Not offered during the Spring 2018 semester

CLGM OC3920	The World Responds to the Greeks: Greece Faces East
Columbia in London- Queen Mary University	
CLEN OC3500	LONDON IN POSTCOLONIAL FICTION: 'WE ARE HERE BECAUSE YOU WERE THERE
Columbia Summer Program in Tunis and Istanbul: Democracy and Constitutional Engineering	
POLS OC3545	Comparative Democratic Politics
Slavic Languages- Office of Global Programs	
CLSL OC4001	The Muslim and the Christian in Balkan Narratives
Reid Hall in Paris	
AHIS OC4652	The Black Voices of Black Model: New Perspectives for the Histories of Art
FILM OC4225	Arab & African Filmmaking
CLEN OC3245	Black Americans and the City of Light: A Seminar (Effective beginning Summer 2020)
FREN OC3719	Violence by and against Women
FREN OC3817	Black Paris
FREN OC3821	"Blackness" in French: from Harlem to Paris and Beyond
WMST OC3550	Women and Society - The Sex Trade Economy

CONTEMPORARY CIVILIZATION/SOCIAL SCIENCE

Courses in the social sciences provide students with a basis for understanding social systems and the interactions of individuals and societies. All GS students must take two courses in this area. GS students may elect to take the two-semester Columbia Core sequence Contemporary Civilization, COCI GS1101-COCI GS1102 (commonly known as "CC"), which gives students the chance to engage directly with some of the key political and philosophical texts in the history of Western thought. Students discover how, across the centuries, thinkers have struggled with certain central questions: What does it mean to be human? What constitutes a good society? What is the relationship between power and authority? How can we reconcile our aspirations to justice and our lived experience of inequality? When is revolution justified, and what happens when and if it goes awry?

Refer to (https://www.college.columbia.edu/core/sites/core/files/pages/Contemporary%20Civilization%202018-19%20Syllabus_0.pdf) the current syllabus for Contemporary Civilization.

This year-long course is particularly recommended for students who are planning to major in any social science field, and

it is required for students entering with under 30 transfer credits in fall 2020 and after who have not already fulfilled this requirement through transfer credit. Students with over 30 transfer credits can also select two social science courses from the following departments and interdisciplinary programs to fulfill the social sciences core requirement:

- Anthropology
- Economics
- History*
- Political Science
- Psychology
 - Columbia psychology courses at the 2600-, 3600-, or 4600- level
 - Barnard College psychology courses except Statistics (PSYC BC1101)
- Sociology
- Challenges of Sustainable Development (SDEV UN2300); please confirm with your advisor whether other courses listed under this interdisciplinary program may fulfill the social sciences requirement

*Courses from the Department of History may be counted toward the social science or humanities requirement, but in no case may more than two courses from one department be used to fulfill the GS core requirements.

**Students may not receive credit for both PSYC BC1101 and PSYC UN1001. Psychology majors should consult the Department of Psychology for additional restrictions on overlapping courses

Interdisciplinary Programs

The following interdisciplinary programs offer courses in both humanities and social sciences. GS advisors must determine the appropriate category for a course when taken to satisfy a core requirement.

- African-American Studies
- American Studies
- Comparative Ethnic Studies
- Comparative Literature and Society
- East Asian Languages and Cultures
- Ethnicity and Race Studies
- Hispanic Studies
- Human Rights
- Jewish Studies
- Latin American and Caribbean Studies
- Linguistics
- Middle East, South Asian, and African Studies
- Women's and Gender Studies

QUANTITATIVE REASONING

Courses that fulfill the quantitative reasoning (QR) core requirement aim to develop critical skills in quantitative analysis and deductive reasoning, which are particularly relevant to the study of science and the social sciences.

QR Requirement Fulfillment

- Scoring a minimum of 600 on the Math SAT or 27 on the math subsection of the ACT within the eight years prior to matriculation;
- Earning a passing score on the GS Quantitative Reasoning Exam (https://gs.columbia.edu/content/placement-exams/#cu_accordion_item-1263);
- Earning a passing letter grade in a course from the list of approved courses;
- Receiving approved transfer credit on the Entrance Credit Report (ECR) in computer science, mathematics, or statistics from international high school leaving exams (e.g., French Baccalaureate, GCE Advanced Level examination, etc.) or courses taken within the eight years prior to matriculation worth three points and equivalent to those classes on the list of approved courses below, as determined by the Dean of Students Office.

Computer Science, Economics, Mathematics, and Statistics

Any course selected from the following departments fulfills the quantitative reasoning requirement when passed with a satisfactory letter grade:

- Computer Science (except S1021D, S1022Q)
- Economics (Columbia department only)
- Mathematics
- Statistics

Approved Columbia courses in computer science, mathematics, and statistics may count toward both the QR requirement and the science requirement. Approved transfer credit for relevant courses in computer science, mathematics, and statistics may count toward both the QR and one science requirement as well; however, the course must have been taken within the last eight years prior to matriculation to satisfy the QR requirement.

College Algebra and Analytic Geometry (MATH UN1003) (or the equivalent) may count toward the QR requirement only.

Foundations of Science

Using modern, student-centered, active and collaborative learning techniques, students will engage — through field observations, in-class experiments, computer simulations, and selected readings — with a range of ideas and techniques

designed to integrate and anchor scientific habits of mind. Topics covered will include statistics, basic probability, a variety of calculations skills, graph reading and estimation, all aimed at elucidating such concepts as energy, matter, cells, and genes in the context of astronomy, biology, chemistry, earth sciences, neuroscience, and physics

Foundations of Science (SCNC UN1212) satisfies both the QR requirement and one course of the science requirement when passed with a letter-grade of C or above.

Frontiers of Science

The goal of this Columbia Core Curriculum course is to introduce students to the way scientists think. As they delve into questions drawn from fields as varied as neuroscience and astrophysics, students learn why scientists cultivate a sense of scale, why they like to convert data to graphs, and why they are so careful to differentiate correlation from causation. Along the way, students are invited to think about how science might contribute answers to old questions (what is the place of our species in the universe?) and new ones (is continued industrialization an environmentally sustainable proposition?)

Frontiers of Science: Discussion (SCNC CC1100) satisfies both the QR requirement and one course of the science requirement when passed with a letter-grade of C or above. To enroll in Frontiers of Science, students must meet at least one of the following requirements:

- Score of 16 or higher on the GS Quantitative Reasoning Exam
- SAT Math score of 600 or higher within the last three years
- ACT Math score of 27 or higher within the last three years

****Note:** Neither Foundations of Science nor Frontiers of Science may be selected for the P/D/F grading option whether or not they are taken towards the core requirements.

Approved QR Courses

The following Columbia courses have been approved as satisfying the QR requirement if completed with a satisfactory letter grade. This list is updated annually. If a particular quantitative reasoning course does not appear on the list, students should ask their respective GS advisors about its appropriateness for the requirement. **Equivalent transfer courses may not count toward the QR requirement.**

ECON BC1007	Mathematical Methods for Economics
ECON BC2411	Statistics for Economics
EEEB UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
PHIL UN1401	Introduction to Logic
PHIL UN3411	Symbolic Logic
POLS UN3704	Data Analysis and Statistics for Political Science Research
POLS UN3720	Scope and Methods

POLS GU4730	Game Theory and Political Theory
POLS GU4700	Mathematical Methods for Political Science
POLS GU4710	Principles of Quantitative Political Research
PSYC BC1101	Statistics
PSYC UN1610	Introductory Statistics for Behavioral Scientists
SOCI W2220	Evaluation of Evidence
SOCI BC3211	Quantitative Methods
SOCI UN3020	Social Statistics
URBS UN3200	Spatial Analysis: GIS Methods and Urban Case Studies

Note: Barnard students are given preference for enrollment in Barnard courses that may fulfill the QR requirement. Barnard courses that fulfill a core requirement will not necessarily count toward a major at Columbia if a student chooses to major or concentrate in one of these fields. (See individual departments concerning courses approved and required for the major.)

***N.B.:** The italicized text on the course description page for BC1007 regarding calculus requirements for economics majors applies to Barnard College students only.

SCIENCE

The core science requirement aims to develop critical awareness of the methods and limits of scientific inquiry, while fostering observational and analytical skills, particularly in reference to the natural and physical world. When choosing a science course, students should make sure they have reviewed and met the specified prerequisites for the course prior to enrollment.

Students who are considering careers in science-related fields, including health-related professions, are urged to begin their study of science within the first two semesters after matriculation at GS.

Science Requirement

To fulfill the science requirement, students must successfully complete three courses selected from two of the following Columbia departments or from the list of approved courses below, no more than two of which should be from the same department:

- Astronomy
- Biological Sciences
- Chemistry
- Earth and Environmental Sciences
- Ecology, Evolution, and Environmental Biology
- Physics
- Psychology (Columbia department only, excluding courses numbered at the 2600, 3600, or 4600 level)

Students may also use international high school leaving exams for which they received at least three transfer credits on the Entrance Credit Report (ECR) in one of the disciplines listed above to fulfill **one** of the three science requirement courses.

List of Approved Science Courses

The list of approved courses that fulfill the science requirement includes recommended sequences, science courses for non-science majors, and approved courses from departments not listed above and Barnard.

The following two courses may satisfy both the QR requirement and one science requirement when passed with a letter-grade of C or above. The P/D/F grading options is not available for either of these two courses.

- Foundations of Science (SCNC UN1212)
Using modern, student-centered, active and collaborative learning techniques, students will engage — through field observations, in-class experiments, computer simulations, and selected readings — with a range of ideas and techniques designed to integrate and anchor scientific habits of mind. Topics covered will include statistics, basic probability, a variety of calculations skills, graph reading and estimation, all aimed at elucidating such concepts as energy, matter, cells, and genes in the context of astronomy, biology, chemistry, earth sciences, neuroscience, and physics.
- Frontiers of Science (SCNC CC1000)
The principal objectives of Frontiers of Science are to engage students in the process of discovery by exploring topics at the forefront of science and to inculcate or reinforce the specific habits of mind that inform a scientific perspective on the world. Sample topics include the evolution of human language, brain dynamics, global climate change, the nanoworld, and biodiversity, among others.

GS students interested in taking this course should have earned a minimum score of 16 on the GS Quantitative Reasoning Exam and/or meet the specific criteria listed for this course in the Quantitative Requirements Core section of the website. Prior to enrolling in the course, students should also read the first chapter of the electronic textbook *Scientific Habits of Mind* and take the self-exam.

Courses Designed For Nonscience Majors

Astronomy

ASTR UN1234	The Universal Timekeeper: Reconstructing History Atom by Atom
ASTR UN1403	Earth, Moon and Planets (Lecture)
ASTR UN1404	Stars, Galaxies and Cosmology (Lecture)
ASTR UN1420	Galaxies and Cosmology

ASTR UN1453	Another Earth
ASTR UN1610	Theories of the Universe: From Babylon to the Big Bang
ASTR UN1836	Stars and Atoms
ASTR BC1753	Life in the Universe
ASTR BC1754	Stars, Galaxies, and Cosmology
Recommended Sequences:	
ASTR UN1403 - ASTR UN1404	Earth, Moon and Planets (Lecture) and Stars, Galaxies and Cosmology (Lecture)
ASTR UN1403 - ASTR UN1420	Earth, Moon and Planets (Lecture) and Galaxies and Cosmology
ASTR UN1403 - ASTR UN1836	Earth, Moon and Planets (Lecture) and Stars and Atoms
ASTR UN1403 - ASTR BC1754	Earth, Moon and Planets (Lecture) and Stars, Galaxies, and Cosmology
ASTR BC1753 - ASTR UN1404	Life in the Universe and Stars, Galaxies and Cosmology (Lecture)
ASTR BC1753 - ASTR BC1754	Life in the Universe and Stars, Galaxies, and Cosmology
Biology	
BIOL UN1002	Theory and Practice of Science: Biology
BIOL UN1130	Genes and Development
Computer Science	
COMS W1001	Introduction to Information Science
COMS W1002	Computing in Context
Earth and Environmental Engineering	
EAEE E2100	A better planet by design
Earth and Environmental Sciences	
EESC UN1001	Dinosaurs and the History of Life: Lectures and Lab
EESC UN1003	Climate and Society: Case Studies
EESC UN1011	Earth: Origin, Evolution, Processes, Future
EESC UN1030	Oceanography
EESC UN1053	Planet Earth
EESC UN1201	Environmental Risks and Disasters
EESC UN1401	Dinosaurs and the History of Life: Lectures
EESC UN1411	Earth: Origin, Evolution, Processes, Future: Lectures
EESC UN2330	Science for Sustainable Development
Ecology, Evolution, and Environmental Biology	
EEEB W1001	Biodiversity
EEEB UN1010	Human Origins and Evolution

EEEB UN1011 Behavioral Biology of the Living Primates

EEEB S1115S The Life Aquatic

Recommended Sequences:

EEEB UN1001 Biodiversity and Conservation Biology
- EEEB UN3087

EEEB UN1010 Human Origins and Evolution and Behavioral Biology of the Living Primates
- EEEB UN1011

Electrical Engineering

ELEN E1101 The digital information age

Food Studies

FSEB UN1020 Food and the Body

FSPH UN1100 FOOD, PUBLIC HEALTH & PUBLIC POLICY

Philosophy

PHIL UN3411 Symbolic Logic

PHIL GU4424 Modal Logic

Physics

PHYS UN1001 Physics for Poets

PHYS UN1018 Weapons of Mass Destruction

Recommended Sequences:

PHYS UN1001 Physics for Poets
- PHYS C1002 and Physics for Poets

Psychology**

Columbia Department only:

PSYC UN1001 The Science of Psychology

PSYC UN1010 Mind, Brain and Behavior

Recommended Sequences:

PSYC UN1001 The Science of Psychology and Mind, Brain and Behavior
- PSYC UN1010

PSYC UN1001 The Science of Psychology ((and any PSYC course numbered 22xx or 24xx**))

Science

SCNC UN1212 Foundations of Science

SCNC UN1800 Energy and Energy Conservation

Statistics

STAT UN1001 Introduction to Statistical Reasoning

* **Note:** Students electing to take Human Origins and Evolution (EEEB UN1010 (<http://bulletin.columbia.edu/search/?P=EEEE%20UN1010/>)) and Behavioral Biology of the Living Primates (EEEB UN1011 (<http://bulletin.columbia.edu/search/?P=EEEE%20UN1011/>)) as a sequence are recommended, but not required, to take EEEB UN1010 (<http://bulletin.columbia.edu/search/?P=EEEE%20UN1010/>) before EEEB UN1011 (<http://bulletin.columbia.edu/search/?P=EEEE%20UN1011/>).

** **Note:** 2600-, 3600-, or 4600-level psychology courses may not be used to fulfill the science requirement.

*** **Note:** The Science of Psychology (PSYC UN1001 (<http://bulletin.columbia.edu/search/?P=PSYC%20UN1001/>)) or Mind, Brain and Behavior (PSYC UN1010 (<http://bulletin.columbia.edu/search/?P=PSYC%20UN1010/>)) must be taken as a prerequisite to any psychology course numbered 22xx or 24xx.

*** Students may not receive credit for both PSYC BC 1101 and PSYC UN 1001. Psychology majors should consult the Psychology department for additional restrictions on overlapping courses.

Additional Courses Approved for the Science Requirement

Most of the following courses have required prerequisites and/or require instructor approval. Prerequisite and instructor approval requirements can be found in the course descriptions for each course or on the department website.

Astronomy

Any 3-point course numbered 2000 or higher

Biology

Any 3-point course numbered 2000 or higher

Chemistry

CHEM UN1403 General Chemistry I (Lecture)

CHEM UN1404 General Chemistry II (Lecture)

CHEM UN1500 General Chemistry Laboratory

CHEM UN1604 Intensive General Chemistry (Lecture)

CHEM UN2507 Intensive General Chemistry Laboratory

Any 3-point course numbered 3000 or higher

Computer Science

COMS W1004 Introduction to Computer Science and Programming in Java

COMS W1005 Introduction to Computer Science and Programming in MATLAB

ENGI E1006 Introduction to Computing for Engineers and Applied Scientists

COMS W1007 Honors Introduction to Computer Science

Any 3-point course numbered 3000 or higher

Computing Science - Philosophy (CSPH)

CSPH G4801 Mathematical Logic I

CSPH G4802 Math Logic II: Incompleteness

Earth and Environmental Sciences

EESC UN2100 Earth's Environmental Systems: The Climate System

EESC UN2200 Earth's Environmental Systems: The Solid Earth System

EESC UN2300 Earth's Environmental Systems: The Life System

Any 3-point course numbered 3000 or higher

Ecology, Evolution, and Environmental Biology

EEEB UN2001 Environmental Biology I: Elements to Organisms

EEEB UN2002 Environmental Biology II: Organisms to the Biosphere

EEEB UN3087 Conservation Biology (Any 3-point course numbered 3000 or higher except EEEB GU4321 or EEEB GU4700)

History-Applied Math

HSAM UN2901 Data: Past, Present, and Future

Mathematics

Any 3-point course numbered 1100 or higher

Physics

PHYS UN1201 General Physics I

PHYS UN1202 General Physics II

PHYS UN1401 Introduction To Mechanics and Thermodynamics

PHYS UN1402 Introduction To Electricity, Magnetism, and Optics

PHYS UN1403 Introduction to Classical and Quantum Waves

PHYS UN1601 Physics, I: Mechanics and Relativity

PHYS UN1602 Physics, II: Thermodynamics, Electricity, and Magnetism

Any 3-point course numbered 2000 or higher

Psychology*

Any 3-point course numbered 32xx, 34xx, 42xx, or 44xx **

Statistics

Any 3-point course except STAT W3997

* **Note:** 2600-, 3600-, or 4600-level psychology courses may not be used to fulfill the science requirement.

** **Note:** These courses may serve as a second term of a recommended sequence starting with Mind, Brain and Behavior (PSYC UN1010 (<http://bulletin.columbia.edu/search/?P=PSYC%20UN1010/>)) or The Science of Psychology (PSYC UN1001 (<http://bulletin.columbia.edu/search/?P=PSYC%20UN1001/>)).

Special Summer Program

The following special program fulfills two of the three terms of the science requirement.

Earth Institute Center for Environmental Sustainability [EICES]

- Summer Ecosystem Experience for Undergraduates (SEE-U) (<http://eices.columbia.edu/education-training/see-u/>): Locations change yearly. Check with the center in the spring semester for details.

CORE REGISTRATION AND PETITIONS

All students are strongly encouraged to consult their academic advisors before making any decisions regarding their Core

registration. Registration for Core courses takes place online during the regular course registration periods.

CORE PETITIONS

Students who wish to register for a fully enrolled section of Art Humanities or Music Humanities will be unable to do so via SSOL (<http://ssol.columbia.edu/>). However, they may file a petition at the Center for the Core Curriculum (<http://www.college.columbia.edu/core/center/>) located in 202 Hamilton Hall.

The Core Registration Petition period runs from the first Tuesday of classes to the following Monday. The last day to drop a Core class is the Friday of the second week of classes. Visit the GS Academic Calendar for specific dates.

UNIVERSITY WRITING

Students are not guaranteed a section change and can only be occasionally accommodated in rare cases of a schedule conflict with other Core or required courses. Students are advised not to contact University Writing professors directly as sections cannot be modified by course instructors.

LITERATURE HUMANITIES AND CONTEMPORARY CIVILIZATION

Students enrolled in Literature Humanities or Contemporary Civilization in the fall will have their registration automatically rolled over into the spring semester by the Registrar.

If the GS sections of Literature Humanities or Contemporary Civilization are full, students may not petition to add into any of the CC sections.

MAJORS AND CONCENTRATIONS

Columbia University School of General Studies offers the following majors and concentrations. Students at GS must complete a major to receive a bachelor's degree.

CONCENTRATIONS

Students may also wish to pursue a concentration, which is optional and provides students the opportunity to develop in-depth knowledge in a secondary field. Most academic departments offer both a major and a concentration.

A few areas of study, which are marked with an *, are offered exclusively as concentrations.

- African-American Studies (p. 35)
- American Studies (p. 37)
- Ancient Studies (p. 39)
- Anthropology (p. 40)
- Applied Mathematics (p. 42)

- Archaeology (p. 52)
- Architecture (p. 54)
- Art History (p. 60)
- Art History and Visual Arts (p. 65)
- Astronomy (p. 68)
- Astrophysics (p. 70)
- Biochemistry (p. 72)
- Biology (<http://bulletin.columbia.edu/general-studies/majors-concentrations/biology/>)
- Biophysics (p. 86)
- Business Management* (p. 93)
- Chemical Physics (p. 95)
- Chemistry (p. 102)
- Classics (p. 108)
- Comparative Literature and Society (p. 111)
- Computer Science (p. 114)
- Computer Science-Mathematics (p. 122)
- Creative Writing (p. 127)
- Dance (p. 129)
- Data Science (p. 132)
- Drama and Theatre Arts (p. 139)
- Earth Science (p. 142)
- East Asian Studies (p. 149)
- Economics (p. 152)
- Economics-Mathematics (p. 162)
- Economics-Philosophy (p. 172)
- Economics-Political Science (p. 182)
- Economics-Statistics (p. 192)
- Education* (p. 202)
- English (p. 206)
- Environmental Biology (p. 210)
- Environmental Chemistry (p. 218)
- Environmental Science (p. 224)
- Ethnicity and Race Studies (p. 231)
- Evolutionary Biology of the Human Species (p. 235)
- Film and Media Studies (p. 243)
- Financial Economics (p. 244)
- French (p. 254)
- French and Francophone Studies (p. 258)
- German Literature and Cultural History (p. 262)
- Hispanic Studies (p. 266)
- History (p. 269)
- History and Theory of Architecture (p. 56)
- Human Rights (p. 273)
- Information Science (p. 275)
- Italian (p. 282)
- Jazz Studies* (p. 287)
- Jewish Studies* (p. 289)
- Latin American and Caribbean Studies (p. 290)

- Linguistics (p. 295)
- Mathematics (p. 298)
- Mathematics-Statistics (p. 309)
- Medieval and Renaissance Studies* (p. 319)
- Middle Eastern, South Asian, and African Studies (p. 320)
- Modern Greek Studies* (p. 323)
- Music (p. 326)
- Neuroscience and Behavior (p. 330)
- Philosophy (p. 339)
- Physics (p. 342)
- Political Science (p. 345)
- Political Science-Statistics (p. 352)
- Portuguese Studies* (p. 359)
- Psychology (p. 363)
- Public Health (p. 372)*
- Regional Studies (p. 374)
- Religion (p. 375)
- Russian Language and Culture (p. 377)
- Russian Literature and Culture (p. 381)
- Slavic Studies (p. 385)
- Sociology (p. 389)
- Statistics (p. 391)
- Sustainable Development (p. 396)
- Urban Studies (p. 400)
- Visual Arts (p. 402)
- Women's and Gender Studies (p. 403)
- Yiddish Studies (p. 404)

AFRICAN-AMERICAN STUDIES

African American and African Diaspora Studies: 758 Schermerhorn Extension; 212-854-7080; <https://afamstudies.columbia.edu/>

Institute for Research in African-American Studies: 758 Schermerhorn Extension; 212-854-7080; <http://iraas.columbia.edu/>

Chair, African American and African Diaspora Studies: Prof. Farah J. Griffin; 758 Schermerhorn Extension; 212-854-7080; fjg8@columbia.edu

Director of Undergraduate Studies: Prof. Kevin Fellezs; 816A Dodge; 212-854-6689; kf2362@columbia.edu

Assistant Director: Shawn Mendoza; 758 Schermerhorn Extension; 212-854-8789; sm322@columbia.edu

Administrative Assistant: Sharon Harris; 758 Schermerhorn Extension; 212-854-7080; sh2004@columbia.edu

The Institute for Research in African-American Studies was established at Columbia in 1993, expanding the University's commitment to this field of study. The African-American studies curriculum explores the historical, cultural, social, and intellectual contours of the development of people of African descent. The curriculum enables students to master the basic foundations of interdisciplinary knowledge in the humanities and social sciences in the black American, Caribbean, and sub-Saharan experience.

Courses examine the cultural character of the African diaspora; its social institutions and political movements; its diversity in thought, belief systems, and spiritual expressions; and the factors behind the continuing burden of racial inequality. During their junior and senior years of study, students focus their research within a specific discipline or regional study relevant to the African diaspora.

Students should consider a major in African American and African Diaspora studies if they are interested in careers where strong liberal arts preparation is needed, such as fields in the business, social service, or government sectors. Depending on one's area of focus within the major, the African American and African Diaspora studies program can also prepare individuals for career fields like journalism, politics, public relations, and other lines of work that involve investigative skills and working with diverse groups. A major in African American and African Diaspora studies can also train students in graduate research skills and methods, such as archival research, and is very useful for individuals who are considering an advanced graduate degree such as the Ph.D.

DEPARTMENTAL HONORS

The requirements for departmental honors in African American and African Diaspora studies are as follows:

1. All requirements for major must be completed by graduation date;
2. Minimum GPA of 3.6 in the major;
3. Completion of senior thesis—due to the director of undergraduate studies on the first Monday in April.

A successful thesis for departmental honors must be selected as the most outstanding paper of all papers reviewed by the thesis committee in a particular year. The Thesis Evaluation Committee is comprised of department faculty and led by the director of undergraduate studies. The thesis should be of superior quality, clearly demonstrating originality and excellent scholarship, as determined by the committee. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

THE AFRICAN AMERICAN AND AFRICAN DIASPORA STUDIES DEPARTMENT THESIS

Although the senior thesis is a prerequisite for consideration for departmental honors, all African American and African Diaspora studies majors are strongly encouraged to consider undertaking thesis work even if they are ineligible or do not wish to be considered for departmental honors. The senior thesis gives undergraduate majors the opportunity to engage in rigorous, independent, and original research on a specific topic of their choosing, the result of which is a paper of 35-60 pages in length.

The senior thesis must be written under the supervision of at least one faculty member. Should the thesis writer elect to have more than one thesis adviser (either from the outset or added on during the early stages of research), these faculty in the aggregate comprise the Thesis Committee, of which one faculty member must be designated chair. In either case, it is incumbent upon the thesis writer to establish with the thesis chair and committee a reasonable schedule of deadlines for submission of outlines, chapters, bibliographies, drafts, etc.

In many cases, thesis writers may find that the most optimal way in which to complete a thesis is to formally enroll in an AFAS independent study course with their thesis adviser as the instructor. **All third year students interested in writing a thesis should notify the director of undergraduate studies and submit the name of the faculty adviser ideally by October 1, but certainly no later than the end of the fall semester of their junior year.** In close consultation with the thesis adviser, students develop a viable topic, schedule of meetings, bibliography, and timeline for completion (including schedule of drafts and outlines).

DEPARTMENTAL PRIZES

Ralph Johnson Bunche Award for Leadership and Service

The Bunche Award recognizes an undergraduate who has demonstrated a tremendous capacity for leadership and provided distinguished service to the Institute for Research in African American Studies.

The award is named in honor of Ralph Johnson Bunche (1901-1971), the highest American official in the United Nations. For his conduct of negotiations leading to an armistice in the First Arab-Israeli War, he received the Nobel Peace Prize in 1950; he was the first African American recipient of this honor.

Ella Baker Award for Outstanding Academic Achievement

The Ella Baker Prize is awarded annually to an undergraduate who has demonstrated academic excellence, intellectual commitment to the field of African American Studies and who

has written a thesis that advances our understanding of the African American experience.

The award is named for the brilliant activist, organizer, leader and Harlem resident, Ella Baker. Baker served as a field secretary for the NAACP before organizing the Southern Christian Leadership Conference under the leadership of Dr. Martin Luther King. Following her departure from SCLC she helped student activists organize the Student Non-violent Coordinating Committee. She would serve as an important mentor to these young people throughout the rest of her life.

SENIOR FACULTY

Robert Gooding-Williams (Philosophy)
Steven Gregory (Anthropology)
Farah J. Griffin (English and Comparative Literature)
Frank Guridy (History)
Samuel K. Roberts (History)
Josef Sorett (Religion)
Sudhir A. Venkatesh (Sociology)

JUNIOR FACULTY

Kevin Fellezs (Music)

RESEARCH FELLOWS

Fredrick C. Harris (Political Science)
Carl Hart (Psychology)
Obery Hendricks (Religion/African-American Studies)
Kellie E. Jones (Art History and Archaeology)
Natasha Lightfoot (History)
Mignon Moore (Sociology - Barnard)
David Scott (Anthropology)
Mabel Wilson (Architecture, Planning and Preservation)

AFFILIATED FACULTY

Vanessa Agard-Jones (Anthropology)
Belinda Archibong (Economics)
Christopher Brown (History)
Maguette Camara (Dance - Barnard)
Tina Campt (Africana & Womens Studies - Barnard College)
Mamadou Diouf (Middle Eastern, South Asian, and African Studies)
Ann Douglas (English and Comparative Literature)
Barbara Fields (History)
Eric Foner (History)
Saidiya Hartman (English and Comparative Literature)
Ousmane Kane (School of International and Public Affairs)
Rashid Khalidid (History)
George E. Lewis (Music)
Mahmood Mamdani (Anthropology)
Gregory Mann (History)
Alondra Nelson (Sociology/Women's and Gender Studies)
Robert O'Meally (English and Comparative Literature)
David Scott (Anthropology)
Susan Strum (Law School)

IN MEMORIUM

Marcellus Blount
Manning Marable, founder of IRAAS

GUIDELINES FOR ALL MAJORS AND CONCENTRATORS

Governed Electives

The "governed electives" category must include courses from at least three different departments, providing an interdisciplinary background in the field of African-American Studies. (Note: you cannot count one of your governed electives within your designated area of study).

Designated Area of Study

A Designated Area of Study, preferably within a distinct discipline (for example, history, politics, sociology, literature, anthropology, psychology, etc.). Students may also select courses within a particular geographical area or region or an interdisciplinary field of study.

Any of the departmental disciplines (history, political science; sociology, anthropology, literature, art history; psychology, religion, music, etc.)

Any of the pertinent area studies (African Studies; Caribbean/Latin American; Gender Studies; etc.).

Please note that the major/concentrator is not allowed to "create" or "make up" a designated area of study without the direct approval of the Director of Undergraduate Studies, and that such approval must be sought before the student has embarked on the course of designated area of study, and that such approval will be granted only in very rare and exceptional cases. Under no circumstances should the major/concentrator hope to take a series of courses only later to "create" a Designated Area of Study around these courses.

MAJOR IN AFRICAN AMERICAN AND AFRICAN DIASPORA STUDIES

A minimum of twenty-seven (27) points is required for the completion of the major. The major should be arranged in consultation with the director of undergraduate studies. Students interested in majoring should plan their course of study no later than the end of their sophomore year.

Core Requirements

All majors must complete to satisfaction the core required courses. The core requirements are:

- (1) Introduction to African-American Studies - 4 Points
- (2) Major Debates in African-American Studies - 4 Points
- (3) Governed Elective - 4 Points
- (4) Governed Elective - 4 Points
- (5) Senior Seminar - 4 Points
- (6) Designated Area of Study Course (DAS) - 3 Points
- (7) DAS or Senior Pro Seminar - 4 Points

CONCENTRATION IN AFRICAN AMERICAN AND AFRICAN DIASPORA STUDIES

A minimum nineteen (19) points is required for the completion of the concentration.

Core Requirements

All concentrators must complete to satisfaction the core required courses. The core requirements are:

- (1) Introduction to African-American Studies - 4 Points
- (2) Governed Elective - 4 Points
- (3) Governed Elective - 4 Points
- (4) Senior Seminar - 4 Points
- (5) Designated Area of Study Course (DAS) - 3-4 Points

AMERICAN STUDIES

Program Office: 319-321 Hamilton; 212-854-6698
<http://www.columbia.edu/cu/amstudies/>

Director: Prof. Casey N. Blake, 321 Hamilton; 212-854-6698;
cb460@columbia.edu

Associate Director: Prof. Robert Amdur, 311 Hamilton;
212-854-4049; rla2@columbia.edu

Assistant Director: Angela Darling, 319 Hamilton;
212-854-6698; amd44@columbia.edu

Administrative Assistant: Laken King, 319 Hamilton;
212-854-6698; lk2639@columbia.edu

American studies offers students the opportunity to explore the experience and values of the people of the United States as embodied in their history, literature, politics, art, and other enduring forms of cultural expression. The program seeks to prepare students to confront with historical awareness the pressing problems that face our society. The program takes advantage of Columbia's location by involving students with the life of the city—working with community service organizations such as the Double Discovery Center, which serves New York City high school students; and by inviting leading figures in the local political and cultural scene to participate in colloquia, public conferences, and classroom discussions. It is an interdisciplinary program designed to be open and flexible while taking seriously the challenge of striving for a liberal education that helps prepare students for responsible citizenship.

ADVISING

Each American studies major or concentrator is assigned an academic adviser who monitors their progress through graduation. With at least ten advisers for each academic year,

students are assured of individual attention and guidance. Advisers meet with students at least twice a semester.

DEPARTMENTAL HONORS

Students with a 3.6 minimum GPA in the major and an outstanding senior project are considered for honors. Normally no more than 10% of graduating majors receive departmental honors in a given year.

DEPARTMENT FACULTY

Casey N. Blake

Lynne Breslin

Andrew Delbanco

Todd Gitlin

Hilary Hallett

Michael Hindus

Thai Jones

Adam Kirsch

Roger Lehecka

Paul Levitz

Roosevelt Montas

Valerie Paley

Robert Pollack

Ross Posnock

Cathleen Price

Benjamin Rosenberg

James Shapiro

Maura Spiegel

Tamara Tweel

AFFILIATED FACULTY

Rachel Adams (English and Comparative Literature)

Courtney Bender (Religion)

Casey N. Blake (History; American Studies)

Jeremy Dauber (Germanic Languages)

Andrew Delbanco (English and Comparative Literature; American Studies)

Eric Foner (History)

Todd Gitlin (Journalism; Sociology)

Farah Griffin (English and Comparative Literature)

Frank Guridy (History)

Ira Katznelson (Political and History)

Alice Kessler-Harris (History)

Shamus Khan (Sociology)

Rebecca Kobrin (History)

Roosevelt Montás (Core and American Studies)

Ross Posnock (English and Comparative Literature; American Studies)

Wayne Proudfoot (Religion)

Jonathan Rieder (Sociology, Barnard)

Maura Spiegel (English and Comparative Literature)

GUIDELINES FOR ALL AMERICAN STUDIES MAJORS AND CONCENTRATORS

Declaring the Major or Concentration

Although students generally declare their major or concentration in the spring of their sophomore year, students may want to take electives early on in areas that interest them but that later connect with the American studies major.

Grading

A grade lower than C- cannot be counted toward the major or concentration in American studies. A grade of C- can be counted only with the approval of the director or associate director. Pass/D/Fail courses do not count toward the major or concentration unless the course was taken before the student declared the major or concentration.

MAJOR IN AMERICAN STUDIES

A minimum of nine courses is required to complete the major.

Please note that as of January 2018 Major requirements have changed, beginning with the Class of 2020. Please consult with the department if there are any questions.

Two American Studies Core courses.

The following two courses are ordinarily required:

AMST UN1010	Introduction to American Studies
HIST UN2478	U.S. Intellectual History, 1865 To the Present
or AMST UN3930	Topics in American Studies

Please note, the AMST UN3930 section MUST be Freedom and Citizenship in the U.S. to count towards the core course requirement

Two seminars in American Studies

AMST UN3930	Topics in American Studies
AMST UN3931	Topics in American Studies

Additional Courses

Four courses drawn from at least two departments, one of which must be in History and one of which must deal primarily with some aspect of American experience before 1900. (A course in U.S. History before 1900 would fulfill both requirements.)

Senior Research Project

The final requirement for the major in American Studies is completion of a senior essay, to be submitted in the spring of senior year. Alternatively, students may fulfill this requirement by taking an additional seminar in which a major paper is required or by writing an independent essay under the supervision of a faculty member. Seniors who wish to do a senior research project are required to take the Senior Project Colloquium AMST UN3920 in the fall of the senior year.

CONCENTRATION IN AMERICAN STUDIES

A minimum of 7 courses is required to complete the concentration. Please note that as of January 2018 Concentration requirements have changed, beginning with the Class of 2020. Please consult with the department if there are any questions.

Two American Studies Core courses.

The following are ordinarily required:

AMST UN1010	Introduction to American Studies
HIST UN2478	U.S. Intellectual History, 1865 To the Present
or AMST UN3930	Topics in American Studies

Please note, the AMST UN3930 section MUST be Freedom and Citizenship in the U.S. to count towards the core course requirement

Additional Courses

Select five additional courses drawn from at least two departments, one of which must be in History, and one of which must deal with the period before 1900.

ANCIENT STUDIES

Program Office: 617 Hamilton; 212-854-3902; classics@columbia.edu
<http://www.columbia.edu/cu/classics/>

Director of Undergraduate Studies: Prof. Katharina Volk, 601 Hamilton; 212-854-5683; kv2018@columbia.edu

Director of Academic Administration and Finance: Juliana Driever, 617 Hamilton; 212-854-2726; jd2185@columbia.edu

The purpose of this program is to enable the student to explore the cultural context of the ancient Mediterranean as a whole while concentrating on one specific Mediterranean or Mesopotamian culture. Central to the concept of the program is its interdisciplinary approach, in which the student brings the perspectives and methodologies of at least three different disciplines to bear on his or her area of specialization.

Faculty participating in the program are scholars specializing in all aspects of ancient culture and civilization from the Departments of Anthropology; Art History and Archaeology; Classics; History; Middle Eastern, South Asian, and African

Studies; Philosophy; and Religion, ensuring that a wide variety of approaches are available.

Course offerings vary year to year. Students are required to discuss their program prior to or during registration. The culmination of the ancient studies major comes in the senior year, when students with different areas of specialization come together to share their ideas in the senior seminar and then to write a substantial piece of original research. Students should think about topics for their senior paper during the junior year and find a faculty adviser at the beginning of the fall term of their senior year, after consulting with the director of undergraduate studies.

In the senior year, students register for ANCS UN3995 during the fall, and ANCS UN3998 Directed Research In Ancient Studies is usually taken during the spring. Sections should be arranged directly with the academic departmental administrator after finding a faculty adviser.

GUIDELINES FOR ALL ANCIENT STUDIES MAJORS

Grading

Advanced placement credits and courses passed with a grade of D may not be counted toward the major.

Courses

In an interdisciplinary program, courses that are available may on occasion have a substantial overlap in content. Since credit cannot be given twice for the same work, no courses may be counted toward the major that overlap significantly with courses already taken or in progress.

It is the student's responsibility to discuss his or her program with the director of undergraduate studies well in advance and to provide him or her with all the necessary information on the courses concerned, since failure to do so may result in a course not being counted after it has already been taken.

Any course in the Department of Classics may be credited toward the major.

MAJOR IN ANCIENT STUDIES

Major Seminar

ANCS UN3995	The Major Seminar
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Senior Thesis

ANCS UN3998	Directed Research In Ancient Studies
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Language Study *

Select two courses of an ancient language at or above the intermediate level, i.e., 1200-level or above.

Fundamental Breadth **

Select two introductory courses on some aspect of the ancient Mediterranean. Some examples include:

HIST UN1010	The Ancient Greeks 800-146 B.C.E.
AHIS UN3248	Greek Art and Architecture
AHIS UN3250	Roman Art and Architecture
PHIL UN2101	The History of Philosophy I: Presocratics to Augustine
CLLT UN3132	Classical Myth

Advanced Study

Select two advanced courses on the ancient Mediterranean, typically at the 3000- or 4000-level.

Cultural Concentration

Select four courses on the culture of the language chosen, including one history course.

- * The minimum language requirement must be completed by the end of the first semester of the student's senior year, so that the student is equipped to use sources in the original language in their thesis. Students are strongly urged to begin study of an ancient language as soon as possible and to complete more than the minimum requirements, since the best way to gain an understanding of a culture is through the actual words of its people. Those considering graduate work on the ancient world should also be aware that most graduate schools require more than two years of undergraduate language training for admission.

The language offered in fulfillment of this requirement should generally match the student's area of cultural concentration; special arrangements are available with other universities for students whose cultural concentration require languages not normally taught at Columbia. Students entering with expertise in their chosen languages are placed in advanced courses as appropriate but are still required to complete at least two semesters of language courses at Columbia; exceptions to this policy may be made in the case of languages not normally taught at Columbia. Language courses at the 1100-level may not be counted toward the major. Language courses, including those at the 1100-level, must be taken for a letter grade.

- ** Relevant introductory courses are offered by the Department of Classics or from offerings in the Programs or Departments of Ancient Studies, Art History and Archaeology, History, Philosophy, or Religion. Students should confirm a course's relevance with the director of undergraduate studies as soon as possible.

ANTHROPOLOGY

Departmental Office: 452 Schermerhorn; 212-854-4552
<http://www.columbia.edu/cu/anthropology> (<http://www.columbia.edu/cu/anthropology/>)

Directors of Undergraduate Studies:

Professor John Pemberton; 858 Schermerhorn Extension; 212-854-7463; jp373@columbia.edu; Office Hours: Mondays and Wednesdays 3:00-4:00

Departmental Consultants:

Archaeology: Prof. Zoë Crossland, 965 Schermerhorn Extension; 212-854-7465; zc2149@columbia.edu

(zc2149@columbia.edu) Office Hours are by appointment

Biological/Physical Anthropology: Prof. Ralph Holloway, 856 Schermerhorn Extension; 212-854-4570; rlh2@columbia.edu

Anthropology at Columbia is the oldest department of anthropology in the United States. Founded by Franz Boas in 1896 as a site of academic inquiry inspired by the uniqueness of cultures and their histories, the department fosters an expansiveness of thought and independence of intellectual pursuit.

Cross-cultural interpretation, global socio-political considerations, a markedly interdisciplinary approach, and a willingness to think otherwise have formed the spirit of anthropology at Columbia. Boas himself wrote widely on pre-modern cultures and modern assumptions, on language, race, art, dance, religion, politics, and much else, as did his graduate students including, most notably, Ruth Benedict and Margaret Mead.

In these current times of increasing global awareness, this same spirit of mindful interconnectedness guides the department. Professors of anthropology at Columbia today write widely on colonialism and postcolonialism; on matters of gender, theories of history, knowledge, and power; on language, law, magic, mass-mediated cultures, modernity, and flows of capital and desire; on nationalism, ethnic imaginations, and political contestations; on material cultures and environmental conditions; on ritual, performance, and the arts; and on linguistics, symbolism, and questions of representation. Additionally, they write across worlds of similarities and differences concerning the Middle East, China, Africa, the Caribbean, Japan, Latin America, South Asia, Europe, Southeast Asia, North America, and other increasingly transnational and technologically virtual conditions of being.

The Department of Anthropology traditionally offered courses and majors in three main areas: sociocultural anthropology, archaeology, and biological/physical anthropology. While the sociocultural anthropology program now comprises the largest part of the department and accounts for the majority of faculty and course offerings, archaeology is also a vibrant program within anthropology whose interests overlap significantly with those of sociocultural anthropology. Biological/physical anthropology has shifted its program to the Department of Ecology, Evolution, and Environmental Biology. The Anthropology Department enthusiastically encourages cross-disciplinary dialogue across disciplines as well as participation in study abroad programs.

SOCIOCULTURAL ANTHROPOLOGY

At the heart of sociocultural anthropology is an exploration of the possibilities of difference and the craft of writing. Sociocultural anthropology at Columbia has emerged as a particularly compelling undergraduate liberal arts major. Recently, the number of majors in sociocultural anthropology has more than tripled.

Students come to sociocultural anthropology with a wide variety of interests, often pursuing overlapping interests in, for example, performance, religion, writing, law, ethnicity, mass-media, teaching, language, literature, history, human rights, art, linguistics, environment, medicine, film, and many other fields, including geographical areas of interest and engagement. Such interests can be brought together into provocative and productive conversation with a major or concentration in sociocultural anthropology. The requirements for a major in sociocultural anthropology reflect this intellectual expansiveness and interdisciplinary spirit.

ARCHAEOLOGY

Archaeologists study the ways in which human relations are mediated through material conditions, both past and present. Particular emphases in the program include the development of ancient states and empires, especially in the indigenous Americas; the impact of colonial encounters on communities in the American Southwest, the Levant and Africa; and human-animal relations in prehistory, religion and ritual, and the archaeology of the dead.

Themes in our teaching include the political, economic, social, and ideological foundations of complex societies; and archaeological theory and its relationship to broader debates in social theory, technology studies, and philosophy. Faculty members also teach and research on questions of museum representations, archaeological knowledge practices, and the socio-politics of archaeology. The program includes the possibility of student internships in New York City museums and archaeological fieldwork in the Americas and elsewhere.

ADVISING

Majors and concentrators should consult the director of undergraduate studies when entering the department and devising programs of study. Students may also seek academic advice from any anthropology faculty member, as many faculty members hold degrees in several fields or positions in other departments and programs at Columbia. All faculty in the department are committed to an expansiveness of thought and an independence of intellectual pursuit and advise accordingly.

HONORS THESIS

Anthropology majors with a minimum GPA of 3.6 in the major who wish to write an honors thesis for departmental honors consideration may enroll in ANTH UN3999 The

Senior Thesis Seminar in Anthropology. Students should have a preliminary concept for their thesis prior to course enrollment. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

PROFESSORS

Nadia Abu El-Haj (Barnard)
Lila Abu-Lughod
Partha Chatterjee
Myron L. Cohen
Terence D'Altroy
Steven Gregory
Ralph L. Holloway

Claudio Lomnitz
Mahmood Mamdani
Brinkley Messick
Rosalind Morris
Elizabeth Povinelli
Nan Rothschild (Barnard, *emerita*)
David Scott, Department Chair
Lesley A. Sharp (Barnard)
Michael Taussig
Paige West (Barnard)

ASSOCIATE PROFESSORS

Zoe Crossland
Catherine Fennell
Severin Fowles (Barnard)
Marilyn Ivy
Brian Larkin (Barnard)
John Pemberton
Audra Simpson

ASSISTANT PROFESSORS

Vanessa Agard-Jones
Naor Ben-Yehoyada
Hannah Rachel Chazin
Maria Jose de Abreu

LECTURERS

Ellen Marakowitz
Karen Seeley

ADJUNCT RESEARCH SCHOLAR

GUIDELINES FOR ALL ANTHROPOLOGY MAJORS AND CONCENTRATORS

Grading

No course with a grade of D or lower can count toward the major or concentration. Only the first course that is to count toward the major or concentration can be taken Pass/D/Fail.

Courses

Courses offered in other departments count toward the major and concentration only when taught by a member of the Department of Anthropology. Courses from other departments not taught by anthropology faculty must have the approval of the director of undergraduate studies in order to count toward the major or concentration.

MAJOR IN ANTHROPOLOGY

The requirements for this program were modified on January 29, 2016.

The program of study should be planned as early as possible in consultation with the director of undergraduate studies.

The anthropology major requires 30 points in the Department of Anthropology.

Sociocultural Focus

Students interested in studying sociocultural anthropology are required to take the following courses:

ANTH UN1002	The Interpretation of Culture
ANTH UN2004	Introduction to Social and Cultural Theory
ANTH UN2005	Ethnographic Imagination

Archaeology Focus

Students interested in studying archaeological anthropology are required to take the following courses:

ANTH UN1002	The Interpretation of Culture
ANTH UN2004	Introduction to Social and Cultural Theory
ACLG UN2028	Pasts, Presents & Futures: An Introduction to 21st Century Archaeology

NOTE: Students wishing to pursue an interdisciplinary major in archaeology should see the *Archaeology* section of this Bulletin.

Biological/Physical Focus

Students interested in studying this field should refer to the major in evolutionary biology of the human species in

the Department of Ecology, Evolution, and Environmental Biology.

CONCENTRATION IN ANTHROPOLOGY

The anthropology concentration requires 20 points in the Department of Anthropology.

Sociocultural Focus

Students interested in studying sociocultural anthropology are required to take the following course:

ANTH UN1002	The Interpretation of Culture
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Archaeology Focus

Students interested in studying archaeological anthropology are required to take the following course:

ACLG UN2028	Pasts, Presents & Futures: An Introduction to 21st Century Archaeology
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Biological/Physical Focus

Students interested in pursuing study in this field should refer to the concentration in evolutionary biology of the human species in the Department of Ecology, Evolution, and Environmental Biology.

APPLIED MATHEMATICS

Departmental Undergraduate Office: 410 Mathematics; 212-854-2432
<http://www.math.columbia.edu/>

Director of Undergraduate Studies: Prof. Ovidiu Savin, 409 Mathematics; 212-854-8233; savin@math.columbia.edu

Calculus Director: Prof. Michael Woodbury; 525 Mathematics; 212-854-2849; woodbury@math.columbia.edu

Computer Science-Mathematics Adviser: Prof. Eric Urban, 608 Mathematics; 212-854-6362; urban@math.columbia.edu

Economics-Mathematics Advisers:

Mathematics: Prof. Julien Dubedat, 601 Mathematics; 212-854-8806; jd2653@columbia.edu

Economics: Dr. Susan Elmes, 1006 International Affairs Building; 212-854-9124; se5@columbia.edu

Mathematics-Statistics Advisers:

Mathematics: Prof. Julien Dubedat, 601 Mathematics; 212-854-8806; dubedat@math.columbia.edu

Statistics: Prof. Banu Baydil, 611 Watson; 212-851-2132; bb2717@columbia.edu

The major in mathematics is an introduction to some of the highlights of the development of theoretical mathematics over the past four hundred years from a modern perspective. This study is also applied to many problems, both internal to mathematics and arising in other disciplines such as physics, cryptography, and finance.

Majors begin by taking either Honors mathematics or the calculus sequence. Students who do not take MATH UN1207 Honors Mathematics A and MATH UN1208 Honors Mathematics B normally take MATH UN2010 Linear Algebra in the second year. Following this, majors begin to learn some aspects of the main branches of modern mathematics: algebra, analysis, and geometry; as well as some of their subdivisions and hybrids (e.g., number theory, differential geometry, and complex analysis). As the courses become more advanced, they also become more theoretical and proof-oriented and less computational.

Aside from the courses offered by the Mathematics Department, cognate courses in areas such as astronomy, chemistry, physics, probability, logic, economics, and computer science can be used toward the major. A cognate course must be a 2000-level (or higher) course and must be approved by the director of undergraduate studies. In general, a course not taught by the Mathematics Department is a cognate course for the mathematics major if either (a) it has at least two semesters of calculus as a stated prerequisite, or (b) the subject matter in the course is mathematics beyond an elementary level, such as PHIL UN3411 Symbolic Logic, in the Philosophy Department, or COMS W3203 Discrete Mathematics: Introduction to Combinatorics and Graph Theory, in the Computer Science Department.

Another requirement for majors is participation in an undergraduate seminar, usually in the junior or senior year. In these seminars, students gain experience in learning an advanced topic and lecturing on it. In order to be eligible for departmental honors, majors must write a senior thesis.

COURSES FOR FIRST-YEAR STUDENTS

The systematic study of mathematics begins with one of the following three alternative calculus and linear algebra sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	Calculus
	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1207	and Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Credit is allowed for only one calculus and linear algebra sequence.

Calculus I, II is a standard course in single-variable differential and integral calculus; *Calculus III, IV* is a standard course in multivariable differential and integral calculus; *Accelerated Multivariable Calculus* is an accelerated course in multivariable differential and integral calculus.

While *Calculus II* is no longer a prerequisite for *Calculus III*, students are strongly urged to take it before taking *Calculus III*. In particular, students thinking of majoring or concentrating in mathematics or one of the joint majors involving mathematics should take *Calculus II* before taking *Calculus III*. Note that *Calculus II* is a prerequisite for Accelerated Multivariable Calculus, and both *Calculus II* and *Calculus III* are prerequisites for *Calculus IV*.

The third sequence, *Honors Mathematics A- B*, is for exceptionally well-qualified students who have strong Advanced Placement scores. It covers multivariable calculus (MATH UN1201 Calculus III- MATH UN1202 Calculus IV) and linear algebra (MATH UN2010 Linear Algebra), with an emphasis on theory.

MATH UN1003 College Algebra and Analytic Geometry does not count toward the degree. Students who take this course do not receive college credit.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 4 or 5 on the AP Calculus AB exam provided students complete MATH UN1102 Calculus II or MATH UN1201 Calculus III with a grade of C or better. The department grants 3 credits for a score of 4 on the AP Calculus BC exam provided students complete MATH UN1102 Calculus II or MATH UN1201 Calculus III with a grade of C or better. The department grants 6 credits for a score of 5 on the AP Calculus BC exam provided students complete MATH UN1201 Calculus III or MATH UN1205 Accelerated Multivariable Calculus MATH UN1207 Honors Mathematics A with a grade of C or better. Students can receive credit for only one calculus sequence.

PLACEMENT IN THE CALCULUS SEQUENCES

Calculus I

Students who have essentially mastered a precalculus course and those who have a score of 3 or less on an Advanced Placement (AP) exam (either AB or BC) should begin their study of calculus with MATH UN1101 Calculus I.

Calculus II and III

Students with a score of 4 or 5 on the AB exam, 4 on the BC exam, or those with no AP score but with a grade of A in a full year of high school calculus may begin with either MATH UN1102 Calculus II or *MATH UN1201 Calculus III*. Note that such students who decide to start with *Calculus III* may still need to take *Calculus II* since it is a requirement or prerequisite for other courses. In particular, they **MUST** take *Calculus II* before going on to MATH UN1202 Calculus IV. Students with a score of 5 on the BC exam may begin with *Calculus III* and do not need to take *Calculus II*.

Those with a score of 4 or 5 on the AB exam or 4 on the BC exam may receive 3 points of AP credit upon completion of *Calculus II* with a grade of C or higher. Those students with a score of 5 on the BC exam may receive 6 points of AP credit upon completion of *Calculus III* with a grade of C or higher.

Accelerated Multivariable Calculus

Students with a score of 5 on the AP BC exam or 7 on the IB HL exam may begin with MATH UN1205 Accelerated Multivariable Calculus. Upon completion of this course with a grade of C or higher, they may receive 6 points of AP credit.

Honors Mathematics A

Students who want a proof-oriented theoretical sequence and have a score of 5 on the BC exam may begin with MATH UN1207 Honors Mathematics A, which is especially designed for mathematics majors. Upon completion of this course with a grade of C or higher, they may receive 6 points of AP credit.

TRANSFERS INSIDE THE CALCULUS SEQUENCES

Students who wish to transfer from one calculus course to another are allowed to do so beyond the date specified on the Academic Calendar. They are considered to be adjusting their level, not changing their program. However, students must obtain the approval of the new instructor and their advising dean prior to reporting to the Office of the Registrar.

GRADING

No course with a grade of D or lower can count toward the major, interdepartmental major, or concentration. Students who are doing a double major cannot double count courses for their majors.

DEPARTMENTAL HONORS

In order to be eligible for departmental honors, majors must write a senior thesis. To write a senior thesis, students must register for MATH UN3999 Senior Thesis in Mathematics in the fall semester of their senior year. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

PROFESSORS

- Mohammed Abouzaid
- David A. Bayer (Barnard)
- Simon Brendle
- Ivan Corwin
- Panagiota Daskalopoulos
- Aise Johan de Jong
- Robert Friedman
- Dorian Goldfeld
- Brian Greene
- Richard Hamilton
- Michael Harris
- Ioannis Karatzas
- Mikhail Khovanov
- Igor Krichever
- Chiu-Chu Liu
- Dusa McDuff (Barnard)
- Walter Neumann (Barnard)
- Andrei Okounkov
- D. H. Phong
- Henry Pinkham
- Ovidiu Savin
- Michael Thaddeus (Department Chair)
- Eric Urban
- Mu-Tao Wang

ASSOCIATE PROFESSORS

- Daniela De Silva (Barnard)
- Julien Dubedat

ASSISTANT PROFESSORS

- Chao Li
- Francesco Lin
- Giulia Sacca
- Will Sawin

J.F. RITT ASSISTANT PROFESSORS

- Konstantin Aleshkin
- Evgeni Dimitrov
- Nathan Dowlin
- Alexandra Florea
- Florian Johne
- Inbar Klang
- Shotaro Makisumi
- Konstantin Matetski
- S. Michael Miller
- Henri Roesch
- Nicholas Salter
- Gus Schrader

- Akash Sengupta
- Kyler Siegel
- Yi Sun
- Evan Warner
- Hui Yu
- Yihang Zhu

SENIOR LECTURERS IN DISCIPLINE

- Lars Nielsen
- Mikhail Smirnov
- Peter Voit

LECTURERS IN DISCIPLINE

- Michael Woodbury

ON LEAVE

- Profs. Florea, Krichever, Neumann, Roesch, Sacca, Salter, Sawin (*Fall 2019*)
- Profs. Abouzaid, Hamilton, Neumann, Roesch, Sacca, Salter, Sawin (*Spring 2020*)

GUIDELINES FOR ALL ECONOMICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Checklists and Requirement

Checklists and Requirement information are available on the Department website (<https://econ.columbia.edu/undergraduate/requirements-and-forms/>).

Course List

Economics Core Courses

All of the core courses must be completed **no later than the spring semester** of the student's **junior year** and must be taken at Columbia. *Students who take any core course during the fall semester of their senior year must obtain written permission from the department's director of undergraduate studies.* Unless otherwise specified below, all students must complete the following core courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Prerequisites

Course prerequisites are strictly enforced. Prerequisites must be taken before the course, not after or concurrently.

Economics courses taken before the completion of any of its prerequisites, even with instructor approval, are **not** counted toward the major, concentration, or interdepartmental

majors. Exemptions from a prerequisite requirement may only be made, in writing, by the department's director of undergraduate studies. Credits from a course taken *prior* to the completion of its prerequisites are **not** counted towards the major requirements. As a consequence, students are required to complete **additional**, specific courses in economics at the direction of the director of undergraduate studies.

The prerequisites for required courses are as follows:

Course	Prerequisites
ECON UN1105 Principles of Economics	None
MATH UN1101 Calculus I	
STAT UN1201 Calculus-Based Introduction to Statistics	MATH UN1101 Calculus I
ECON UN3211 Intermediate Microeconomics	ECON UN1105 Principles of Economics MATH UN1201 Calculus III or UN1205
ECON UN3213 Intermediate Macroeconomics	ECON UN1105 Principles of Economics MATH UN1101 Calculus I Co-requisite: MATH UN1201 Calculus III or UN1205
ECON UN3412 Introduction To Econometrics	MATH UN1201 Calculus III or UN1205 ECON UN3211 Intermediate Microeconomics or UN3213 STAT UN1201 Calculus-Based Introduction to Statistics
ECON 2000-level electives	ECON UN1105 Principles of Economics
ECON GU4211 Advanced Microeconomics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics MATH UN2010 Linear Algebra Corequisites: MATH UN2500 Analysis and Optimization or GU4061
ECON GU4412 Advanced Econometrics	ECON UN3211 Intermediate Microeconomics
ECON GU4213 Advanced Macroeconomics	ECON UN3213 Intermediate Macroeconomics
ECON GU4413 Econometrics of Time Series and Forecasting	ECON UN3412 Introduction To Econometrics MATH UN2010 Linear Algebra

ECON UN3025 Financial Economics	ECON UN3211 Intermediate Microeconomics	ECPH GU4950 Economics and Philosophy Seminar	ECON UN3211 Intermediate Microeconomics
ECON GU4020 Economics of Uncertainty and Information	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4230 Economics of New York City	STAT UN1201 Calculus-Based Introduction to Statistics		ECON UN3412 Introduction To Econometrics
ECON GU4260 Market Design		Barnard electives	See Barnard bulletin
ECON GU4280 Corporate Finance			
ECON GU4370 Political Economy			
ECON GU4700 Financial Crises			
ECON GU4710 Finance and the Real Economy			
ECON GU4850 Cognitive Mechanisms and Economic Behavior			
ECON GU4860 Behavioral Finance	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
All other ECON 3000- and 4000-level electives	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
ECON UN3901 Economics of Education	ECON UN3211 Intermediate Microeconomics		
ECON UN3952 Seminar in Macroeconomics and Formation of Expectations	ECON UN3213 Intermediate Macroeconomics		
ECON UN3981 Applied Econometrics	ECON UN3412 Introduction To Econometrics		
ECON GU4911 Seminar In Microeconomics			
ECON GU4913 Seminar In Macroeconomics			
ECON GU4918 Seminar In Econometrics			
ECPS GU4921 Seminar In Political Economy	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
	ECON GU4370 Political Economy		

It is **strongly recommended** that students take ECON UN3412 Introduction To Econometrics in the semester **immediately** following the completion of the statistics course.

Grading

No course with a grade of D or lower, including calculus and statistics courses, can count toward the major, concentration, or interdepartmental majors. Economics core courses with a grade of D or F must be retaken and completed with a grade of C- or better.

Students who receive a grade of D or F in a core course are permitted to take a higher-level elective course that has that core course as a prerequisite, so long as it is taken concurrently with the retaking of that core course. For example, if a student fails ECON UN3211 Intermediate Microeconomics, the student must retake it and, in the same semester, may enroll in an elective course for which it is a prerequisite, provided that all other prerequisites for the elective have been completed. The same rule applies to the required math and statistics courses. For example, if a student fails *MATH UN1201 Calculus III*, the student may retake calculus III concurrently with *Intermediate Microeconomics*. Students who must retake any core economics or math course may not retake it concurrently with a senior seminar; the economics core courses *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, and *ECON UN3412 Introduction To Econometrics* must be successfully completed before a student may enroll in a seminar.

A grade of W is not equivalent to a grade of D or F; it does not qualify a student to retake the course concurrently with a higher level course that lists the course as a prerequisite. Students who receive a grade of W in a core course must complete the course with a grade of C- or better before taking a course that lists it as a prerequisite.

Only ECON UN1105 Principles of Economics may be taken for a grade of Pass/D/Fail, and the student must receive a grade of P for it to count towards the requirements for the major, concentration, or interdepartmental majors.

Economics Electives

Only those courses identified in the Economics Department listings in this Bulletin may be taken for elective credit. All 3000-level or higher electives offered by the Economics Department have ECON UN3211 Intermediate Microeconomics and ECON UN3213 Intermediate

Macroeconomics as prerequisites. However, some electives have additional prerequisites and students should ensure that all prerequisites have been completed (see the table of prerequisites printed above). *Seminars do not count as electives.*

Seminars

Seminars can be taken only after all of the required core courses in economics have been successfully completed. Students may not take or re-take ECON UN3211 Intermediate Microeconomics, ECON UN3213 Intermediate Macroeconomics, or ECON UN3412 Introduction To Econometrics concurrently with any senior seminar. *Seminars do not count as electives.* Each seminar is limited to sixteen students, with priority given to seniors. For ECPS GU4921 Seminar In Political Economy and ECPH GU4950 Economics and Philosophy Seminar, priority is given to economics–political science and economics–philosophy majors, respectively.

For seminar registration details, read the information posted on the department's *Senior Seminar Registration* page: <http://econ.columbia.edu/senior-seminars-registration> (<http://econ.columbia.edu/senior-seminars-registration/>).

Mathematics

Students must consult with the Mathematics Department for the appropriate placement in the calculus sequence. Students must complete one of the following sequences:

Select one of the following sequences:

MATH UN1101 - MATH UN1201	Calculus I and Calculus III
MATH UN1101 - MATH UN1205	Calculus I and Accelerated Multivariable Calculus
MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B

In addition:

1. Students who receive a grade of D or F in MATH UN1201 Calculus III or MATH UN1205 must retake the course, but may enroll in ECON UN3211 Intermediate Microeconomics.
2. Students who receive a grade of D or F in MATH UN1207 Honors Mathematics A may either retake the course, or take MATH UN1201 Calculus III or MATH UN1205, and enroll in ECON UN3211 Intermediate Microeconomics concurrently.

Statistics

Unless otherwise specified below, all students must take STAT UN1201 Calculus-Based Introduction to Statistics, or a higher level course, such as STAT GU4204 Statistical Inference, or STAT GU4001.

Barnard Courses

A limited number of Barnard economics electives may count toward the major, concentration, and interdepartmental majors. Students should pay careful attention to the limit of Barnard electives indicated in their program requirements. Please see the *Transfer Credit* section below for information on the number of Barnard electives that may be taken to fulfill major requirements. In addition, students may receive credit for the major, concentration, and interdepartmental majors only for those Barnard economics courses listed in this Bulletin. However, students may not receive credit for two courses whose content overlaps. Barnard and Columbia economics electives with overlapping content include but are not limited to:

ECON BC3029 - ECON GU4321	Empirical Development Economics and Economic Development
ECON BC3038 - ECON GU4505	International Money and Finance and International Macroeconomics
ECON BC3019 - ECON GU4400	Labor Economics and Labor Economics
ECON BC3047 - ECON GU4500	International Trade and International Trade
ECON BC3039 - ECON GU4625	Environmental and Natural Resource Economics and Economics of the Environment
ECON BC3041 - ECON GU4235	Theoretical Foundations of Political Economy and HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4400	Labor Economics
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes

Students should always first consult with *econ-advising* to confirm that the Barnard elective they wish to take does not overlap with a Columbia elective that they have already taken or plan to take. Students may *not* take the Barnard core economics, math, statistics, or seminar courses for credit towards the completion of major requirements.

School of Professional Studies Courses

The Department of Economics does not accept *any* of the courses offered through the School of Professional Studies for credit towards the economics major, concentration, or interdepartmental majors with the exception of the courses offered by the Economics Department during the summer session at Columbia.

Other Department and School Courses

Please note that with the exception of the above Barnard courses and the specific courses listed below for the financial

economics major, no other courses offered through the different departments and schools at Columbia count toward the economics majors or concentration.

Transfer Credits

Students are required to take a minimum number of courses in the Columbia Economics Department. For all majors and interdepartmental majors, students must complete a minimum of *five* lecture courses in the Columbia department. Students may fulfill their remaining requirements for economics lecture courses through AP (or IB or GCE) credits, Barnard electives, transfer courses, and study abroad courses (the latter two are subject to the approval of the Economics Department). The following table summarizes the new rules:

Program	Number of required economics lecture courses	Minimum number which must be taken in the department	Maximum number of outside allowed
Economics major	9	5	4
Financial economics	8	5	3
Economics-mathematics	7	5	2
Economics-political science	7	5	2
Economics-statistics	7	5	2
Economics-philosophy	7	5	2
Economics concentration	7	4	3

- Lecture courses** do not include seminars, which must be taken in the Columbia Economics Department. The lecture course counts are counts of economics courses only and do **not** include math, statistics, or courses in other departments;
- At least two of the three *3000*-level economics core courses must be taken in the department and no corresponding Barnard courses are accepted. ECON UN3025 Financial Economics and ECON UN3265 The Economics of Money and Banking are counted as departmental courses regardless of the instructor;
- Outside courses** include AP (or IB or GCE) credits, transfer credits, Barnard *2000*- and *3000*-level elective courses and transfer credits from other universities. In the case where two or more courses taken outside of Columbia are used as the equivalent of ECON UN1105 Principles of Economics, those courses are counted as one transfer course.

Approval of transfer credits to fulfill economics requirements must be obtained in writing from the Department of Economics (see the departmental website (<http://www.columbia.edu/cu/economics/>) or speak with your advising dean for information regarding applications for transfer credit). Approval is granted only for courses that are considered to be comparable to those offered at Columbia.

Summer courses taken at other institutions must be approved in writing by the department's transfer credit adviser before the course is taken. The department does not accept transfer credits for any *3000* level core courses taken during a summer session outside of Columbia University. Summer courses taken from the department of economics at Columbia University do not need approval.

Guidelines and instructions on how to request transfer credit approval can be found in the *Transfer Credit Information* page of the departmental website (<http://www.columbia.edu/cu/economics/>).

MAJOR IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 45) above.

The economics major requires a minimum of 35 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 44 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least five electives, of which no more than one may be taken at the *2000*-level (including Barnard courses)

Economics Seminar

Select one economics seminar course

CONCENTRATION IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 45) above.

The economics concentration requires a minimum of 25 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 34 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least three electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

MAJOR IN FINANCIAL ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 45) above.

The Department of Economics offers the major in financial economics, which provides an academic framework to explore the role of financial markets and intermediaries in the allocation (and misallocation) of capital. Among the topics studied in financial economics are financial markets, banks and other financial intermediaries, asset valuation, portfolio allocation, regulation and corporate governance.

The financial economics major requires 26 points in economics, 6 points in mathematics, 3 points in statistics, 3 points in business, and 12 points from a list of selected courses for a total minimum of 50 points as follows:

Economics Core Courses

All economics core courses

Finance Core Courses*

ECON UN3025	Financial Economics
ECON GU4280	Corporate Finance
BUSI UN3013	Financial Accounting

*NOTE: The department considers BUSI UN3013 and IEOR E2261 as overlapping courses. Students who take both courses shall be credited with one course only. Financial economics majors who are also in the Business Management concentration program (CNBUMG) must take an additional elective from either the financial economics prescribed elective list (below) or from the CNBUMB prescribed list.

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Electives

Select four of the following, of which two must be from the Columbia or Barnard economics departments, or equivalent economics transfer credits:

ECON BC3014	Entrepreneurship
ECON BC3017	Economics of Business Organization
ECON UN3265	The Economics of Money and Banking
ECON UN3952	Seminar in Macroeconomics and Formation of Expectations
ECON GU4020	Economics of Uncertainty and Information

ECON GU4213	Advanced Macroeconomics
ECON GU4251	Industrial Organization
ECON GU4260	Market Design
ECON GU4412	Advanced Econometrics
ECON GU4415	Game Theory
ECON GU4465	Public Economics
ECON GU4500	International Trade
ECON GU4505	International Macroeconomics
or ECON BC3038	International Money and Finance
ECON G4526	Transition Reforms, Globalization and Financial Crisis
ECON GU4700	Financial Crises
ECON GU4710	Finance and the Real Economy
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON GU4860	Behavioral Finance
BIOT GU4180	Entrepreneurship in Biotechnology
BUSI UN3021	Marketing Management
BUSI UN3701	Strategy Formulation
BUSI UN3702	Venturing to Change the World
BUSI UN3703	Leadership in Organizations
BUSI UN3704	Making History Through Venturing
COMS W1002	Computing in Context
HIST W2904	History of Finance
IEOR E3106	Stochastic Systems and Applications
IEOR E4700	Introduction to Financial Engineering
MATH UN3050	Discrete Time Models in Finance
POLS UN3630	Politics of International Economic Relations
STAT W3201	Math Finance in Continuous Time
STAT GU4261	Statistical Methods in Finance
STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance

Seminar

The seminar must be chosen from a list of seminars eligible for the financial economics major. The department indicates which seminars are eligible for the major on the Senior Seminars page of the departmental website.

Students must have completed at least one of ECON UN3025 or ECON GU4280 prior to taking their senior seminar.

* Students must complete the finance core no later than fall of their senior year.

MAJOR IN ECONOMICS-MATHEMATICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 45) above.

The major in economics and mathematics provides students with a grounding in economic theory comparable to that provided by the general economics major and exposes students to rigorous and extensive training in mathematics. The program is recommended for any student planning to do graduate work in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Mathematics has an assigned adviser with whom students may consult on mathematics requirements. The economics adviser can only advise on economics requirements; the mathematics adviser can only advise on mathematics requirements.

The economics-mathematics major requires a total of 52 or 56 points (depending on mathematics sequence) : 29 points in economics and 23-27 points in mathematics and statistics as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	Calculus and Linear Algebra

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Note: Students who take MATH UN1205 may not receive credit for both MATH UN1201 and MATH UN1202.

Analysis requirement:

MATH UN2500	Analysis and Optimization
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Select three of the following:

MATH UN1202	Calculus IV
MATH UN2030	Ordinary Differential Equations

Any mathematics course at the 3000-level or above

Note: Students who take MATH UN1205 will not receive credit for MATH UN1202.

Statistics

Select one of the following sequences:

STAT GU4001	Introduction to Probability and Statistics
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STAT GU4203 - STAT GU4204	PROBABILITY THEORY and Statistical Inference
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Economics Seminar

Select an economics seminar

NOTE:

1. Students who fulfill the statistics requirement with STAT GU4203 and STAT GU4204, may count STAT GU4203 or STAT GU4204 as one of the three required mathematics electives.
2. Students who choose the one year sequence (STAT GU4203/ STAT GU4204), must complete the year long sequence *prior* to taking ECON UN3412. Students receive elective credit for the probability course.

MAJOR IN ECONOMICS-PHILOSOPHY

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 45) above.

Economics-philosophy is an interdisciplinary major that introduces students to basic methodologies of economics and philosophy and stresses areas of particular concern to both, e.g. rationality and decision making, justice and efficiency, freedom and collective choice, logic of empirical theories and testing. Many issues are dealt with historically. Classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Philosophy has an assigned adviser with whom students may consult on philosophy requirements. The economics adviser can only advise on economics requirements; the philosophy adviser can only advise on philosophy requirements.

The economics-philosophy major requires a total minimum of 54 points: 25 points in economics, 16 points in philosophy, 6 points in mathematics, 3 points in statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105	Principles of Economics
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ECON UN3211	Intermediate Microeconomics
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ECON UN3213	Intermediate Macroeconomics
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ECON UN3412	Introduction To Econometrics
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Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three Electives are required; two must be selected from the below list, and the remaining elective may be any economics elective at the 3000-level or above.

ECON GU4020	Economics of Uncertainty and Information
ECON GU4211	Advanced Microeconomics
ECON GU4213	Advanced Macroeconomics
ECON GU4228	Urban Economics
ECON GU4230	Economics of New York City
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4301	Economic Growth and Development
ECON GU4370	Political Economy
ECON GU4400	Labor Economics
ECON GU4415	Game Theory
ECON GU4438	Economics of Race in the U.S.
ECON GU4465	Public Economics
ECON GU4480	Gender and Applied Economics
ECON GU4500	International Trade
ECON W4615	Law and Economics
ECON GU4625 or ECON BC3039	Economics of the Environment Environmental and Natural Resource Economics
ECON GU4750	Globalization and Its Risks
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON BC3011	Inequality and Poverty
Philosophy Courses	
PHIL UN1010	Methods and Problems of Philosophical Thought
PHIL UN3411	Symbolic Logic
PHIL UN3701	Ethics
PHIL UN3551 or PHIL UN3960	Philosophy of Science Epistemology
PHIL GU4561	Probability and Decision Theory
Seminar	
ECPH GU4950	Economics and Philosophy Seminar

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN ECONOMICS–POLITICAL SCIENCE

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 45) above.

Political economy is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Political Science has an assigned adviser with whom students may consult on political science requirements. The economics adviser can only advise on economics requirements; the political science adviser can only advise on political science requirements.

The economics–political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows.

The political science courses are grouped into four areas, i.e. subfields: (1) American Politics, (2) Comparative Politics, (3) International Relations, and (4) Political Theory. For the political science part of the major, students are required to select one area as a major subfield and one as a minor subfield. The corresponding introductory courses in both subfields must be taken, plus two electives in the major subfield, and one in the minor subfield.

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON GU4370	Political Economy

Mathematics

Select a mathematics sequence

Statistical Methods

STAT UN1201	Calculus-Based Introduction to Statistics
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Select one of the following:

ECON UN3412	Introduction To Econometrics
POLS GU4712	PRINC OF QUANT POL RESEARCH 2

Economics Electives

Select two electives (6 points) at the 3000-level or above

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921 Seminar In Political Economy
and a Political Science Department seminar, in the student's
Primary Subfield. Please select one of the following: *

- POLS UN3911 Seminar in Political Theory
or POLS UN3912 Seminar in Political Theory
- POLS UN3921 Seminar in American Politics
or POLS UN3922 Seminar in American Politics
- POLS UN3951 Seminar in Comparative Politics
or POLS UN3952 Seminar in Comparative Politics
- POLS UN3961 International Politics Seminar
or POLS UN3962 INTERNATIONAL POLITICS
SEMINAR

- Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN ECONOMICS- STATISTICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 45) above.

The major in economics-statistics provides students with a grounding in economic theory comparable to that provided by the general economics major, but also exposes students to a significantly more rigorous and extensive statistics training than is provided by the general major. This program is recommended for students with strong quantitative skills and for those contemplating graduate studies in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Statistics has an assigned adviser with whom students may consult on statistics requirements. The economics adviser can only advise on economics requirements; the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, 3 points in computer science as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Calculus III
- MATH UN1201 and Linear Algebra

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Accelerated Multivariable
- MATH UN1205 Calculus
- MATH UN2010 and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Statistics

STAT UN1201 Calculus-Based Introduction to
Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

One elective in statistics from among courses numbered
STAT GU 4206 through GU 4266.

Computer Science

Select one of the following:

COMS W1004 Introduction to Computer Science
and Programming in Java

COMS W1005 Introduction to Computer Science
and Programming in MATLAB

COMS W1007 Honors Introduction to Computer
Science

ENGI E1006 Introduction to Computing for
Engineers and Applied Scientists

STAT UN2102 Applied Statistical Computing

Economics Seminar

ECON GU4918 Seminar In Econometrics

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

ARCHAEOLOGY

The Columbia Center for Archaeology (<http://www.columbia.edu/cu/archaeology/>): 965 Schermerhorn Extension

Director of Undergraduate Studies: Prof. Terence D'Altroy, 961 Schermerhorn; 212-854-2131; tnd1@columbia.edu

Archaeology is the study of the material conditions inhabited and acted upon by people in the past and present. Investigation of the past through the study of material remains is entangled with historiography, politics, and individual and collective memory, and is implicated in the production of present-day identities. Archaeology has come to mean many things to different generations of scholars, yet all approaches share in common a focus on the physical remains of the past and on the

interpretive acts that enliven these remains and are challenged by them.

At Columbia, archaeology is a multidisciplinary field practiced by faculty and students in the humanities, social sciences, and natural sciences. At present, there are faculty in the Departments of Anthropology; Art History and Archaeology; Classics; East Asian Languages and Cultures; Historic Preservation; History; Middle Eastern, South Asian, and African Studies; as well as in the Center for Environmental Research and Conservation, the Institute for Research on Women and Gender, and the Lamont-Doherty Earth Observatory, all of whom conduct research on prehistory, ancient society, or historical archaeology.

Among locations in which students and faculty are conducting or participating in field programs are Argentina, Peru, Central America, the North American Southwest, New York City, upstate New York, the UK, France, Italy, Greece, Turkey, Egypt, Yemen, Israel, Palestine, and Madagascar. Archaeologists at Columbia also work with professionals at a wide range of institutions in New York. Among the institutions at which students in particular programs may conduct research, or work on internships, are the American Museum of Natural History, the Brooklyn Museum, the Metropolitan Museum of Art, the Museum of the City of New York, the National Museum of the American Indian, the New York Botanical Garden, and the South Street Seaport Museum.

DEPARTMENTAL HONORS

For the requirements for departmental honors, please check with the program advisers. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

PROFESSORS

Zainab Bahrani
Terence D'Altroy
Holger Klein
Feng Li
Kristina Milnor (Barnard)
Stephen Murray
Esther Pasztory (*emerita*)
Nan Rothschild (Barnard, *emerita*)
Marc Van De Mieroop

ASSOCIATE PROFESSORS

Francesco Benelli
Zoë Crossland
Francesco de Angelis
Severin Fowles (Barnard)
Ioannis Mylonopoulos

ASSISTANT PROFESSORS

Ellen Morris (Barnard)
Marco Maiuro

ADJUNCT/VISITING PROFESSORS

Brian Boyd
Megan O'Neil (Barnard)
Walter Pitman
Adam Watson
Norman Weiss
George Wheeler

LECTURERS

Clarence Gifford
Jill Shapiro

ON LEAVE

GUIDELINES FOR ALL ARCHAEOLOGY MAJORS AND CONCENTRATORS

Courses

It is recommended that archaeology students consider introductory courses in Earth and environmental sciences, environmental biology, and/or chemistry for their Core Curriculum science requirement.

For information on upper-level graduate courses and courses in historic preservation, please see the program advisers. Decisions about upper-level, related, or seminar courses that are not on this list and their applicability to the major or concentration in archaeology should be made in consultation with the program advisers.

Graduate Study

Students intending to pursue graduate degrees in archaeology should be aware that a reading knowledge of two languages is often required as part of graduate study. Further, although language courses do not count toward the major or concentration, students are encouraged to acquire language training that is relevant to their particular interests in archaeology.

MAJOR IN ARCHAEOLOGY

Please read *Guidelines for all Archaeology Majors and Concentrators* above.

The program of study should be planned as early as possible with the program advisers, preferably before the end of the sophomore year and no later than the beginning of the junior year. The major in archaeology requires a total of 30 points within the major and 9 points of related courses as follows:

Two introductory courses:

ACLG UN2028 Pasts, Presents & Futures: An
Introduction to 21st Century
Archaeology

ANTH UN1008 The Rise of Civilization
or ANTH UN1007 The Origins of Human Society

Select two upper-level courses from different regions of the world, in addition to three other upper-level courses, planned in consultation with the program advisers.

Participation of four to six weeks in field projects with which Columbia University is affiliated, independent study in excavation or other field projects, or relevant museum internship and/or lab work.*

Select one laboratory course in archaeology or its equivalent in the field, as approved by the program advisers.

The capstone seminar in archaeology:

ANTH UN3993 World Archaeologies/Global
Perspectives

Select 9 points of related courses, planned with the program advisers in accordance with the student's interests.

A senior thesis is recommended for students planning to pursue a graduate degree.***

* The field, school, project, or internship must be approved in advance by the program advisers, and arrangements should be made in advance with the director of undergraduate studies for credits to be accepted as part of the degree. For more information, see the Center for Archaeology (<http://www.columbia.edu/cu/archaeology/>) website.

** Taught alternate years, preferably taken in the junior or senior year, or a substitute seminar to be decided with the advance approval of the director of undergraduate studies. Students who are writing a thesis may substitute a thesis seminar for this requirement.

*** Topics should be discussed with a faculty adviser during the junior year, allowing time for planning, research, and travel during the following summer. In the senior year, students may register for two semesters of senior thesis study with their adviser, e.g., ANTH UN3997 Supervised Individual Research Course In Anthropology or ANTH UN3999 The Senior Thesis Seminar in Anthropology, to cover the writing of the thesis. The final draft of the thesis must be submitted by March 25. (See the Center for Archaeology (<http://www.columbia.edu/cu/archaeology/>) webpages for more information.)

CONCENTRATION IN ARCHAEOLOGY

Please read *Guidelines for all Archaeology Majors and Concentrators* above.

The program of study should be planned with the program advisers. The concentration in archaeology requires a total of 21 points from within anthropology, art history and archaeology, and other approved departments, with no more

than four courses being taken within any single department. Requirements for the concentration are as follows:

Select one of the following introductory courses:

ANTH UN1007 The Origins of Human Society

ANTH UN1008 The Rise of Civilization

ACLG UN2028 Pasts, Presents & Futures: An
Introduction to 21st Century
Archaeology

Select one seminar or colloquium in the Departments of Anthropology, Art History and Archaeology, Classics, or History, as approved by the program advisers.

Select three upper-level courses, including at least one from two different regions of the world.

Select one related course, planned with the program advisers in accordance with the student's interests.

ARCHITECTURE

Departmental Office:

500 The Diana Center
212-854-8430

architecture.barnard.edu (<https://architecture.barnard.edu/>)
architecture@barnard.edu

Director of Undergraduate Studies:

Professor Karen Fairbanks
(212) 854-8431
kfairban@barnard.edu

Senior Department Assistant:

Rachel Garcia-Grossman
(212) 854-8430
rgarciag@barnard.edu

THE DEPARTMENT OF ARCHITECTURE

Mission

The Architecture major establishes an intellectual context for students to interpret the relation of form, space, program, materials and media to human life and thought. Through the Architecture curriculum, students participate in the ongoing shaping of knowledge about the built environment and learn to see architecture as one among many forms of cultural production. At the same time, the major stresses the necessity of learning disciplinary-specific tools, methods, terms and critiques. Thus, work in the studio, lecture or seminar asks that students treat architecture as a form of research and speculation which complement the liberal arts mission of expansive thinking.

Undergraduate Study in Architecture

Studying Architecture at Barnard College, Columbia College, and General Studies leads to a liberal arts degree – a Bachelor of Arts with a major in Architecture, and Barnard College is

the administrative location for all undergraduate architecture studies at Columbia University and its partner institutions. A liberal arts education in architecture holds a unique position in academia and in relation to the discipline. If the goal of a professional education in architecture is to enable students to participate directly in the world as an architect – a liberal arts education asks that students consider the broader and myriad conditions in which architecture is conceived and practiced and, in turn, to understand how architecture inevitably alters those conditions. Students are asked to confront and interpret the complex social, cultural, political, and environmental processes that weave through architectural design and urbanism. The purpose of an undergraduate liberal arts degree in architecture is to educate students to think about the world through architecture.

The Architecture curriculum introduces design at a variety of scales, acknowledging that integrated design thinking is effective for problem solving at any scale and in any discipline. Students will experiment with full-scale installations and devices and make small-scale models of urban conditions from which they extract, interpret and invent new possibilities of inhabitation and use. The curriculum intentionally balances the traditions of handcrafted representation with evolving digital technologies of architectural design and communication.

The Architecture major complements, and makes great use of its University setting. With access to superb libraries, research centers, graduate programs, and abundant intellectual resources, our students have the opportunity to follow their creative instincts to great depth and breadth – and they do. The major depends on New York City as more than a convenient site for many design and research projects and frames the City as one of the key social and architectural, and thus didactic, markers of Modernity. Architecture students study with peers from countries around the world in one of the most diverse cities in the world. A large majority of the Architecture students expand their education by interning in Architecture or a related field during their undergraduate studies. Alumni of the Department are leaders in architecture and design fields around the world. The faculty teaching in the undergraduate program are dedicated teachers who are also at the forefront of practice and research and are similarly drawn to New York City as a nexus of global design thinking.

Students interested in obtaining a professional degree in Architecture continue on to graduate programs after their undergraduate degree, and students from the Barnard-Columbia program have enjoyed enormous success in their admissions to the most competitive graduate programs in the country. Students who study Architecture as undergraduates have also pursued graduate degrees in a variety of disciplines including Urban Planning, Law, and Media and Communications.

Student Learning Outcomes

Students in the Architecture Majors who fully engage with the curriculum should be able to complete the following outcomes:

- Apply integrated design thinking to specific problems in and beyond the discipline;
- Visually communicate architectural concepts and research using discipline-specific techniques in multiple media;
- Verbally present independent, group or assigned research, in multiple media formats;
- Organize and concisely write in a variety of formats including reports, case studies, synthetic overviews, etc.;
- Understand and critically interpret major buildings and themes of Architectural history and theory;
- Be intellectually prepared for graduate studies in architecture and related disciplines.

Departmental Honors

Senior requirements (a portfolio and research paper from a previous architecture course) are used to award departmental honors. Students must have a grade point average of at least 3.6 in classes for the major. Normally no more than 10% of the graduating majors in the department each year receive departmental honors.

Professors of Professional Practice:

Karen Fairbanks (Chair)
Kadambari Baxi

Assistant Professors:

Anooradha Iyer Siddiqi
Ralph Ghoche

Term Assistant Professor of Professional Practice:

Ignacio G. Galán

Adjunct Professors:

Joeb Moore
Madeline Schwartzman
Suzanne Stephens

Adjunct Assistant Professors:

Severino Alfonso Dunn
Ana Penalba
Todd Rouhe
Brad Samuels
Fred Tang
Irina Verona

MAJOR IN ARCHITECTURE

The major in architecture requires a total of 14 courses, distributed as follows:

Studio Courses

Four studio courses, to be taken one per semester (studio courses have limited enrollment and priority is given to Architecture majors):

ARCH UN3101	Architectural Representation: Abstraction
ARCH UN3103	Architectural Representation: Perception
ARCH UN3201	Architectural Design, I
ARCH UN3202	Architectural Design, II

Required History/Theory Courses*

Five elective courses following the distribution requirement below:

ARCH UN3117 Modern Architecture in the World

One course with a topic that is pre-1750

One course with a topic that is post-1750

Two electives (it is suggested that one of these be on a non-western topic)

Senior Courses*

ARCH UN3901 Senior Seminar

Either a second Senior Seminar (from our program), a seminar from a related department (and related to student's disciplinary specialization/cluster), Architectural Design III, or Independent Research

Cluster of Related Courses

Three courses that relate to a single topic or theme that is relevant to architecture. Courses for the cluster may be taken in any department and may not overlap with any other courses for the major (e.g. history/theory courses or senior courses). All cluster courses should be selected in consultation with a major adviser.

Senior Requirements

Portfolio

Research Paper from Senior Seminar or Senior Course

* These are courses offered by the architecture department or other applicable departments offered within the University. Students should consult the program office for a list of applicable courses each semester.

ARCHITECTURE, HISTORY AND THEORY

Departmental Office: 826 Schermerhorn; 212-854-4505
<http://www.columbia.edu/cu/arhistory/>

Director of Undergraduate Studies: Prof. Barry Bergdoll, 918 Schermerhorn; 212-854-5425; bgb1@columbia.edu

Director of Art Humanities: Prof. Noam Elcott, 907 Schermerhorn; 212-854-7968; nme2106@columbia.edu

Coordinator for Undergraduate Programs: Emily Benjamin, 826 Schermerhorn; 212-854-4505; eb3061@columbia.edu

The goal of the major in the Department of Art History and Archaeology is to explore the history of art, architecture, and archaeology across a broad historical, cultural, geographic, and methodological spectrum.

Department courses take advantage of the extraordinary cultural resources of New York City and often involve museum assignments and trips to local monuments. The department offers a major and concentration in art history and in the history and theory of architecture, and a combined major in art history and visual arts.

At the heart of the major is AHIS UN3000 Majors' Colloquium: the Literature and Methods of Art History, which introduces students to different methodological approaches to art history and critical texts that have shaped the discipline. The colloquium also prepares students for the independent research required in seminars and advanced lecture courses, and should be taken during the junior year.

Surveys and advanced lecture courses offered by Barnard and Columbia cover the spectrum of art history from antiquity to the present and introduce students to a wide range of materials and methodologies. Limited-enrollment seminars have a narrower focus and offer intensive instruction in research and writing. The opportunity for advanced research with a senior thesis is available to students who qualify.

The major readily accommodates students who wish to study abroad during junior year. Courses taken at accredited programs can generally count as transfer credits toward the major, but students must gain the approval of the director of undergraduate studies. Similarly, any transfer credit for the major must be approved by the director of undergraduate studies. Generally no more than 12 points of transfer credit are applicable to the major. The form to petition for transfer credit can be found on the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>). Eligible Art History courses taken at Reid Hall and through the Berlin Consortium are counted as Columbia courses, not transfer courses.

All newly declared majors and concentrators should visit the department office and speak with the undergraduate program coordinator about the requirements and their planned curriculum.

The director of undergraduate studies regularly communicates with majors by e-mail to announce departmental events, museum internships, and other news. **Students who do not receive these messages should email the undergraduate program coordinator.** The director of undergraduate studies is also available to talk to students about their professional goals and plans to study abroad.

COURSE INFORMATION

Lectures

Attendance at the first class meeting is recommended.

Colloquia

For information about enrollment in the required colloquium *AHIS UN3000 Majors' Colloquium: the Literature*

and Methods of Art History, students should consult the department during the registration period in the semester prior to the one in which the course is offered. Interested students must sign up using an online form; majors will be informed of the sign-up dates and deadline via the majors mailing list. Enrollment is limited and admission is at the discretion of the instructor. It is recommended that students sign up for the colloquium in their junior year.

Seminars

Seminars require an application which is due in the departmental office in 826 Schermerhorn before the registration period in the semester prior to the one in which the course is offered (April for fall courses, November for spring courses). The required application form is available in PDF format on the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>). Students should wait list the seminars to which they apply on SSOL.

Bridge Seminars

Bridge seminars are open to graduate and undergraduate students. As with other seminars, they require an application, which are due in the semester prior to the semester in which the course is offered (August for fall courses, December for spring courses). The required application form is available in PDF format on the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>).

Bridge Lectures

Bridge lectures are open to graduate and advanced undergraduate students. They do not require an application.

Travel Seminar

In the spring, one or more undergraduate seminars in the Department of Art History and Archaeology may be designated as a travel seminar. Travel seminars receive funding to sponsor travel over the spring break to a distant site related to the subject matter of the seminar.

STUDY ABROAD

Reid Hall, Paris

For information about the Columbia University in Paris Art History Program at Reid Hall, including summer session courses, visit the Office of Global Programs (<http://ogp.columbia.edu/>) website.

Summer Program in Italy: Archaeological Fieldwork at Hadrian's Villa

Columbia University offers a four-week summer program that provides undergraduate and graduate students with the opportunity to excavate and learn together at Hadrian's Villa, a UNESCO World Heritage site near Rome and the most important Roman villa. It synthesizes Roman, Greek, and Egyptian architectural

and artistic traditions and has attracted scholarly attention for centuries. For more information, visit the program website (http://columbia.studioabroad.com/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=10577/).

Columbia Summer Program in Venice

The Department of Art History and Archaeology and the Department of Italian offer a summer program based at Co' Foscari University in Venice. The program uses an interdisciplinary approach to understanding Italian culture through study of its language, literature/film, architecture, art history and conservation, and economy. Students have the opportunity to gain a deeper appreciation of the rich Venetian culture, traditions and history. The program is open to qualified undergraduate and graduate students from the U.S. and Italy. For more information, visit the program website (http://columbia.studioabroad.com/index.cfm?FuseAction=Abroad.ViewLink&Parent_ID=3D708992-BCDE-E7F3-57371CF1854BF98A&Link_ID=BD582BB6-BCDE-E7F3-50ED440855275AC0&Program_ID=10436/).

Columbia Summer Program in Greece

The Department of Art History and Archaeology and the Program in Hellenic Studies offer a new summer program in Athens. "Curating the Histories of the Greek Present" examines aspects of Greek history and culture through the organization of an art exhibition under the general theme of the environment. The project is structured around classroom seminars, museum and site visits, walking tours, and workshop sessions in which students will learn about and gain experience in all stages of curating an exhibition. For more information, visit the program website (http://columbia.studioabroad.com/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=10911/).

DEPARTMENTAL HONORS SENIOR THESIS PRIZE

A prize is awarded each year to the best senior honors thesis written in the Department of Art History and Archaeology.

PROFESSORS

Alexander Alberro (Barnard)
Zainab Bahrani
Barry Bergdoll
Michael Cole
Jonathan Crary
Francesco de Angelis
Vidya Dehejia
David Freedberg
Robert E. Harrist, Jr.
Anne Higonnet (Barnard)
Holger Klein
Rosalind Krauss

Kellie Jones
 Branden Joseph
 Matthew McKelway
 Jonathan Reynolds (Barnard)
 Simon Schama
 Avinoam Shalem
 Zoë Strother

ASSOCIATE PROFESSORS

Diane Bodart
 Zeynep Çelik
 Noam M. Elcott
 Elizabeth Hutchinson (Barnard)
 Ioannis Mylonopoulos
 Lisa Trever

ASSISTANT PROFESSORS

Gregory Bryda (Barnard)
 Meredith Gamer
 Eleonora Pistis
 Michael Waters

ADJUNCT FACULTY

Dawn Delbanco
 Rosalyn Deutsche (Barnard)
 John Rajchman
 Stefaan Van Liefferinge

LECTURERS

Molly Allen
 Frederique Baumgartner
 Eliza Butler
 Hannah Friedman
 Alexandra Helprin
 Page Knox
 Janet Kraynak
 Sandrine Larrive-Bass
 Ja Won Lee
 Daria Melnikova
 Martina Mims
 Irina Oryshkevich
 Elizabeth Perkins
 Olivia Powell
 Kelly Presutti
 Michael Sanchez
 Susan Sivard
 Caroline Wamsler
 Gillian Young

ON LEAVE

Profs. Freedberg, Trever (2019-2020)
 Profs. Cary, de Angelis, Delbanco, Harrist (Fall 2019)
 Profs. Dehejia, Jones, Krauss, Mylonopoulos, Pistis (Spring 2020)

GUIDELINES FOR ALL ART HISTORY AND ARCHAEOLOGY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Courses

HUMA UN1121 Masterpieces of Western Art (Art Humanities) does not count toward the majors or concentrations, and no credit is given for Advanced Placement exams.

Grading

Courses in which a grade of D has been received do not count toward the major or concentration requirements.

Only the first course a student takes in the department may be taken for a grade of Pass/D/Fail. Classes taken in the Architecture or Visual Arts departments to fulfill the studio requirement may be taken for a grade of Pass/D/Fail.

Senior Thesis

The senior thesis project consists of a research paper 35-45 pages in length. It is a year-long project, and students writing a thesis must register for *AHIS UN3002 Senior Thesis* for the fall and spring terms. Much of the fall semester is devoted to research, and the spring semester to writing.

All thesis writers are required to participate in class and, on alternate weeks, meet as a group or individually with the instructor. Group meetings are designed as a series of research and writing workshops geared toward students' research projects. Students receive a total of six credits for successful completion of the thesis and class.

In order to apply, students follow a selection process similar to the one currently used for seminars. Students must identify a thesis topic and secure a faculty adviser in the Department of Art History and Archaeology. Applications must indicate the subject of the thesis, a short annotated bibliography, and the name and the signature of the adviser, followed by a one-page statement (400 words) outlining the topic, goals, and methodology of the thesis.

The application deadline is set for August before the senior year. Please check the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/senior-thesis.html>) for exact dates. Applications may be delivered in person or emailed to the coordinator for undergraduate programs. The director of undergraduate studies, in consultation with the thesis adviser, reviews the applications.

Students who intend to write a thesis should begin formulating a research topic and approaching potential faculty sponsors during the spring of the junior year. Currently, the department offers the Summer Research Travel Grant fellowship, which supports thesis-related research and travel during the summer. Additional senior thesis research funding during the academic

year is administered through Columbia College and General Studies.

Senior thesis applications may be found at: <http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>

Summer Research Travel Grant

The department offers the Summer Research Travel Grant, which may be used for travel to museums, building sites, libraries, archives, and other places of interest relevant to the thesis project. Students normally use these funds to conduct research during the summer before senior year.

Travel grant applications require a carefully edited thesis proposal, itemized budget, and supporting letter from a faculty sponsor. Applications are due in April of the student's junior year. Students will be notified of deadlines as they become available. Please contact the coordinator for undergraduate programs with any questions.

MAJOR IN ART HISTORY

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

The year-long senior thesis project (for qualified students; see below) *AHIS UN3002 Senior Thesis* may substitute for one elective lecture course. Seminars may substitute for lecture courses and may count toward fulfillment of the distribution requirements. Barnard Art History courses count toward the majors and concentration requirements.

The requirements for the major are as follows:

AHIS UN3000	Majors' Colloquium: the Literature and Methods of Art History
-------------	---

Seven 3-point lecture courses in Art History:

At least one course in three of four historical periods, listed below

An additional two courses in two different world regions, listed below

Two additional lectures of the student's choice

Two seminars in art history

A studio course taken in the Visual Arts or Architecture departments (which may be taken Pass/D/Fail)

Historical Periods

- Ancient (pre-400 CE/AD)
- 400-1400
- 1400-1700
- 1700-Present

World Regions

- Africa
- Asia

- Europe/North America/Australia
- Latin America
- Middle East

NOTE: These chronological divisions are approximate. In case of ambiguities, please contact the director of undergraduate studies.

MAJOR IN HISTORY AND THEORY OF ARCHITECTURE

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

Majors can take advantage of one of the strengths of the department by focusing on architectural history. This track combines an introductory studio in architectural design with a slightly modified program in art history. Major requirements were updated in February 2019; please contact the director of undergraduate studies with any questions.

The requirements for the major are as follows:

AHIS UN3000	Majors' Colloquium: the Literature and Methods of Art History
-------------	---

Seven lecture courses in art history, one of which must be AHIS UN1007 Introduction to Architecture, and three of which must focus on architectural history. Courses must cover four of five general areas:

Ancient Mediterranean

Medieval Europe

Renaissance and Baroque

18th-20th century

Non-Western

At least two seminars in art history or architectural history

Architectural Studio:

ARCH UN1020	Introduction To Architectural Design and Visual Culture
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NOTE: These chronological divisions are approximate. In case of ambiguities, please contact the director of undergraduate studies.

MAJOR IN ART HISTORY AND VISUAL ARTS

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

Students interested in the combined major should contact the coordinator for undergraduate programs in the Art History department, as well as the director of undergraduate studies in the Visual Arts department.

Up to two 3-point courses in art history may be replaced by a related course in another department, with approval of

the adviser. The combined major requires the completion of sixteen or seventeen courses. It is recommended that students interested in this major begin working toward the requirements in their sophomore year.

The requirements for the major are as follows:

AHIS UN3000 Majors' Colloquium: the Literature and Methods of Art History

Seven 3-point lecture courses in art history:

At least one course in three of four historical periods, as listed below

An additional two courses in two different world regions, as listed below

Two additional lectures of the student's choice

21 points in Visual Arts covering:

VIAR UN1000 Basic Drawing

VIAR UN2300 Sculpture I
or VIAR UN2200 Ceramics I

Five additional VIAR 3-point studio courses (15 points)

In the senior year, students must complete either a seminar in the Department of Art History and Archaeology or a senior project in visual arts (pending approval by the Visual Arts Department).

NOTE: These chronological divisions are approximate. In case of ambiguities, please contact the director of undergraduate studies.

Historical Periods

- Ancient (pre-400 CE/AD)
- 400-1400
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World Regions

- Africa
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- Europe/North America/Australia
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- Middle East

CONCENTRATION IN ART HISTORY

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

The requirements for the concentration are as follows:

Seven 3-point lecture courses in art history:

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NOTE: These chronological divisions are approximate. In case of ambiguities, please contact the director of undergraduate studies.

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World Regions

- Africa
- Asia
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- Latin America
- Middle East

Concentrators are not required to take the majors colloquium, a seminar, or a studio course.

CONCENTRATION IN HISTORY AND THEORY OF ARCHITECTURE

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

The requirements for the concentration are as follows:

AHIS UN1007 Introduction to the History of Architecture

Seven lecture courses in art history, one of which must be AHIS UN1007 Introduction to the History of Architecture, and three of which must focus on architectural history.

Courses must cover four of five general areas:

Ancient Mediterranean

Medieval Europe

Renaissance and Baroque

18th-20th century

Non-Western

Concentrators are not required to take the majors colloquium, a seminar, or a studio course.

ART HISTORY

Departmental Office: 826 Schermerhorn; 212-854-4505
<http://www.columbia.edu/cu/arhistory/>

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Director of Art Humanities: Prof. Noam Elcott, 907 Schermerhorn; 212-854-7968; nme2106@columbia.edu

Coordinator for Undergraduate Programs: Emily Benjamin, 826 Schermerhorn; 212-854-4505; eb3061@columbia.edu

The goal of the major in the Department of Art History and Archaeology is to explore the history of art, architecture, and archaeology across a broad historical, cultural, geographic, and methodological spectrum.

Department courses take advantage of the extraordinary cultural resources of New York City and often involve museum assignments and trips to local monuments. The department offers a major and concentration in art history and in the history and theory of architecture, and a combined major in art history and visual arts.

At the heart of the major is AHIS UN3000 Majors' Colloquium: the Literature and Methods of Art History, which introduces students to different methodological approaches to art history and critical texts that have shaped the discipline. The colloquium also prepares students for the independent research required in seminars and advanced lecture courses, and should be taken during the junior year.

Surveys and advanced lecture courses offered by Barnard and Columbia cover the spectrum of art history from antiquity to the present and introduce students to a wide range of materials and methodologies. Limited-enrollment seminars have a narrower focus and offer intensive instruction in research and writing. The opportunity for advanced research with a senior thesis is available to students who qualify.

The major readily accommodates students who wish to study abroad during junior year. Courses taken at accredited programs can generally count as transfer credits toward the major, but students must gain the approval of the director of undergraduate studies. Similarly, any transfer credit for the major must be approved by the director of undergraduate studies. Generally no more than 12 points of transfer credit are applicable to the major. The form to petition for transfer credit can be found on the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>). Eligible Art History courses taken at Reid Hall and through the Berlin Consortium are counted as Columbia courses, not transfer courses.

All newly declared majors and concentrators should visit the department office and speak with the undergraduate program coordinator about the requirements and their planned curriculum.

The director of undergraduate studies regularly communicates with majors by e-mail to announce departmental events, museum internships, and other news. **Students who do not receive these messages should email the undergraduate program coordinator.** The director of undergraduate studies is

also available to talk to students about their professional goals and plans to study abroad.

COURSE INFORMATION

Lectures

Attendance at the first class meeting is recommended.

Colloquia

For information about enrollment in the required colloquium *AHIS UN3000 Majors' Colloquium: the Literature and Methods of Art History*, students should consult the department during the registration period in the semester prior to the one in which the course is offered. Interested students must sign up using an online form; majors will be informed of the sign-up dates and deadline via the majors mailing list. Enrollment is limited and admission is at the discretion of the instructor. It is recommended that students sign up for the colloquium in their junior year.

Seminars

Seminars require an application which is due in the departmental office in 826 Schermerhorn before the registration period in the semester prior to the one in which the course is offered (April for fall courses, November for spring courses). The required application form is available in PDF format on the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>). Students should wait list the seminars to which they apply on SSOL.

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Bridge seminars are open to graduate and undergraduate students. As with other seminars, they require an application, which are due in the semester prior to the semester in which the course is offered (August for fall courses, December for spring courses). The required application form is available in PDF format on the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>).

Bridge Lectures

Bridge lectures are open to graduate and advanced undergraduate students. They do not require an application.

Travel Seminar

In the spring, one or more undergraduate seminars in the Department of Art History and Archaeology may be designated as a travel seminar. Travel seminars receive funding to sponsor travel over the spring break to a distant site related to the subject matter of the seminar.

STUDY ABROAD

Reid Hall, Paris

For information about the Columbia University in Paris Art History Program at Reid Hall, including summer

session courses, visit the Office of Global Programs (<http://ogp.columbia.edu/>) website.

Summer Program in Italy: Archaeological Fieldwork at Hadrian's Villa

Columbia University offers a four-week summer program that provides undergraduate and graduate students with the opportunity to excavate and learn together at Hadrian's Villa, a UNESCO World Heritage site near Rome and the most important Roman villa. It synthesizes Roman, Greek, and Egyptian architectural and artistic traditions and has attracted scholarly attention for centuries. For more information, visit the program website (http://columbia.studioabroad.com/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=10577/).

Columbia Summer Program in Venice

The Department of Art History and Archaeology and the Department of Italian offer a summer program based at Co' Foscari University in Venice. The program uses an interdisciplinary approach to understanding Italian culture through study of its language, literature/film, architecture, art history and conservation, and economy. Students have the opportunity to gain a deeper appreciation of the rich Venetian culture, traditions and history. The program is open to qualified undergraduate and graduate students from the U.S. and Italy. For more information, visit the program website (http://columbia.studioabroad.com/index.cfm?FuseAction=Abroad.ViewLink&Parent_ID=3D708992-BCDE-E7F3-57371CF1854BF98A&Link_ID=BD582BB6-BCDE-E7F3-50ED440855275AC0&Program_ID=10436/).

Columbia Summer Program in Greece

The Department of Art History and Archaeology and the Program in Hellenic Studies offer a new summer program in Athens. "Curating the Histories of the Greek Present" examines aspects of Greek history and culture through the organization of an art exhibition under the general theme of the environment. The project is structured around classroom seminars, museum and site visits, walking tours, and workshop sessions in which students will learn about and gain experience in all stages of curating an exhibition. For more information, visit the program website (http://columbia.studioabroad.com/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=10911/).

DEPARTMENTAL HONORS

SENIOR THESIS PRIZE

A prize is awarded each year to the best senior honors thesis written in the Department of Art History and Archaeology.

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Barry Bergdoll
Michael Cole
Jonathan Crary
Francesco de Angelis
Vidya Dehejia
David Freedberg
Robert E. Harrist, Jr.
Anne Higonnet (Barnard)
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Page Knox
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Sandrine Larrive-Bass
Ja Won Lee
Daria Melnikova
Martina Mims
Irina Oryshkevich
Elizabeth Perkins

Olivia Powell
 Kelly Presutti
 Michael Sanchez
 Susan Sivard
 Caroline Wamsler
 Gillian Young

ON LEAVE

Profs. Freedberg, Trever (2019-2020)
 Profs. Crary, de Angelis, Delbanco, Harrist (Fall 2019)
 Profs. Dehejia, Jones, Krauss, Mylonopoulos, Pistis (Spring 2020)

GUIDELINES FOR ALL ART HISTORY AND ARCHAEOLOGY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Courses

HUMA UN1121 Masterpieces of Western Art (Art Humanities) does not count toward the majors or concentrations, and no credit is given for Advanced Placement exams.

Grading

Courses in which a grade of D has been received do not count toward the major or concentration requirements.

Only the first course a student takes in the department may be taken for a grade of Pass/D/Fail. Classes taken in the Architecture or Visual Arts departments to fulfill the studio requirement may be taken for a grade of Pass/D/Fail.

Senior Thesis

The senior thesis project consists of a research paper 35-45 pages in length. It is a year-long project, and students writing a thesis must register for *AHIS UN3002 Senior Thesis* for the fall and spring terms. Much of the fall semester is devoted to research, and the spring semester to writing.

All thesis writers are required to participate in class and, on alternate weeks, meet as a group or individually with the instructor. Group meetings are designed as a series of research and writing workshops geared toward students' research projects. Students receive a total of six credits for successful completion of the thesis and class.

In order to apply, students follow a selection process similar to the one currently used for seminars. Students must identify a thesis topic and secure a faculty adviser in the Department of Art History and Archaeology. Applications must indicate the subject of the thesis, a short annotated bibliography, and the name and the signature of the adviser, followed by a one-page statement (400 words) outlining the topic, goals, and methodology of the thesis.

The application deadline is set for August before the senior year. Please check the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/senior-thesis.html>) for exact dates. Applications may be delivered in person or emailed to the coordinator for undergraduate programs. The director of undergraduate studies, in consultation with the thesis adviser, reviews the applications.

Students who intend to write a thesis should begin formulating a research topic and approaching potential faculty sponsors during the spring of the junior year. Currently, the department offers the Summer Research Travel Grant fellowship, which supports thesis-related research and travel during the summer. Additional senior thesis research funding during the academic year is administered through Columbia College and General Studies.

Senior thesis applications may be found at: <http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>

Summer Research Travel Grant

The department offers the Summer Research Travel Grant, which may be used for travel to museums, building sites, libraries, archives, and other places of interest relevant to the thesis project. Students normally use these funds to conduct research during the summer before senior year.

Travel grant applications require a carefully edited thesis proposal, itemized budget, and supporting letter from a faculty sponsor. Applications are due in April of the student's junior year. Students will be notified of deadlines as they become available. Please contact the coordinator for undergraduate programs with any questions.

MAJOR IN ART HISTORY

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

The year-long senior thesis project (for qualified students; see below) *AHIS UN3002 Senior Thesis* may substitute for one elective lecture course. Seminars may substitute for lecture courses and may count toward fulfillment of the distribution requirements. Barnard Art History courses count toward the majors and concentration requirements.

The requirements for the major are as follows:

AHIS UN3000	Majors' Colloquium: the Literature and Methods of Art History
-------------	---

Seven 3-point lecture courses in Art History:

At least one course in three of four historical periods, listed below

An additional two courses in two different world regions, listed below

Two additional lectures of the student's choice

Two seminars in art history

A studio course taken in the Visual Arts or Architecture departments (which may be taken Pass/D/Fail)

Historical Periods

- Ancient (pre-400 CE/AD)
- 400-1400
- 1400-1700
- 1700-Present

World Regions

- Africa
- Asia
- Europe/North America/Australia
- Latin America
- Middle East

NOTE: These chronological divisions are approximate. In case of ambiguities, please contact the director of undergraduate studies.

MAJOR IN HISTORY AND THEORY OF ARCHITECTURE

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

Majors can take advantage of one of the strengths of the department by focusing on architectural history. This track combines an introductory studio in architectural design with a slightly modified program in art history. Major requirements were updated in February 2019; please contact the director of undergraduate studies with any questions.

The requirements for the major are as follows:

AHIS UN3000 Majors' Colloquium: the Literature and Methods of Art History

Seven lecture courses in art history, one of which must be AHIS UN1007 Introduction to Architecture, and three of which must focus on architectural history. Courses must cover four of five general areas:

Ancient Mediterranean

Medieval Europe

Renaissance and Baroque

18th-20th century

Non-Western

At least two seminars in art history or architectural history

Architectural Studio:

ARCH UN1020 Introduction To Architectural Design and Visual Culture

NOTE: These chronological divisions are approximate. In case of ambiguities, please contact the director of undergraduate studies.

MAJOR IN ART HISTORY AND VISUAL ARTS

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

Students interested in the combined major should contact the coordinator for undergraduate programs in the Art History department, as well as the director of undergraduate studies in the Visual Arts department.

Up to two 3-point courses in art history may be replaced by a related course in another department, with approval of the adviser. The combined major requires the completion of sixteen or seventeen courses. It is recommended that students interested in this major begin working toward the requirements in their sophomore year.

The requirements for the major are as follows:

AHIS UN3000 Majors' Colloquium: the Literature and Methods of Art History

Seven 3-point lecture courses in art history:

At least one course in three of four historical periods, as listed below

An additional two courses in two different world regions, as listed below

Two additional lectures of the student's choice

21 points in Visual Arts covering:

VIAR UN1000 Basic Drawing

VIAR UN2300 Sculpture I

or VIAR UN2200 Ceramics I

Five additional VIAR 3-point studio courses (15 points)

In the senior year, students must complete either a seminar in the Department of Art History and Archaeology or a senior project in visual arts (pending approval by the Visual Arts Department).

NOTE: These chronological divisions are approximate. In case of ambiguities, please contact the director of undergraduate studies.

Historical Periods

- Ancient (pre-400 CE/AD)
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- 1400-1700
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World Regions

- Africa
- Asia
- Europe/North America/Australia

- Latin America
- Middle East

CONCENTRATION IN ART HISTORY

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

The requirements for the concentration are as follows:

Seven 3-point lecture courses in art history:

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An additional two courses in two different world regions, listed below

Two additional lectures of the student's choice

NOTE: These chronological divisions are approximate. In case of ambiguities, please contact the director of undergraduate studies.

Historical Periods

- Ancient (pre-400 CE/AD)
- 400-1400
- 1400-1700
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World Regions

- Africa
- Asia
- Europe/North America/Australia
- Latin America
- Middle East

Concentrators are not required to take the majors colloquium, a seminar, or a studio course.

CONCENTRATION IN HISTORY AND THEORY OF ARCHITECTURE

Please read *Guidelines for all for Art History and Archaeology Majors, Concentrators, and Interdepartmental Majors* above.

The requirements for the concentration are as follows:

AHIS UN1007 Introduction to the History of Architecture

Seven lecture courses in art history, one of which must be AHIS UN1007 Introduction to the History of Architecture, and three of which must focus on architectural history.

Courses must cover four of five general areas:

Ancient Mediterranean

Medieval Europe

Renaissance and Baroque

18th-20th century

Non-Western

Concentrators are not required to take the majors colloquium, a seminar, or a studio course.

ART HISTORY-VISUAL ARTS

Departmental Office: 826 Schermerhorn; 212-854-4505
<http://www.columbia.edu/cu/arhistory/>

Director of Undergraduate Studies: Prof. Barry Bergdoll, 918 Schermerhorn; 212-854-5425; bgb1@columbia.edu

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Coordinator for Undergraduate Programs: Emily Benjamin, 826 Schermerhorn; 212-854-4505; eb3061@columbia.edu

The goal of the major in the Department of Art History and Archaeology is to explore the history of art, architecture, and archaeology across a broad historical, cultural, geographic, and methodological spectrum.

Department courses take advantage of the extraordinary cultural resources of New York City and often involve museum assignments and trips to local monuments. The department offers a major and concentration in art history and in the history and theory of architecture, and a combined major in art history and visual arts.

At the heart of the major is AHIS UN3000 Majors' Colloquium: the Literature and Methods of Art History, which introduces students to different methodological approaches to art history and critical texts that have shaped the discipline. The colloquium also prepares students for the independent research required in seminars and advanced lecture courses, and should be taken during the junior year.

Surveys and advanced lecture courses offered by Barnard and Columbia cover the spectrum of art history from antiquity to the present and introduce students to a wide range of materials and methodologies. Limited-enrollment seminars have a narrower focus and offer intensive instruction in research and writing. The opportunity for advanced research with a senior thesis is available to students who qualify.

The major readily accommodates students who wish to study abroad during junior year. Courses taken at accredited programs can generally count as transfer credits toward the major, but students must gain the approval of the director of undergraduate studies. Similarly, any transfer credit for the major must be approved by the director of undergraduate studies. Generally no more than 12 points of transfer credit are applicable to the major. The form to petition for transfer

credit can be found on the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>). Eligible Art History courses taken at Reid Hall and through the Berlin Consortium are counted as Columbia courses, not transfer courses.

All newly declared majors and concentrators should visit the department office and speak with the undergraduate program coordinator about the requirements and their planned curriculum.

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COURSE INFORMATION

Lectures

Attendance at the first class meeting is recommended.

Colloquia

For information about enrollment in the required colloquium *AHIS UN3000 Majors' Colloquium: the Literature and Methods of Art History*, students should consult the department during the registration period in the semester prior to the one in which the course is offered. Interested students must sign up using an online form; majors will be informed of the sign-up dates and deadline via the majors mailing list. Enrollment is limited and admission is at the discretion of the instructor. It is recommended that students sign up for the colloquium in their junior year.

Seminars

Seminars require an application which is due in the departmental office in 826 Schermerhorn before the registration period in the semester prior to the one in which the course is offered (April for fall courses, November for spring courses). The required application form is available in PDF format on the department website (<http://www.columbia.edu/cu/arhistory/undergraduate/forms.html>). Students should wait list the seminars to which they apply on SSOL.

Bridge Seminars

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STUDY ABROAD

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ON LEAVE

Prof. Freedberg, Trever (2019-2020)
Prof. Crary, de Angelis, Delbanco, Harrist (Fall 2019)
Prof. Dehejia, Jones, Krauss, Mylonopoulos, Pistis (Spring 2020)

MAJOR IN ART HISTORY AND VISUAL ARTS

Students electing the combined major should consult with a faculty adviser in the department, as well as with the director of undergraduate studies in the Visual Arts Department.

Up to two of the seven 3-point courses in art history may be replaced by a specifically related course in another department with approval of the adviser. The combined major requires fulfillment of sixteen or seventeen courses. It is recommended that students interested in this major begin work toward the requirements in their sophomore year.

The requirements for the major are as follows:

AHIS W3895	Majors' Colloquium: the Literature and Methods of Art History
------------	---

Seven 3-point lecture courses in art history.

At least one course in three of four historical periods, as listed below.

An additional two courses drawn from at least two different world regions, as listed below.

Two additional lectures of the student's choice

21 points in Visual Arts covering:

VIAR R1001	Basic Drawing
------------	---------------

VIAR R3330	Sculpture I
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Five additional VIAR R3000-level or above course

In the senior year, students undertake either a seminar in the Department of Art History and Archaeology or a senior project in visual arts (pending approval by the Visual Arts Department).

NOTE: These chronological divisions are approximate. In case of ambiguities about the eligibility of a course to fill the requirement, please consult the director of undergraduate studies.

Historical Periods

- Ancient (up to 400 CE/AD)
- 400-1400
- 1400-1700
- 1700-present

World Regions

- Africa
- Asia
- Europe, North America, Australia
- Latin America
- Middle East

ASTRONOMY

Departmental Office: 1328 Pupin; 212-854-3278
<http://www.astro.columbia.edu>

Director of Undergraduate Studies:

Prof. Frederik B.S. Paerels, 1022 Pupin;
 212-854-0181; frits@astro.columbia.edu

Astronomy is, at once, the oldest science and one of the most vibrant fields of modern research. Its goal is to construct testable, quantitative, coherent models of the universe (the UNItY of the diVERSE) and its contents—galaxies, stars, and planets. The department offers two majors, both of which require a solid grounding in the mathematics and physics necessary for the pursuit of the discipline.

The astrophysics major is designed as preparation for graduate study and consists of a standard physics major sequence; a yearlong introduction to astrophysics (typically taken in the sophomore year, but open to first-years with adequate preparation in calculus and physics); and two required courses covering advanced topics in astronomy. Research, in the form of summer internships and/or term-time independent projects, which can lead to a senior thesis, is strongly encouraged. For a research thesis, students should enroll in the parallel, two-semester sequence *ASTR UN3997-ASTR UN3998 Independent Research*, preferably in their senior year. Students begin the research project in the fall and complete the written thesis in the spring. *ASTR UN3997* and *ASTR UN3998* cannot be repeated for credit.

The astronomy major provides a basis for further study in the field, but is also designed to be compatible with liberal arts students who pursue other careers and those wishing to combine astronomy with related sciences other than physics, such as chemistry or geology. It requires only two physics courses beyond the introductory sequence and can be completed easily if begun in the sophomore year.

The department offers numerous introductory astronomy courses at the 1000-level that do not have prerequisites. The calculus-based *ASTR UN2001 Introduction To Astrophysics, I-ASTR UN2002 Introduction To Astrophysics, II* sequence is recommended for astronomy majors and concentrators and is required for astrophysics majors.

Most 3000-level courses, as well as *ASTR GU4260 Modeling the Universe*, are offered every other year. Students should inquire with the director of undergraduate studies if they have specific questions on the course schedule. *ASTR UN3996 Current Research in Astrophysics* is a one-point course offered in the fall, designed to introduce majors to research methods and topics. It requires students to attend the department colloquia and a seminar designed to help students understand the colloquium topic. The 3000-level courses need not be taken in any particular order.

PROFESSORS

James Applegate
 Greg Bryan
 Zoltan Haiman
 Jules P. Halpern
 David J. Helfand
 Kathryn Johnston
 Laura Kay (Barnard)
 Jeremiah P. Ostriker
 Frederik B. S. Paerels
 Joseph Patterson
 Mary E. Putman
 David Schiminovich (Chair)
 Edward A. Spiegel (*emeritus*)
 Jacqueline van Gorkom

ASSOCIATE PROFESSOR

Marcel Agüeros

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 Lorenzo Sironi

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 Mordecai-Mark MacLow (Hayden Planetarium)
 Rebecca Oppenheimer (Hayden Planetarium)

Michael Shara (Hayden Planetarium)

Ruth Angus (Hayden Planetarium)

SENIOR LECTURER

Caleb Scharf

ON LEAVE

Profs. Johnston, Kay, Kipping, Sironi (*Spring 2020*)

GUIDELINES FOR ALL ASTRONOMY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Courses in which the grade of D has been received do not count toward the major or concentration requirements.

MAJOR IN ASTRONOMY

The major requirements, to be planned with the director of undergraduate studies, are as follows:

Mathematics

Calculus sequence through MATH UN1202 Calculus IV or MATH UN1208 Honors Mathematics IV

Astronomy

Select one of the following options:

Option 1:

Two 3-point 1000-level astronomy courses

12 points in astronomy at the 2000-level or above

Option 2:

ASTR UN2001 Introduction To Astrophysics, I
- ASTR UN2002 and Introduction To Astrophysics, II

9 points in astronomy at the 3000-level or above

Physics

Select one of the following physics sequences:

Sequence 1:

PHYS UN1401 Introduction To Mechanics and
- PHYS UN1402 Thermodynamics
- PHYS UN1403 and Introduction To Electricity,
Magnetism, and Optics
and Introduction to Classical and
Quantum Waves

Sequence 2:

PHYS UN1601 Physics, I: Mechanics and
- PHYS UN1602 Relativity
- PHYS UN2601 and Physics, II: Thermodynamics,
Electricity, and Magnetism
and Physics, III: Classical and
Quantum Waves

Sequence 3:

PHYS UN2801 Accelerated Physics I
- PHYS UN2802 and Accelerated Physics II

Additional Physics Courses

Two physics courses at the 3000-level or above

Students contemplating graduate study are advised to include at least two of these physics courses:

PHYS UN3003	Mechanics
PHYS UN3007	Electricity and Magnetism
PHYS GU4021 - PHYS GU4022	Quantum Mechanics I and Quantum Mechanics II

One of these may be substituted for 3 points of astronomy.

MAJOR IN ASTROPHYSICS

Students considering an Astrophysics major are encouraged to meet with the director of undergraduate studies. If possible, it is useful to start the physics sequence in the first year.

Mathematics

Calculus sequence through MATH UN1202 Calculus IV or MATH UN1208 Honors Mathematics IV

Astronomy

ASTR UN2001 Introduction To Astrophysics, I
- ASTR UN2002 and Introduction To Astrophysics, II

6 points in astronomy at the 3000-level or above

Physics

Select one of the following physics sequences:

Sequence 1:

PHYS UN1401 Introduction To Mechanics and
- PHYS UN1402 Thermodynamics
- PHYS UN1403 and Introduction To Electricity,
Magnetism, and Optics
and Introduction to Classical and
Quantum Waves

Sequence 2:

PHYS UN1601 Physics, I: Mechanics and
- PHYS UN1602 Relativity
- PHYS UN2601 and Physics, II: Thermodynamics,
Electricity, and Magnetism
and Physics, III: Classical and
Quantum Waves

Sequence 3:

PHYS UN2801 Accelerated Physics I
- PHYS UN2802 and Accelerated Physics II

Additional Physics Courses

PHYS UN3003	Mechanics
PHYS UN3007	Electricity and Magnetism
PHYS UN3008	Electromagnetic Waves and Optics
PHYS GU4021 - PHYS GU4022	Quantum Mechanics I and Quantum Mechanics II

OR

PHYS BC3006 - PHYS GU4023	Quantum Physics and Thermal and Statistical Physics
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CONCENTRATION IN ASTRONOMY

An extra 3 points of physics can substitute for 3 points of astronomy, as long as the course submitted is at the equivalent or higher level. The concentration requirements are as follows:

Mathematics

9 points of mathematics

Astronomy

15 points of astronomy, nine of which must be at or above the 2000-level

Physics

9 points of physics

ASTROPHYSICS

Departmental Office: 1328 Pupin; 212-854-3278
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Director of Undergraduate Studies:

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ON LEAVE

Prof. Johnston, Kay, Kipping, Sironi (*Spring 2020*)

GUIDELINES FOR ALL ASTRONOMY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

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The major requirements, to be planned with the director of undergraduate studies, are as follows:

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Select one of the following options:

Option 1:

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12 points in astronomy at the 2000-level or above

Option 2:

ASTR UN2001 Introduction To Astrophysics, I
- ASTR UN2002 and Introduction To Astrophysics, II

9 points in astronomy at the 3000-level or above

Physics

Select one of the following physics sequences:

Sequence 1:

PHYS UN1401 Introduction To Mechanics and
- PHYS UN1402 Thermodynamics
- PHYS UN1403 and Introduction To Electricity,
Magnetism, and Optics
and Introduction to Classical and
Quantum Waves

Sequence 2:

PHYS UN1601 Physics, I: Mechanics and
- PHYS UN1602 Relativity
- PHYS UN2601 and Physics, II: Thermodynamics,
Electricity, and Magnetism
and Physics, III: Classical and
Quantum Waves

Sequence 3:

PHYS UN2801 Accelerated Physics I
- PHYS UN2802 and Accelerated Physics II

Additional Physics Courses

Two physics courses at the 3000-level or above

Students contemplating graduate study are advised to include at least two of these physics courses:

PHYS UN3003 Mechanics
PHYS UN3007 Electricity and Magnetism
PHYS GU4021 Quantum Mechanics I
- PHYS GU4022 and Quantum Mechanics II

One of these may be substituted for 3 points of astronomy.

MAJOR IN ASTROPHYSICS

Students considering an Astrophysics major are encouraged to meet with the director of undergraduate studies. If possible, it is useful to start the physics sequence in the first year.

Mathematics

Calculus sequence through MATH UN1202 Calculus IV or MATH UN1208 Honors Mathematics IV

Astronomy

ASTR UN2001 Introduction To Astrophysics, I
- ASTR UN2002 and Introduction To Astrophysics, II

6 points in astronomy at the 3000-level or above

Physics

Select one of the following physics sequences:

Sequence 1:

PHYS UN1401 Introduction To Mechanics and
- PHYS UN1402 Thermodynamics
- PHYS UN1403 and Introduction To Electricity,
Magnetism, and Optics
and Introduction to Classical and
Quantum Waves

Sequence 2:

PHYS UN1601 Physics, I: Mechanics and
- PHYS UN1602 Relativity
- PHYS UN2601 and Physics, II: Thermodynamics,
Electricity, and Magnetism
and Physics, III: Classical and
Quantum Waves

Sequence 3:

PHYS UN2801 Accelerated Physics I
- PHYS UN2802 and Accelerated Physics II

Additional Physics Courses

PHYS UN3003 Mechanics
PHYS UN3007 Electricity and Magnetism
PHYS UN3008 Electromagnetic Waves and Optics
PHYS GU4021 Quantum Mechanics I
- PHYS GU4022 and Quantum Mechanics II

OR

PHYS BC3006 Quantum Physics
- PHYS GU4023 and Thermal and Statistical
Physics

CONCENTRATION IN ASTRONOMY

An extra 3 points of physics can substitute for 3 points of astronomy, as long as the course submitted is at the equivalent or higher level. The concentration requirements are as follows:

Mathematics

9 points of mathematics

Astronomy

15 points of astronomy, nine of which must be at or above the 2000-level

Physics

9 points of physics

BIOCHEMISTRY

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Chemistry, the study of molecules, is a central science interesting for its own sake but also necessary as an intellectual link to the other sciences of biology, physics, and environmental science. Faculty find the various disciplines of chemistry fascinating because they establish intellectual bridges between the macroscopic or human-scale world that we see, smell, and touch, and the microscopic world that affects every aspect of our lives. The study of chemistry begins on the microscopic scale and extends to engage a variety of different macroscopic contexts.

Chemistry is currently making its largest impact on society at the nexus between chemistry and biology and the nexus between chemistry and engineering, particularly where new materials are being developed. A typical chemistry laboratory now has more computers than test tubes and no longer smells of rotten eggs.

The chemistry department majors are designed to help students focus on these new developments and to understand the factors influencing the nature of the discipline. Because the science is constantly changing, courses change as well, and while organic and physical chemistry remain the bedrock courses, they too differ greatly from the same courses 40 years ago. Many consider biochemistry to be a foundation course as well. Although different paths within the chemistry major take different trajectories, there is a core that provides the essential foundation students need regardless of the path they choose. Students should consider majoring in chemistry if they share or can develop a fascination with the explanatory power that comes with an advanced understanding of the nature and influence of the microscopic world of molecules.

Students who choose to major in chemistry may elect to continue graduate study in this field and obtain a Ph.D. which is a solid basis for a career in research, either in the industry or in a university. A major in chemistry also provides students with an astonishing range of career choices such as working in the chemical or pharmaceutical industries or in many other businesses where a technical background is highly desirable. Other options include becoming a financial analyst for a technical company, a science writer, a high school chemistry teacher, a patent attorney, an environmental consultant, or a hospital laboratory manager, among others. The choices are both numerous and various as well as intellectually exciting and personally fulfilling.

ADVANCED PLACEMENT

The department grants advanced placement (AP) credit for a score of 4 or 5 or the equivalent. The amount of credit granted is based on the results of the department placement exam and completion of the requisite course. Students who are placed into CHEM UN1604 Intensive General Chemistry (Lecture) are granted 3 points of credit; students who are placed into CHEM UN2045 Intensive Organic Chemistry I (Lecture)-CHEM UN2046 Intensive Organic Chemistry II (Lecture) are granted 6 points of credit. In either case, credit is granted only upon completion of the course with a grade of C or better. Students must complete a department placement exam prior to registering for either of these courses.

PROGRAMS OF STUDY

The Department of Chemistry offers four distinct academic major programs for undergraduates interested in professional-level training and education in the chemical sciences: chemistry, chemical physics, biochemistry and environmental chemistry. For students interested in a program of less extensive study and coursework, the department offers a concentration in chemistry.

COURSE INFORMATION

The results of the placement exam are used to advise students which track to pursue. The Department of Chemistry offers three different tracks. Students who wish to take Track 2 or 3 classes must take the placement exam. Students who wish to pursue Track 1 classes do not need to take the placement exam.

TRACK INFORMATION

In the first year, Track 1 students with one year of high school chemistry take a one-year course in general chemistry, and the one-term laboratory course that accompanies it. In the second year, students study organic chemistry, and take organic chemistry laboratory.

Students who qualify by prior examination during orientation week can place into the advanced tracks. There are two options. Track 2 students take, in the fall term, a special one-term intensive course in general chemistry in place of the one-year course. In the second year, students study organic chemistry

and take organic chemistry laboratory. Track 3 students take a one-year course in organic chemistry for first-year students and the one-term intensive general chemistry laboratory course. In the second year, students enroll in physical chemistry and the organic chemistry laboratory course.

Additional information on the tracks can be found in the *Requirements* section.

ADDITIONAL COURSES

First-year students may also elect to take CHEM UN2408. This seminar focuses on topics in modern chemistry, and is offered to all students who have taken at least one semester of college chemistry and have an interest in chemical research.

Biochemistry (BIOC UN3501, BIOC UN3512) is recommended for students interested in the biomedical sciences.

Physical chemistry (CHEM UN3079-CHEM UN3080), a one-year program, requires prior preparation in mathematics and physics. The accompanying laboratory is CHEM UN3085-CHEM UN3086.

Also offered are a senior seminar (CHEM UN3920); advanced courses in biochemistry, inorganic, organic, and physical chemistry; and an introduction to research (CHEM UN3098).

SAMPLE PROGRAMS

Some *typical* programs are shown below. Programs are crafted by the student and the director of undergraduate studies to meet individual needs and interests.

Track 1

First Year

- CHEM UN1403 General Chemistry I (Lecture)
- CHEM UN1404 General Chemistry II (Lecture)
- CHEM UN1500 General Chemistry Laboratory
- CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and physics as required.

Second Year

- CHEM UN2443 Organic Chemistry I (Lecture)
- CHEM UN2444 Organic Chemistry II (Lecture)
- CHEM UN2493 Organic Chemistry Laboratory I (Techniques)
- CHEM UN2494 Organic Chemistry Laboratory II (Synthesis)

Calculus and physics as required.

Third Year

- CHEM UN3079 Physical Chemistry I
- CHEM UN3080 Physical Chemistry II
- BIOC UN3501 Biochemistry: Structure and Metabolism

CHEM UN3546 Advanced Organic Chemistry Laboratory

CHEM UN3098 Supervised Independent Research

Fourth Year

CHEM UN3085 Physical and Analytical Chemistry Laboratory I

CHEM UN3086 Physical and Analytical Chemistry Laboratory II

CHEM UN3920 Senior Seminar in Chemical Research

CHEM GU4071 Inorganic Chemistry

Advanced courses (4000-level or higher)

Track 2

First Year

CHEM UN1507 Intensive General Chemistry Laboratory

CHEM UN1604 Intensive General Chemistry (Lecture)

CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and physics as required.

Second Year

CHEM UN2443 Organic Chemistry I (Lecture)

CHEM UN2444 Organic Chemistry II (Lecture)

CHEM UN2493 Organic Chemistry Laboratory I (Techniques)

CHEM UN2494 Organic Chemistry Laboratory II (Synthesis)

Calculus and physics as required.

Third Year

CHEM UN3079 Physical Chemistry I

CHEM UN3080 Physical Chemistry II

BIOC UN3501 Biochemistry: Structure and Metabolism

CHEM UN3546 Advanced Organic Chemistry Laboratory

CHEM UN3098 Supervised Independent Research

Fourth Year

CHEM UN3085 Physical and Analytical Chemistry Laboratory I

CHEM UN3086 Physical and Analytical Chemistry Laboratory II

CHEM UN3920 Senior Seminar in Chemical Research

CHEM GU4071 Inorganic Chemistry

Advanced courses (4000-level or higher)

Track 3

First Year

CHEM UN1507 Intensive General Chemistry Laboratory

- CHEM UN2045 Intensive Organic Chemistry I
(Lecture)
CHEM UN2046 Intensive Organic Chemistry II
(Lecture)
CHEM UN2408 First-Year Seminar in Chemical
Research

Calculus and Physics as required.

Second Year

- CHEM UN3079 Physical Chemistry I
CHEM UN3080 Physical Chemistry II
CHEM UN2545 Intensive Organic Chemistry
Laboratory
CHEM UN3546 Advanced Organic Chemistry
Laboratory

Calculus and physics as required.

Third Year

- BIOC UN3501 Biochemistry: Structure and
Metabolism
CHEM UN3085 Physical and Analytical Chemistry
Laboratory I
CHEM UN3086 Physical and Analytical Chemistry
Laboratory II
CHEM UN3098 Supervised Independent Research
CHEM GU4071 Inorganic Chemistry

Fourth Year

- CHEM UN3920 Senior Seminar in Chemical Research
Advanced courses (4000-level or higher)

PROFESSORS

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Louis Brus
Virginia W. Cornish
Kenneth B. Eisenthal
Richard A. Friesner
Ruben Gonzalez
Laura Kaufman
James L. Leighton
Ann E. McDermott
Wei Min
Jack R. Norton
Colin Nuckolls
Gerard Parkin
David R. Reichman
Tomislav Rovis
Dalibor Sames
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Xavier Roy
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Luis Avila
Fay Ng
Karen Phillips

LECTURERS

Robert Beer
John Decatur
Charles E. Doubleday
Sarah Hansen
Ruben Savizky
Talha Siddiqui

ASSOCIATES

Anna Ghurbanyan
Joseph Ulichny

GUIDELINES FOR ALL CHEMISTRY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Students majoring in chemistry or in one of the interdepartmental majors in chemistry should go to the director of undergraduate studies or the undergraduate program manager in the Department of Chemistry to discuss their program of study. Chemistry majors and interdepartmental majors usually postpone part of the Core Curriculum beyond the sophomore year.

Chemistry Tracks

All students who wish to start with Track 2 or 3 courses must take a placement exam. The results of the placement exam are used to advise students which track to pursue. Unless otherwise specified below, all students must complete one of the following tracks:

Track 1

CHEM UN1403	General Chemistry I (Lecture)
CHEM UN1404	General Chemistry II (Lecture)
CHEM UN1500	General Chemistry Laboratory
CHEM UN2443	Organic Chemistry I (Lecture)
CHEM UN2444	Organic Chemistry II (Lecture)

CHEM UN2493 Organic Chemistry Laboratory I (Techniques)

CHEM UN2494 Organic Chemistry Laboratory II (Synthesis)

Track 2

CHEM UN1500 General Chemistry Laboratory
or CHEM UN1507 Intensive General Chemistry Laboratory

CHEM UN1604 Intensive General Chemistry (Lecture)

CHEM UN2443 Organic Chemistry I (Lecture)

CHEM UN2444 Organic Chemistry II (Lecture)

CHEM UN2493 Organic Chemistry Laboratory I (Techniques)

CHEM UN2494 Organic Chemistry Laboratory II (Synthesis)

Track 3

CHEM UN1507 Intensive General Chemistry Laboratory

CHEM UN2045 Intensive Organic Chemistry I (Lecture)

CHEM UN2046 Intensive Organic Chemistry II (Lecture)

CHEM UN2545 Intensive Organic Chemistry Laboratory

Physics Sequences

Unless otherwise specified below, all students must complete one of the following sequences:

Sequence A

For students with limited background in high school physics:

PHYS UN1401 Introduction To Mechanics and Thermodynamics

PHYS UN1402 Introduction To Electricity, Magnetism, and Optics

PHYS UN1403 Introduction to Classical and Quantum Waves

For chemistry majors, the following laboratory courses are recommended, NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN1494 Introduction to Experimental Physics

PHYS UN2699 Experiments in Classical and Modern Physics

PHYS UN3081 Intermediate Laboratory Work

Sequence B

PHYS UN1601 Physics, I: Mechanics and Relativity

PHYS UN1602 Physics, II: Thermodynamics, Electricity, and Magnetism

PHYS UN2601 Physics, III: Classical and Quantum Waves

or PHYS UN3081 Intermediate Laboratory Work

For chemistry majors, the following laboratory courses are recommended NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN2699 Experiments in Classical and Modern Physics

Sequence C

For students with advanced preparation in physics and mathematics:

PHYS UN2801 Accelerated Physics I
- PHYS UN2802 and Accelerated Physics II

For chemistry majors, the following laboratory courses are recommended NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN2699 Experiments in Classical and Modern Physics

or PHYS UN3081 Intermediate Laboratory Work

MAJOR IN CHEMISTRY

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN2408 First-Year Seminar in Chemical Research (Recommended NOT required)

CHEM UN3079 Physical Chemistry I

CHEM UN3080 Physical Chemistry II

CHEM UN3085 Physical and Analytical Chemistry Laboratory I

CHEM UN3086 Physical and Analytical Chemistry Laboratory II

CHEM UN3546 Advanced Organic Chemistry Laboratory

CHEM UN3920 Senior Seminar in Chemical Research

CHEM GU4071 Inorganic Chemistry

Select one course from the following:

CHEM UN3098 Supervised Independent Research
OR Chemistry courses numbered CHEM GU4000 or above

Physics

Select one of the physics sequences outlined above in the Guidelines section.

Mathematics

Select one of the following sequences:

Four semesters of calculus:

MATH UN1101 Calculus I
- MATH UN1102 and Calculus II
- MATH UN1201 and Calculus III
- MATH UN1202 and Calculus IV

Two semesters of honors mathematics:

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

MAJOR IN BIOCHEMISTRY

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN2408 First-Year Seminar in Chemical Research (Recommended NOT required)

CHEM UN3079 Physical Chemistry I

CHEM UN3080 Physical Chemistry II

Biology

BIOL UN1908 First-Year Seminar in Modern Biology (Recommended NOT required)

BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology

BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology

BIOC UN3501 Biochemistry: Structure and Metabolism

BIOC UN3512 Molecular Biology

Physics

Select one of the following physics sequences:

Sequence A:

PHYS UN1201 General Physics I
- PHYS UN1202 and General Physics II

Sequence B:

PHYS UN1401 Introduction To Mechanics and Thermodynamics
- PHYS UN1402 and Introduction To Electricity, Magnetism, and Optics
- PHYS UN1403 and Introduction to Classical and Quantum Waves (PHYS UN1403 is recommended NOT required)

Sequence C:

PHYS UN1601 Physics, I: Mechanics and Relativity
- PHYS UN1602 and Physics, II: Thermodynamics, Electricity, and Magnetism
- PHYS UN2601 and Physics, III: Classical and Quantum Waves (PHYS UN2601 is recommended but not required)

Sequence D:

PHYS UN2801 Accelerated Physics I
- PHYS UN2802 and Accelerated Physics II

Mathematics

Select one of the following sequences:

Two semesters of calculus:

MATH UN1101 Calculus I
- MATH UN1102 and Calculus II
- MATH UN1201 and Calculus III
- MATH UN1202 and Calculus IV

Two semesters of honors mathematics:

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

AP credit and one term of calculus (Calculus II or higher)

Additional Courses

Select two of the following upper level laboratory courses (one should be a Biology lab):

BIOL UN3040 Lab in Molecular Biology
- BIOL UN2501 and Contemporary Biology Laboratory

BIOL UN3050 Project Laboratory In Protein Biochemistry

BIOL UN3052 Project Laboratory in Molecular Genetics

BIOL UN3500 Independent Biological Research

CHEM UN3085 Physical and Analytical Chemistry Laboratory I

CHEM UN3086 Physical and Analytical Chemistry Laboratory II

CHEM UN3098 Supervised Independent Research

CHEM UN3546 Advanced Organic Chemistry Laboratory

Select any three courses from the following:

CHEM GU4071 Inorganic Chemistry

CHEM GU4102 Chemistry for the Brain

CHEM GU4147 Advanced Organic Chemistry

BIOC GU4323 Biophysical Chemistry I

BIOC GU4324 Biophysical Chemistry II

MATH UN3027 Ordinary Differential Equations
or MATH UN2030 Ordinary Differential Equations

One additional semester of calculus

One additional semester of honors math:

MATH UN1207 Honors Mathematics A

or MATH UN1208 Honors Mathematics B

Any biology course at the 3000/4000 level for 3 or more points. The following are recommended:

BIOL UN3004 Neurobiology I: Cellular and Molecular Neurobiology

or BIOL UN3005 Neurobiology II: Development & Systems

BIOL UN3008 The Cellular Physiology of Disease

BIOL UN3022 Developmental Biology

BIOL UN3034 Biotechnology

BIOL UN3041 Cell Biology

BIOL UN3073 Cellular and Molecular Immunology

BIOL GU4065 Molecular Biology of Disease

BIOL GU4300 Drugs and Disease

MAJOR IN CHEMICAL PHYSICS

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN3079	Physical Chemistry I
CHEM UN3080	Physical Chemistry II
CHEM UN3085	Physical and Analytical Chemistry Laboratory I
CHEM UN3086	Physical and Analytical Chemistry Laboratory II
CHEM UN3098	Supervised Independent Research
CHEM UN3920	Senior Seminar in Chemical Research
CHEM GU4221 or PHYS GU4021	Quantum Chemistry Quantum Mechanics I

Physics

Select one of the physics sequences outlined above in *Guidelines for all Chemistry Majors, Concentrators and Interdepartmental Majors*. For the chemical physics major, one lab **MUST** be completed for the sequence chosen.

Complete the following lectures:

PHYS UN3003	Mechanics
PHYS UN3007	Electricity and Magnetism
PHYS UN3008	Electromagnetic Waves and Optics

Mathematics

Select one of the following sequences:

Four semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B
- MATH UN3027	and Ordinary Differential Equations

Two semesters of advanced calculus:

MATH UN1202	Calculus IV
- MATH UN3027	and Ordinary Differential Equations

MAJOR IN ENVIRONMENTAL CHEMISTRY

The requirements for this program were modified on February 1, 2016. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above. A second semester of Organic Chemistry lecture is recommended NOT required.

CHEM UN3079	Physical Chemistry I
CHEM GU4071	Inorganic Chemistry

The following courses are recommended NOT required:

CHEM UN2408	First-Year Seminar in Chemical Research
CHEM UN3920	Senior Seminar in Chemical Research

Earth and Environmental Science

Select two of the following three courses:

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System

Additional course required:

EESC UN3101	Geochemistry for a Habitable Planet
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Select one of the following labs:

EESC BC3016	Environmental Measurements
CHEM UN3085	Physical and Analytical Chemistry Laboratory I

Select one option for Independent Research in Environmental Chemistry:

EESC BC3800	Senior Research Seminar
- EESC BC3801	and Senior Research Seminar
CHEM UN3098	Supervised Independent Research (It is strongly recommended to take CHEM UN3920 if taking CHEM UN3098)

Physics

Select one of the following physics sequences:

Sequence A:

PHYS UN1201	General Physics I
- PHYS UN1202	and General Physics II

Sequence B:

PHYS UN1401	Introduction To Mechanics and Thermodynamics
- PHYS UN1402	and Introduction To Electricity, Magnetism, and Optics
- PHYS UN1403	and Introduction to Classical and Quantum Waves (Recommended NOT required)

Sequence C:

PHYS UN1601 - PHYS UN1602 - PHYS UN2601	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves (Recommended, not required)
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Sequence D:

PHYS UN2801 - PHYS UN2802	Accelerated Physics I and Accelerated Physics II
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Mathematics

Two semesters of calculus:

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN1202	Calculus IV

Additional Courses

Select any two of the following:

Chemistry:

CHEM UN3080	Physical Chemistry II
CHEM GU4103	Organometallic Chemistry
CHEM GU4147	Advanced Organic Chemistry

Earth and Environmental Science:

EESC BC3017	Environmental Data Analysis
EESC BC3025	Hydrology
EESC GU4008	Introduction to Atmospheric Science
EESC GU4009	Chemical Geology
EESC GU4040	Climate Thermodynamics and Energy Transfer
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
EESC GU4600	Earth Resources and Sustainable Development
EESC GU4835	Wetlands and Climate Change
EESC GU4885	The Chemistry of Continental Waters
EESC GU4888	Stable Isotope Geochemistry
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4925	Principles of Physical Oceanography
EESC GU4926	Principles of Chemical Oceanography

Earth and Environmental Engineering:

EAAE E4001	Industrial ecology of earth resources
EAAE E4003	Aquatic chemistry

Mathematics:

One additional semester of calculus

CONCENTRATION IN CHEMISTRY

No more than four points of CHEM UN3098 Supervised Independent Research may be counted toward the concentration.

Select one of the three chemistry tracks listed below.

PHYS UN1201 - PHYS UN1202	General Physics I and General Physics II
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Two semesters of calculus

Chemistry Tracks**Track 1**

CHEM UN1403	General Chemistry I (Lecture)
CHEM UN1404	General Chemistry II (Lecture)
CHEM UN1500	General Chemistry Laboratory

Select 22 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

Track 2

CHEM UN1500 or CHEM UN1507	General Chemistry Laboratory Intensive General Chemistry Laboratory
CHEM UN1604	Intensive General Chemistry (Lecture)

Select 22 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

Track 3

CHEM UN1507	Intensive General Chemistry Laboratory
CHEM UN2045	Intensive Organic Chemistry I (Lecture)
CHEM UN2046	Intensive Organic Chemistry II (Lecture)

Select 18 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

BIOLOGICAL SCIENCES

Departmental Office: 600 Fairchild, 212-854-4581;
mes2314@columbia.edu; biology@columbia.edu

Director of Undergraduate Studies, Undergraduate Programs and Laboratories:

Prof. Deborah Mowshowitz, 744D Mudd; 212-854-4497;
dbm2@columbia.edu

Biology Major and Concentration Advisers:

For a list of current biology, biochemistry, biophysics, and neuroscience and behavior advisers, please visit <http://biology.columbia.edu/programs/advisors> (<http://biology.columbia.edu/programs/advisors/>)

A-H: Prof. Daniel Kalderon, 1013 Fairchild;
ddk1@columbia.edu

I-P: Prof. Alice Heicklen, 744B Mudd; ah2289@columbia.edu

Q-Z: Prof. Harmen Bussemaker, 607E Fairchild;
hjb2004@columbia.edu
Backup Advisor: Prof. Deborah Mowshowitz, 744D Mudd;
212-854-4497; dbm2@columbia.edu

Biochemistry Advisers:

Biology: Prof. Brent Stockwell, 1208 Northwest Corner Building; 212-854-2948; stockwell@biology.columbia.edu
Chemistry: Prof. Virginia Cornish, 1209 Northwest Corner Building; 212-854-5209; vc114@columbia.edu

Biophysics Adviser: Prof. Ozgur Sahin, 908 Northwest Corner Building; os2246@columbia.edu

Neuroscience and Behavior Advisers:

Biology: Prof. Jian Yang, 917A Fairchild; 212-854-6161; jy160@columbia.edu
or Prof. Deborah Mowshowitz, 744D Mudd; 212-854-4497; dbm2@columbia.edu
Psychology:

Professor Caroline Marvin, 317 Schermerhorn Ext, 854-0166, cbm2118@columbia.edu

On-Line Resources:

FAQs for prospective majors: <http://www.columbia.edu/cu/biology/ug/advice/faqs/major.html>
Checklist of major requirements: <http://biology.columbia.edu/programs/major-requirements> (<http://biology.columbia.edu/programs/major-requirements/>)
Additional course information: <http://biology.columbia.edu/courses> (<http://biology.columbia.edu/courses/>)
FAQs for prospective traditional students: <http://www.columbia.edu/cu/biology/ug/advice/faqs/firstyr.html>
FAQs for nontraditional students: <http://www.columbia.edu/cu/biology/ug/advice/faqs/gs.html>

For the first term of their introductory biology sequence, students may take either BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology, which has a prerequisite of chemistry, or EEEB UN2001 Environmental Biology I: Elements to Organisms, which does not require chemistry. EEEB UN2001 Environmental Biology I: Elements to Organisms may be taken in the first year.

BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology should be taken later, after general chemistry. For more details, see *Introductory Courses under Requirements*—Major in Biology. All students interested in biology are encouraged to take BIOL UN1908 First-Year Seminar in Modern Biology in the fall semester of their first year.

Nonscience majors who wish to take a biology course to fulfill the science requirement are encouraged to take BIOL UN1130 Genes and Development. They may also take, with the instructor's permission, BIOL UN3208 Introduction to Evolutionary Biology or EEEB UN2001 Environmental Biology I: Elements to Organisms.

Interested students should consult listings in other departments for courses related to biology. For courses in environmental studies, see listings for Earth and environmental sciences or for ecology, evolution, and environmental biology. For courses in human evolution, see listings for anthropology or for ecology, evolution, and environmental biology. For courses in the history of evolution, see listings for history and for philosophy of science. For a list of courses in computational biology and genomics, visit <http://systemsbiology.columbia.edu/courses> (<http://systemsbiology.columbia.edu/courses/>).

ADVANCED PLACEMENT TRANSFER CREDIT

Transfer credits granted toward the degree are not automatically counted toward the major. The department determines which transfer credits can be counted toward the major. For most majors, at least four biology or biochemistry courses and at least 18 credits of the total (biology, biochemistry, math, physics, and chemistry) must be taken at Columbia. Barnard courses may not be substituted for the required Columbia courses without advance permission from the adviser. For neuroscience and behavior, one of the five biology course and one of the psychology courses may be transferred. Students who wish to count a course from outside Columbia toward their major must receive written approval from their adviser or the director of undergraduate studies. Students must supply a syllabus and/or course description to receive approval.

ADVISING

Neuroscience and Behavior Advisers:

Biology: Prof. Jian Yang, 917A Fairchild; 854-6161; jy160@columbia.edu
or Prof. Deborah Mowshowitz, 744D Mudd; 854-4497; dbm2@columbia.edu
Psychology:

A-E: Professor Carl Hart, 401D Schermerhorn Hall; 212-854-5313; chair@psych.columbia.edu

F-Q: Professor Caroline Marvin, 355B Schermerhorn Ext; 212-854-3608; cbm2118@columbia.edu

R-Z: Professor Don Hood, 415 Schermerhorn; 212-854-4587; dch3@columbia.edu

SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP (SURF) PROGRAM

First-year students, sophomores, and juniors are eligible for the department's paid internship program (SURF). This program is competitive; the department cannot assure every eligible student a place in any given summer.

Students apply to the program early in the spring term. A faculty committee headed by Dr. Alice Hecklen then matches

selected students to appropriate labs. The deadline for SURF applications is at the beginning of the spring semester.

SURF students must submit a report on their work at the end of the summer session and participate in the following year's annual Undergraduate Research Symposium. Although it does not carry any academic credit, SURF can be used toward the lab requirement for majors and toward graduation with honors. For detailed information on all summer research programs and how to apply, please visit the SURF website (<http://www.columbia.edu/cu/biology/ug/surf/>).

Current detailed descriptions of the SURF program and the application procedure are available at SURF's website, <http://www.columbia.edu/cu/biology/ug/surf/>. For more information on the Amgen Scholarship Program, please visit <http://www.columbia.edu/cu/biology/ug/amgen/>. Applications to all of these programs are through SURF.

DEPARTMENTAL HONORS

Students must apply for departmental honors. Applications are due no later than one day after spring break of their senior year. For details, please visit the departmental website at <http://biology.columbia.edu/programs/honors-biological-sciences> (<http://biology.columbia.edu/programs/honors-biological-sciences/>). (<http://biology.columbia.edu/programs/honors-biological-sciences/>)

PROFESSORS

Peter Andolfatto
J. Chloë Bulinski
Harmen Bussemaker
Martin Chalfie
Lawrence Chasin
Julio Fernandez
Stuart Firestein
Joachim Frank
Iva Greenwald
Tulle Hazelrigg
Oliver Hobert
John Hunt
Daniel Kalderon
Darcy Kelley
Laura Landweber
James Manley
Robert Pollack
Carol Prives
Ronald Prywes
Molly Przeworski
Michael Sheetz
Brent Stockwell
Simon Tavare
Saeed Tavazoie
Liang Tong
Alexander Tzagoloff

Jian Yang
Rafael Yuste

ASSOCIATE PROFESSORS

Lars Dietrich
Songtao Jia
Ozgur Sahin
Guy Sella

ASSISTANT PROFESSORS

Erin Barnhart Laura Duvall
Jellert Gaublomme
Marko Jovanovic
Raju Tomer Maria Tosches

LECTURERS

Claire Elise Hazen
Alice Heicklen
Mary Ann Price
Lili Yamasaki

ADJUNCT FACULTY

Lewis Brown Ronald Guido Jay Hammel
Danny Nam Ho
John Loike
Alan Morrison
Deborah Mowshowitz
Solomon Mowshowitz
Dana Pe'er
Vincent Racaniello
David Sable

GUIDELINES FOR ALL BIOLOGICAL SCIENCES MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Returning students should check the departmental website for any last-minute changes and/or additional information. See especially undergraduate updates and list of department courses. All major and concentration requirements are detailed on the website and links provided below.

Exceptions to Requirements

Students must get written permission in advance for any exceptions to the requirements listed below. For the exceptions to be applied toward graduation, the student must notify the biology department in one of the following two ways:

1. The student can file a completed paper planning form, signed by a faculty adviser, in the biology department office at 600 Fairchild;
2. The faculty member approving the exception can send an e-mail explaining the exceptions to mes2314@columbia.edu.

Grade Requirements for the Major

A grade of C- or higher must be earned and revealed on your transcript for any course – including the first – to be counted toward the major or concentration requirements. The grade of P is not acceptable. A course that was taken Pass/D/Fail may be counted if and only if the P is uncovered by the Registrar's deadline.

Courses

Courses with the subject code *HPSC* or *SCNC* do not count toward the majors or concentrations.

MAJOR IN BIOLOGY

General Information

The requirements for the biology major include courses in biology, chemistry, physics, and mathematics.

The required biology courses are one year of introductory biology, two core courses in biology or biochemistry, two 3-point electives in biology or biochemistry, and an appropriate lab experience. See below for details.

The required courses outside the biology department are chemistry through organic (plus labs), one year of college-level physics (plus lab), and the completion of one year of college-level mathematics (usually calculus).

Alternative sequences to the above may be arranged in special circumstances, but only with the permission of the director of undergraduate studies or a departmental adviser obtained in advance; for example, certain courses listed in the *Summer Term Bulletin*, the *School of General Studies Bulletin*, and the *Barnard College Bulletin* may be applied toward the major. In addition, selected courses at the Columbia-Presbyterian Medical Center are open to advanced undergraduates. Credit toward the major for courses not listed in the *Columbia College Bulletin* must be discussed in advance with the director of undergraduate studies or a departmental adviser. Students are responsible for notifying the department of all exceptions either in writing or by e-mail as explained above.

Alternative programs must be arranged in advance with the director of undergraduate studies. Students planning graduate work in biology should keep in mind that physical chemistry and statistics are important for many graduate programs.

Introductory Courses

The usual one-year introductory biology sequence is BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology-BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology, taken in the sophomore year, or EEB UN2001 Environmental Biology I: Elements to Organisms-BIOL UN2006 Introductory Biology

II: Cell Biology, Development & Physiology, which may be taken in the first year.

Other sequences require permission in advance from the director of undergraduate studies or departmental advisers. Students with a strong background in chemistry or molecular biology may take BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology-BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology in their first year; the permission of one of the instructors is required.

Premedical students usually take BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology-BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology after a year of general chemistry; premedical students interested in the environmental sciences may take EEB UN2001 *Environmental Biology I: Elements to Organisms* followed by BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology.

Students with advanced placement in biology are expected but not required to take EEB UN2001 Environmental Biology I: Elements to Organisms or BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology as their initial biology course, because BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology-BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology is taught at a level of detail and depth not found in most advanced placement courses.

Students who wish to skip BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology and start with a higher-level biology course may do so, but they must obtain permission in advance from the director of undergraduate studies. For additional information, see FAQs for first-year students at <http://www.columbia.edu/cu/biology/ug/advice/faqs/firstyr.html>.

Core Courses

Two out of the following five departmental core courses are required:

BIOL UN3022	Developmental Biology
BIOL UN3031	Genetics
BIOL UN3041	Cell Biology
BIOC UN3501	Biochemistry: Structure and Metabolism
or BIOC UN3300	Biochemistry
BIOC UN3512	Molecular Biology

Laboratory Courses

A laboratory experience in biology is required. It may be fulfilled by completing any one of the following options:

Option 1:

Select one of the following 5-point laboratory courses:

BIOL UN3050	Project Laboratory In Protein Biochemistry
BIOL UN3052	Project Laboratory in Molecular Genetics
BIOL UN3058	Project Laboratory in Microbiology

Option 2:

BIOL UN2501 Contemporary Biology Laboratory

Select an additional 3-point lab such as BIOL UN3040 or a Barnard lab.

Option 3:

Two terms of BIOL UN3500 taken for a letter grade, including the submission of a satisfactory research report at the end of each semester

Option 4:

Completion of all the requirements for one session of the Summer Undergraduate Research Fellowship (SURF). An additional semester of BIOL UN3500 in the same research lab is recommended but not required. Summer lab work under other auspices may not be substituted for the SURF Program.

The laboratory fee (\$150) partially covers the cost of nonreturnable items. This fee is charged for all lab courses, including BIOL UN3500 Independent Biological Research.

Upper-Level Elective Courses

Select two additional courses, carrying at least 3 points each, from any of the 3000- or 4000- level lecture courses. BIOL UN3500 Independent Biological Research cannot be used as one of the courses to satisfy the upper-level elective course requirement.

Chemistry

All majors must take chemistry through organic including labs. One of the following three groups of chemistry courses is required:

Option 1:

CHEM UN1403 General Chemistry I (Lecture)
- CHEM UN1404 and General Chemistry II (Lecture)

CHEM UN1500 General Chemistry Laboratory
- CHEM UN1501 and General Chemistry Laboratory Lecture

CHEM UN2443 Organic Chemistry I (Lecture)
- CHEM UN2444 and Organic Chemistry II (Lecture)

CHEM UN2493 Organic Chemistry Laboratory I
- CHEM UN2494 (Techniques) and Organic Chemistry Laboratory II (Synthesis)

Option 2:

For students who qualify for intensive chemistry

CHEM UN1604 Intensive General Chemistry (Lecture)

CHEM UN1507 Intensive General Chemistry Laboratory

CHEM UN2444 Organic Chemistry II (Lecture)
- CHEM UN2443 and Organic Chemistry I (Lecture)

CHEM UN2495 Organic Chem. Laboratory I
- CHEM UN2496 and Organic Chem. Laboratory II

Option 3:

For students who qualify for first year organic chemistry

CHEM UN1507 Intensive General Chemistry Laboratory

CHEM UN2045 Intensive Organic Chemistry I
- CHEM UN2046 (Lecture) and Intensive Organic Chemistry II (Lecture)

CHEM UN2495 Organic Chem. Laboratory I
- CHEM UN2496 and Organic Chem. Laboratory II
or CHEM UN2545 Intensive Organic Chemistry Laboratory

Physics

Students must take two terms of physics including the accompanying labs. The usual choices are PHYS UN1201-PHYS UN1202 General Physics II and PHYS UN1291-PHYS UN1292 General Physics Laboratory II. Higher-level physics sequences are also acceptable. The 1400-level sequence is recommended for students who plan to take three terms of physics.

Mathematics

Two semesters of calculus or honors mathematics are required. Students may substitute one semester of statistics for one semester of calculus with an adviser's permission. For students with AP credit, completion of MATH UN1102 Calculus II, MATH UN1201 Calculus III, or MATH UN1207 Honors Mathematics A is sufficient. However, students with AP credit are encouraged to take additional courses in mathematics or statistics at Columbia.

For more details on the biology major requirements, visit <http://biology.columbia.edu/pages/biology-major-requirements> (<http://biology.columbia.edu/pages/biology-major-requirements/>).

MAJOR IN BIOCHEMISTRY

The required basic courses for the biochemistry major are chemistry through organic, including laboratory, and one year each of physical chemistry, physics, calculus, biology, and biochemistry/molecular biology.

The required additional courses are three lecture courses chosen from mathematics, chemistry, and biology, and two upper-level laboratory courses.

<http://biology.columbia.edu/pages/biochemistry-major-requirements> (<http://biology.columbia.edu/pages/biochemistry-major-requirements/>)

MAJOR IN BIOPHYSICS

The requirements for the biophysics major are as follows:

One year of introductory biology:

BIOL UN2005 - BIOL UN2006	Introductory Biology I: Biochemistry, Genetics & Molecular Biology and Introductory Biology II: Cell Biology, Development & Physiology
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Select at least one of the following laboratory courses:

BIOL UN3050	Project Laboratory In Protein Biochemistry
BIOL UN3052	Project Laboratory in Molecular Genetics
BIOL UN3058	Project Laboratory in Microbiology
BIOL UN3500	Independent Biological Research

One course in biochemistry or molecular biology:

BIOC UN3501	Biochemistry: Structure and Metabolism
or BIOC UN3512	Molecular Biology
or BIOC UN3300	Biochemistry

Select one of the following options:

Option 1 - Genetics:

BIOL UN3031	Genetics
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Option 2 - Neurobiology:

BIOL UN3004	Neurobiology I: Cellular and Molecular Neurobiology
or BIOL UN3005	Neurobiology II: Development & Systems

Option 3 - Developmental Biology:

BIOL UN3022	Developmental Biology
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Select one of the following sequences to be completed at the end of sophomore year:

PHYS UN1401 - PHYS UN1402 - PHYS UN1403 - PHYS UN1494	Introduction To Mechanics and Thermodynamics and Introduction To Electricity, Magnetism, and Optics and Introduction to Classical and Quantum Waves and Introduction to Experimental Physics
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PHYS UN1601 - PHYS UN1602 - PHYS UN2601 - PHYS UN2699	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves and Experiments in Classical and Modern Physics
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PHYS UN2801 - PHYS UN2802 - PHYS UN3081	Accelerated Physics I and Accelerated Physics II and Intermediate Laboratory Work
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Select any two physics courses at the 3000-level or above, chosen in consultation with the adviser.

Calculus through MATH UN1202 or MATH UN1208

MATH UN3027	Ordinary Differential Equations
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Chemistry through organic including labs; see biology major for options

Select one additional course at the 3000- or 4000-level, including BIOL GU4002, BIOC GU4323, and BIOC GU4324, in either physics or biology.

MAJOR IN NEUROSCIENCE AND BEHAVIOR

In addition to one year of general chemistry, ten courses are required to complete the major in neuroscience and behavior—five in biology and five in psychology.

BIOLOGY COURSES

One year of introductory biology.

BIOL UN2005 - BIOL UN2006	Introductory Biology I: Biochemistry, Genetics & Molecular Biology and Introductory Biology II: Cell Biology, Development & Physiology
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One year of Neurobiology

BIOL UN3004 - BIOL UN3005	Neurobiology I: Cellular and Molecular Neurobiology and Neurobiology II: Development & Systems
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One additional 3000 or 4000 level biology lecture course from the following:

BIOL UN3006	Physiology
BIOL UN3022	Developmental Biology
BIOL UN3025	Neurogenetics
BIOL UN3031	Genetics
BIOL UN3799	Molecular Biology of Cancer
BIOL UN3034	Biotechnology
BIOL UN3041	Cell Biology
BIOL UN3073	Cellular and Molecular Immunology
BIOL UN3193	Stem Cell Biology and Applications
BIOC UN3300	Biochemistry
BIOC UN3501	Biochemistry: Structure and Metabolism
BIOL UN3310	Virology
BIOL UN3404	Seminar on the Global Threat of Antimicrobial Resistance
BIOC UN3512	Molecular Biology

BIOL GU4008	The Cellular Physiology of Disease
BIOL GU4082	Theoretical Foundations and Applications of Biophysical Methods
BIOL GU4300	Drugs and Disease
BIOL GU4510	Genomics of Gene Regulation
BIOL GU4560	Evolution in the age of genomics
BIOL GU4035	Seminar in Epigenetics
BIOL GU4070	The Biology and Physics of Single Molecules
BIOL GU4075	Biology at Physical Extremes
BIOL GU4080	The Ancient and Modern RNA Worlds
BIOL GU4260	Proteomics Laboratory
BIOL GU4290	Biological Microscopy
BIOL GU4305	Seminar in Biotechnology
PSYCHOLOGY COURSES	
PSYC UN1001	The Science of Psychology
PSYC UN2430	Cognitive Neuroscience (Students who have previously taken PSYC UN1010 Mind, Brain and Behavior may use that course to fulfill this requirement.)
or PSYC UN2450	Behavioral Neuroscience
One lab or statistics course from the following:	
PSYC S2210Q	Cognition: Basic Processes ^{STAT} UN1001 does not count towards the Neuroscience & Behavior Major.
or PSYC UN1420	RESEARCH METHODS - HUMAN BEHAVIOR
or PSYC UN1450	Experimental Psychology: Social Cognition and Emotion
or PSYC UN1490	Experimental Psychology: Cognition and Decision Making
or PSYC UN1610	Introductory Statistics for Behavioral Scientists
or PSYC UN1660	Advanced Statistical Inference
or STAT UN1101	Introduction to Statistics
or STAT UN1201	Calculus-Based Introduction to Statistics
One additional 2000 or 3000 level psychology course from a list approved by the Psychology Departmental adviser to the program.	
PSYC S2215D	Cognition and the Brain
or PSYC S2215D	Cognition and the Brain
PSYC UN2220	Cognition: Memory and Stress
PSYC W2225	Attention and Perception
PSYC W2230	Perception and Sensory Processes
PSYC UN2235	Thinking and Decision Making
or PSYC S2235Q	Thinking and Decision Making
PSYC UN2250	Evolution of Cognition
PSYC UN2280	Introduction to Developmental Psychology
PSYC UN2420	Animal Behavior
or PSYC UN2430	Cognitive Neuroscience
PSYC W2440	Language and the Brain

PSYC S2450Q	Behavioral Neuroscience
or PSYC UN2450	Behavioral Neuroscience
PSYC UN2460	Drugs and Behavior
PSYC W2480	The Developing Brain
PSYC UN2620	Abnormal Behavior
or PSYC S2620Q	Abnormal Behavior
One advanced psychology seminar from a list approved by the Psychology Department adviser to the program	
PSYC W3225	The Wandering Mind: Psychological Approaches to Distraction
PSYC W3250	Seminar in Space Perception (Seminar)
or PSYC G4230	Sensation and Perception (Seminar)
PSYC W3255	Modern Classics in Visual Perception, Visual Science and Visual Neuroscience (Seminar)
or PSYC G4255	Modern Classics in Visual Perception, Visual Science and Visual Neuroscience (Seminar)
PSYC W3265	Auditory Perception (Seminar)
PSYC UN3270	Computational Approaches to Human Vision (Seminar)
PSYC W3280	Seminar In Infant Development
or PSYC S3280D	Seminar in Infant Development
PSYC S3285D	The Psychology of Disaster Preparedness
PSYC UN3290	Self: A Cognitive Exploration (Seminar)
PSYC G4220	Cognition and Psychopathology (Seminar)
PSYC GU4222	The Cognitive Neuroscience of Aging (Seminar)
PSYC GU4223	Memory and Executive Function Thru the Lifespan
PSYC GU4225	Consciousness and Attention (Seminar)
PSYC GU4229	Attention and Perception
PSYC G4230	Sensation and Perception (Seminar)
PSYC GU4232	Production and Perception of Language
PSYC GU4235	Special Topics in Vision (Seminar)
PSYC GU4239	Cognitive neuroscience of narrative and film
PSYC GU4250	Evolution of Intelligence, Cognition, and Language (Seminar)
PSYC GU4270	Cognitive Processes (Seminar)
PSYC G4272	Advanced Seminar in Language Development
PSYC G4275	Contemporary Topics in Language and Communication (Seminar)
PSYC GU4280	Core Knowledge (Seminar)

PSYC G4285	Multidisciplinary Approaches to Human Decision Making (Seminar)
PSYC GU4287	Decision Architecture
PSYC S3410Q	Seminar in Emotion
PSYC S3425D	Animals in Our Own Backyard: The Science of Observing Behavior
PSYC W3435	Neurobiology of Reproductive Behavior (Seminar)
PSYC W3440	Issues In Brain and Behavior (Seminar)
or PSYC UN3445	The Brain & Memory
PSYC UN3450	Evolution of Intelligence and Consciousness (Seminar)
or PSYC G4450	The Evolution of Intelligence & Consciousness (Seminar)
PSYC UN3460	Evolution of Behavior (Seminar)
PSYC UN3470	Brain Evolution: Becoming Human (Seminar)
PSYC UN3481	Critical Periods in Brain Development and Behavior
PSYC S3483D	The Dynamic Brain: Plasticity from Birth to Old Age
PSYC W3484	Life Span Development: Theory and Methods
PSYC UN3496	Neuroscience and Society
or PSYC S3496Q	Neuroscience and Society
PSYC GU4420	Animal Cognition (Seminar)
PSYC GU4430	Learning and the Brain (Seminar)
PSYC GU4435	Non-Mnemonic Functions of Memory Systems
PSYC GU4440	Topics in Neurobiology and Behavior (Seminar)
or PSYC S4440Q	Topics in Neurobiology and Behavior
PSYC G4460	Cognitive Neuroscience and the Media (Seminar)
PSYC G4475	Neurobiology of Social Behavior
PSYC GU4480	Psychobiology of Infant Development (Seminar)
PSYC G4485	Affective Neuroscience (Seminar)
PSYC GU4486	Developmental and Affective Neuroscience (Seminar)
PSYC GU4490	Inheritance (Seminar)
PSYC G4492	Psychobiology of Stress
PSYC G4495	Ethics, Genetics, and the Brain
PSYC GU4498	Behavioral Epigenetics
PSYC G4499	Behavioral Psychopharmacology (Seminar)
PSYC UN3615	Children at Risk (Lecture)
PSYC UN3620	Seminar in Developmental Psychopathology
PSYC UN3625	Clinical Neuropsychology (Seminar)
or PSYC S3625D	Clinical Neuropsychology Seminar

PSYC UN3680	Social Cognitive Neuroscience (Seminar)
or PSYC GU4685	Social Cognitive Neuroscience (Seminar)
PSYC G4635	The Unconscious Mind (Seminar)
PSYC GU4690	Social Factors and Psychopathology (Seminar)

For more details, see the *Psychology* section in this Bulletin, and for additional information visit the Department of Biological Sciences website: <http://biology.columbia.edu/pages/neuroscience-and-behavior-major-requirements> (<http://biology.columbia.edu/pages/neuroscience-and-behavior-major-requirements/>).

CONCENTRATION IN BIOLOGY

Students who wish to concentrate in biology must design their programs in advance with the director of undergraduate studies or a departmental adviser.

The requirement for the concentration is 22 points in biology or biochemistry, with at least five courses chosen from the courses listed in the Biological Sciences section of the Bulletin. Additional courses in physics, chemistry, and mathematics are required as detailed below.

A project laboratory and BIOL UN2501 Contemporary Biology Laboratory may **not** both be counted toward the 22-point total. See the biology major requirements for additional information.

The requirements for the concentration in biology are as follows:

BIOL UN2005	Introductory Biology I: Biochemistry, Genetics & Molecular Biology
or EEBB UN2001	Environmental Biology I: Elements to Organisms

BIOL UN2006	Introductory Biology II: Cell Biology, Development & Physiology
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Select at least one of the following core courses:

BIOL UN3022	Developmental Biology
BIOL UN3031	Genetics
BIOL UN3041	Cell Biology
BIOC UN3501	Biochemistry: Structure and Metabolism
or BIOC UN3300	Biochemistry
BIOC UN3512	Molecular Biology

Beginning Fall 2018, no lab is required for the concentration. All other requirements remain the same, including enough electives to reach at least 22 points. Either UN2501 or a five-point lab course, but not both, may count towards the 22 point total.

Chemistry through organic including labs; see biology major for options

One year of physics, including laboratory; see biology major for options

One year of college-level mathematics (ordinarily this should be calculus); see biology major for options

For more details, visit <http://biology.columbia.edu/pages/biology-concentration-requirements> (<http://biology.columbia.edu/pages/biology-concentration-requirements/>).

MAJOR IN ENVIRONMENTAL BIOLOGY

BIOPHYSICS

Departmental Office: 600 Fairchild, 212-854-4581; mes2314@columbia.edu; biology@columbia.edu

Director of Undergraduate Studies, Undergraduate Programs and Laboratories:

Prof. Deborah Mowshowitz, 744D Mudd; 212-854-4497; dbm2@columbia.edu

Biology Major and Concentration Advisers:

For a list of current biology, biochemistry, biophysics, and neuroscience and behavior advisers, please visit <http://biology.columbia.edu/programs/advisors> (<http://biology.columbia.edu/programs/advisors/>)

A-H: Prof. Daniel Kalderon, 1013 Fairchild; ddk1@columbia.edu

I-P: Prof. Alice Heicklen, 744B Mudd; ah2289@columbia.edu

Q-Z: Prof. Harmen Bussemaker, 607E Fairchild; hjb2004@columbia.edu

Backup Advisor: Prof. Deborah Mowshowitz, 744D Mudd; 212-854-4497; dbm2@columbia.edu

Biochemistry Advisers:

Biology: Prof. Brent Stockwell, 1208 Northwest Corner Building; 212-854-2948; stockwell@biology.columbia.edu

Chemistry: Prof. Virginia Cornish, 1209 Northwest Corner Building; 212-854-5209; vc114@columbia.edu

Biophysics Adviser: Prof. Ozgur Sahin, 908 Northwest Corner Building; os2246@columbia.edu

Neuroscience and Behavior Advisers:

Biology: Prof. Jian Yang, 917A Fairchild; 212-854-6161; jy160@columbia.edu

or Prof. Deborah Mowshowitz, 744D Mudd; 212-854-4497; dbm2@columbia.edu

Psychology:

Professor Caroline Marvin, 317 Schermerhorn Ext, 854-0166, cbm2118@columbia.edu

On-Line Resources:

FAQs for prospective majors: <http://www.columbia.edu/cu/biology/ug/advice/faqs/major.html>

Checklist of major requirements: <http://biology.columbia.edu/programs/major-requirements> (<http://biology.columbia.edu/programs/major-requirements/>)

Additional course information: <http://biology.columbia.edu/courses> (<http://biology.columbia.edu/courses/>)

FAQs for prospective traditional students: <http://www.columbia.edu/cu/biology/ug/advice/faqs/firstyr.html>

FAQs for nontraditional students: <http://www.columbia.edu/cu/biology/ug/advice/faqs/gs.html>

For the first term of their introductory biology sequence, students may take either BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology, which has a prerequisite of chemistry, or EEEB UN2001 Environmental Biology I: Elements to Organisms, which does not require chemistry. EEEB UN2001 Environmental Biology I: Elements to Organisms may be taken in the first year.

BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology should be taken later, after general chemistry. For more details, see *Introductory Courses under Requirements*—Major in Biology. All students interested in biology are encouraged to take BIOL UN1908 First-Year Seminar in Modern Biology in the fall semester of their first year.

Nonscience majors who wish to take a biology course to fulfill the science requirement are encouraged to take BIOL UN1130 Genes and Development. They may also take, with the instructor's permission, BIOL UN3208 Introduction to Evolutionary Biology or EEEB UN2001 Environmental Biology I: Elements to Organisms.

Interested students should consult listings in other departments for courses related to biology. For courses in environmental studies, see listings for Earth and environmental sciences or for ecology, evolution, and environmental biology. For courses in human evolution, see listings for anthropology or for ecology, evolution, and environmental biology. For courses in the history of evolution, see listings for history and for philosophy of science. For a list of courses in computational biology and genomics, visit <http://systemsbiology.columbia.edu/courses> (<http://systemsbiology.columbia.edu/courses/>).

ADVANCED PLACEMENT TRANSFER CREDIT

Transfer credits granted toward the degree are not automatically counted toward the major. The department determines which transfer credits can be counted toward the major. For most majors, at least four biology or biochemistry courses and at least 18 credits of the total (biology, biochemistry, math, physics, and chemistry) must be taken at Columbia. Barnard courses may not be substituted for the required Columbia courses without advance permission from the adviser. For neuroscience

and behavior, one of the five biology course and one of the psychology courses may be transferred. Students who wish to count a course from outside Columbia toward their major must receive written approval from their adviser or the director of undergraduate studies. Students must supply a syllabus and/or course description to receive approval.

ADVISING

Neuroscience and Behavior Advisers:

Biology: Prof. Jian Yang, 917A Fairchild; 854-6161;

jy160@columbia.edu

or Prof. Deborah Mowshowitz, 744D Mudd; 854-4497;

dbm2@columbia.edu

Psychology:

A-E: Professor Carl Hart, 401D Schermerhorn Hall;

212-854-5313; chair@psych.columbia.edu

F-Q: Professor Caroline Marvin, 355B Schermerhorn Ext.;

212-854-3608; cbm2118@columbia.edu

R-Z: Professor Don Hood, 415 Schermerhorn; 212-854-4587;

dch3@columbia.edu

SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP (SURF) PROGRAM

First-year students, sophomores, and juniors are eligible for the department's paid internship program (SURF). This program is competitive; the department cannot assure every eligible student a place in any given summer.

Students apply to the program early in the spring term. A faculty committee headed by Dr. Alice Hecklen then matches selected students to appropriate labs. The deadline for SURF applications is at the beginning of the spring semester.

SURF students must submit a report on their work at the end of the summer session and participate in the following year's annual Undergraduate Research Symposium. Although it does not carry any academic credit, SURF can be used toward the lab requirement for majors and toward graduation with honors. For detailed information on all summer research programs and how to apply, please visit the SURF website (<http://www.columbia.edu/cu/biology/ug/surf/>).

Current detailed descriptions of the SURF program and the application procedure are available at SURF's website, <http://www.columbia.edu/cu/biology/ug/surf/>. For more information on the Amgen Scholarship Program, please visit <http://www.columbia.edu/cu/biology/ug/amgen/>. Applications to all of these programs are through SURF.

DEPARTMENTAL HONORS

Students must apply for departmental honors. Applications are due no later than one day after spring break of their senior year. For details, please visit the departmental website at <http://biology.columbia.edu/programs/honors-biological-sciences>

(<http://biology.columbia.edu/programs/honors-biological-sciences/>). (<http://biology.columbia.edu/programs/honors-biological-sciences/>)

PROFESSORS

Peter Andolfatto

J. Chloë Bulinski

Harmen Bussemaker

Martin Chalfie

Lawrence Chasin

Julio Fernandez

Stuart Firestein

Joachim Frank

Iva Greenwald

Tulle Hazelrigg

Oliver Hobert

John Hunt

Daniel Kalderon

Darcy Kelley

Laura Landweber

James Manley

Robert Pollack

Carol Prives

Ronald Prywes

Molly Przeworski

Michael Sheetz

Brent Stockwell

Simon Tavare

Saeed Tavazoie

Liang Tong

Alexander Tzagoloff

Jian Yang

Rafael Yuste

ASSOCIATE PROFESSORS

Lars Dietrich

Songtao Jia

Ozgur Sahin

Guy Sella

ASSISTANT PROFESSORS

Erin Barnhart Laura Duvall

Jellert Gaublomme

Marko Jovanovic

Raju Tomer Maria Tosches

LECTURERS

Claire Elise Hazen

Alice Hecklen

Mary Ann Price

Lili Yamasaki

ADJUNCT FACULTY

Lewis Brown Ronald Guido Jay Hammel
 Danny Nam Ho
 John Loike
 Alan Morrison
 Deborah Mowshowitz
 Solomon Mowshowitz
 Dana Pe'er
 Vincent Racaniello
 David Sable

GUIDELINES FOR ALL BIOLOGICAL SCIENCES MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Returning students should check the departmental website for any last-minute changes and/or additional information. See especially undergraduate updates and list of department courses. All major and concentration requirements are detailed on the website and links provided below.

Exceptions to Requirements

Students must get written permission in advance for any exceptions to the requirements listed below. For the exceptions to be applied toward graduation, the student must notify the biology department in one of the following two ways:

1. The student can file a completed paper planning form, signed by a faculty adviser, in the biology department office at 600 Fairchild;
2. The faculty member approving the exception can send an e-mail explaining the exceptions to mes2314@columbia.edu.

Grade Requirements for the Major

A grade of C- or higher must be earned and revealed on your transcript for any course – including the first – to be counted toward the major or concentration requirements. The grade of P is not acceptable. A course that was taken Pass/D/Fail may be counted if and only if the P is uncovered by the Registrar's deadline.

Courses

Courses with the subject code *HPSC* or *SCNC* do not count toward the majors or concentrations.

MAJOR IN BIOLOGY

General Information

The requirements for the biology major include courses in biology, chemistry, physics, and mathematics.

The required biology courses are one year of introductory biology, two core courses in biology or biochemistry, two 3-

point electives in biology or biochemistry, and an appropriate lab experience. See below for details.

The required courses outside the biology department are chemistry through organic (plus labs), one year of college-level physics (plus lab), and the completion of one year of college-level mathematics (usually calculus).

Alternative sequences to the above may be arranged in special circumstances, but only with the permission of the director of undergraduate studies or a departmental adviser obtained in advance; for example, certain courses listed in the *Summer Term Bulletin*, the *School of General Studies Bulletin*, and the *Barnard College Bulletin* may be applied toward the major. In addition, selected courses at the Columbia-Presbyterian Medical Center are open to advanced undergraduates. Credit toward the major for courses not listed in the *Columbia College Bulletin* must be discussed in advance with the director of undergraduate studies or a departmental adviser. Students are responsible for notifying the department of all exceptions either in writing or by e-mail as explained above.

Alternative programs must be arranged in advance with the director of undergraduate studies. Students planning graduate work in biology should keep in mind that physical chemistry and statistics are important for many graduate programs.

Introductory Courses

The usual one-year introductory biology sequence is BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology-BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology, taken in the sophomore year, or EEEB UN2001 Environmental Biology I: Elements to Organisms-BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology, which may be taken in the first year.

Other sequences require permission in advance from the director of undergraduate studies or departmental advisers. Students with a strong background in chemistry or molecular biology may take BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology-BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology in their first year; the permission of one of the instructors is required.

Premedical students usually take BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology-BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology after a year of general chemistry; premedical students interested in the environmental sciences may take EEEB UN2001 *Environmental Biology I: Elements to Organisms* followed by BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology.

Students with advanced placement in biology are expected but not required to take EEEB UN2001 Environmental Biology I: Elements to Organisms or BIOL UN2005 Introductory

Biology I: Biochemistry, Genetics & Molecular Biology as their initial biology course, because BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology-BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology is taught at a level of detail and depth not found in most advanced placement courses.

Students who wish to skip BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology and start with a higher-level biology course may do so, but they must obtain permission in advance from the director of undergraduate studies. For additional information, see FAQs for first-year students at <http://www.columbia.edu/cu/biology/ug/advice/faqs/firstyr.html>.

Core Courses

Two out of the following five departmental core courses are required:

BIOL UN3022	Developmental Biology
BIOL UN3031	Genetics
BIOL UN3041	Cell Biology
BIOC UN3501	Biochemistry: Structure and Metabolism
or BIOC UN3300	Biochemistry
BIOC UN3512	Molecular Biology

Laboratory Courses

A laboratory experience in biology is required. It may be fulfilled by completing any one of the following options:

Option 1:

Select one of the following 5-point laboratory courses:

BIOL UN3050	Project Laboratory In Protein Biochemistry
BIOL UN3052	Project Laboratory in Molecular Genetics
BIOL UN3058	Project Laboratory in Microbiology

Option 2:

BIOL UN2501 Contemporary Biology Laboratory

Select an additional 3-point lab such as BIOL UN3040 or a Barnard lab.

Option 3:

Two terms of BIOL UN3500 taken for a letter grade, including the submission of a satisfactory research report at the end of each semester

Option 4:

Completion of all the requirements for one session of the Summer Undergraduate Research Fellowship (SURF). An additional semester of BIOL UN3500 in the same research lab is recommended but not required. Summer lab work under other auspices may not be substituted for the SURF Program.

The laboratory fee (\$150) partially covers the cost of nonreturnable items. This fee is charged for all lab courses, including BIOL UN3500 Independent Biological Research.

Upper-Level Elective Courses

Select two additional courses, carrying at least 3 points each, from any of the 3000- or 4000- level lecture courses. BIOL UN3500 Independent Biological Research cannot be used as one of the courses to satisfy the upper-level elective course requirement.

Chemistry

All majors must take chemistry through organic including labs. One of the following three groups of chemistry courses is required:

Option 1:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
CHEM UN1500 - CHEM UN1501	General Chemistry Laboratory and General Chemistry Laboratory Lecture
CHEM UN2443 - CHEM UN2444	Organic Chemistry I (Lecture) and Organic Chemistry II (Lecture)
CHEM UN2493 - CHEM UN2494	Organic Chemistry Laboratory I (Techniques) and Organic Chemistry Laboratory II (Synthesis)

Option 2:

For students who qualify for intensive chemistry

CHEM UN1604	Intensive General Chemistry (Lecture)
CHEM UN1507	Intensive General Chemistry Laboratory
CHEM UN2444 - CHEM UN2443	Organic Chemistry II (Lecture) and Organic Chemistry I (Lecture)
CHEM UN2495 - CHEM UN2496	Organic Chem. Laboratory I and Organic Chem. Laboratory II

Option 3:

For students who qualify for first year organic chemistry

CHEM UN1507	Intensive General Chemistry Laboratory
CHEM UN2045 - CHEM UN2046	Intensive Organic Chemistry I (Lecture) and Intensive Organic Chemistry II (Lecture)
CHEM UN2495 - CHEM UN2496 or CHEM UN2545	Organic Chem. Laboratory I and Organic Chem. Laboratory II Intensive Organic Chemistry Laboratory

Physics

Students must take two terms of physics including the accompanying labs. The usual choices are

PHYS UN1201-PHYS UN1202 General Physics II and PHYS UN1291-PHYS UN1292 General Physics Laboratory II. Higher-level physics sequences are also acceptable. The 1400-level sequence is recommended for students who plan to take three terms of physics.

Mathematics

Two semesters of calculus or honors mathematics are required. Students may substitute one semester of statistics for one semester of calculus with an adviser's permission. For students with AP credit, completion of MATH UN1102 Calculus II, MATH UN1201 Calculus III, or MATH UN1207 Honors Mathematics A is sufficient. However, students with AP credit are encouraged to take additional courses in mathematics or statistics at Columbia.

For more details on the biology major requirements, visit <http://biology.columbia.edu/pages/biology-major-requirements> (<http://biology.columbia.edu/pages/biology-major-requirements/>).

MAJOR IN BIOCHEMISTRY

The required basic courses for the biochemistry major are chemistry through organic, including laboratory, and one year each of physical chemistry, physics, calculus, biology, and biochemistry/molecular biology.

The required additional courses are three lecture courses chosen from mathematics, chemistry, and biology, and two upper-level laboratory courses.

<http://biology.columbia.edu/pages/biochemistry-major-requirements> (<http://biology.columbia.edu/pages/biochemistry-major-requirements/>)

MAJOR IN BIOPHYSICS

The requirements for the biophysics major are as follows:

One year of introductory biology:

BIOL UN2005 - BIOL UN2006	Introductory Biology I: Biochemistry, Genetics & Molecular Biology and Introductory Biology II: Cell Biology, Development & Physiology
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Select at least one of the following laboratory courses:

BIOL UN3050	Project Laboratory In Protein Biochemistry
BIOL UN3052	Project Laboratory in Molecular Genetics
BIOL UN3058	Project Laboratory in Microbiology
BIOL UN3500	Independent Biological Research

One course in biochemistry or molecular biology:

BIOC UN3501 or BIOC UN3512 or BIOC UN3300	Biochemistry: Structure and Metabolism Molecular Biology Biochemistry
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Select one of the following options:

Option 1 - Genetics:	
BIOL UN3031	Genetics

Option 2 - Neurobiology:	
BIOL UN3004 or BIOL UN3005	Neurobiology I: Cellular and Molecular Neurobiology Neurobiology II: Development & Systems

Option 3 - Developmental Biology:	
BIOL UN3022	Developmental Biology

Select one of the following sequences to be completed at the end of sophomore year:

PHYS UN1401 - PHYS UN1402 - PHYS UN1403 - PHYS UN1494	Introduction To Mechanics and Thermodynamics and Introduction To Electricity, Magnetism, and Optics and Introduction to Classical and Quantum Waves and Introduction to Experimental Physics
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PHYS UN1601 - PHYS UN1602 - PHYS UN2601 - PHYS UN2699	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves and Experiments in Classical and Modern Physics
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PHYS UN2801 - PHYS UN2802 - PHYS UN3081	Accelerated Physics I and Accelerated Physics II and Intermediate Laboratory Work
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Select any two physics courses at the 3000-level or above, chosen in consultation with the adviser.

Calculus through MATH UN1202 or MATH UN1208

MATH UN3027	Ordinary Differential Equations
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Chemistry through organic including labs; see biology major for options

Select one additional course at the 3000- or 4000-level, including BIOL GU4002, BIOC GU4323, and BIOC GU4324, in either physics or biology.

MAJOR IN NEUROSCIENCE AND BEHAVIOR

In addition to one year of general chemistry, ten courses are required to complete the major in neuroscience and behavior—five in biology and five in psychology.

BIOLOGY COURSES

One year of introductory biology.

BIOL UN2005 Introductory Biology I:
- BIOL UN2006 Biochemistry, Genetics &
Molecular Biology
and Introductory Biology II:
Cell Biology, Development &
Physiology

One year of Neurobiology

BIOL UN3004 Neurobiology I: Cellular and
- BIOL UN3005 Molecular Neurobiology
and Neurobiology II:
Development & Systems

One additional 3000 or 4000 level biology lecture course
from the following:

BIOL UN3006 Physiology
BIOL UN3022 Developmental Biology
BIOL UN3025 Neurogenetics
BIOL UN3031 Genetics
BIOL UN3799 Molecular Biology of Cancer
BIOL UN3034 Biotechnology
BIOL UN3041 Cell Biology
BIOL UN3073 Cellular and Molecular
Immunology
BIOL UN3193 Stem Cell Biology and
Applications
BIOC UN3300 Biochemistry
BIOC UN3501 Biochemistry: Structure and
Metabolism
BIOL UN3310 Virology
BIOL UN3404 Seminar on the Global Threat of
Antimicrobial Resistance
BIOC UN3512 Molecular Biology
BIOL GU4008 The Cellular Physiology of Disease
BIOL GU4082 Theoretical Foundations and
Applications of Biophysical
Methods
BIOL GU4300 Drugs and Disease
BIOL GU4510 Genomics of Gene Regulation
BIOL GU4560 Evolution in the age of genomics
BIOL GU4035 Seminar in Epigenetics
BIOL GU4070 The Biology and Physics of Single
Molecules
BIOL GU4075 Biology at Physical Extremes
BIOL GU4080 The Ancient and Modern RNA
Worlds
BIOL GU4260 Proteomics Laboratory
BIOL GU4290 Biological Microscopy
BIOL GU4305 Seminar in Biotechnology

PSYCHOLOGY COURSES

PSYC UN1001 The Science of Psychology
PSYC UN2430 Cognitive Neuroscience (Students
who have previously taken
PSYC UN1010 Mind, Brain and
Behavior may use that course to
fulfill this requirement.)
or PSYC UN2450 Behavioral Neuroscience

One lab or statistics course from the following:

PSYC S2210Q Cognition: Basic Processes ^{STAT}
UN1001 does not count towards the
Neuroscience & Behavior Major.
or PSYC UN1420 RESEARCH METHODS - HUMAN
BEHAVIOR
or PSYC UN1450 Experimental Psychology: Social Cognition
and Emotion
or PSYC UN1490 Experimental Psychology: Cognition and
Decision Making
or PSYC UN1610 Introductory Statistics for Behavioral
Scientists
or PSYC UN1660 Advanced Statistical Inference
or STAT UN1101 Introduction to Statistics
or STAT UN1201 Calculus-Based Introduction to Statistics

One additional 2000 or 3000 level psychology course from a
list approved by the Psychology Departmental adviser to the
program.

PSYC S2215D Cognition and the Brain
or PSYC S2215D Cognition and the Brain
PSYC UN2220 Cognition: Memory and Stress
PSYC W2225 Attention and Perception
PSYC W2230 Perception and Sensory Processes
PSYC UN2235 Thinking and Decision Making
or PSYC S2235Q Thinking and Decision Making
PSYC UN2250 Evolution of Cognition
PSYC UN2280 Introduction to Developmental
Psychology
PSYC UN2420 Animal Behavior
or PSYC UN2430 Cognitive Neuroscience
PSYC W2440 Language and the Brain
PSYC S2450Q Behavioral Neuroscience
or PSYC UN2450 Behavioral Neuroscience
PSYC UN2460 Drugs and Behavior
PSYC W2480 The Developing Brain
PSYC UN2620 Abnormal Behavior
or PSYC S2620Q Abnormal Behavior

One advanced psychology seminar from a list approved by
the Psychology Department adviser to the program

PSYC W3225 The Wandering Mind:
Psychological Approaches to
Distraction
PSYC W3250 Seminar in Space Perception
(Seminar)
or PSYC G4230 Sensation and Perception (Seminar)
PSYC W3255 Modern Classics in Visual
Perception, Visual Science and
Visual Neuroscience (Seminar)
or PSYC G4255 Modern Classics in Visual Perception,
Visual Science and Visual Neuroscience
(Seminar)
PSYC W3265 Auditory Perception (Seminar)
PSYC UN3270 Computational Approaches to
Human Vision (Seminar)
PSYC W3280 Seminar In Infant Development

or PSYC S3280D	Seminar in Infant Development
PSYC S3285D	The Psychology of Disaster Preparedness
PSYC UN3290	Self: A Cognitive Exploration (Seminar)
PSYC G4220	Cognition and Psychopathology (Seminar)
PSYC GU4222	The Cognitive Neuroscience of Aging (Seminar)
PSYC GU4223	Memory and Executive Function Thru the Lifespan
PSYC GU4225	Consciousness and Attention (Seminar)
PSYC GU4229	Attention and Perception
PSYC G4230	Sensation and Perception (Seminar)
PSYC GU4232	Production and Perception of Language
PSYC GU4235	Special Topics in Vision (Seminar)
PSYC GU4239	Cognitive neuroscience of narrative and film
PSYC GU4250	Evolution of Intelligence, Cognition, and Language (Seminar)
PSYC GU4270	Cognitive Processes (Seminar)
PSYC G4272	Advanced Seminar in Language Development
PSYC G4275	Contemporary Topics in Language and Communication (Seminar)
PSYC GU4280	Core Knowledge (Seminar)
PSYC G4285	Multidisciplinary Approaches to Human Decision Making (Seminar)
PSYC GU4287	Decision Architecture
PSYC S3410Q	Seminar in Emotion
PSYC S3425D	Animals in Our Own Backyard: The Science of Observing Behavior
PSYC W3435	Neurobiology of Reproductive Behavior (Seminar)
PSYC W3440	Issues In Brain and Behavior (Seminar)
or PSYC UN3445	The Brain & Memory
PSYC UN3450	Evolution of Intelligence and Consciousness (Seminar)
or PSYC G4450	The Evolution of Intelligence & Consciousness (Seminar)
PSYC UN3460	Evolution of Behavior (Seminar)
PSYC UN3470	Brain Evolution: Becoming Human (Seminar)
PSYC UN3481	Critical Periods in Brain Development and Behavior
PSYC S3483D	The Dynamic Brain: Plasticity from Birth to Old Age
PSYC W3484	Life Span Development: Theory and Methods

PSYC UN3496	Neuroscience and Society
or PSYC S3496Q	Neuroscience and Society
PSYC GU4420	Animal Cognition (Seminar)
PSYC GU4430	Learning and the Brain (Seminar)
PSYC GU4435	Non-Mnemonic Functions of Memory Systems
PSYC GU4440	Topics in Neurobiology and Behavior (Seminar)
or PSYC S4440Q	Topics in Neurobiology and Behavior
PSYC G4460	Cognitive Neuroscience and the Media (Seminar)
PSYC G4475	Neurobiology of Social Behavior
PSYC GU4480	Psychobiology of Infant Development (Seminar)
PSYC G4485	Affective Neuroscience (Seminar)
PSYC GU4486	Developmental and Affective Neuroscience (Seminar)
PSYC GU4490	Inheritance (Seminar)
PSYC G4492	Psychobiology of Stress
PSYC G4495	Ethics, Genetics, and the Brain
PSYC GU4498	Behavioral Epigenetics
PSYC G4499	Behavioral Psychopharmacology (Seminar)
PSYC UN3615	Children at Risk (Lecture)
PSYC UN3620	Seminar in Developmental Psychopathology
PSYC UN3625	Clinical Neuropsychology (Seminar)
or PSYC S3625D	Clinical Neuropsychology Seminar
PSYC UN3680	Social Cognitive Neuroscience (Seminar)
or PSYC GU4685	Social Cognitive Neuroscience (Seminar)
PSYC G4635	The Unconscious Mind (Seminar)
PSYC GU4690	Social Factors and Psychopathology (Seminar)

For more details, see the *Psychology* section in this Bulletin, and for additional information visit the Department of Biological Sciences website: <http://biology.columbia.edu/pages/neuroscience-and-behavior-major-requirements> (<http://biology.columbia.edu/pages/neuroscience-and-behavior-major-requirements/>).

CONCENTRATION IN BIOLOGY

Students who wish to concentrate in biology must design their programs in advance with the director of undergraduate studies or a departmental adviser.

The requirement for the concentration is 22 points in biology or biochemistry, with at least five courses chosen from the courses listed in the Biological Sciences section of the Bulletin. Additional courses in physics, chemistry, and mathematics are required as detailed below.

A project laboratory and BIOL UN2501 Contemporary Biology Laboratory may **not** both be counted toward the 22-point total. See the biology major requirements for additional information.

The requirements for the concentration in biology are as follows:

BIOL UN2005	Introductory Biology I: Biochemistry, Genetics & Molecular Biology
or EEEB UN2001	Environmental Biology I: Elements to Organisms

BIOL UN2006	Introductory Biology II: Cell Biology, Development & Physiology
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Select at least one of the following core courses:

BIOL UN3022	Developmental Biology
BIOL UN3031	Genetics
BIOL UN3041	Cell Biology
BIOC UN3501	Biochemistry: Structure and Metabolism
or BIOC UN3300	Biochemistry
BIOC UN3512	Molecular Biology

Beginning Fall 2018, no lab is required for the concentration. All other requirements remain the same, including enough electives to reach at least 22 points. Either UN2501 or a five-point lab course, but not both, may count towards the 22 point total.

Chemistry through organic including labs; see biology major for options

One year of physics, including laboratory; see biology major for options

One year of college-level mathematics (ordinarily this should be calculus); see biology major for options

For more details, visit <http://biology.columbia.edu/pages/biology-concentration-requirements> (<http://biology.columbia.edu/pages/biology-concentration-requirements/>).

MAJOR IN ENVIRONMENTAL BIOLOGY

BUSINESS MANAGEMENT*

***Business Management is offered exclusively as a concentration.**

Program Manager: Cara Mandarino, 104 Uris; 212-854-0140; MendelsonCenter@gsb.columbia.edu

<http://www8.gsb.columbia.edu/mendelson> (<http://www8.gsb.columbia.edu/mendelson/>)

The collaboration between the faculty of Arts and Sciences and Columbia Business School offers students access to the ideas and expertise of the faculty of a top-ranked professional school recognized for its excellence in graduate business education through a series of elective courses. These courses, designed by Business School faculty specifically for undergraduates, build upon the strong liberal arts education at Columbia. Students learn how finance is directly connected to the fundamental principles of economics; that marketing utilizes concepts from psychology; and how management depends upon principles developed in psychology and sociology.

Students can take advantage of the opportunity to enhance their experience by participating in co-curricular activities, such as Business School faculty lecture series, industry panels, informal mentoring/networking activities with MBA students and alumni, in addition to research opportunities with Business School faculty.

This curricular and co-curricular programming capitalizes on the Business School's ability to connect academic theory with real-world practice, providing students with the opportunity to develop key leadership skills, an entrepreneurial mindset, and the ability to innovate.

Eligibility:

- To be eligible to earn a Special Concentration in Business Management, students must apply to the program in the spring semester of their sophomore or junior years, and they must be accepted through a process governed by the Columbia Business School. Beginning with the Special Concentration cohort of 2017-2018 (i.e., students accepted via the application process of Spring 2017), the program will accept up to 45 qualified candidates each year. The size of the program may be reviewed from time to time by Columbia College and Columbia Business School and adjusted, if desired by both schools.
- For students who entered Columbia College or General Studies in, or before, Fall 2016: Students who have not been accepted into the Special Concentration program may have the option to “shadow” the Special Concentration in Business Management by taking the required courses if space is available in those courses. Students who “shadow” the program will not be given priority registration in any courses that count toward the Special Concentration. If a student is able to take all of the courses and earns a 3.0 or higher grade-point average in the prerequisite, core, and elective courses, she or he will be allowed to declare retroactively the Special Concentration and have the program noted on their transcript.
- The shadowing option is no longer available for students who entered Columbia College or General Studies in, or after, Fall 2017.

APPLICATION REQUIREMENTS

To apply for the special concentration in business management, students must meet these three requirements:

1. Sophomore or junior standing;
2. Have a cumulative GPA of 3.4 or higher;
3. Have received a B+ or better in at least one, but preferably two, of the following three prerequisite courses, i.e. in statistics, economics, and psychology. Students who completed only one prerequisite at the time of application must be currently enrolled in at least one other; acceptance is conditional on achieving a grade of B+ or higher in the second course.

Statistics Prerequisite

Select one of the following:

STAT UN1001	Introduction to Statistical Reasoning
STAT UN1101	Introduction to Statistics
STAT UN1201	Calculus-Based Introduction to Statistics
PSYC UN1610	Introductory Statistics for Behavioral Scientists
SOCI UN3020	Social Statistics

Economics Prerequisite

ECON UN1105	Principles of Economics
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Psychology/Sociology Prerequisite

Select one of the following:

PSYC UN1001	The Science of Psychology
PSYC UN1010	Mind, Brain and Behavior
SOCI UN1000	The Social World

Application Components

1. Application form
2. Current class schedule, including a brief description of how all concentration requirements will be completed
3. Official transcript
4. Resume

Benefits for Admitted Students

While students may complete the special concentration requirements without applying to the program, the following benefits are available to students admitted through the application process:

1. Guaranteed enrollment in popular undergraduate business courses (must reserve in advance through program manager);
2. Access to special guest speaker presentations at the Business School, including business leader or faculty presentations exclusively for admitted students;
3. Formal and informal networking opportunities with Business School students, faculty, and alumni.

CURRENT FACULTY

AFFILIATED FACULTY

GUIDELINES FOR ALL BUSINESS MANAGEMENT SPECIAL CONCENTRATORS

The business management special concentration is not a stand-alone concentration: it is intended to complement the disciplinary specialization and methodological training inherent in a major. In addition to the special concentration requirements, students must complete a major.

Students who matriculated at Columbia in Fall 2012 and beyond must earn a minimum GPA of 3.0 in prerequisite, core, and elective courses. Students who matriculated before Fall 2012 must either adhere to the above requirement or previous requirement of B+ or better in at least two of the prerequisites and a minimum GPA of 3.0 in core and elective classes.

Students who do not meet course prerequisites or who do not receive a passing grade do not receive credit for that course towards the special concentration. All courses must be taken for a letter grade. Only prerequisites may be double counted for other majors or concentrations. The core classes **cannot** be double counted. Electives may be double counted if a student's major allows double counting.

For information about this special concentration, including the application process, visit <http://www8.gsb.columbia.edu/mendelson> (<http://www8.gsb.columbia.edu/mendelson/>).

SPECIAL CONCENTRATION IN BUSINESS MANAGEMENT

Please read *Guidelines for all Business Management Special Concentrators* above.

The requirements for the special concentration in business management are as follows:

Prerequisites

Select one of the following Statistics courses:

STAT UN1001	Introduction to Statistical Reasoning
STAT UN1101	Introduction to Statistics
STAT UN1201	Calculus-Based Introduction to Statistics
PSYC UN1610	Introductory Statistics for Behavioral Scientists
SOCI UN3020	Social Statistics

Select the following Economics course:

ECON UN1105	Principles of Economics
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Select one of the following Psychology/Sociology courses:

PSYC UN1001	The Science of Psychology
PSYC UN1010	Mind, Brain and Behavior

SOCI UN1000 The Social World

Core

Select one of the following Financial Core courses:

ECON GU4280 Corporate Finance

BUSI UN3013 Financial Accounting

Select two of the following Managerial Core courses:

BUSI UN3701 Strategy Formulation

BUSI UN3021 Marketing Management

BUSI UN3703 Leadership in Organizations

Electives

Select two of the following courses:

BUSI UN3702 Venturing to Change the World

BUSI UN3704 Making History Through
Venturing

ECON UN3025 Financial Economics

ECON UN3265 The Economics of Money and
Banking

PSYC UN2235 Thinking and Decision Making

PSYC UN2630 Social Psychology

PSYC UN2640 Introduction to Social Cognition

SOCI UN2240 Economy and Society

SOCI UN3490 Mistake, Misconduct, Disaster

SOCI W3670 Culture, Markets, and
Consumption

SOCI S3675Q Organizing Innovation

SOCI G4032 Sociology of Labor Markets

POLS V3615 Globalization and International
Politics

PSYC BC1136 Social Psychology

PSYC BC1138 Social Psychology

PSYC BC2151 Organizational Psychology

NOTE: Students may not receive credit for two or more of PSYC BC1136 Social Psychology, *PSYC BC1138 Social Psychology*, and PSYC UN2630 Social Psychology.

CHEMICAL PHYSICS

Undergraduate Office: 340 Havemeyer; 212-854-2163

Departmental Office: 344 Havemeyer; 212-854-2202
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Director of Undergraduate Studies: Prof. Karen Phillips,
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(kep12@chem.columbia.edu)

Program Manager for Undergraduate Studies: Dr.
Vesna Gasperov, 211A Havemeyer; 212-854-2017;
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Biochemistry Advisers:

Biology: Prof. Brent Stockwell, 1208 Northwest Corner
Building; 212-854-2919; stockwell@biology.columbia.edu

Chemistry, the study of molecules, is a central science interesting for its own sake but also necessary as an intellectual link to the other sciences of biology, physics, and environmental science. Faculty find the various disciplines of chemistry fascinating because they establish intellectual bridges between the macroscopic or human-scale world that we see, smell, and touch, and the microscopic world that affects every aspect of our lives. The study of chemistry begins on the microscopic scale and extends to engage a variety of different macroscopic contexts.

Chemistry is currently making its largest impact on society at the nexus between chemistry and biology and the nexus between chemistry and engineering, particularly where new materials are being developed. A typical chemistry laboratory now has more computers than test tubes and no longer smells of rotten eggs.

The chemistry department majors are designed to help students focus on these new developments and to understand the factors influencing the nature of the discipline. Because the science is constantly changing, courses change as well, and while organic and physical chemistry remain the bedrock courses, they too differ greatly from the same courses 40 years ago. Many consider biochemistry to be a foundation course as well. Although different paths within the chemistry major take different trajectories, there is a core that provides the essential foundation students need regardless of the path they choose. Students should consider majoring in chemistry if they share or can develop a fascination with the explanatory power that comes with an advanced understanding of the nature and influence of the microscopic world of molecules.

Students who choose to major in chemistry may elect to continue graduate study in this field and obtain a Ph.D. which is a solid basis for a career in research, either in the industry or in a university. A major in chemistry also provides students with an astonishing range of career choices such as working in the chemical or pharmaceutical industries or in many other businesses where a technical background is highly desirable. Other options include becoming a financial analyst for a technical company, a science writer, a high school chemistry teacher, a patent attorney, an environmental consultant, or a hospital laboratory manager, among others. The choices are both numerous and various as well as intellectually exciting and personally fulfilling.

ADVANCED PLACEMENT

The department grants advanced placement (AP) credit for a score of 4 or 5 or the equivalent. The amount of credit granted is based on the results of the department placement exam and completion of the requisite course. Students who are placed into CHEM UN1604 Intensive General Chemistry (Lecture) are granted 3 points of credit; students who are placed into CHEM UN2045 Intensive Organic Chemistry I (Lecture)-CHEM UN2046 Intensive Organic Chemistry II (Lecture) are granted 6 points of credit. In either case, credit

is granted only upon completion of the course with a grade of C or better. Students must complete a department placement exam prior to registering for either of these courses.

PROGRAMS OF STUDY

The Department of Chemistry offers four distinct academic major programs for undergraduates interested in professional-level training and education in the chemical sciences: chemistry, chemical physics, biochemistry and environmental chemistry. For students interested in a program of less extensive study and coursework, the department offers a concentration in chemistry.

COURSE INFORMATION

The results of the placement exam are used to advise students which track to pursue. The Department of Chemistry offers three different tracks. Students who wish to take Track 2 or 3 classes must take the placement exam. Students who wish to pursue Track 1 classes do not need to take the placement exam.

TRACK INFORMATION

In the first year, Track 1 students with one year of high school chemistry take a one-year course in general chemistry, and the one-term laboratory course that accompanies it. In the second year, students study organic chemistry, and take organic chemistry laboratory.

Students who qualify by prior examination during orientation week can place into the advanced tracks. There are two options. Track 2 students take, in the fall term, a special one-term intensive course in general chemistry in place of the one-year course. In the second year, students study organic chemistry and take organic chemistry laboratory. Track 3 students take a one-year course in organic chemistry for first-year students and the one-term intensive general chemistry laboratory course. In the second year, students enroll in physical chemistry and the organic chemistry laboratory course.

Additional information on the tracks can be found in the *Requirements* section.

ADDITIONAL COURSES

First-year students may also elect to take CHEM UN2408. This seminar focuses on topics in modern chemistry, and is offered to all students who have taken at least one semester of college chemistry and have an interest in chemical research.

Biochemistry (BIOC UN3501, BIOC UN3512) is recommended for students interested in the biomedical sciences.

Physical chemistry (CHEM UN3079-CHEM UN3080), a one-year program, requires prior preparation in mathematics and physics. The accompanying laboratory is CHEM UN3085-CHEM UN3086.

Also offered are a senior seminar (CHEM UN3920); advanced courses in biochemistry, inorganic, organic, and physical chemistry; and an introduction to research (CHEM UN3098).

SAMPLE PROGRAMS

Some *typical* programs are shown below. Programs are crafted by the student and the director of undergraduate studies to meet individual needs and interests.

Track 1

First Year

CHEM UN1403 General Chemistry I (Lecture)
 CHEM UN1404 General Chemistry II (Lecture)
 CHEM UN1500 General Chemistry Laboratory
 CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and physics as required.

Second Year

CHEM UN2443 Organic Chemistry I (Lecture)
 CHEM UN2444 Organic Chemistry II (Lecture)
 CHEM UN2493 Organic Chemistry Laboratory I (Techniques)
 CHEM UN2494 Organic Chemistry Laboratory II (Synthesis)

Calculus and physics as required.

Third Year

CHEM UN3079 Physical Chemistry I
 CHEM UN3080 Physical Chemistry II
 BIOC UN3501 Biochemistry: Structure and Metabolism
 CHEM UN3546 Advanced Organic Chemistry Laboratory
 CHEM UN3098 Supervised Independent Research

Fourth Year

CHEM UN3085 Physical and Analytical Chemistry Laboratory I
 CHEM UN3086 Physical and Analytical Chemistry Laboratory II
 CHEM UN3920 Senior Seminar in Chemical Research
 CHEM GU4071 Inorganic Chemistry
 Advanced courses (4000-level or higher)

Track 2

First Year

CHEM UN1507 Intensive General Chemistry Laboratory
 CHEM UN1604 Intensive General Chemistry (Lecture)
 CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and physics as required.

Second Year

- CHEM UN2443 Organic Chemistry I (Lecture)
 CHEM UN2444 Organic Chemistry II (Lecture)
 CHEM UN2493 Organic Chemistry Laboratory I
 (Techniques)
 CHEM UN2494 Organic Chemistry Laboratory II
 (Synthesis)

Calculus and physics as required.

Third Year

- CHEM UN3079 Physical Chemistry I
 CHEM UN3080 Physical Chemistry II
 BIOC UN3501 Biochemistry: Structure and
 Metabolism
 CHEM UN3546 Advanced Organic Chemistry
 Laboratory
 CHEM UN3098 Supervised Independent Research

Fourth Year

- CHEM UN3085 Physical and Analytical Chemistry
 Laboratory I
 CHEM UN3086 Physical and Analytical Chemistry
 Laboratory II
 CHEM UN3920 Senior Seminar in Chemical Research
 CHEM GU4071 Inorganic Chemistry
 Advanced courses (4000- level or higher)

Track 3

First Year

- CHEM UN1507 Intensive General Chemistry
 Laboratory
 CHEM UN2045 Intensive Organic Chemistry I
 (Lecture)
 CHEM UN2046 Intensive Organic Chemistry II
 (Lecture)
 CHEM UN2408 First-Year Seminar in Chemical
 Research

Calculus and Physics as required.

Second Year

- CHEM UN3079 Physical Chemistry I
 CHEM UN3080 Physical Chemistry II
 CHEM UN2545 Intensive Organic Chemistry
 Laboratory
 CHEM UN3546 Advanced Organic Chemistry
 Laboratory

Calculus and physics as required.

Third Year

- BIOC UN3501 Biochemistry: Structure and
 Metabolism
 CHEM UN3085 Physical and Analytical Chemistry
 Laboratory I

CHEM UN3086 Physical and Analytical Chemistry
 Laboratory II

CHEM UN3098 Supervised Independent Research
 CHEM GU4071 Inorganic Chemistry

Fourth Year

CHEM UN3920 Senior Seminar in Chemical Research
 Advanced courses (4000-level or higher)

PROFESSORS

Bruce J. Berne
 Louis Brus
 Virginia W. Cornish
 Kenneth B. Eisenthal
 Richard A. Friesner
 Ruben Gonzalez
 Laura Kaufman
 James L. Leighton
 Ann E. McDermott
 Wei Min
 Jack R. Norton
 Colin Nuckolls
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 David R. Reichman
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ASSISTANT PROFESSORS

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SENIOR LECTURER

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 Karen Phillips

LECTURERS

Robert Beer
 John Decatur
 Charles E. Doubleday
 Sarah Hansen

Ruben Savizky
Talha Siddiqui

ASSOCIATES

Anna Ghurbanyan
Joseph Ulichny

GUIDELINES FOR ALL CHEMISTRY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Students majoring in chemistry or in one of the interdepartmental majors in chemistry should go to the director of undergraduate studies or the undergraduate program manager in the Department of Chemistry to discuss their program of study. Chemistry majors and interdepartmental majors usually postpone part of the Core Curriculum beyond the sophomore year.

Chemistry Tracks

All students who wish to start with Track 2 or 3 courses must take a placement exam. The results of the placement exam are used to advise students which track to pursue. Unless otherwise specified below, all students must complete one of the following tracks:

Track 1

CHEM UN1403	General Chemistry I (Lecture)
CHEM UN1404	General Chemistry II (Lecture)
CHEM UN1500	General Chemistry Laboratory
CHEM UN2443	Organic Chemistry I (Lecture)
CHEM UN2444	Organic Chemistry II (Lecture)
CHEM UN2493	Organic Chemistry Laboratory I (Techniques)
CHEM UN2494	Organic Chemistry Laboratory II (Synthesis)

Track 2

CHEM UN1500	General Chemistry Laboratory
or CHEM UN1507	Intensive General Chemistry Laboratory
CHEM UN1604	Intensive General Chemistry (Lecture)
CHEM UN2443	Organic Chemistry I (Lecture)
CHEM UN2444	Organic Chemistry II (Lecture)
CHEM UN2493	Organic Chemistry Laboratory I (Techniques)
CHEM UN2494	Organic Chemistry Laboratory II (Synthesis)

Track 3

CHEM UN1507	Intensive General Chemistry Laboratory
CHEM UN2045	Intensive Organic Chemistry I (Lecture)

CHEM UN2046	Intensive Organic Chemistry II (Lecture)
CHEM UN2545	Intensive Organic Chemistry Laboratory

Physics Sequences

Unless otherwise specified below, all students must complete one of the following sequences:

Sequence A

For students with limited background in high school physics:

PHYS UN1401	Introduction To Mechanics and Thermodynamics
PHYS UN1402	Introduction To Electricity, Magnetism, and Optics
PHYS UN1403	Introduction to Classical and Quantum Waves

For chemistry majors, the following laboratory courses are recommended, NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN1494	Introduction to Experimental Physics
PHYS UN2699	Experiments in Classical and Modern Physics
PHYS UN3081	Intermediate Laboratory Work

Sequence B

PHYS UN1601	Physics, I: Mechanics and Relativity
PHYS UN1602	Physics, II: Thermodynamics, Electricity, and Magnetism
PHYS UN2601	Physics, III: Classical and Quantum Waves
or PHYS UN3081	Intermediate Laboratory Work

For chemistry majors, the following laboratory courses are recommended NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN2699	Experiments in Classical and Modern Physics
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Sequence C

For students with advanced preparation in physics and mathematics:

PHYS UN2801	Accelerated Physics I
- PHYS UN2802	and Accelerated Physics II

For chemistry majors, the following laboratory courses are recommended NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN2699	Experiments in Classical and Modern Physics
or PHYS UN3081	Intermediate Laboratory Work

MAJOR IN CHEMISTRY

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN2408	First-Year Seminar in Chemical Research (Recommended NOT required)
CHEM UN3079	Physical Chemistry I
CHEM UN3080	Physical Chemistry II
CHEM UN3085	Physical and Analytical Chemistry Laboratory I
CHEM UN3086	Physical and Analytical Chemistry Laboratory II
CHEM UN3546	Advanced Organic Chemistry Laboratory
CHEM UN3920	Senior Seminar in Chemical Research
CHEM GU4071	Inorganic Chemistry

Select one course from the following:

CHEM UN3098	Supervised Independent Research
OR Chemistry courses numbered CHEM GU4000 or above	

Physics

Select one of the physics sequences outlined above in the Guidelines section.

Mathematics

Select one of the following sequences:

Four semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

MAJOR IN BIOCHEMISTRY

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN2408	First-Year Seminar in Chemical Research (Recommended NOT required)
CHEM UN3079	Physical Chemistry I
CHEM UN3080	Physical Chemistry II

Biology

BIOL UN1908	First-Year Seminar in Modern Biology (Recommended NOT required)
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BIOL UN2005	Introductory Biology I: Biochemistry, Genetics & Molecular Biology
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BIOL UN2006	Introductory Biology II: Cell Biology, Development & Physiology
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BIOC UN3501	Biochemistry: Structure and Metabolism
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BIOC UN3512	Molecular Biology
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Physics

Select one of the following physics sequences:

Sequence A:

PHYS UN1201	General Physics I
- PHYS UN1202	and General Physics II

Sequence B:

PHYS UN1401	Introduction To Mechanics and Thermodynamics and Introduction To Electricity, Magnetism, and Optics and Introduction to Classical and Quantum Waves (PHYS UN1403 is recommended NOT required)
- PHYS UN1402	
- PHYS UN1403	

Sequence C:

PHYS UN1601	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves (PHYS UN2601 is recommended but not required)
- PHYS UN1602	
- PHYS UN2601	

Sequence D:

PHYS UN2801	Accelerated Physics I
- PHYS UN2802	and Accelerated Physics II

Mathematics

Select one of the following sequences:

Two semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

AP credit and one term of calculus (Calculus II or higher)

Additional Courses

Select two of the following upper level laboratory courses (one should be a Biology lab):

BIOL UN3040	Lab in Molecular Biology and Contemporary Biology Laboratory
- BIOL UN2501	

BIOL UN3050	Project Laboratory In Protein Biochemistry
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BIOL UN3052	Project Laboratory in Molecular Genetics
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BIOL UN3500	Independent Biological Research
CHEM UN3085	Physical and Analytical Chemistry Laboratory I
CHEM UN3086	Physical and Analytical Chemistry Laboratory II
CHEM UN3098	Supervised Independent Research
CHEM UN3546	Advanced Organic Chemistry Laboratory
Select any three courses from the following:	
CHEM GU4071	Inorganic Chemistry
CHEM GU4102	Chemistry for the Brain
CHEM GU4147	Advanced Organic Chemistry
BIOC GU4323	Biophysical Chemistry I
BIOC GU4324	Biophysical Chemistry II
MATH UN3027	Ordinary Differential Equations
	or MATH UN2030 Ordinary Differential Equations
One additional semester of calculus	
One additional semester of honors math:	
MATH UN1207	Honors Mathematics A
	or MATH UN1208 Honors Mathematics B
Any biology course at the 3000/4000 level for 3 or more points. The following are recommended:	
BIOL UN3004	Neurobiology I: Cellular and Molecular Neurobiology
	or BIOL UN3005 Neurobiology II: Development & Systems
BIOL UN3008	The Cellular Physiology of Disease
BIOL UN3022	Developmental Biology
BIOL UN3034	Biotechnology
BIOL UN3041	Cell Biology
BIOL UN3073	Cellular and Molecular Immunology
BIOL GU4065	Molecular Biology of Disease
BIOL GU4300	Drugs and Disease

MAJOR IN CHEMICAL PHYSICS

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN3079	Physical Chemistry I
CHEM UN3080	Physical Chemistry II
CHEM UN3085	Physical and Analytical Chemistry Laboratory I
CHEM UN3086	Physical and Analytical Chemistry Laboratory II
CHEM UN3098	Supervised Independent Research
CHEM UN3920	Senior Seminar in Chemical Research
CHEM GU4221	Quantum Chemistry
	or PHYS GU4021 Quantum Mechanics I

Physics

Select one of the physics sequences outlined above in *Guidelines for all Chemistry Majors, Concentrators and Interdepartmental Majors*. For the chemical physics major, one lab **MUST** be completed for the sequence chosen.

Complete the following lectures:

PHYS UN3003	Mechanics
PHYS UN3007	Electricity and Magnetism
PHYS UN3008	Electromagnetic Waves and Optics

Mathematics

Select one of the following sequences:

Four semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B
- MATH UN3027	and Ordinary Differential Equations

Two semesters of advanced calculus:

MATH UN1202	Calculus IV
- MATH UN3027	and Ordinary Differential Equations

MAJOR IN ENVIRONMENTAL CHEMISTRY

The requirements for this program were modified on February 1, 2016. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above. A second semester of Organic Chemistry lecture is recommended NOT required.

CHEM UN3079	Physical Chemistry I
CHEM GU4071	Inorganic Chemistry

The following courses are recommended NOT required:

CHEM UN2408	First-Year Seminar in Chemical Research
CHEM UN3920	Senior Seminar in Chemical Research

Earth and Environmental Science

Select two of the following three courses:

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System

Additional course required:

EESC UN3101	Geochemistry for a Habitable Planet
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Select one of the following labs:

EESC BC3016	Environmental Measurements
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CHEM UN3085	Physical and Analytical Chemistry Laboratory I
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Select one option for Independent Research in Environmental Chemistry:

EESC BC3800 - EESC BC3801	Senior Research Seminar and Senior Research Seminar
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CHEM UN3098	Supervised Independent Research (It is strongly recommended to take CHEM UN3920 if taking CHEM UN3098)
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Physics

Select one of the following physics sequences:

Sequence A:

PHYS UN1201 - PHYS UN1202	General Physics I and General Physics II
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Sequence B:

PHYS UN1401 - PHYS UN1402 - PHYS UN1403	Introduction To Mechanics and Thermodynamics and Introduction To Electricity, Magnetism, and Optics and Introduction to Classical and Quantum Waves (Recommended NOT required)
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Sequence C:

PHYS UN1601 - PHYS UN1602 - PHYS UN2601	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves (Recommended, not required)
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Sequence D:

PHYS UN2801 - PHYS UN2802	Accelerated Physics I and Accelerated Physics II
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Mathematics

Two semesters of calculus:

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN1202	Calculus IV

Additional Courses

Select any two of the following:

Chemistry:

CHEM UN3080	Physical Chemistry II
CHEM GU4103	Organometallic Chemistry
CHEM GU4147	Advanced Organic Chemistry

Earth and Environmental Science:

EESC BC3017	Environmental Data Analysis
EESC BC3025	Hydrology
EESC GU4008	Introduction to Atmospheric Science

EESC GU4009	Chemical Geology
EESC GU4040	Climate Thermodynamics and Energy Transfer
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
EESC GU4600	Earth Resources and Sustainable Development
EESC GU4835	Wetlands and Climate Change
EESC GU4885	The Chemistry of Continental Waters
EESC GU4888	Stable Isotope Geochemistry
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4925	Principles of Physical Oceanography
EESC GU4926	Principles of Chemical Oceanography

Earth and Environmental Engineering:

EAAE E4001	Industrial ecology of earth resources
EAAE E4003	Aquatic chemistry

Mathematics:

One additional semester of calculus

CONCENTRATION IN CHEMISTRY

No more than four points of CHEM UN3098 Supervised Independent Research may be counted toward the concentration.

Select one of the three chemistry tracks listed below.

PHYS UN1201 - PHYS UN1202	General Physics I and General Physics II
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Two semesters of calculus

Chemistry Tracks

Track 1

CHEM UN1403	General Chemistry I (Lecture)
CHEM UN1404	General Chemistry II (Lecture)
CHEM UN1500	General Chemistry Laboratory

Select 22 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

Track 2

CHEM UN1500 or CHEM UN1507	General Chemistry Laboratory or Intensive General Chemistry Laboratory
CHEM UN1604	Intensive General Chemistry (Lecture)

Select 22 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

Track 3

CHEM UN1507	Intensive General Chemistry Laboratory
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CHEM UN2045 Intensive Organic Chemistry I (Lecture)

CHEM UN2046 Intensive Organic Chemistry II (Lecture)

Select 18 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

CHEMISTRY

Undergraduate Office: 340 Havemeyer; 212-854-2163

Departmental Office: 344 Havemeyer; 212-854-2202
<http://www.columbia.edu/cu/chemistry/>

Director of Undergraduate Studies: Prof. Karen Phillips, 422 Havemeyer; 212-851-7534; kep12@columbia.edu (kep12@chem.columbia.edu)

Program Manager for Undergraduate Studies: Dr. Vesna Gasperov, 211A Havemeyer; 212-854-2017; vg2231@columbia.edu

Biochemistry Advisers:

Biology: Prof. Brent Stockwell, 1208 Northwest Corner Building; 212-854-2919; stockwell@biology.columbia.edu

Chemistry, the study of molecules, is a central science interesting for its own sake but also necessary as an intellectual link to the other sciences of biology, physics, and environmental science. Faculty find the various disciplines of chemistry fascinating because they establish intellectual bridges between the macroscopic or human-scale world that we see, smell, and touch, and the microscopic world that affects every aspect of our lives. The study of chemistry begins on the microscopic scale and extends to engage a variety of different macroscopic contexts.

Chemistry is currently making its largest impact on society at the nexus between chemistry and biology and the nexus between chemistry and engineering, particularly where new materials are being developed. A typical chemistry laboratory now has more computers than test tubes and no longer smells of rotten eggs.

The chemistry department majors are designed to help students focus on these new developments and to understand the factors influencing the nature of the discipline. Because the science is constantly changing, courses change as well, and while organic and physical chemistry remain the bedrock courses, they too differ greatly from the same courses 40 years ago. Many consider biochemistry to be a foundation course as well. Although different paths within the chemistry major take different trajectories, there is a core that provides the essential foundation students need regardless of the path they choose. Students should consider majoring in chemistry if they share or can develop a fascination with the explanatory power that

comes with an advanced understanding of the nature and influence of the microscopic world of molecules.

Students who choose to major in chemistry may elect to continue graduate study in this field and obtain a Ph.D. which is a solid basis for a career in research, either in the industry or in a university. A major in chemistry also provides students with an astonishing range of career choices such as working in the chemical or pharmaceutical industries or in many other businesses where a technical background is highly desirable. Other options include becoming a financial analyst for a technical company, a science writer, a high school chemistry teacher, a patent attorney, an environmental consultant, or a hospital laboratory manager, among others. The choices are both numerous and various as well as intellectually exciting and personally fulfilling.

ADVANCED PLACEMENT

The department grants advanced placement (AP) credit for a score of 4 or 5 or the equivalent. The amount of credit granted is based on the results of the department placement exam and completion of the requisite course. Students who are placed into CHEM UN1604 Intensive General Chemistry (Lecture) are granted 3 points of credit; students who are placed into CHEM UN2045 Intensive Organic Chemistry I (Lecture)-CHEM UN2046 Intensive Organic Chemistry II (Lecture) are granted 6 points of credit. In either case, credit is granted only upon completion of the course with a grade of C or better. Students must complete a department placement exam prior to registering for either of these courses.

PROGRAMS OF STUDY

The Department of Chemistry offers four distinct academic major programs for undergraduates interested in professional-level training and education in the chemical sciences: chemistry, chemical physics, biochemistry and environmental chemistry. For students interested in a program of less extensive study and coursework, the department offers a concentration in chemistry.

COURSE INFORMATION

The results of the placement exam are used to advise students which track to pursue. The Department of Chemistry offers three different tracks. Students who wish to take Track 2 or 3 classes must take the placement exam. Students who wish to pursue Track 1 classes do not need to take the placement exam.

TRACK INFORMATION

In the first year, Track 1 students with one year of high school chemistry take a one-year course in general chemistry, and the one-term laboratory course that accompanies it. In the second year, students study organic chemistry, and take organic chemistry laboratory.

Students who qualify by prior examination during orientation week can place into the advanced tracks. There are two options.

Track 2 students take, in the fall term, a special one-term intensive course in general chemistry in place of the one-year course. In the second year, students study organic chemistry and take organic chemistry laboratory. Track 3 students take a one-year course in organic chemistry for first-year students and the one-term intensive general chemistry laboratory course. In the second year, students enroll in physical chemistry and the organic chemistry laboratory course.

Additional information on the tracks can be found in the *Requirements* section.

ADDITIONAL COURSES

First-year students may also elect to take CHEM UN2408. This seminar focuses on topics in modern chemistry, and is offered to all students who have taken at least one semester of college chemistry and have an interest in chemical research.

Biochemistry (BIOC UN3501, BIOC UN3512) is recommended for students interested in the biomedical sciences.

Physical chemistry (CHEM UN3079-CHEM UN3080), a one-year program, requires prior preparation in mathematics and physics. The accompanying laboratory is CHEM UN3085-CHEM UN3086.

Also offered are a senior seminar (CHEM UN3920); advanced courses in biochemistry, inorganic, organic, and physical chemistry; and an introduction to research (CHEM UN3098).

SAMPLE PROGRAMS

Some *typical* programs are shown below. Programs are crafted by the student and the director of undergraduate studies to meet individual needs and interests.

Track 1

First Year

CHEM UN1403 General Chemistry I (Lecture)
 CHEM UN1404 General Chemistry II (Lecture)
 CHEM UN1500 General Chemistry Laboratory
 CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and physics as required.

Second Year

CHEM UN2443 Organic Chemistry I (Lecture)
 CHEM UN2444 Organic Chemistry II (Lecture)
 CHEM UN2493 Organic Chemistry Laboratory I (Techniques)
 CHEM UN2494 Organic Chemistry Laboratory II (Synthesis)

Calculus and physics as required.

Third Year

CHEM UN3079 Physical Chemistry I

CHEM UN3080 Physical Chemistry II
 BIOC UN3501 Biochemistry: Structure and Metabolism
 CHEM UN3546 Advanced Organic Chemistry Laboratory
 CHEM UN3098 Supervised Independent Research

Fourth Year

CHEM UN3085 Physical and Analytical Chemistry Laboratory I
 CHEM UN3086 Physical and Analytical Chemistry Laboratory II
 CHEM UN3920 Senior Seminar in Chemical Research
 CHEM GU4071 Inorganic Chemistry
 Advanced courses (4000-level or higher)

Track 2

First Year

CHEM UN1507 Intensive General Chemistry Laboratory
 CHEM UN1604 Intensive General Chemistry (Lecture)
 CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and physics as required.

Second Year

CHEM UN2443 Organic Chemistry I (Lecture)
 CHEM UN2444 Organic Chemistry II (Lecture)
 CHEM UN2493 Organic Chemistry Laboratory I (Techniques)
 CHEM UN2494 Organic Chemistry Laboratory II (Synthesis)

Calculus and physics as required.

Third Year

CHEM UN3079 Physical Chemistry I
 CHEM UN3080 Physical Chemistry II
 BIOC UN3501 Biochemistry: Structure and Metabolism
 CHEM UN3546 Advanced Organic Chemistry Laboratory

CHEM UN3098 Supervised Independent Research

Fourth Year

CHEM UN3085 Physical and Analytical Chemistry Laboratory I
 CHEM UN3086 Physical and Analytical Chemistry Laboratory II
 CHEM UN3920 Senior Seminar in Chemical Research
 CHEM GU4071 Inorganic Chemistry
 Advanced courses (4000-level or higher)

Track 3**First Year**

- CHEM UN1507 Intensive General Chemistry Laboratory
- CHEM UN2045 Intensive Organic Chemistry I (Lecture)
- CHEM UN2046 Intensive Organic Chemistry II (Lecture)
- CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and Physics as required.

Second Year

- CHEM UN3079 Physical Chemistry I
- CHEM UN3080 Physical Chemistry II
- CHEM UN2545 Intensive Organic Chemistry Laboratory
- CHEM UN3546 Advanced Organic Chemistry Laboratory

Calculus and physics as required.

Third Year

- BIOC UN3501 Biochemistry: Structure and Metabolism
- CHEM UN3085 Physical and Analytical Chemistry Laboratory I
- CHEM UN3086 Physical and Analytical Chemistry Laboratory II
- CHEM UN3098 Supervised Independent Research
- CHEM GU4071 Inorganic Chemistry

Fourth Year

- CHEM UN3920 Senior Seminar in Chemical Research
- Advanced courses (4000-level or higher)

PROFESSORS

Bruce J. Berne
 Louis Brus
 Virginia W. Cornish
 Kenneth B. Eisenthal
 Richard A. Friesner
 Ruben Gonzalez
 Laura Kaufman
 James L. Leighton
 Ann E. McDermott
 Wei Min
 Jack R. Norton
 Colin Nuckolls
 Gerard Parkin
 David R. Reichman
 Tomislav Rovis
 Dalibor Sames
 Brent Stockwell
 James J. Valentini

Latha Venkataraman
 Xiaoyang Zhu

ASSOCIATE PROFESSORS

Angelo Cacciuto
 Luis Campos
 Jonathan Owen

ASSISTANT PROFESSORS

Timothy Berkelbach
 Xavier Roy
 Neel Shah

SENIOR LECTURER

Luis Avila

Fay Ng

Karen Phillips

LECTURERS

Robert Beer
 John Decatur
 Charles E. Doubleday
 Sarah Hansen
 Ruben Savizky
 Talha Siddiqui

ASSOCIATES

Anna Ghurbanyan
 Joseph Ulichny

GUIDELINES FOR ALL CHEMISTRY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Students majoring in chemistry or in one of the interdepartmental majors in chemistry should go to the director of undergraduate studies or the undergraduate program manager in the Department of Chemistry to discuss their program of study. Chemistry majors and interdepartmental majors usually postpone part of the Core Curriculum beyond the sophomore year.

Chemistry Tracks

All students who wish to start with Track 2 or 3 courses must take a placement exam. The results of the placement exam are used to advise students which track to pursue. Unless otherwise specified below, all students must complete one of the following tracks:

Track 1

CHEM UN1403	General Chemistry I (Lecture)
CHEM UN1404	General Chemistry II (Lecture)

CHEM UN1500	General Chemistry Laboratory
CHEM UN2443	Organic Chemistry I (Lecture)
CHEM UN2444	Organic Chemistry II (Lecture)
CHEM UN2493	Organic Chemistry Laboratory I (Techniques)
CHEM UN2494	Organic Chemistry Laboratory II (Synthesis)

Track 2

CHEM UN1500 or CHEM UN1507	General Chemistry Laboratory Intensive General Chemistry Laboratory
CHEM UN1604	Intensive General Chemistry (Lecture)
CHEM UN2443	Organic Chemistry I (Lecture)
CHEM UN2444	Organic Chemistry II (Lecture)
CHEM UN2493	Organic Chemistry Laboratory I (Techniques)
CHEM UN2494	Organic Chemistry Laboratory II (Synthesis)

Track 3

CHEM UN1507	Intensive General Chemistry Laboratory
CHEM UN2045	Intensive Organic Chemistry I (Lecture)
CHEM UN2046	Intensive Organic Chemistry II (Lecture)
CHEM UN2545	Intensive Organic Chemistry Laboratory

Physics Sequences

Unless otherwise specified below, all students must complete one of the following sequences:

Sequence A

For students with limited background in high school physics:

PHYS UN1401	Introduction To Mechanics and Thermodynamics
PHYS UN1402	Introduction To Electricity, Magnetism, and Optics
PHYS UN1403	Introduction to Classical and Quantum Waves

For chemistry majors, the following laboratory courses are recommended, NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN1494	Introduction to Experimental Physics
PHYS UN2699	Experiments in Classical and Modern Physics
PHYS UN3081	Intermediate Laboratory Work

Sequence B

PHYS UN1601	Physics, I: Mechanics and Relativity
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PHYS UN1602	Physics, II: Thermodynamics, Electricity, and Magnetism
PHYS UN2601	Physics, III: Classical and Quantum Waves
or PHYS UN3081	Intermediate Laboratory Work

For chemistry majors, the following laboratory courses are recommended NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN2699	Experiments in Classical and Modern Physics
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Sequence C

For students with advanced preparation in physics and mathematics:

PHYS UN2801	Accelerated Physics I
- PHYS UN2802	and Accelerated Physics II

For chemistry majors, the following laboratory courses are recommended NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN2699	Experiments in Classical and Modern Physics
or PHYS UN3081	Intermediate Laboratory Work

MAJOR IN CHEMISTRY

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN2408	First-Year Seminar in Chemical Research (Recommended NOT required)
CHEM UN3079	Physical Chemistry I
CHEM UN3080	Physical Chemistry II
CHEM UN3085	Physical and Analytical Chemistry Laboratory I
CHEM UN3086	Physical and Analytical Chemistry Laboratory II
CHEM UN3546	Advanced Organic Chemistry Laboratory
CHEM UN3920	Senior Seminar in Chemical Research
CHEM GU4071	Inorganic Chemistry

Select one course from the following:

CHEM UN3098	Supervised Independent Research
OR Chemistry courses numbered CHEM GU4000 or above	

Physics

Select one of the physics sequences outlined above in the Guidelines section.

Mathematics

Select one of the following sequences:

Four semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

MAJOR IN BIOCHEMISTRY

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN2408	First-Year Seminar in Chemical Research (Recommended NOT required)
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CHEM UN3079	Physical Chemistry I
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CHEM UN3080	Physical Chemistry II
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Biology

BIOL UN1908	First-Year Seminar in Modern Biology (Recommended NOT required)
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BIOL UN2005	Introductory Biology I: Biochemistry, Genetics & Molecular Biology
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BIOL UN2006	Introductory Biology II: Cell Biology, Development & Physiology
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BIOC UN3501	Biochemistry: Structure and Metabolism
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BIOC UN3512	Molecular Biology
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Physics

Select one of the following physics sequences:

Sequence A:

PHYS UN1201	General Physics I
- PHYS UN1202	and General Physics II

Sequence B:

PHYS UN1401	Introduction To Mechanics and Thermodynamics and Introduction To Electricity, Magnetism, and Optics and Introduction to Classical and Quantum Waves (PHYS UN1403 is recommended NOT required)
- PHYS UN1402	
- PHYS UN1403	

Sequence C:

PHYS UN1601	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves (PHYS UN2601 is recommended but not required)
- PHYS UN1602	
- PHYS UN2601	

Sequence D:

PHYS UN2801	Accelerated Physics I
- PHYS UN2802	and Accelerated Physics II

Mathematics

Select one of the following sequences:

Two semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

AP credit and one term of calculus (Calculus II or higher)

Additional Courses

Select two of the following upper level laboratory courses (one should be a Biology lab):

BIOL UN3040	Lab in Molecular Biology and Contemporary Biology Laboratory
- BIOL UN2501	

BIOL UN3050	Project Laboratory In Protein Biochemistry
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BIOL UN3052	Project Laboratory in Molecular Genetics
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BIOL UN3500	Independent Biological Research
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CHEM UN3085	Physical and Analytical Chemistry Laboratory I
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CHEM UN3086	Physical and Analytical Chemistry Laboratory II
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CHEM UN3098	Supervised Independent Research
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CHEM UN3546	Advanced Organic Chemistry Laboratory
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Select any three courses from the following:

CHEM GU4071	Inorganic Chemistry
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CHEM GU4102	Chemistry for the Brain
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CHEM GU4147	Advanced Organic Chemistry
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BIOC GU4323	Biophysical Chemistry I
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BIOC GU4324	Biophysical Chemistry II
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MATH UN3027	Ordinary Differential Equations
or MATH UN2030	Ordinary Differential Equations

One additional semester of calculus

One additional semester of honors math:

MATH UN1207	Honors Mathematics A
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or MATH UN1208 Honors Mathematics B

Any biology course at the 3000/4000 level for 3 or more points. The following are recommended:

BIOL UN3004	Neurobiology I: Cellular and Molecular Neurobiology
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or BIOL UN3005 Neurobiology II: Development & Systems

BIOL UN3008	The Cellular Physiology of Disease
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BIOL UN3022	Developmental Biology
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BIOL UN3034	Biotechnology
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BIOL UN3041	Cell Biology
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BIOL UN3073	Cellular and Molecular Immunology
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BIOL GU4065	Molecular Biology of Disease
BIOL GU4300	Drugs and Disease

MAJOR IN CHEMICAL PHYSICS

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN3079	Physical Chemistry I
CHEM UN3080	Physical Chemistry II
CHEM UN3085	Physical and Analytical Chemistry Laboratory I
CHEM UN3086	Physical and Analytical Chemistry Laboratory II
CHEM UN3098	Supervised Independent Research
CHEM UN3920	Senior Seminar in Chemical Research
CHEM GU4221	Quantum Chemistry
or PHYS GU4021	Quantum Mechanics I

Physics

Select one of the physics sequences outlined above in *Guidelines for all Chemistry Majors, Concentrators and Interdepartmental Majors*. For the chemical physics major, one lab **MUST** be completed for the sequence chosen.

Complete the following lectures:

PHYS UN3003	Mechanics
PHYS UN3007	Electricity and Magnetism
PHYS UN3008	Electromagnetic Waves and Optics

Mathematics

Select one of the following sequences:

Four semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B
- MATH UN3027	and Ordinary Differential Equations

Two semesters of advanced calculus:

MATH UN1202	Calculus IV
- MATH UN3027	and Ordinary Differential Equations

MAJOR IN ENVIRONMENTAL CHEMISTRY

The requirements for this program were modified on February 1, 2016. Students who declared this program before this date should

contact the director of undergraduate studies for the department in order to confirm their correct course of study.

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above. A second semester of Organic Chemistry lecture is recommended NOT required.

CHEM UN3079	Physical Chemistry I
CHEM GU4071	Inorganic Chemistry

The following courses are recommended NOT required:

CHEM UN2408	First-Year Seminar in Chemical Research
CHEM UN3920	Senior Seminar in Chemical Research

Earth and Environmental Science

Select two of the following three courses:

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System

Additional course required:

EESC UN3101	Geochemistry for a Habitable Planet
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Select one of the following labs:

EESC BC3016	Environmental Measurements
CHEM UN3085	Physical and Analytical Chemistry Laboratory I

Select one option for Independent Research in Environmental Chemistry:

EESC BC3800	Senior Research Seminar
- EESC BC3801	and Senior Research Seminar
CHEM UN3098	Supervised Independent Research (It is strongly recommended to take CHEM UN3920 if taking CHEM UN3098)

Physics

Select one of the following physics sequences:

Sequence A:

PHYS UN1201	General Physics I
- PHYS UN1202	and General Physics II

Sequence B:

PHYS UN1401	Introduction To Mechanics and Thermodynamics
- PHYS UN1402	and Introduction To Electricity, Magnetism, and Optics
- PHYS UN1403	and Introduction to Classical and Quantum Waves (Recommended NOT required)

Sequence C:

PHYS UN1601 - PHYS UN1602 - PHYS UN2601	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves (Recommended, not required)
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Sequence D:

PHYS UN2801 - PHYS UN2802	Accelerated Physics I and Accelerated Physics II
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Mathematics

Two semesters of calculus:

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN1202	Calculus IV

Additional Courses

Select any two of the following:

Chemistry:

CHEM UN3080	Physical Chemistry II
CHEM GU4103	Organometallic Chemistry
CHEM GU4147	Advanced Organic Chemistry

Earth and Environmental Science:

EESC BC3017	Environmental Data Analysis
EESC BC3025	Hydrology
EESC GU4008	Introduction to Atmospheric Science
EESC GU4009	Chemical Geology
EESC GU4040	Climate Thermodynamics and Energy Transfer
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
EESC GU4600	Earth Resources and Sustainable Development
EESC GU4835	Wetlands and Climate Change
EESC GU4885	The Chemistry of Continental Waters
EESC GU4888	Stable Isotope Geochemistry
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4925	Principles of Physical Oceanography
EESC GU4926	Principles of Chemical Oceanography

Earth and Environmental Engineering:

EAAE E4001	Industrial ecology of earth resources
EAAE E4003	Aquatic chemistry

Mathematics:

One additional semester of calculus

CONCENTRATION IN CHEMISTRY

No more than four points of CHEM UN3098 Supervised Independent Research may be counted toward the concentration.

Select one of the three chemistry tracks listed below.

PHYS UN1201 - PHYS UN1202	General Physics I and General Physics II
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Two semesters of calculus

Chemistry Tracks

Track 1

CHEM UN1403	General Chemistry I (Lecture)
CHEM UN1404	General Chemistry II (Lecture)
CHEM UN1500	General Chemistry Laboratory

Select 22 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

Track 2

CHEM UN1500 or CHEM UN1507	General Chemistry Laboratory Intensive General Chemistry Laboratory
CHEM UN1604	Intensive General Chemistry (Lecture)

Select 22 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

Track 3

CHEM UN1507	Intensive General Chemistry Laboratory
CHEM UN2045	Intensive Organic Chemistry I (Lecture)
CHEM UN2046	Intensive Organic Chemistry II (Lecture)

Select 18 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

CLASSICS

Departmental Office: 617 Hamilton; 212-854-3902; classics@columbia.edu
<http://www.columbia.edu/cu/classics/>

Director of Undergraduate Studies (Classics): Prof. Gareth Williams; 212-854-7856; gdw5@columbia.edu

Director of Undergraduate Studies (Modern Greek Studies): Prof. Nikolas Kakkoufa; 212-854-3902; nk2776@columbia.edu

Director of Academic Administration and Finance: Juliana Driever; 212-854-2726; jd2185@columbia.edu

When one visits Rome or Athens, they also visit the many layers of physical, historical, and cultural development that have contributed to the complex evolution of those cities.

When one tours the Roman Forum or the Greek Parthenon, they set foot on monuments whose physical impressiveness symbolizes political strength and historical importance; in a very physical way they experience the past. When one studies Latin and Greek language and culture, they embark on a tour of an alternative kind, making their way through texts and other cultural forms—such as paintings, sculptures, and philosophical ideas—that bring them directly into contact with the Greco-Roman past. Literature, philosophy, history, art and architecture, linguistics, papyrology, religion: all (and more) are branches of investigation to which the modern student of classics/classical studies has access through the surviving literary and material evidence.

But when one studies in the original language Virgil's *Aeneid*, say, or Plato's philosophical writings, they find that ancient Greek or Latin literature deals with issues and ideas that are, for us, of central contemporary importance: e.g., How can I be happy? What is the best political constitution for our (or any) state? What responsibilities do I have to the society in which I live? What national significance is served or owed by literature?

The study of Greek and Latin language and culture concentrates in one main area (ancient Greece and Rome) and on many of the questions that are of direct pertinence to the ways in which modern lives are shaped and lived; at the same time, Greco-Roman literature and philosophy, so fundamental to the later development of the Western tradition, boast works of great intrinsic worth and interest. While all Columbia students get an introduction to classical texts in *Literature Humanities* and *Contemporary Civilization*, classics/classical studies provides a more advanced study of ancient cultural issues and habits of mind already sampled in the Core.

Study abroad in Greece or Italy offers a variety of educational experiences that are continuous with those of the major, enriching both linguistic expertise and cultural awareness. Students in classics have the opportunity to take part in archaeological digs abroad and, on occasion, to assist faculty in research projects that require, for example, bibliographical collection or the checking of research data.

Many majors pursue graduate study in classics and classical studies. Upon earning their graduate degrees, they often embark on teaching careers in universities, colleges, and high schools. Many graduating majors also enter a number of other professional fields, among them law, banking, accountancy, publishing, and museum-work. Employers tend to find that students in classics are articulate on paper, as well as orally; are organized of mind; and have good skills in general reasoning, an ability developed by the study of Greek and Latin language. In effect, the study of classics opens up a wide array of options, both in education and in the wider world.

The program of the department aims for a comprehensive understanding of classical literature and culture, and the mastery of Greek and Latin on which such understanding depends. Careful study of the language occupies the largest

part of the first-year courses and is not omitted in the more advanced courses. Although literature becomes the chief subject only in the advanced courses, important authors like Homer, Plato, and Virgil are studied as literary texts already in the intermediate courses. A wide variety of courses are offered in translation.

Through a joint program with Barnard, the department offers a broad range of subjects. The department annually offers four advanced courses in each language (at the 3000- or 4000-level), the content of which changes each year in order to provide a curricular range and to balance authors and genres over a two-year period.

Opportunities for individual projects of reading and research are available. Students are also permitted to take graduate courses if they are sufficiently prepared. Additionally, they can supplement their studies within the department through work in other departments, such as art history and archaeology, history, philosophy, and the other departments of languages and literature.

It is not necessary to have previously studied either language in order to major in it. A student starting Greek or Latin at Columbia can meet all the requirements of a major within an ordinary undergraduate program.

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT

Students beginning the study of Greek or Latin at Columbia must take four terms of either of the following two-year sequences:

Greek

GREK UN1101 - GREK UN1102	Elementary Greek I and Elementary Greek II
GREK UN2101 - GREK UN2102	Intermediate Greek I Attic Prose and Intermediate Greek II: Homer

Latin

LATN UN1101 - LATN UN1102	Elementary Latin I and Elementary Latin II
LATN UN2101 - LATN UN2102	Intermediate Latin I and Intermediate Latin II

With the permission of the director of undergraduate studies, GREK UN2102 Intermediate Greek II: Homer may be taken before GREK UN2101 Intermediate Greek I Attic Prose.

The intensive elementary courses GREK UN1121 Intensive Elementary Greek and LATN UN1121 Intensive Elementary Latin may be substituted for the two-term *UN1101-UN1102* sequence. The intensive intermediate courses GREK S2121Q Intensive Intermediate Greek: Poetry and Prose and LATN S2121Q Intensive Intermediate Latin: Poetry and Prose may be substituted for the two-term *UN2101-UN2102* sequence.

LATN UN2101 Intermediate Latin I should be taken before LATN UN2102 Intermediate Latin II.

For students with secondary-school training in Greek or Latin, the director of undergraduate studies determines, on the basis of records and test scores, what further work is needed to fulfill the language requirement.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 5 on the Latin AP exam, which also satisfies the foreign language requirement, upon successful completion (with a grade of B or higher) of a Latin class at the 3000-level or higher.

MAJOR PROGRAM

The department offers a major in classics and a major track in classical studies. The major in classics involves the intensive study of both Greek and Latin, as well as their cultural matrix; the track in classical studies offers a more interdisciplinary approach. The major in classics is recommended for students planning to continue the study of classics in graduate school. The department also participates in the interdepartmental ancient studies program and offers a concentration in classics; these are all described below.

The major in classics and the track in classical studies are designed in part to build on the experience of the ancient world that undergraduates have acquired at Columbia in the Core Curriculum (especially in *Literature Humanities*). The major in classics is structured on the principle of gradual and closely monitored linguistic progress from the elementary (1100-level) to the advanced (3000- and 4000-levels) and ultimately to the literature survey courses (*GU4105-GU4106*) in Greek and/or Latin.

Those majors intending to embark on graduate study in classics are especially encouraged to undertake, in their senior year, an independent research project (*UN3998*). This option is designed to allow students to personalize their experience in the major by conducting advanced study in a specialized area under the guidance of the specializing faculty member of their choice.

UN3998 is required in the classical studies track. Otherwise, students in classical studies are not required to take advanced courses beyond *UN3996 The Major Seminar*, but are expected to follow a coherent plan of study by taking a sequence of cognate courses in different but related departments (e.g., art history and archaeology, history, etc.).

The director of undergraduate studies is responsible for overseeing the path of study followed by each student in classics or classical studies. Through close interaction with the director of undergraduate studies, as well as with other faculty members where appropriate, each major is strongly encouraged to debate the strengths and weaknesses of his or her own trajectory of study even as the requirements for the major are being completed.

Students should contact the director of undergraduate studies with any questions about the classics majors and course offerings. The director of undergraduate studies can provide students with a worksheet to help in planning their progress toward major requirements.

PROFESSORS

Kathy Eden
Helene P. Foley (Barnard)
Carmela V. Franklin
Stathis Gourgouris
John Ma (Chair)
Kristina Milnor (Barnard, Chair)
Seth R. Schwartz
Deborah T. Steiner
Karen Van Dyck
Katharina Volk
Gareth D. Williams
Nancy Worman (Barnard)

ASSOCIATE PROFESSORS

Marcus Folch
Joseph Howley
Elizabeth Irwin
Ellen Morris (Barnard)

ASSISTANT PROFESSORS

Alan Ross

SENIOR LECTURER

Elizabeth Scharffenberger

LECTURERS

Dimitrios Antoniou
Nikolas Kakkoufa
Darcy Krasne

MAJOR IN CLASSICS

The major in classics involves a program in both Greek and Latin languages and literatures, and in Greek and Roman civilization. Students generally emphasize the study of one of the languages (the primary language), but significant study of the other (secondary) language is required as well.

The major requires the completion of 11 courses (a minimum of 34 points) and must include the following:

1. In a primary language:
 - Four courses at or above the UN2100-level;
 - *The Major Seminar UN3996*;
 - Two courses from the following four advanced options: *GU4105*, *GU4106*, *GU4139*, *UN3998* (any others may count toward the four upper level requirement).
2. In a secondary language:

- Two courses at or above the UN2100-level.
3. Two ancient culture courses, including:
 - One course in the culture of the primary language;
 - One course in any aspect of ancient history or culture (*HIST*, *AHIS*, *PHIL*, *CLLT*, *CLCV*). All substitutions must be approved by the director of undergraduate studies.

The classical languages follow a standard track of elementary (1100-level) and intermediate (2100-level) levels, followed by 3000- and 4000-level classes that may generally be taken in any order.

Although it is easier to complete the major if at least one classical language is begun no later than the first year, it is possible to begin one classical language in the sophomore year and the other in the junior year and still complete the major.

Those planning to go on to graduate study in classics are urged to take both terms of GU4105-GU4106 if possible, to write a senior research thesis, and to acquire a reading knowledge of German and preferably also of French (Italian is also useful).

To be eligible for departmental honors and prizes, students must take UN3998.

MAJOR TRACK IN CLASSICAL STUDIES

The major track in classical studies requires the completion of 11 courses (a minimum of 35 points) and must include the following:

1. Five courses, at or above the UN1102-level, in either or both Latin and Greek;
2. *The Major Seminar UN3996*;
3. Four classes in Ancient History, Art, Philosophy, Religion, and Civilization. Note that certain courses may be 6 credits, e.g., ICCS's *City of Rome* course, and may count as two courses towards this requirement. Students in doubt about a course's relevance should confirm it with the director of undergraduate studies as soon as possible;
4. *Senior Thesis UN3998*, completed on a chosen aspect of Greek or Roman civilization under the direction of a faculty member (3 points).

Summer courses 1221/1221 are counted as four credits for the purposes of major requirements.

MAJOR IN ANCIENT STUDIES

CONCENTRATION IN CLASSICS

Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The concentration in classics is designed for those who cannot fit the complete major into their undergraduate schedule, but still wish to take a substantial program in Greek and Latin.

The concentration requires the completion of seven courses (a minimum of 21 points) and must include the following:

1. In a primary language, six courses distributed as follows:
 - Five courses above the 1100-level, three of which must be 3000- or 4000-level;
 - One course from the following three advanced options: *GU4105*, *GU4106*, *GU4139*.
2. One course in Ancient History or Classical Civilization (3 points).

SPECIAL CONCENTRATION IN HELLENIC STUDIES

The courses in the Hellenic Studies program are designed to develop the student's proficiency in aspects of Modern Greek culture, language, and history. The minimum credit requirement for the Hellenic Studies Concentration is 21 credits and includes:

1. Modern Greek language and culture courses (Elementary, Intermediate, Advanced, Conversation I & II, Reading in Greek; minimum 8 credits). Students will work with undergraduate advisor to determine their level of the language,
2. Modern Greek Studies interdepartmental courses (CLGM, CSGM, HSGM; minimum 12 credits). The program of study should be planned as early as possible with the Director of Undergraduate Studies. Students meet with the Director of Undergraduate Studies each semester in order to obtain program approval. Opportunities exist for study abroad in Greece, Cyprus and Turkey for the summer or an academic term for credit. Students work closely with the concentration advisor on the selection of the foreign schools and the transfer of credit.

Students may also wish to write a Senior Thesis which will substitute one Modern Greek Studies interdepartmental seminar. While not required for graduation, the thesis enables a student to be considered for departmental honors. It is advisable to begin planning for the thesis during the student's junior year. Interested students should identify a potential faculty advisor.

COMPARATIVE LITERATURE AND SOCIETY

Program Office: B-101 Heyman Center, East Campus;
212-854-4541; icls@columbia.edu
<http://icls.columbia.edu> (<http://icls.columbia.edu/>)

Director: Prof. Lydia Liu, 407 Kent Hall; 212-854-5631; ll2410@columbia.edu

Associate Director: Associate Prof. Anupama Rao, Barnard Hall 2nd Floor, Lefrak 226; 212-854-8547; a rao@barnard.edu

Director of Undergraduate Studies: L. Maria Bo, Lecturer in Discipline; B106 Heyman Center, East Campus; 212-854-4541; lmb2204@columbia.edu

Director of Medicine, Literature and Society Major track: Assistant Prof. of Medicine Rishi Goyal; B106 Heyman Center, East Campus; 212-854-4541; rkg6@cumc.columbia.edu

Assistant Director: Sarah Monks, B-102 Heyman Center, East Campus; 212-854-8850; sm3373@columbia.edu

Established at Columbia in 1998, the Institute for Comparative Literature and Society (ICLS) (<http://icls.columbia.edu>) promotes a global perspective in the study of literature and its social context. Committed to cross-disciplinary study of literary works, the Institute brings together the rich resources of Columbia in the various literatures of the world; in the social sciences; in art history, architecture, and media; and in the medical humanities.

The major program at ICLS allows qualified students to study literature, culture, and society with reference to material from several national traditions, or in combination of literary study with comparative study in other disciplines in the humanities and social sciences. Under the guidance of the director of undergraduate studies, students select courses offered by participating departments.

The program is designed for students whose interest and expertise in languages other than English permit them to work comparatively in several national or regional cultures. The course of study differs from that of traditional comparative literature programs, both in its cross-disciplinary nature and in its expanded geographic range, including not just European, but also Asian, Middle Eastern, African, and Latin American cultures.

The program includes course work in the social sciences, and several core courses are jointly taught by faculty from different disciplines. Students thus explore a variety of methodological and disciplinary approaches to cultural and literary artifacts in the broadest sense. The cross-disciplinary range of the program includes visual and media studies; law and the humanities; medicine and the humanities; and studies of space, cities, and architecture. As a major or concentration, this program can be said to flow naturally from Columbia's Core Curriculum, which combines literature, art, philosophy, and social thought, and consistently attracts some of Columbia's most ambitious and cosmopolitan students.

Students can choose to complete the major in Comparative Literature and Society (CLS) or the major track in Medicine,

Literature, and Society (MLS). Currently, the MLS track is not available for the concentration.

Given the wide variety of geographic and disciplinary specializations possible within the major and concentration, students construct their course sequence in close collaboration with the director of undergraduate studies. All students, however, share the experience of taking the course CPLS UN3900 Introduction to Comparative Literature and Society in their sophomore year, as well as the required senior seminar in the fall of their last year in the program. The ICLS major and concentration are designed for students interested in the cross-disciplinary and cross-cultural study of texts, traditions, media, and discourses in an increasingly transnational world.

Students planning to apply for admission to the CLS major, the MLS major track, or the CLS concentration should organize their course of study in order to complete the following prerequisites by the end of the sophomore year:

1. Preparation to undertake advanced work in one foreign language, to be demonstrated by completion of two introduction to literature courses, typically numbered 3333-3350.
2. Completion of at least four terms of study of a second foreign language or two terms in each of two foreign languages.
3. Enrollment in CPLS UN3900 Introduction to Comparative Literature and Society in the spring semester of the sophomore year.

Information about admission requirements and application to the major or concentration can be found at <http://icls.columbia.edu/programs/undergraduate-admissions/>. Students are advised to meet with the director of undergraduate studies before submitting the statement of purpose for the application. Applications are due in early January of the sophomore year.

DEPARTMENTAL HONORS

To be eligible for departmental honors, students must have a minimum grade point average of 3.6 for courses in the major. Departmental honors will be conferred only on students who have submitted a superior senior thesis that clearly demonstrates originality and excellent scholarship. Note that the senior thesis is not required for the major. For information on the honors program, see <http://icls.columbia.edu/programs/departmental-honors/>.

Executive Committee of ICLS L. Maria Bo (English and Comparative Literature) Bruno Bosteels (Latin American and Iberian Cultures) Souleymane Bachir Diagne (French and Romance Philology) Madeleine Dobie (French and Romance Philology) Brent Hayes Edwards (English and Comparative Literature, Jazz) Matthew Engelke (Religion) Stathis Gourgouris (Classics, English and Comparative Literature) Rishi Kumar Goyal (Emergency Medicine) Bernard

Harcourt (Columbia Law School) Gil Hochberg (Middle Eastern, South Asian, and African Studies and IRWGS) Seth Kimmel (Latin American and Iberian Cultures) Lydia H. Liu (East Asian Languages and Cultures) David B. Lurie (East Asian Languages and Cultures) Anupama P Rao (History, Barnard) Felicity Scott (Architecture) Oliver Simons (Germanic Languages) Joseph Slaughter (English and Comparative Literature) Gayatri Chakravorty Spivak (University Professor of the Humanities) Dennis Tenen (English and Comparative Literature) Jesus R. Velasco (Latin American and Iberian Cultures)

GUIDELINES FOR ALL ICLS MAJORS AND CONCENTRATORS

Requirements for the major and concentration in Comparative Literature and Society were updated in February 2019; please contact the director of undergraduate studies with any questions. An application worksheet can be found on our website (<http://icls.columbia.edu/programs/undergraduate-admissions/>). Applications are due in early January of a student's sophomore year. At the time of application, students interested in the major (including the major track in Medicine, Literature, and Society) or concentration must have met these requirements:

1. Foreign language 1: four semesters of language training (or equivalent) and two semesters of introductory literature courses, typically numbered 3330-3350;
2. (CLS Majors only) Foreign language 2: four semesters of one language or two semesters of two languages;
3. CPLS UN3900 Introduction to Comparative Literature and Society, usually taken in the spring of the sophomore year;
4. A focus statement, 1-2 pages in length. The focus is a period, theme, problem, movement, etc., that is explored from an interdisciplinary and/or a comparative perspective. Faculty understand that this statement is a work in progress, but that it serves as a useful guide to students' academic pursuits and course selection.

MAJOR IN COMPARATIVE LITERATURE AND SOCIETY

The major in Comparative Literature and Society consists of a minimum of 33 points or 11 courses, distributed as follows. Courses taken to fulfill the application requirements do not count toward the major. With the exception of courses taken to satisfy the global core requirement, double counting of courses to the CPLS major and another program or university requirement must be approved by the DUS. Requirements for the major and concentration in Comparative Literature and Society were updated in February 2019; please contact the director of undergraduate studies with any questions.

1. CPLS UN3900 Introduction to Comparative Literature and Society, required for all majors and normally taken in the spring of the sophomore year;
2. Advanced courses as follows (please note that one course may be used to fulfill two of the advanced course requirements):
 - **Two courses** with a CPLS designator. CLxx courses, i.e. courses cross-listed between ICLS and other departments, may also be counted toward this requirement (6-8 points)
 - **Two seminars** in a humanities or social science discipline other than literature (e.g. Architecture, Anthropology, Art History, Economics, Gender & Sexuality Studies, History, Law, Linguistics, Music, Political Science, Race & Ethnicity Studies, Sociology...). The two courses must be grounded in the same disciplinary approach but don't have to be offered by the same department or program (6-8 points)
 - **Two courses** requiring readings in a language other than English. (The two courses don't have to be in the same foreign language) (6-8 points)
 - **Two courses** focusing on a specific national or regional literature or culture, chosen from any discipline (The two courses should focus on the same nation/region) (6-8 points)
 - **Two elective courses** reflecting the student's intellectual interests. The senior thesis may be counted toward this requirement. Additional foreign language study may also be counted with DUS approval (6-8 points)
3. CPLS UN3991 Senior Seminar in Comparative Literature and Society
4. Senior thesis (optional).

MAJOR TRACK IN MEDICINE, LITERATURE, AND SOCIETY

The major track in Medicine, Literature, and Society requires 39 points (15 courses.) Note that language courses taken to fulfill the application requirements 1 above do not count toward the required points for the major. Students interested in the track are strongly encouraged to fulfill their science requirement with classes in human biology (e.g., *Human Species, Genes and Development*) or human psychology (e.g., *Mind, Brain, and Behavior*).

1. CPLS UN3900 Introduction to Comparative Literature and Society, required for all ICLS majors and normally taken in the spring of the sophomore year
2. Advanced courses as follows (please note that one course may be used to fulfill two of the advanced course requirements):
 - **Three courses** with a CPLS designator, or courses designated as comparative in nature by the various

language-literature or social science departments (i.e., CL-- courses)

- **Three courses** within a given department/discipline that address the student's focused interest (Literature and Medicine; Medical Anthropology; History of Medicine/Public Health) but most importantly develop the methodological skills of that discipline
- **Two courses** requiring readings in a language other than English, preferably conducted in the target language and for which written assignments are composed in the language as well
- **Four courses** in interdisciplinary studies that address the nexus of the student's interests (Literature and Medicine; Medical Anthropology; History of Medicine/Public Health) OR an individual area of specialization (e.g., Disability Studies; Neuroscience and the Human; Technology Studies; Discourses of the Body; Biopolitics; Bioethics; etc.)
- **One course** of engaged scholarship/service learning/independent project (this may be fulfilled by appropriate study abroad and/or study elsewhere in the US)

3. CPLS UN3992 Senior Seminar in Medicine, Literature, and Society or CPLS UN3991 Senior Seminar in Comparative Literature and Society

4. Senior thesis (optional).

CONCENTRATION IN COMPARATIVE LITERATURE AND SOCIETY

The concentration in Comparative Literature and Society consists of a minimum of 27 points or 9 courses, distributed as follows. Please note that courses taken to fulfill the application requirements do not count toward the major. With the exception of courses taken to satisfy the global core requirement, any double counting of courses to the CPLS major and another program or university requirement must be approved by the DUS. Requirements for the major and concentration in Comparative Literature and Society were updated in February 2019; please contact the director of undergraduate studies with any questions.

1. *CPLS UN3900 Introduction to Comparative Literature and Society*, normally taken in the spring of the sophomore year;
2. Advanced courses as follows:
 - Two courses with a CPLS designator. CL-- courses, i.e. courses cross-listed between ICLS and other departments, may also be counted toward this requirement (6-8 points)
 - Two seminars in a humanities or social science discipline other than literature (e.g. Architecture, Anthropology, Art History, Economics, Gender & Sexuality Studies, History, Law, Linguistics, Music, Political Science, Race

& Ethnicity Studies, Sociology...). The two courses must be grounded in the same disciplinary approach but don't have to be offered by the same department or program (6-8 points)

- Two courses requiring readings in a language other than English (the two courses don't have to be in the same foreign language) (6-8 points)
- One course focusing on a specific national or regional literature or culture, chosen from any discipline (3-8 points)
- Senior Seminar in Comparative Literature and Society (CPLS V3991)

The senior seminar is taken in fall semester of the senior year. Students explore three areas of contemporary reflection in the field of comparative literature and society. Topics change yearly and are aligned with current ICLS research projects. Recent examples include: Bandung Humanism; Global Language Justice; A Safer Online Public Square

- (Optional) Senior Thesis (CPLS 3995) (3 points)

Students sign up for thesis credits (CPLS 3995) in the spring semester of the senior year but should begin to prepare in the fall semester. They work with an adviser from the Columbia/Barnard faculty who oversees the project and assigns the final grade. The DUS of ICLS is the second reader for all projects. The thesis must be a minimum of 35 pages double-spaced and must include footnotes and a bibliography. Translations, creative work and multi-media projects can be submitted with the prior approval of the DUS. These must be accompanied by an introduction that situates the project intellectually. The thesis should be written in English unless a student receives permission from the DUS to write in another language. Note that the completed thesis is submitted before the end of the spring semester, usually by April 15. The thesis is considered as a 3-point course. It may be counted in lieu of a course taken to meet requirements 2, 3, 4, or 5.

Students should consult frequently with the DUS to ensure that their program of study develops in consonance with the intellectual project described in the focus statement that was presented as part of the admissions process. The faculty understands that this statement is itself a work in progress, but also that it serves as a useful guide to the student's academic pursuits and course selection.

Comparative Literature and Society concentration students should also consider the Barnard College course offerings in Comparative Literature. They are also strongly encouraged to avail themselves of the opportunity to study abroad.

COMPUTER SCIENCE

Departmental Office: 450 Computer Science Building;
212-939-7000

<http://www.cs.columbia.edu/>

Director of Undergraduate Studies: Dr. Jae Woo Lee, 715 CEPSR; 212-939-7066; jae@cs.columbia.edu

Departmental Advisers:

For updated adviser information, see <http://www.cs.columbia.edu/education/undergrad/advisors> (<http://www.cs.columbia.edu/education/undergrad/advisors/>).

For administrative advising issues please contact: advising@cs.columbia.edu.

The majors in the Department of Computer Science provide students with the appropriate computer science background necessary for graduate study or a professional career. Computers impact nearly all areas of human endeavor. Therefore, the department also offers courses for students who do not plan a computer science major or concentration. The computer science majors offer maximum flexibility by providing students with a range of options for program specialization. The department offers four majors: computer science; information science; data science; and computer science-mathematics, offered jointly with the Mathematics Department.

COMPUTER SCIENCE MAJOR

Students study a common core of fundamental topics, supplemented by a track that identifies specific areas for deeper study. The foundations track prepares students for advanced work in fundamental, theoretical, and mathematical aspects of computing, including analysis of algorithms, scientific computing, and security. The systems track prepares students for immediate employment in the computer industry as well as advanced study in software engineering, operating systems, computer-aided digital design, computer architecture, programming languages, and user interfaces. The intelligent systems track provides specialization for the student interested in natural language processing and systems capable of exhibiting “human-like” intelligence. The applications track is for students interested in the implementation of interactive multimedia content for the Internet and wireless applications. The vision, graphics, interaction, and robotics track exposes students to computer vision, graphics, human-computer interaction, and robotics.

A combination track is available to students who wish to pursue an interdisciplinary course of study combining computer science and another field in the arts, humanities, mathematics, natural sciences, or social sciences. A student planning a combination track should be aware that one additional course is required to complete this option.

INFORMATION SCIENCE MAJOR

Information science is an interdisciplinary major designed to provide a student with an understanding of how information is organized, accessed, stored, distributed, and processed in strategic segments of today’s society. Recent years have seen an explosive growth of on-line information, with people of all ages

and all walks of life making use of the World Wide Web and other information in digital form.

This major puts students at the forefront of the information revolution, studying how on-line access touches on all disciplines and changing the very way people communicate. Organizations have large stores of in-house information that are crucial to their daily operation. Today’s systems must enable quick access to relevant information, must ensure that confidential information is secure, and must enable new forms of communication among people and their access to information.

The information science major can choose a scientific focus on algorithms and systems for organizing, accessing, and processing information, or an interdisciplinary focus in order to develop an understanding of, and tools for, information modeling and use within an important sector of modern society such as economics or health.

ADVANCED PLACEMENT

The department grants 3 points for a score of 4 or 5 on the AP Computer Science exam along with exemption from COMS W1004 Introduction to Computer Science and Programming in Java. However, we still recommend that you take COMS W1004 or W1007 even if you have credits from the CS AP exam. COMS W1007 Honors Introduction to Computer Science is recommended if you scored 5 on the AP exam, and COMS W1004 is recommended if you scored 4.

PRE-INTRODUCTORY COURSES

COMS W1004 is the first course in the Computer Science major curriculum, and it does not require any previous computing experience. Before taking COMS W1004, however, students have an option to start with one of the pre-introductory courses: ENGI E1006 or COMS W1002.

ENGI E1006 Introduction to Computing for Engineers and Applied Scientist is a general introduction to computing for STEM students. ENGI E1006 is in fact a required course for all engineering students. COMS W1002 Computing In Context is a course primarily intended for humanities majors, but it also serves as a pre-introductory course for CS majors.

ENGI E1006 and COMS W1002 do not count towards Computer Science major.

LABORATORY FACILITIES

The department has well-equipped lab areas for research in computer graphics, computer-aided digital design, computer vision, databases and digital libraries, data mining and knowledge discovery, distributed systems, mobile and wearable computing, natural language processing, networking, operating systems, programming systems, robotics, user interfaces, and real-time multimedia.

Research labs contain several large Linux and Solaris clusters; Puma 500 and IBM robotic arms; a UTAH-MIT dexterous

hand; an Adept-1 robot; three mobile research robots; a real-time defocus range sensor; interactive 3-D graphics workstations with 3-D position and orientation trackers; prototype wearable computers, wall-sized stereo projection systems; see-through head-mounted displays; a networking testbed with three Cisco 7500 backbone routers, traffic generators; an IDS testbed with secured LAN, Cisco routers, EMC storage, and Linux servers; and a simulation testbed with several Sun servers and Cisco Catalyst routers. The department uses a SIP IP phone system. The protocol was developed in the department.

The department's computers are connected via a switched 1Gb/s Ethernet network, which has direct connectivity to the campus OC-3 Internet and internet 2 gateways. The campus has 802.11b/g wireless LAN coverage.

The research facility is supported by a full-time staff of professional system administrators and programmers.

PROFESSORS

Alfred V. Aho
 Peter K. Allen
 Peter Belhumeur
 Steven M. Bellovin
 David Blei
 Luca Carloni
 Michael J. Collins
 Steven K. Feiner
 Luis Gravano
 Julia Hirschberg
 Gail E. Kaiser
 John R. Kender
 Kathleen R. McKeown
 Vishal Misra
 Shree K. Nayar
 Jason Nieh
 Steven M. Nowick
 Christos Papadimitriou
 Kenneth A. Ross
 Henning G. Schulzrinne
 Rocco A. Servedio
 Salvatore J. Stolfo
 Jeannette Wing
 Mihalis Yannakakis

ASSOCIATE PROFESSORS

Alexandr Andoni
 Augustin Chaintreau
 Xi Chen
 Stephen A. Edwards
 Yaniv Erlich
 Roxana Geambasu
 Eitan Grinspun
 Daniel Hsu
 Tony Jebara
 Martha Allen Kim

Tal Malkin
 Itsik Pe'er
 Daniel S. Rubenstein
 Simha Sethumadhavan
 Junfeng Yang
 Changxi Zheng

ASSISTANT PROFESSORS

Lydia Chilton
 Ronghui Gu
 Suman Jana
 Baishakhi Ray
 Carl Vondrick
 Omri Weinstein
 Eugene Wu

SENIOR LECTURER IN DISCIPLINE

Paul Blaer
 Adam Cannon
 Jae Woo Lee

LECTURER IN DISCIPLINE

Daniel Bauer
 Tony Dear
 Ansaf Salleb-Aouissi
 Nakul Verma

ASSOCIATED FACULTY JOINT

Shih-Fu Chang
 Clifford Stein

ASSOCIATED FACULTY

Matei Ciocarlie
 Edward G. Coffman Jr. (*emeritus*)
 Eleni Drinea
 Jonathan Gross (*emeritus*)
 Andreas Mueller
 Steven H. Unger (*emeritus*)
 Vladimir Vapnik
 Yechiam Yemini (*emeritus*)

SENIOR RESEARCH SCIENTISTS

Moti Yung

RESEARCH SCIENTISTS

Smaranda Muresan*

ASSOCIATED RESEARCH SCIENTISTS

Allison Breton Bishop
 Giuseppe DiGuglielmo
 Paolo Mantovani

Hiroshi Sasaki
Eran Tromer

PROFESSOR OF PRACTICE

Donald F. Ferguson

GUIDELINES FOR ALL COMPUTER SCIENCE MAJORS AND CONCENTRATORS

Courses

Students may receive credit for only one of the following two courses:

- COMS W1004 Introduction to Computer Science and Programming in Java
- COMS W1005 Introduction to Computer Science and Programming in MATLAB.

Students may receive credit for only one of the following three courses:

- COMS W3134 Data Structures in Java
- COMS W3136 Data Structures with C/C++
- COMS W3137 Honors Data Structures and Algorithms

However, COMS W1005 and COMS W3136 cannot be counted towards the Computer Science major, minor, and concentration.

Transfer Credit

As a rule, no more than 12 transfer credits are accepted toward the major.

Grading

A maximum of one course worth no more than 4 points passed with a grade of D may be counted toward the major or concentration.

MAJOR IN COMPUTER SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

All majors should confer with their program adviser each term to plan their programs of study. Students considering a major in computer science are encouraged to talk to a program adviser during their first or second year. A typical program of study is as follows:

Program of Study

Computer Science Core (22-24 points)

For students who declare in Spring 2014 and beyond:

ENGI E1006	Introduction to Computing for Engineers and Applied Scientists (recommended but not required)
First Year	
COMS W1004	Introduction to Computer Science and Programming in Java
or COMS W1007	Honors Introduction to Computer Science
Sophomore Year	
COMS W3134	Data Structures in Java
or COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
Junior and Senior Year	
Select the remaining required core courses:	
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems
Select one of the following courses:	
MATH UN2010	Linear Algebra
APMA E2101	Introduction to Applied Mathematics
APMA E3101	Linear Algebra
STAT GU4001	Introduction to Probability and Statistics

For students who declared prior to Spring 2014:

First Year	
COMS W1004	Introduction to Computer Science and Programming in Java
Sophomore Year	
COMS W1007	Honors Introduction to Computer Science
COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
Junior and Senior Year	
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems

In addition to the CS Core (22-24 points), all CS majors must complete the Calculus Requirement (3 points) and a Track Requirement (15 or 18 points). The CS major therefore requires 40-45 points total.

Mathematics (3 points)

Calculus II or Calculus III.

Note that Calculus III does NOT depend on Calculus II. You can take either Calculus II or III, but we recommend Calculus III, which covers topics that are a bit more relevant for upper-level Computer Science courses.

If you have received equivalent credits for Calculus I & II already (through a 4 or 5 on the AP Calculus exam for example), you are not required to take any more Calculus courses. But we recommend taking one more semester of Calculus, either Math UN1201 Calculus III or APAM E2000 Multivariate Calculus for Engineers and Scientists. APAM E2000 covers relevant topics from Calculus III and IV.

Track Requirement (15 or 18 points)

Students must select one of the following six upper-level tracks. Each track, except the combination track, requires five courses consisting of required, elective breadth, and elective track courses. The combination track requires a selection of six advanced courses: three 3000- or 4000-level computer science courses and three 3000- or 4000-level courses from another field. The elective breadth requirement in each track can be fulfilled with any 3-point computer science 3000-level or higher course that is not a computer science core course or a technical elective course in that track. In addition to the breadth elective, the track requirements are as follows:

Foundations Track (15 points)

For students interested in algorithms, computational complexity, and other areas of theoretical Computer Science.

Note: Students who declared their Computer Science major prior to Fall 2016 may also count COMS 4241, COMS 4205, COMS 4281, COMS 4444, COMS 4771, and COMS 4772 as track elective courses.

Required Courses

CSOR W4231	Analysis of Algorithms I
COMS W4236	Introduction to Computational Complexity

Track Electives

Select 2 from:

MATH UN3020	Number Theory and Cryptography
MATH UN3025	Making, Breaking Codes
COMS W4203	Graph Theory
MATH GU4032	Fourier Analysis
MATH GU4041	Introduction to Modern Algebra I
MATH GU4042	Introduction to Modern Algebra II
MATH GU4061	Introduction To Modern Analysis I
MATH GU4155	Probability Theory
COMS W4252	Introduction to Computational Learning Theory

COMS W4261	Introduction to Cryptography
APMA E4300	Computational Math: Introduction to Numerical Methods
IEOR E4407	Game Theoretic Models of Operations
CSPH G4802	Math Logic II: Incompleteness
COMS E6232	Analysis of Algorithms, II
MATH G6238	Enumerative Combinatorics
COMS E6253	Advanced Topics in Computational Learning Theory
COMS E6261	Advanced Cryptography
EEOR E6616	Convex optimization
IEOR E6613	Optimization, I
IEOR E6614	Optimization, II
IEOR E6711	Stochastic models, I
IEOR E6712	Stochastic models, II
ELEN E6717	Information theory
ELEN E6718	Error Correcting Codes: Classical and Modern

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I
COMS E6998	Topics in Computer Science

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Software Systems Track (15 points)

For students interested in networks, programming languages, operating systems, software engineering, databases, security, and distributed systems.

Required Courses

COMS W4115	Programming Languages and Translators
COMS W4118	Operating Systems I
CSEE W4119	Computer Networks

Track Electives

Select 1 from:

Any COMS W41xx course	
COMS W4444	Programming and Problem Solving

Any COMS W48xx course

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science

COMS W4995	Special topics in computer science, I
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COMS W4996	Special topics in computer science, II
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Any COMS E68XX course

Any COMS E61XX course

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Intelligent Systems Track (15 points)

For students interested in machine learning, robotics, and systems capable of exhibiting “human-like” intelligence.

Required Courses

Select two of the following courses:

COMS W4701	Artificial Intelligence
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COMS W4705	Natural Language Processing
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COMS W4706	Spoken Language Processing
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COMS W4731	Computer Vision
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COMS W4733	Computational Aspects of Robotics
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COMS W4771	Machine Learning
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Track Electives

Select 2 from:

COMS W4252	Introduction to Computational Learning Theory
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Any COMS W47xx course

Any COMS E67XX course

Adviser Approved:

COMS W3902	Undergraduate Thesis
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COMS W3998	Undergraduate Projects in Computer Science
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COMS W4901	Projects in Computer Science
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COMS W4995	Special topics in computer science, I
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COMS E6998	Topics in Computer Science
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One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Applications Track (15 points)

For students interested in the implementation of interactive multimedia applications for the internet and wireless networks.

Required Courses

COMS W4115	Programming Languages and Translators
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COMS W4170	User Interface Design
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Track Electives

Select 2 from:

Any COMS W41xx course

Any COMS W47xx course

Adviser Approved:

COMS W3902	Undergraduate Thesis
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COMS W3998	Undergraduate Projects in Computer Science
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COMS W4901	Projects in Computer Science
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COMS W4995	Special topics in computer science, I
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Any COMS E69XX course

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Vision, Graphics, Interaction, and Robotics Track (15 points)

For students in the vision, interaction, graphics, and robotics track. It focuses on visual information with topics in vision, graphics, human-computer interaction, robotics, modeling, and learning. Students learn about fundamental ways in which visual information is captured, manipulated, and experienced.

Required Courses

Select two of the following courses:

COMS W4160	Computer Graphics
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COMS W4167	Computer Animation
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COMS W4731	Computer Vision
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Track Electives

Select 2 from:

COMS W4162	Advanced Computer Graphics
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COMS W4170	User Interface Design
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COMS W4172	3D User Interfaces and Augmented Reality
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COMS W4701	Artificial Intelligence
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COMS W4733	Computational Aspects of Robotics
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COMS W4735	Visual Interfaces to Computers
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COMS W4771	Machine Learning
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Adviser Approved:

COMS W3902	Undergraduate Thesis
------------	----------------------

COMS W3998	Undergraduate Projects in Computer Science
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COMS W4901	Projects in Computer Science
------------	------------------------------

COMS W4995	Special topics in computer science, I
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Any COMS E69XX course

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Combination Track (18 points)

For students who wish to combine computer science with another discipline in the arts, humanities, social or natural sciences. A coherent selection of six upper-level courses is

required: three from computer science and three from another discipline.

The courses should be planned with and approved by the student's CS faculty advisor by the first semester of the junior year. The six courses are typically 4000-level elective courses that would count towards the individual majors. Moreover, the six courses should have a common theme. The combination track is not intended for those students who pursue double majors.

MAJOR IN COMPUTER SCIENCE— MATHEMATICS

For a description of the joint major in computer science—mathematics, see the *Mathematics* section in this bulletin.

MAJOR IN INFORMATION SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

The major in information science requires a minimum of 33 points including a core requirement of five courses.

The elective courses must be chosen with a faculty adviser to focus on the modeling and use of information within the context of a disciplinary theme. After discussing potential selections students prepare a proposal of study that must be approved by the faculty adviser. In all cases the six courses must be at the 3000-level or above with at least three courses chosen from computer science. Following are some example programs. For more examples or templates for the program proposal, see a faculty adviser.

Note: In most cases additional courses will be necessary as prerequisites in order to take some of the elective courses. This will depend on the student's proposed program of study.

Core Requirement

COMS W1001	Introduction to Information Science
or COMS W1002 Computing in Context	
COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1007	Honors Introduction to Computer Science
COMS W3134	Data Structures in Java
STAT GU4001	Introduction to Probability and Statistics

Following are some suggested programs of instruction:

Information Science and Contemporary Society

Students may focus on how humans use technology and how technology has changed society.

The requirements include:

COMS W4111	Introduction to Databases
COMS W4170	User Interface Design
COMS W4701	Artificial Intelligence
COMS W3410	Computers and Society
SOCI UN3010	Methods for Social Research
SOCI UN3960	Law, Science, and Society

Information Science and the Economy

Students may focus on understanding information modeling together with existing and emerging needs in economics and finance as well as algorithms and systems to address those needs.

The requirements include:

COMS W4111	Introduction to Databases
COMS W4701	Artificial Intelligence
COMS W4771	Machine Learning
ECON UN3412	Introduction To Econometrics
ECON UN3025	Financial Economics
ECON UN3265	The Economics of Money and Banking

Information Science and Health Sciences

Students may focus on understanding information modeling together with existing and emerging needs in health sciences, as well as algorithms and systems to address those needs.

The requirements include:

COMS W4111	Introduction to Databases
COMS W4170	User Interface Design
COMS W4701	Artificial Intelligence
BINF G4001	
BIOL W4037	Bioinformatics of Gene Expression
ECBM E3060/E4060	Introduction to genomic information science and technology

MAJOR IN DATA SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

In response to the ever growing importance of "big data" in scientific and policy endeavors, the last few years have seen an explosive growth in theory, methods, and applications at the interface between computer science and statistics. The statistics and computer science departments have responded

with a joint-major that emphasizes the interface between the disciplines.

Prerequisites (15 points)

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN2010	Linear Algebra
This introductory Statistics course:	
STAT UN1201	Calculus-Based Introduction to Statistics

Statistics (12 points)

STAT GU4203	PROBABILITY THEORY
STAT GU4204	Statistical Inference
STAT GU4205	Linear Regression Models
STAT GU4241	Statistical Machine Learning
	or COMS W4771 Machine Learning

Computer Science (12 points)

Select one of the following courses:

COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1005	Introduction to Computer Science and Programming in MATLAB
COMS W1007	Honors Introduction to Computer Science
ENGI E1006	Introduction to Computing for Engineers and Applied Scientists

Select one of the following courses:

COMS W3134	Data Structures in Java
COMS W3136	Data Structures with C/C++
COMS W3137	Honors Data Structures and Algorithms

Two required courses:

COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
CSOR W4231	Analysis of Algorithms I

Electives (15 points)

Select two of the following courses:

STAT UN3106	Applied Data Mining
STAT GU4206	Statistical Computing and Introduction to Data Science
STAT GU4224	Bayesian Statistics
STAT GU4243	Applied Data Science
STAT Q4242	Advanced Machine Learning

Select three of the following courses:

COMS W3261	Computer Science Theory
COMS W4111	Introduction to Databases
COMS W4130	Principles and Practice of Parallel Programming
COMS W4236	Introduction to Computational Complexity

COMS W4252 Introduction to Computational Learning Theory

Any COMS W47xx course EXCEPT W4771

CONCENTRATION IN COMPUTER SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

For students who declare in Spring 2014 and beyond:

The concentration in computer science requires a minimum of 22-24 points, as follows:

COMS W1004	Introduction to Computer Science and Programming in Java
or COMS W1007	Honors Introduction to Computer Science
COMS W3134	Data Structures in Java
or COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems (or any 3 point 4000-level computer science course)

Select one of the following courses:

MATH UN2010	Linear Algebra
MATH V2020	Honors Linear Algebra
APMA E2101	Introduction to Applied Mathematics
APMA E3101	Linear Algebra
STAT GU4001	Introduction to Probability and Statistics

SIEO W3600

For students who declared prior to Spring 2014:

The concentration requires a minimum of 23 points, as follows:

COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1007	Honors Introduction to Computer Science
COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems (or any 3-point 4000-level computer science course)

COMPUTER SCIENCE - MATHEMATICS

Departmental Undergraduate Office: 410 Mathematics;
212-854-2432
<http://www.math.columbia.edu/>

Director of Undergraduate Studies: Prof. Ovidiu Savin, 409
Mathematics; 212-854-8233; savin@math.columbia.edu

Calculus Director: Prof. Michael Woodbury; 525
Mathematics; 212-854-2849; woodbury@math.columbia.edu

Computer Science-Mathematics Adviser: Prof. Eric Urban,
608 Mathematics; 212-854-6362; urban@math.columbia.edu

Economics-Mathematics Advisers:

Mathematics: Prof. Julien Dubedat, 601 Mathematics;
212-854-8806; jd2653@columbia.edu

Economics: Dr. Susan Elmes, 1006 International Affairs
Building; 212-854-9124; se5@columbia.edu

Mathematics-Statistics Advisers:

Mathematics: Prof. Julien Dubedat, 601 Mathematics;
212-854-8806; dubedat@math.columbia.edu

Statistics: Prof. Banu Baydil, 611 Watson; 212-851-2132;
bb2717@columbia.edu

The major in mathematics is an introduction to some of the highlights of the development of theoretical mathematics over the past four hundred years from a modern perspective. This study is also applied to many problems, both internal to mathematics and arising in other disciplines such as physics, cryptography, and finance.

Majors begin by taking either Honors mathematics or the calculus sequence. Students who do not take MATH UN1207 Honors Mathematics A and MATH UN1208 Honors Mathematics B normally take MATH UN2010 Linear Algebra in the second year. Following this, majors begin to learn some aspects of the main branches of modern mathematics: algebra, analysis, and geometry; as well as some of their subdivisions and hybrids (e.g., number theory, differential geometry, and complex analysis). As the courses become more advanced, they also become more theoretical and proof-oriented and less computational.

Aside from the courses offered by the Mathematics Department, cognate courses in areas such as astronomy, chemistry, physics, probability, logic, economics, and computer science can be used toward the major. A cognate course must be a 2000-level (or higher) course and must be approved by the director of undergraduate studies. In general, a course not taught by the Mathematics Department is a cognate course for the mathematics major if either (a) it has at least two semesters of calculus as a stated prerequisite, or (b) the subject matter

in the course is mathematics beyond an elementary level, such as PHIL UN3411 Symbolic Logic, in the Philosophy Department, or COMS W3203 Discrete Mathematics: Introduction to Combinatorics and Graph Theory, in the Computer Science Department.

Another requirement for majors is participation in an undergraduate seminar, usually in the junior or senior year. In these seminars, students gain experience in learning an advanced topic and lecturing on it. In order to be eligible for departmental honors, majors must write a senior thesis.

COURSES FOR FIRST-YEAR STUDENTS

The systematic study of mathematics begins with one of the following three alternative calculus and linear algebra sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV
- MATH UN2010	and Linear Algebra
MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	Calculus
	and Linear Algebra
MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1207	and Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Credit is allowed for only one calculus and linear algebra sequence.

Calculus I, II is a standard course in single-variable differential and integral calculus; *Calculus III, IV* is a standard course in multivariable differential and integral calculus; *Accelerated Multivariable Calculus* is an accelerated course in multivariable differential and integral calculus.

While *Calculus II* is no longer a prerequisite for *Calculus III*, students are strongly urged to take it before taking *Calculus III*. In particular, students thinking of majoring or concentrating in mathematics or one of the joint majors involving mathematics should take *Calculus II* before taking *Calculus III*. Note that *Calculus II* is a prerequisite for Accelerated Multivariable Calculus, and both *Calculus II* and *Calculus III* are prerequisites for *Calculus IV*.

The third sequence, *Honors Mathematics A- B*, is for exceptionally well-qualified students who have strong Advanced Placement scores. It covers multivariable calculus (MATH UN1201 Calculus III- MATH UN1202 Calculus IV) and linear algebra (MATH UN2010 Linear Algebra), with an emphasis on theory.

MATH UN1003 College Algebra and Analytic Geometry does not count toward the degree. Students who take this course do not receive college credit.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 4 or 5 on the AP Calculus AB exam provided students complete MATH UN1102 Calculus II or MATH UN1201 Calculus III with a grade of C or better. The department grants 3 credits for a score of 4 on the AP Calculus BC exam provided students complete MATH UN1102 Calculus II or MATH UN1201 Calculus III with a grade of C or better. The department grants 6 credits for a score of 5 on the AP Calculus BC exam provided students complete MATH UN1201 Calculus III or MATH UN1205 Accelerated Multivariable Calculus MATH UN1207 Honors Mathematics A with a grade of C or better. Students can receive credit for only one calculus sequence.

PLACEMENT IN THE CALCULUS SEQUENCES

Calculus I

Students who have essentially mastered a precalculus course and those who have a score of 3 or less on an Advanced Placement (AP) exam (either AB or BC) should begin their study of calculus with MATH UN1101 Calculus I.

Calculus II and III

Students with a score of 4 or 5 on the AB exam, 4 on the BC exam, or those with no AP score but with a grade of A in a full year of high school calculus may begin with either MATH UN1102 Calculus II or *MATH UN1201 Calculus III*. Note that such students who decide to start with *Calculus III* may still need to take *Calculus II* since it is a requirement or prerequisite for other courses. In particular, they **MUST** take *Calculus II* before going on to MATH UN1202 Calculus IV. Students with a score of 5 on the BC exam may begin with *Calculus III* and do not need to take *Calculus II*.

Those with a score of 4 or 5 on the AB exam or 4 on the BC exam may receive 3 points of AP credit upon completion of *Calculus II* with a grade of C or higher. Those students with a score of 5 on the BC exam may receive 6 points of AP credit upon completion of *Calculus III* with a grade of C or higher.

Accelerated Multivariable Calculus

Students with a score of 5 on the AP BC exam or 7 on the IB HL exam may begin with MATH UN1205 Accelerated Multivariable Calculus. Upon completion of this course with a grade of C or higher, they may receive 6 points of AP credit.

Honors Mathematics A

Students who want a proof-oriented theoretical sequence and have a score of 5 on the BC exam may begin with MATH UN1207 Honors Mathematics A, which is especially

designed for mathematics majors. Upon completion of this course with a grade of C or higher, they may receive 6 points of AP credit.

TRANSFERS INSIDE THE CALCULUS SEQUENCES

Students who wish to transfer from one calculus course to another are allowed to do so beyond the date specified on the Academic Calendar. They are considered to be adjusting their level, not changing their program. However, students must obtain the approval of the new instructor and their advising dean prior to reporting to the Office of the Registrar.

GRADING

No course with a grade of D or lower can count toward the major, interdepartmental major, or concentration. Students who are doing a double major cannot double count courses for their majors.

DEPARTMENTAL HONORS

In order to be eligible for departmental honors, majors must write a senior thesis. To write a senior thesis, students must register for MATH UN3999 Senior Thesis in Mathematics in the fall semester of their senior year. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

PROFESSORS

- Mohammed Abouzaid
- David A. Bayer (Barnard)
- Simon Brendle
- Ivan Corwin
- Panagiota Daskalopoulos
- Aise Johan de Jong
- Robert Friedman
- Dorian Goldfeld
- Brian Greene
- Richard Hamilton
- Michael Harris
- Ioannis Karatzas
- Mikhail Khovanov
- Igor Krichever
- Chiu-Chu Liu
- Dusa McDuff (Barnard)
- Walter Neumann (Barnard)
- Andrei Okounkov
- D. H. Phong
- Henry Pinkham
- Ovidiu Savin
- Michael Thaddeus (Department Chair)

- Eric Urban
- Mu-Tao Wang

ASSOCIATE PROFESSORS

- Daniela De Silva (Barnard)
- Julien Dubedat

ASSISTANT PROFESSORS

- Chao Li
- Francesco Lin
- Giulia Sacca
- Will Sawin

J.F. RITT ASSISTANT PROFESSORS

- Konstantin Aleshkin
- Evgeni Dimitrov
- Nathan Dowlin
- Alexandra Florea
- Florian Johne
- Inbar Klang
- Shotaro Makisumi
- Konstantin Matetski
- S. Michael Miller
- Henri Roesch
- Nicholas Salter
- Gus Schrader
- Akash Sengupta
- Kyler Siegel
- Yi Sun
- Evan Warner
- Hui Yu
- Yihang Zhu

SENIOR LECTURERS IN DISCIPLINE

- Lars Nielsen
- Mikhail Smirnov
- Peter Voit

LECTURERS IN DISCIPLINE

- Michael Woodbury

ON LEAVE

- Profs. Florea, Krichever, Neumann, Roesch, Sacca, Salter, Sawin (*Fall 2019*)
- Profs. Abouzaid, Hamilton, Neumann, Roesch, Sacca, Salter, Sawin (*Spring 2020*)

MAJOR IN MATHEMATICS

The major requires 40-42 points as follows:

Select one of the following three calculus and linear algebra sequences (13-15 points including Advanced Placement Credit):

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	Calculus and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1207	and Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

15 points in the following required courses:

MATH UN3951	Undergraduate Seminars in
- MATH UN3952	Mathematics I
	and Undergraduate Seminars in
	Mathematics II (at least one term)

MATH GU4041	Introduction to Modern Algebra I
- MATH GU4042	and Introduction to Modern
	Algebra II

MATH GU4061	Introduction To Modern Analysis
- MATH GU4062	I
	and Introduction To Modern
	Analysis II

12 points in any combination of mathematics and cognate courses. **

* Students who are not contemplating graduate study in mathematics may replace one or both of the two terms of MATH GU4061- MATH GU4062 by one or two of the following courses: MATH UN2500 Analysis and Optimization, MATH UN3007 Complex Variables, MATH UN3028 Partial Differential Equations, or MATH GU4032 Fourier Analysis.

** A course not taught by the Mathematics Department is a cognate course for the mathematics major if either (a) it has at least two semesters of calculus as a stated prerequisite and is a 2000-level (or higher) course, or (b) the subject matter in the course is mathematics beyond an elementary level, such as PHIL UN3411 Symbolic Logic, in the Philosophy Department, or COMS W3203 Discrete Mathematics: Introduction to Combinatorics and Graph Theory, in the Computer Science Department. In exceptional cases, the director of undergraduate studies may approve the substitution of certain more advanced courses for those mentioned above.

The program of study should be planned with a departmental adviser before the end of the sophomore year. Majors who are planning on graduate studies in mathematics are urged to obtain a reading knowledge of one of the following languages: French, German, or Russian.

Majors are offered the opportunity to write an honors senior thesis under the guidance of a faculty member. Interested students should contact the director of undergraduate studies.

MAJOR IN APPLIED MATHEMATICS

The major requires 38-40 points as follows:

Select one of the following three calculus and linear algebra sequences (13-15 points including Advanced Placement Credit):

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1207	and Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Select one of the following three courses:

MATH UN2500	Analysis and Optimization
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MATH GU4032	Fourier Analysis
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MATH GU4061	Introduction To Modern Analysis I
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APMA E4901	Seminar: Problem in Applied Mathematics (junior year)
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APMA E4903	Seminar: Problems in Applied Mathematics (senior year)
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18 points in electives, selected from the following (other courses may be used with the approval of the Applied Mathematics Committee):

MATH UN2500	Analysis and Optimization
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MATH UN3007	Complex Variables
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or MATH GU4065 Honors Complex Variables

or APMA E4204 Functions of a Complex Variable

MATH UN3027	Ordinary Differential Equations
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MATH UN3028	Partial Differential Equations
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or APMA E4200 Partial Differential Equations

or APMA E6301 Analytic methods for partial differential equations

MATH GU4032	Fourier Analysis
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APMA E4300	Computational Math: Introduction to Numerical Methods
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APMA E4101	Introduction to Dynamical Systems
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APMA E4150	Applied Functional Analysis
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APMA E4400	Introduction to Biophysical Modeling
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MAJOR IN COMPUTER SCIENCE–MATHEMATICS

The goal of this interdepartmental major is to provide substantial background in each of these two disciplines, focusing on some of the parts of each which are closest to the other. Students intending to pursue a Ph.D. program in either discipline are urged to take additional courses, in consultation with their advisers.

The major requires 20 points in computer science, 19-21 points in mathematics, and two 3-point electives in either computer science or mathematics.

Computer Science

COMS W1004	Introduction to Computer Science and Programming in Java
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or COMS W1007 Honors Introduction to Computer Science

COMS W3134	Data Structures in Java
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or COMS W3137 Honors Data Structures and Algorithms

COMS W3157	Advanced Programming
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COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
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COMS W3261	Computer Science Theory
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CSEE W3827	Fundamentals of Computer Systems
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Mathematics

Select one of the following three calculus and linear algebra sequences (13-15 points including Advanced Placement Credit):

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable Calculus
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1207	and Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

MATH UN3951	Undergraduate Seminars in Mathematics I
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or MATH UN3952 Undergraduate Seminars in Mathematics II

MATH GU4041	Introduction to Modern Algebra I
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Electives

Select two of the following courses:

CSOR W4231	Analysis of Algorithms I
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COMS W4241	Numerical Algorithms and Complexity
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MATH BC2006	Combinatorics
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MATH UN2500	Analysis and Optimization
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MATH UN3007	Complex Variables
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MATH UN3020	Number Theory and Cryptography
MATH UN3386	Differential Geometry
MATH GU4051	Topology
MATH GU4061	Introduction To Modern Analysis I

MAJOR IN ECONOMICS- MATHEMATICS

MAJOR IN MATHEMATICS- STATISTICS

The program is designed to prepare the student for: (1) a career in industries such as finance and insurance that require a high level of mathematical sophistication and a substantial knowledge of probability and statistics, and (2) graduate study in quantitative disciplines. Students choose electives in finance, actuarial science, operations research, or other quantitative fields to complement requirements in mathematics, statistics, and computer science.

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
- MATH UN1102 and Calculus II
- MATH UN1201 and Calculus III
- MATH UN2010 and Linear Algebra
- MATH UN2500 and Analysis and Optimization

MATH UN1101 Calculus I
- MATH UN1102 and Calculus II
- MATH UN1205 and Accelerated Multivariable Calculus
- MATH UN2010 and Linear Algebra
- MATH UN2500 and Analysis and Optimization

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B
- MATH UN2500 and Analysis and Optimization (with approval from the adviser)

Statistics

Introductory Course

STAT UN1201 Calculus-Based Introduction to Statistics

Required Courses

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

Select one of the following courses:

STAT GU4207 Elementary Stochastic Processes

STAT GU4262 Stochastic Processes for Finance

STAT GU4264 STOCHASTIC PROCESSES-
APPLIC

STAT GU4265 Stochastic Methods in Finance

Computer Science

Select one of the following courses:

COMS W1004 Introduction to Computer Science and Programming in Java

COMS W1005 Introduction to Computer Science and Programming in MATLAB

ENGI E1006 Introduction to Computing for Engineers and Applied Scientists

COMS W1007 Honors Introduction to Computer Science

or an advanced computer science offering in programming

Electives

An approved selection of three advanced courses in mathematics, statistics, applied mathematics, industrial engineering and operations research, computer science, or approved mathematical methods courses in a quantitative discipline. At least one elective must be a Mathematics Department course numbered 3000 or above.

Students interested in modeling applications are recommended to take MATH UN3027 Ordinary Differential Equations and MATH UN3028 Partial Differential Equations.

Students interested in finance are recommended to take MATH GR5010 Introduction to the Mathematics of Finance, STAT GU4261 Statistical Methods in Finance, and STAT GU4221 Time Series Analysis.

Students interested in graduate study in mathematics or in statistics are recommended to take MATH GU4061 Introduction To Modern Analysis I and MATH GU4062 Introduction To Modern Analysis II.

Students preparing for a career in actuarial science are encouraged to replace STAT GU4205 Linear Regression Models with STAT GU4282 Linear Regression and Time Series Methods, and to take among their electives STAT GU4281 Theory of Interest.

CONCENTRATION IN MATHEMATICS

The concentration requires the following:

Mathematics

Select one of the following three multivariable calculus and linear algebra sequences:

MATH UN1201 Calculus III
- MATH UN1202 and Calculus IV
- MATH UN2010 and Linear Algebra

MATH UN1205 Accelerated Multivariable Calculus
- MATH UN2010 and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Additional Courses

Select at least 12 additional points from any of the courses offered by the department numbered 2000 or higher.

For mathematics courses taken in other departments, consult with the director of undergraduate studies.

Any course given by the Mathematics department fulfills the General Studies quantitative reasoning requirement when passed with a satisfactory letter grade.

CREATIVE WRITING

Undergraduate Creative Writing Program Office: 609 Kent; 212-854-3774

<http://arts.columbia.edu/writing/undergraduate> (<http://arts.columbia.edu/writing/undergraduate/>)

Director of Undergraduate Studies: Prof. Dorothea Lasky, 609 Kent; 212-854-3774; dsl2121@columbia.edu (hj26@columbia.edu)

Executive Committee on Undergraduate Creative Writing:

Prof. Anelise Chen, 609 Kent; 212-854-3774; ac4132@columbia.edu (hj26@columbia.edu)

Prof. Timothy Donnelly, Poetry Division Chair, 415 Dodge; 212-854-4391; td28@columbia.edu

Prof. Margo Jefferson, Nonfiction, 609 Kent; 212-854-3774; mlj4@columbia.edu

Prof. Heidi Julavits, Fiction, 609 Kent; 212-854-3774; hj26@columbia.edu

Prof. Dorothea Lasky, Poetry, 609 Kent; 212-854-3774; dsl2121@columbia.edu

Prof. Sam Lipsyte, Fiction, 609 Kent; 212-854-4391; sam.lipsyte@columbia.edu

Prof. Alan Ziegler, Fiction, 415 Dodge; 212-854-4391; az8@columbia.edu

The Creative Writing Program in The School of the Arts combines intensive writing workshops with seminars that study literature from a writer's perspective. Students develop and hone their literary technique in workshops. The seminars (which explore literary technique and history) broaden their sense of possibility by exposing them to various ways that language has been used to make art. Related courses are drawn from departments such as English, comparative literature and society, philosophy, history, and anthropology, among others.

Students consult with faculty advisers to determine the related courses that best inform their creative work. The creative writing major is by application only. For details, see the Creative Writing website: <http://arts.columbia.edu/writing/undergraduate> (<http://arts.columbia.edu/writing/undergraduate/>).

PROFESSORS

Margo L. Jefferson
Benjamin Marcus
Alan Ziegler

ASSOCIATE PROFESSORS

Susan Bernofsky
Timothy Donnelly
Heidi Julavits
Dorothea Lasky
Victor LaValle
Sam Lipsyte
Deborah Paredez

ASSISTANT PROFESSORS

Anelise Chen
Shane McCrae
Ben Metcalf
Lynn Xu

ADJUNCT PROFESSORS

Camille Bromley
Alexander Dimitrov
Joseph Fasano
Will Hunt
Crystal Hana Kim
Marie Myung-Ok Lee
Hilary Leichter
Daniel Magariel
Melody Nixon
Tracy O'Neill
Mark Rozzo
John Vincler
Rose Waldman
Christopher Wolfe
Samantha Zighelboim

GRADUATE FACULTY FELLOWS

Ryan Avanzado
Synne Borgen
Jacob Carroll
Jessica Colley Clarke
Elly Graf
Molly McGhee
Mitchell Glazier
Kate Greene
Jared Jackson
Anastasios Karnazes
Margaret Meehan
Vivian Nixon
Margaret Richardson
Daniel Ryan
Adam Schwartzman
Gordon Slater
Robert Taylor Supplee
Brian Wiora
Alex Ulloa

MAJOR IN CREATIVE WRITING

The major in creative writing requires a minimum of 36 points: five workshops, four seminars, and three related courses.

Workshop Curriculum (15 points)

Students in the workshops produce original works of fiction, poetry, or nonfiction, and submit them to their classmates and instructor for a close critical analysis. Workshop critiques (which include detailed written reports and thorough line-edits) assess the mechanics and merits of the writing pieces. Individual instructor conferences distill the critiques into a direct plan of action to improve the work. Student writers develop by practicing the craft under the diligent critical attention of their peers and instructor, which guides them toward new levels of creative endeavor.

Creative writing majors select 15 points within the division in the following courses. One workshop must be in a genre other than the primary focus. For instance, a fiction writer might take four fiction workshops and one poetry workshop.

Beginning Workshop

Designed for students who have little or no previous experience writing literary texts in a particular genre.

WRIT UN1100	Beginning Fiction Workshop
WRIT UN1200	Beginning Nonfiction Workshop
WRIT UN1300	Beginning Poetry Workshop

Intermediate Workshop

Permission required. Admission by writing sample. Enrollment limited to 15. Course may be repeated in fulfillment of the major.

WRIT UN2100	Intermediate Fiction Workshop
WRIT UN2200	Intermediate Nonfiction Workshop
WRIT UN2300	Intermediate Poetry Workshop

Advanced Workshop

Permission required. Admission by writing sample. Enrollment limited to 15. Course may be repeated in fulfillment of the major.

WRIT UN3100	Advanced Fiction Workshop
WRIT UN3200	Advanced Nonfiction Workshop
WRIT UN3300	Advanced Poetry Workshop

Senior Creative Writing Workshop

Seniors who are creative writing majors are given priority. Enrollment limited to 12, by instructor's permission. The senior workshop offers students the opportunity to work exclusively with classmates who are at the same high level of accomplishment in the major. This course is only offered by graduate faculty professors.

WRIT UN3101	Senior Fiction Workshop
WRIT UN3201	Senior Nonfiction Workshop
WRIT UN3301	Senior Poetry Workshop

Seminar Curriculum (12 points)

The creative writing seminars form the intellectual ballast of our program. Our seminars offer a close examination of literary techniques such as plot, point of view, tone, and voice.

They seek to inform and inspire students by exposing them to a wide variety of approaches in their chosen genre. Our curriculum, via these seminars, actively responds not only to historical literary concerns, but to contemporary ones as well. Extensive readings are required, along with short critical papers and/or creative exercises. By closely analyzing diverse works of literature and participating in roundtable discussions, writers build the resources necessary to produce their own accomplished creative work.

Creative writing majors select 12 points within the division. Any 4 seminars will fulfill the requirement, no matter the student's chosen genre concentration. Below is a sampling of our seminars. The list of seminars currently being offered can be found in the "Courses" section.

These seminars offer close examination of literary techniques such as plot, point of view, tone, suspense, and narrative voice. Extensive readings are required, along with creative exercises.

FICTION

WRIT UN3121	Fiction Seminar: How To Build A Person
WRIT UN3117	Fiction Seminar: The Here & Now
WRIT UN3122	First Novels: How They Work
WRIT UN3120	Fiction Seminar: The Craft Of Writing Dialogue

NONFICTION

WRIT UN3213	Nonfiction Seminar: The Literary Reporter
WRIT UN3215	Nonfiction Seminar: Learning to See: Writing The Visual
WRIT UN3216	Nonfiction Seminar: Truths & Facts
WRIT UN3217	Nonfiction Seminar: Science And Sensibility

POETRY

WRIT UN2311	Poetry Seminar: Traditions in Poetry
WRIT UN3313	Poetry Seminar: The Crisis of the I
WRIT UN3314	Poetry Seminar: 21st Century American Poetry and Its Concerns
WRIT GU4310	Poetry Seminar - Witness, Record, Document: Poetry & Testimony

CROSS GENRE

WRIT GU4011	Cross Genre Seminar: Imagining Berlin
WRIT GU4012	Cross Genre Seminar: Diva Voice, Diva Style, Diva Lyrics
WRIT UN3016	Cross Genre Seminar: Walking

WRIT UN3013

Cross-Genre Seminar: Process
Writing & Writing Process

Related Courses (9 points)

Drawn from various departments, these courses provide concentrated intellectual and creative stimulation, as well as exposure to ideas that enrich students' artistic instincts. Courses may be different for each student writer. Students should consult with faculty advisers to determine the related courses that best inform their creative work.

DANCE

310 Barnard Hall

212-854-2995

dance@barnard.edu

Department Assistant: Diane Roe

THE DEPARTMENT OF DANCE

Mission

The Barnard College Department of Dance, located in a world dance capital, offers an interdisciplinary program that integrates the study of dance within a liberal arts setting of intellectual and creative exploration. The major builds upon studio courses, the Department's productions at Miller Theater, New York Live Arts, and other venues, as well as a rich array of dance studies courses, allowing students' creative work to develop in dialogue with critical inquiry into the history, culture, theory and forms of western and non-western performance, typically enhanced by study in other disciplines. Students work with accomplished artists whose work enriches contemporary American dance; they also study with outstanding research scholars.

Making, thinking about, and writing about art are an essential part of the liberal arts education. For this reason, the Department of Dance offers technique courses for students of all levels of expertise, while opening its other courses to majors and non-majors alike, who may also audition for its productions. The Department partners with cultural institutions in New York City to connect students with the professional world.

Student Learning Outcomes for the Major and Concentration

Students graduating with a major in Dance should be able to attain the following outcomes:

- Apply critical thinking, reading, and writing skills to dance-related texts and choreography.
- Develop the knowledge and research skills to explore the dance past in writing, orally, and in performance.
- Present interpretations of dance-related texts orally, in writing, and in performance.

- Apply library, archival, and internet research skills to dance scholarship and choreography.
- Demonstrate improved efficiency and expressivity in dance technique.
- Demonstrate growing technical understanding and fluency in dance technique.
- Create original dances, dance/theater works or dance-based, mixed media works.
- Collaborate with an artist in the creation of original dance works.
- Participate in the creative process through the creation and interpretation of choreography.
- Apply interdisciplinary research methods to dance scholarship and choreography.
- Apply historical research methods to dance scholarship and choreography.
- Demonstrate conceptual and methodological approaches for studying world dance forms through research and writing.
- Demonstrate the ability to understand cultural and historical texts in relation to dance forms.
- Apply anatomical knowledge to movement and movement concepts.
- Evaluate the theoretical and artistic work of peers.
- Communicate with an audience in oral presentations and dance performance.
- Understand and interpret the language and form of an artist's choreography.
- Solve technical problems in dance movement.
- Apply musical knowledge to movement and choreography.
- Design choreographic movement and structures.

Dance Technique Courses

Level I courses, except for global and somatic courses, have no prerequisite and students receive a Pass/Fail grade. All other courses must be taken for a letter grade and require a placement audition (held at the first meeting of classes) or the permission of the instructor. These courses may be taken to fulfill the physical education requirement.

GS students registering for a dance technique class must register for at least one credit: GS students may not register for a 0-credit dance technique class.

Additionally, a maximum of six (6) points of dance technique courses can be taken for credit by GS non-dance majors.

Ballet

Technique of classical ballet emphasizing proper alignment and graduated study of its vocabulary. Artistry of articulation, phrasing, dynamics, and nuance in the broad range of classical materials are addressed at each level.

Modern

The study of contemporary dance based on the work of the 20th and 21st century innovators. Aesthetic principles of modern dance will be taught with increased technical demands required at each successive level.

Global and Somatic Forms

The study of dance forms including classical Spanish, Jazz, Tap, West African, Afro-Cuban, and Indian.

Professor: Paul A. Scolieri (Chair & Director of Undergraduate Studies)

Professor of Professional Practice: Colleen Thomas-Young

Associate Professor of Professional Practice: Marjorie Folkman

Assistant Professor: Seth Williams (*on leave in 2019-20*)

Assistant Professor of Professional Practice: Gabri Christa

Senior Associate: Katie Glasner (*on leave in 2019-20*)

Adjunct Faculty: Cynthia Anderson, Jennifer Archibald, Lisa Boudreau, Rebecca Bliss, Siobhan Burke, Maguette Camara, Antonio Carmena, Mary Carpenter, Uttara Coolawala, Elisa Davis, Caroline Fermin, Allegra Kent, Katiti King, Melinda Marquez, Vincent Mc Closkey, Jodi Melnick, Margaret Morrison, Brian Reeder, Kathryn Sullivan, Caitlin Trainor, Ashley Tuttle

Lida A. Orzeck '68 Distinguished Artist-in-Residence: Yvonne Rainer

Artists in Residence (Fall 2019): Doug Varone & Dancers, Davalois Fearon

Technical Director and Lighting Designer: Tricia Toliver

Music Director: Robert Boston

Senior Administrative Assistant: Diane Roe

MAJOR IN DANCE (FOR STUDENTS ENTERING IN FALL 2011 OR LATER)

Majors must complete eleven academic courses (six required, five elective) and a minimum of eight 1-point technique courses. All majors write a senior thesis as part of their coursework.

The required courses for the major in dance are distributed as follows:

Dance History

The following two courses in Dance History must be completed before the fall of the senior year:

DNCE BC2565	World Dance History	3
DNCE BC3001	Western Theatrical Dance from the Renaissance to the 1960s	3

Movement Science

Select one or more of the following:

DNCE BC2501	Biomechanics for the Dancer: Theory and Practice	3
DNCE BC2562	Movement Analysis	3

Composition

One course in Composition must be completed before the fall of the senior year.

DNCE BC2564	Dance Composition: Content	3
DNCE BC3565	Composition: Collaboration and the Creative Process	3
DNCE BC3566	Composition: Site Specific and Experimental Methods	3
DNCE BC2563	Dance Composition: Form	3

Senior Work

Seniors planning to write a combined thesis must request approval from both departments and notify the Registrar. All majors must complete two semesters of senior work. The following course, which culminates in a 25-30-page written thesis and an oral presentation to the Department at the end of the semester, is required of all seniors:

DNCE BC3591	Senior Seminar in Dance	4
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In addition, all majors must take one of the following two courses, depending on whether the senior requirement is completed with a creative project or a two-semester written thesis:

DNCE BC3592	Senior Project: Research for Dance	4
DNCE BC3593	Senior Project: Repertory for Dance	3

Students who are double majors may request permission to write a two-semester combined thesis.

Electives

Five additional 3- or 4-point courses, chosen in consultation with the major advisor, are required. Electives may be chosen from among the departmental offerings listed above or below, including additional coursework in Composition, Movement Science, and/or Senior Work beyond the major requirement.

History/Criticism:

DNCE BC2570	Dance in New York City	
DNCE BC2575	Choreography for the American Musical	
DNCE BC2580	Tap as an American Art Form	
DNCE BC3000	From Page to Stage: Interactions of Literature and Choreography	
DNCE BC3200	Dance in Film	
DNCE BC3567	Dance of India	
DNCE BC3570	Latin American and Caribbean Dance: Identities in Motion	
DNCE BC3575	George Balanchine and the Reinvention of Modern Ballet	
DNCE BC3576	Dance Criticism	
DNCE BC3577	Performing the Political: Embodying Change in American Performance	
DNCE BC3578	Traditions of African-American Dance	

DNCE BC3580	History of Social Dancing: Dance Crazes from the Waltz to Flash Mobs
DNCE BC3583	Gender and Historical Memory in American Dance of the 1930's to the Early 1960's
DNCE BC3980	Performing the Political: Embodying Change in American Performance
DNCE BC3981	Inventing American Modern Dance: Ruth St. Denis and Ted Shawn
DNCE BC3982	Diaghilev's Ballets Russes and Its World
Studio/Performance:	
DNCE BC2555	Ensemble Dance Repertory (Modern Dance)
DNCE BC2556	Ensemble Dance Repertory: Ballet
DNCE BC2557	Evolution of Spanish Dance Style
DNCE BC2558	Tap Ensemble
DNCE BC2567	Music for Dance
DNCE BC3571	Solo Repertory: Performance Styles
DNCE BC3601 - DNCE BC3604	Rehearsal and Performance in Dance and Rehearsal and Performance in Dance

Overview of Major Requirements (11 total, plus 8 technique courses)

- 1 Movement Science
- 1 Composition
- 2 History
- 1 Senior Seminar
- 1 Senior Project (Research in Dance or Repertory for Dance)
- 5 Electives
- 8 Technique Courses

MAJOR IN DANCE (for students declaring a major before Fall 2011)

Majors must fulfill an eleven-course requirement, including the DNCE BC3591 Senior Seminar in Dance and either Senior Project: Research in Dance (DNCE BC3592 Senior Project: Research for Dance) or DNCE BC3593 Senior Project: Repertory for Dance, in addition to taking a minimum of eight 1-point technique courses.

To fulfill the distribution requirements, one course must be taken in each of the following four areas:

Movement Science

DNCE BC2501	Biomechanics for the Dancer: Theory and Practice	3
DNCE BC2562	Movement Analysis	3
ANAT BC2573	Human Anatomy and Movement	3

Composition

DNCE BC2563	Dance Composition: Form	3
DNCE BC2564	Dance Composition: Content	3
DNCE BC3565	Composition: Collaboration and the Creative Process	3
DNCE BC3566	Composition: Site Specific and Experimental Methods	3

History

DNCE BC2565	World Dance History	3
DNCE BC3001	Western Theatrical Dance from the Renaissance to the 1960s	3

Writing

DNCE BC2570	Dance in New York City	3
DNCE BC3570	Latin American and Caribbean Dance: Identities in Motion	3
DNCE BC3574	Inventing the Contemporary: Dance Since the 1960s	3
DNCE BC3576	Dance Criticism	3
DNCE BC3577	Performing the Political: Embodying Change in American Performance	3

Electives

In consultation with the major advisor, an additional five courses should be chosen from the courses listed above or below:

History/Criticism:

DNCE BC2575	Choreography for the American Musical
DNCE BC2580	Tap as an American Art Form
DNCE BC3000	From Page to Stage: Interactions of Literature and Choreography
DNCE BC3567	Dance of India
DNCE BC3575	George Balanchine and the Reinvention of Modern Ballet
DNCE BC3577	Performing the Political: Embodying Change in American Performance
DNCE BC3578	Traditions of African-American Dance
DNCE BC3980	Performing the Political: Embodying Change in American Performance
DNCE BC3982	Diaghilev's Ballets Russes and Its World

Studio/Performance:

DNCE BC2555	Ensemble Dance Repertory (Modern Dance)
DNCE BC2556	Ensemble Dance Repertory: Ballet
DNCE BC2558	Tap Ensemble
DNCE BC2567	Music for Dance

DNCE BC3571	Solo Repertory: Performance Styles
DNCE BC3572	Dance Production
DNCE BC3601 - DNCE BC3604	Rehearsal and Performance in Dance and Rehearsal and Performance in Dance

Senior Work

All dance majors must complete two semesters of senior work. DNCE BC3591 Senior Seminar in Dance given in the fall semesters, requires a 25-30 page written thesis and an oral presentation to the Department at the end of the semester. The second semester is usually a performance project for which the student registers in DNCE BC3593 Senior Project: Repertory for Dance. Students may also choose to do a two-semester thesis, registering in DNCE BC3592 Senior Project: Research for Dance. Students who are double majors may request permission to do a two-semester combined thesis.

Overview of Major Requirements (11 total, plus 8 technique classes)

- 1 Movement Science
- 1 Composition
- 1 History
- 1 Writing
- 1 Senior Seminar
- 1 Senior Project (Research in Dance or Repertory for Dance)
- 5 Electives
- 8 Technique Classes

CONCENTRATION IN DANCE

The concentration in dance is identical to the major except that only two electives are required.

For the major requirements, please see above.

Overview of Concentration Requirements (8 total, plus 8 technique classes)

- 1 Movement Science
- 1 Composition
- 2 History
- 1 Senior Seminar
- 1 Senior Project (Research in Dance or Repertory for Dance)
- 2 Electives
- 8 Technique Classes

DATA SCIENCE

Departmental Office: 450 Computer Science Building;
212-939-7000
<http://www.cs.columbia.edu/>

Director of Undergraduate Studies: Dr. Jae Woo Lee, 715 CEPSSR; 212-939-7066; jae@cs.columbia.edu

Departmental Advisers:

For updated adviser information, see <http://www.cs.columbia.edu/education/undergrad/advisors> (<http://www.cs.columbia.edu/education/undergrad/advisors/>).

For administrative advising issues please contact: advising@cs.columbia.edu.

The majors in the Department of Computer Science provide students with the appropriate computer science background necessary for graduate study or a professional career. Computers impact nearly all areas of human endeavor. Therefore, the department also offers courses for students who do not plan a computer science major or concentration. The computer science majors offer maximum flexibility by providing students with a range of options for program specialization. The department offers four majors: computer science; information science; data science; and computer science-mathematics, offered jointly with the Mathematics Department.

COMPUTER SCIENCE MAJOR

Students study a common core of fundamental topics, supplemented by a track that identifies specific areas for deeper study. The foundations track prepares students for advanced work in fundamental, theoretical, and mathematical aspects of computing, including analysis of algorithms, scientific computing, and security. The systems track prepares students for immediate employment in the computer industry as well as advanced study in software engineering, operating systems, computer-aided digital design, computer architecture, programming languages, and user interfaces. The intelligent systems track provides specialization for the student interested in natural language processing and systems capable of exhibiting “human-like” intelligence. The applications track is for students interested in the implementation of interactive multimedia content for the Internet and wireless applications. The vision, graphics, interaction, and robotics track exposes students to computer vision, graphics, human-computer interaction, and robotics.

A combination track is available to students who wish to pursue an interdisciplinary course of study combining computer science and another field in the arts, humanities, mathematics, natural sciences, or social sciences. A student planning a combination track should be aware that one additional course is required to complete this option.

INFORMATION SCIENCE MAJOR

Information science is an interdisciplinary major designed to provide a student with an understanding of how information is organized, accessed, stored, distributed, and processed in strategic segments of today's society. Recent years have seen an explosive growth of on-line information, with people of all ages and all walks of life making use of the World Wide Web and other information in digital form.

This major puts students at the forefront of the information revolution, studying how on-line access touches on all disciplines and changing the very way people communicate. Organizations have large stores of in-house information that are crucial to their daily operation. Today's systems must enable quick access to relevant information, must ensure that confidential information is secure, and must enable new forms of communication among people and their access to information.

The information science major can choose a scientific focus on algorithms and systems for organizing, accessing, and processing information, or an interdisciplinary focus in order to develop an understanding of, and tools for, information modeling and use within an important sector of modern society such as economics or health.

ADVANCED PLACEMENT

The department grants 3 points for a score of 4 or 5 on the AP Computer Science exam along with exemption from COMS W1004 Introduction to Computer Science and Programming in Java. However, we still recommend that you take COMS W1004 or W1007 even if you have credits from the CS AP exam. COMS W1007 Honors Introduction to Computer Science is recommended if you scored 5 on the AP exam, and COMS W1004 is recommended if you scored 4.

PRE-INTRODUCTORY COURSES

COMS W1004 is the first course in the Computer Science major curriculum, and it does not require any previous computing experience. Before taking COMS W1004, however, students have an option to start with one of the pre-introductory courses: ENGI E1006 or COMS W1002.

ENGI E1006 Introduction to Computing for Engineers and Applied Scientist is a general introduction to computing for STEM students. ENGI E1006 is in fact a required course for all engineering students. COMS W1002 Computing In Context is a course primarily intended for humanities majors, but it also serves as a pre-introductory course for CS majors.

ENGI E1006 and COMS W1002 do not count towards Computer Science major.

LABORATORY FACILITIES

The department has well-equipped lab areas for research in computer graphics, computer-aided digital design, computer vision, databases and digital libraries, data mining and

knowledge discovery, distributed systems, mobile and wearable computing, natural language processing, networking, operating systems, programming systems, robotics, user interfaces, and real-time multimedia.

Research labs contain several large Linux and Solaris clusters; Puma 500 and IBM robotic arms; a UTAH-MIT dexterous hand; an Adept-1 robot; three mobile research robots; a real-time defocus range sensor; interactive 3-D graphics workstations with 3-D position and orientation trackers; prototype wearable computers, wall-sized stereo projection systems; see-through head-mounted displays; a networking testbed with three Cisco 7500 backbone routers, traffic generators; an IDS testbed with secured LAN, Cisco routers, EMC storage, and Linux servers; and a simulation testbed with several Sun servers and Cisco Catalyst routers. The department uses a SIP IP phone system. The protocol was developed in the department.

The department's computers are connected via a switched 1Gb/s Ethernet network, which has direct connectivity to the campus OC-3 Internet and internet 2 gateways. The campus has 802.11b/g wireless LAN coverage.

The research facility is supported by a full-time staff of professional system administrators and programmers.

PROFESSORS

Alfred V. Aho
 Peter K. Allen
 Peter Belhumeur
 Steven M. Bellovin
 David Blei
 Luca Carloni
 Michael J. Collins
 Steven K. Feiner
 Luis Gravano
 Julia Hirschberg
 Gail E. Kaiser
 John R. Kender
 Kathleen R. McKeown
 Vishal Misra
 Shree K. Nayar
 Jason Nieh
 Steven M. Nowick
 Christos Papadimitriou
 Kenneth A. Ross
 Henning G. Schulzrinne
 Rocco A. Servedio
 Salvatore J. Stolfo
 Jeannette Wing
 Mihalis Yannakakis

ASSOCIATE PROFESSORS

Alexandr Andoni
 Augustin Chaintreau
 Xi Chen

Stephen A. Edwards
 Yaniv Erlich
 Roxana Geambasu
 Eitan Grinspun
 Daniel Hsu
 Tony Jebara
 Martha Allen Kim
 Tal Malkin
 Itsik Pe'er
 Daniel S. Rubenstein
 Simha Sethumadhavan
 Junfeng Yang
 Changxi Zheng

ASSISTANT PROFESSORS

Lydia Chilton
 Ronghui Gu
 Suman Jana
 Baishakhi Ray
 Carl Vondrick
 Omri Weinstein
 Eugene Wu

SENIOR LECTURER IN DISCIPLINE

Paul Blaer
 Adam Cannon
 Jae Woo Lee

LECTURER IN DISCIPLINE

Daniel Bauer
 Tony Dear
 Ansaf Salleb-Aouissi
 Nakul Verma

ASSOCIATED FACULTY JOINT

Shih-Fu Chang
 Clifford Stein

ASSOCIATED FACULTY

Matei Ciocarlie
 Edward G. Coffman Jr. (*emeritus*)
 Eleni Drinea
 Jonathan Gross (*emeritus*)
 Andreas Mueller
 Steven H. Unger (*emeritus*)
 Vladimir Vapnik
 Yechiam Yemini (*emeritus*)

SENIOR RESEARCH SCIENTISTS

Moti Yung

RESEARCH SCIENTISTS

Smaranda Muresan*

ASSOCIATED RESEARCH SCIENTISTS

Allison Breton Bishop
 Giuseppe DiGuglielmo
 Paolo Mantovani
 Hiroshi Sasaki
 Eran Tromer

PROFESSOR OF PRACTICE

Donald F. Ferguson

GUIDELINES FOR ALL COMPUTER SCIENCE MAJORS AND CONCENTRATORS

Courses

Students may receive credit for only one of the following two courses:

- COMS W1004 Introduction to Computer Science and Programming in Java
- COMS W1005 Introduction to Computer Science and Programming in MATLAB.

Students may receive credit for only one of the following three courses:

- COMS W3134 Data Structures in Java
- COMS W3136 Data Structures with C/C++
- COMS W3137 Honors Data Structures and Algorithms

However, COMS W1005 and COMS W3136 cannot be counted towards the Computer Science major, minor, and concentration.

Transfer Credit

As a rule, no more than 12 transfer credits are accepted toward the major.

Grading

A maximum of one course worth no more than 4 points passed with a grade of D may be counted toward the major or concentration.

MAJOR IN COMPUTER SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

All majors should confer with their program adviser each term to plan their programs of study. Students considering a major in computer science are encouraged to talk to a program adviser during their first or second year. A typical program of study is as follows:

Program of Study

Computer Science Core (22-24 points)

For students who declare in Spring 2014 and beyond:

ENGI E1006	Introduction to Computing for Engineers and Applied Scientists (recommended but not required)
First Year	
COMS W1004	Introduction to Computer Science and Programming in Java
or COMS W1007	Honors Introduction to Computer Science
Sophomore Year	
COMS W3134	Data Structures in Java
or COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
Junior and Senior Year	
Select the remaining required core courses:	
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems
Select one of the following courses:	
MATH UN2010	Linear Algebra
APMA E2101	Introduction to Applied Mathematics
APMA E3101	Linear Algebra
STAT GU4001	Introduction to Probability and Statistics

For students who declared prior to Spring 2014:

First Year	
COMS W1004	Introduction to Computer Science and Programming in Java
Sophomore Year	
COMS W1007	Honors Introduction to Computer Science
COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
Junior and Senior Year	
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems

In addition to the CS Core (22-24 points), all CS majors must complete the Calculus Requirement (3 points) and a Track Requirement (15 or 18 points). The CS major therefore requires 40-45 points total.

Mathematics (3 points)

Calculus II or Calculus III.

Note that Calculus III does NOT depend on Calculus II. You can take either Calculus II or III, but we recommend Calculus III, which covers topics that are a bit more relevant for upper-level Computer Science courses.

If you have received equivalent credits for Calculus I & II already (through a 4 or 5 on the AP Calculus exam for example), you are not required to take any more Calculus courses. But we recommend taking one more semester of Calculus, either Math UN1201 Calculus III or APAM E2000 Multivariate Calculus for Engineers and Scientists. APAM E2000 covers relevant topics from Calculus III and IV.

Track Requirement (15 or 18 points)

Students must select one of the following six upper-level tracks. Each track, except the combination track, requires five courses consisting of required, elective breadth, and elective track courses. The combination track requires a selection of six advanced courses: three 3000- or 4000-level computer science courses and three 3000- or 4000-level courses from another field. The elective breadth requirement in each track can be fulfilled with any 3-point computer science 3000-level or higher course that is not a computer science core course or a technical elective course in that track. In addition to the breadth elective, the track requirements are as follows:

Foundations Track (15 points)

For students interested in algorithms, computational complexity, and other areas of theoretical Computer Science.

Note: Students who declared their Computer Science major prior to Fall 2016 may also count COMS 4241, COMS 4205, COMS 4281, COMS 4444, COMS 4771, and COMS 4772 as track elective courses.

Required Courses

CSOR W4231	Analysis of Algorithms I
COMS W4236	Introduction to Computational Complexity

Track Electives

Select 2 from:	
MATH UN3020	Number Theory and Cryptography
MATH UN3025	Making, Breaking Codes
COMS W4203	Graph Theory
MATH GU4032	Fourier Analysis
MATH GU4041	Introduction to Modern Algebra I
MATH GU4042	Introduction to Modern Algebra II
MATH GU4061	Introduction To Modern Analysis I
MATH GU4155	Probability Theory
COMS W4252	Introduction to Computational Learning Theory

COMS W4261	Introduction to Cryptography
APMA E4300	Computational Math: Introduction to Numerical Methods
IEOR E4407	Game Theoretic Models of Operations
CSPH G4802	Math Logic II: Incompleteness
COMS E6232	Analysis of Algorithms, II
MATH G6238	Enumerative Combinatorics
COMS E6253	Advanced Topics in Computational Learning Theory
COMS E6261	Advanced Cryptography
EEOR E6616	Convex optimization
IEOR E6613	Optimization, I
IEOR E6614	Optimization, II
IEOR E6711	Stochastic models, I
IEOR E6712	Stochastic models, II
ELEN E6717	Information theory
ELEN E6718	Error Correcting Codes: Classical and Modern

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I
COMS E6998	Topics in Computer Science

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Software Systems Track (15 points)

For students interested in networks, programming languages, operating systems, software engineering, databases, security, and distributed systems.

Required Courses

COMS W4115	Programming Languages and Translators
COMS W4118	Operating Systems I
CSEE W4119	Computer Networks

Track Electives

Select 1 from:

Any COMS W41xx course

COMS W4444	Programming and Problem Solving
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Any COMS W48xx course

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science

COMS W4995	Special topics in computer science, I
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COMS W4996	Special topics in computer science, II
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Any COMS E68XX course

Any COMS E61XX course

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Intelligent Systems Track (15 points)

For students interested in machine learning, robotics, and systems capable of exhibiting “human-like” intelligence.

Required Courses

Select two of the following courses:

COMS W4701	Artificial Intelligence
COMS W4705	Natural Language Processing
COMS W4706	Spoken Language Processing
COMS W4731	Computer Vision
COMS W4733	Computational Aspects of Robotics
COMS W4771	Machine Learning

Track Electives

Select 2 from:

COMS W4252	Introduction to Computational Learning Theory
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Any COMS W47xx course

Any COMS E67XX course

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I
COMS E6998	Topics in Computer Science

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Applications Track (15 points)

For students interested in the implementation of interactive multimedia applications for the internet and wireless networks.

Required Courses

COMS W4115	Programming Languages and Translators
COMS W4170	User Interface Design

Track Electives

Select 2 from:

Any COMS W41xx course
Any COMS W47xx course

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I

Any COMS E69XX course

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Vision, Graphics, Interaction, and Robotics Track (15 points)

For students in the vision, interaction, graphics, and robotics track. It focuses on visual information with topics in vision, graphics, human-computer interaction, robotics, modeling, and learning. Students learn about fundamental ways in which visual information is captured, manipulated, and experienced.

Required Courses

Select two of the following courses:

COMS W4160	Computer Graphics
COMS W4167	Computer Animation
COMS W4731	Computer Vision

Track Electives

Select 2 from:

COMS W4162	Advanced Computer Graphics
COMS W4170	User Interface Design
COMS W4172	3D User Interfaces and Augmented Reality
COMS W4701	Artificial Intelligence
COMS W4733	Computational Aspects of Robotics
COMS W4735	Visual Interfaces to Computers
COMS W4771	Machine Learning

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I

Any COMS E69XX course

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Combination Track (18 points)

For students who wish to combine computer science with another discipline in the arts, humanities, social or natural sciences. A coherent selection of six upper-level courses is

required: three from computer science and three from another discipline.

The courses should be planned with and approved by the student's CS faculty advisor by the first semester of the junior year. The six courses are typically 4000-level elective courses that would count towards the individual majors. Moreover, the six courses should have a common theme. The combination track is not intended for those students who pursue double majors.

MAJOR IN COMPUTER SCIENCE—MATHEMATICS

For a description of the joint major in computer science—mathematics, see the *Mathematics* section in this bulletin.

MAJOR IN INFORMATION SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

The major in information science requires a minimum of 33 points including a core requirement of five courses.

The elective courses must be chosen with a faculty adviser to focus on the modeling and use of information within the context of a disciplinary theme. After discussing potential selections students prepare a proposal of study that must be approved by the faculty adviser. In all cases the six courses must be at the 3000-level or above with at least three courses chosen from computer science. Following are some example programs. For more examples or templates for the program proposal, see a faculty adviser.

Note: In most cases additional courses will be necessary as prerequisites in order to take some of the elective courses. This will depend on the student's proposed program of study.

Core Requirement

COMS W1001	Introduction to Information Science
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or COMS W1002 Computing in Context

COMS W1004	Introduction to Computer Science and Programming in Java
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COMS W1007	Honors Introduction to Computer Science
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COMS W3134	Data Structures in Java
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STAT GU4001	Introduction to Probability and Statistics
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Following are some suggested programs of instruction:

Information Science and Contemporary Society

Students may focus on how humans use technology and how technology has changed society.

The requirements include:

COMS W4111	Introduction to Databases
COMS W4170	User Interface Design
COMS W4701	Artificial Intelligence
COMS W3410	Computers and Society
SOCI UN3010	Methods for Social Research
SOCI UN3960	Law, Science, and Society

Information Science and the Economy

Students may focus on understanding information modeling together with existing and emerging needs in economics and finance as well as algorithms and systems to address those needs.

The requirements include:

COMS W4111	Introduction to Databases
COMS W4701	Artificial Intelligence
COMS W4771	Machine Learning
ECON UN3412	Introduction To Econometrics
ECON UN3025	Financial Economics
ECON UN3265	The Economics of Money and Banking

Information Science and Health Sciences

Students may focus on understanding information modeling together with existing and emerging needs in health sciences, as well as algorithms and systems to address those needs.

The requirements include:

COMS W4111	Introduction to Databases
COMS W4170	User Interface Design
COMS W4701	Artificial Intelligence
BINF G4001	
BIOL W4037	Bioinformatics of Gene Expression
ECBM E3060/E4060	Introduction to genomic information science and technology

MAJOR IN DATA SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

In response to the ever growing importance of "big data" in scientific and policy endeavors, the last few years have seen an explosive growth in theory, methods, and applications at the interface between computer science and statistics. The statistics and computer science departments have responded

with a joint-major that emphasizes the interface between the disciplines.

Prerequisites (15 points)

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN2010	Linear Algebra
This introductory Statistics course:	
STAT UN1201	Calculus-Based Introduction to Statistics

Statistics (12 points)

STAT GU4203	PROBABILITY THEORY
STAT GU4204	Statistical Inference
STAT GU4205	Linear Regression Models
STAT GU4241	Statistical Machine Learning or COMS W4771 Machine Learning

Computer Science (12 points)

Select one of the following courses:

COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1005	Introduction to Computer Science and Programming in MATLAB
COMS W1007	Honors Introduction to Computer Science
ENGI E1006	Introduction to Computing for Engineers and Applied Scientists

Select one of the following courses:

COMS W3134	Data Structures in Java
COMS W3136	Data Structures with C/C++
COMS W3137	Honors Data Structures and Algorithms

Two required courses:

COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
CSOR W4231	Analysis of Algorithms I

Electives (15 points)

Select two of the following courses:

STAT UN3106	Applied Data Mining
STAT GU4206	Statistical Computing and Introduction to Data Science
STAT GU4224	Bayesian Statistics
STAT GU4243	Applied Data Science
STAT Q4242	Advanced Machine Learning

Select three of the following courses:

COMS W3261	Computer Science Theory
COMS W4111	Introduction to Databases
COMS W4130	Principles and Practice of Parallel Programming
COMS W4236	Introduction to Computational Complexity

COMS W4252 Introduction to Computational Learning Theory
 Any COMS W47xx course EXCEPT W4771

CONCENTRATION IN COMPUTER SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

For students who declare in Spring 2014 and beyond:

The concentration in computer science requires a minimum of 22-24 points, as follows:

COMS W1004	Introduction to Computer Science and Programming in Java
or COMS W1007	Honors Introduction to Computer Science
COMS W3134	Data Structures in Java
or COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems (or any 3 point 4000-level computer science course)

Select one of the following courses:

MATH UN2010	Linear Algebra
MATH V2020	Honors Linear Algebra
APMA E2101	Introduction to Applied Mathematics
APMA E3101	Linear Algebra
STAT GU4001	Introduction to Probability and Statistics
SIEO W3600	

For students who declared prior to Spring 2014:

The concentration requires a minimum of 23 points, as follows:

COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1007	Honors Introduction to Computer Science
COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems (or any 3-point 4000-level computer science course)

DRAMA AND THEATRE ARTS

507 Milbank Hall
 212-854-2080
 212-280-8764 (fax)
 Department Administrator: Coretta Grant
 Faculty Department Assistant: Valerie Coates

The Barnard and Columbia undergraduate theatre program engages the disciplines of drama, theatre, and performance studies as a distinctive mode of intellectual and artistic inquiry. Majors take foundational coursework in the literary, cultural, and embodied traditions of western and nonwestern performance as well as in the practices of acting, directing, design, and playwriting. All majors then specialize in a specific area and undertake advanced thesis work, leading either to a formal essay of original research, or to an artistic project (in acting, design, directing, dramaturgy, playwriting, or solo performance) that combines the practices of research and artistic creation.

While Barnard and Columbia students fulfill the overall graduation requirements of their respective institutions, major requirements for the Barnard Major in Theatre/Columbia Major in Drama and Theatre Arts are identical, and the majority of required coursework is offered through the Barnard College Department of Theatre. Barnard and Columbia students receive their degrees from their respective colleges of Columbia University.

The Department's season of productions in the Minor Latham Playhouse and the Glicker-Milstein Black Box Theatre is a crucible of investigation: the place where professional directors and designers collaborate with undergraduates, using a wide range of classic and contemporary plays and performance practices to shape insights unique to theatrical inquiry today. Whether it's Shakespeare or Soyinka or Caryl Churchill, or the directing, solo performance, and playwriting theses in the Senior Thesis Festival, Department of Theatre productions are both a learning process and a scene of encounter, where perceptions are shaped for the attention and creative response of a larger public.

Students interested in majoring in Theatre should consider taking three or four of the required classes in their first two years of study: Theatre History I, Theatre History II and/or a course fulfilling the "world theatre" requirement, and at least one class in acting, design, directing, or playwriting (preferably in the area you might choose as areas of specialization). Students thinking about a research focus might consider an additional dramatic literature class early in their studies; students thinking about an acting or design focus, for example, might consider additional classes in those areas in the second or third year of study.

Students declare the major in the spring semester of the sophomore year. The major requirements are spelled out below, and the process for choosing a thesis area as well: all Theatre/ Drama and Theatre Arts majors complete a thesis as a capstone to their work in the degree. For more information about the major, please contact any full-time faculty member (see Faculty pages).

Barnard students must make an appointment or come by the office of the Department Chair to have the major-declaration form signed, and will have a major adviser from the Department faculty; Columbia students are encouraged to meet with members of the faculty to discuss the degree. All majors should introduce themselves to the Theatre Administrator in 507 Milbank Hall; she will add names to the departmental listserv, and help students to keep up to date in important information about studying in the Department.

STUDENT LEARNING OBJECTIVES

Upon completion of the major, successful students will be able to attain the following objectives:

- Assess critically the artistic ambitions of contemporary theatrical performance, and of literary, critical and theoretical issues involved in the interpretation of dramatic literature and theatrical performance;
- Create with proficiency in at least one area of creative work in the field: critical/research writing, acting, directing, design, playwriting, and dramaturgy.

Areas of Concentration

Drama and Theatre Studies Student Learning Objectives

Students successfully completing drama and theatre studies coursework, or concentrating in drama and theatre studies, should be able to attain the following objectives:

1. Write clearly about dramatic literature, and about performance, including where applicable film performance;
2. Synthesize and evaluate contemporary criticism and research scholarship in writing;
3. Know specific authors, movements, periods, styles, and ideological structures in the history of drama, theatre, and performance (i.e., Shakespeare, American drama, Performative Cultures of the Third Reich, Black Theatre);
4. Use critical, theoretical, and historical concepts in the analysis of drama and performance.

Acting Student Learning Objectives

Students successfully completing a concentration in acting should be able to attain the following objectives:

1. Analyze dramatic texts and apply the analysis to developing a performable role/character;
2. Synthesize external elements with external elements (social mores, environment, historical context, status

relationship to others) and internal elements (center of gravity, personal rhythm, speed, tempo) toward the expression of a character's physicality and emotionality;

3. Recognize and apply the fundamental concepts of character development: objectives, obstacles, actions, given circumstances;
4. Develop vocal, physical and emotional awareness and imagination, and to explore techniques available to aid the actor in applying these elements in a conscious way during rehearsal and performance.

Design Student Learning Objectives

Students successfully completing a concentration in design should be able to attain the following objectives:

1. Analyze dramatic texts and translate that analysis into documents used in the production process (breakdowns, plots, etc.);
2. Collect images and texts that provide insight into the developing design idea, and accurately communicate historical and stylistic choices;
3. Demonstrate fluency with the craft of a design field – e.g. sketching, model making, drafting, sound and lighting plots, and associated software;
4. Perform collaboratively, adapting and informing their designs with ideas generated through conversation with colleagues, classmates, and advisors.

Directing Student Learning Objectives

Students successfully completing a concentration in directing should be able to attain the following objectives:

1. Recognize the different demands of different configurations of stage space;
2. Apply compositional tools;
3. Define production style and its influence on performance choices;
4. Communicate effectively with actors;
5. Analyze the historical, social, and aesthetic elements of a dramatic text as the basis for a directorial conception.

Dramaturgy Student Learning Objectives

Students successfully completing a concentration in dramaturgy should be able to attain the following objectives:

1. Apply important critical and theoretical concepts to the analysis of dramatic writing and theatrical performance;
2. Synthesize and evaluate contemporary research scholarship and apply it to a specific production, including biographical, historical, and interpretive information;
3. Write clearly and effectively about the goals of a production, its critical contexts and purposes;

4. Communicate the critical stakes of a performance to a director and cast; to be able to work with a director in fashioning those stakes;
5. Edit dramatic scripts for production.

Playwriting Student Learning Objectives

Students successfully completing a concentration in playwriting should be able to attain the following objectives:

1. Create an individual theatrical voice in writing;
2. Construct dramatic and theatrical events onstage;
3. Communicate supportive critique to fellow writers;
4. Interpret plot and story, and to employ language and spectacle creatively;
5. Recognize dramatic structures, and be able to shape and hold an audience's attention.

Chair: W.B. Worthen (Alice Brady Pels Professor in the Arts, Co-Director of Undergraduate Studies, Drama and Theatre Arts)

Assistant Professors: Paige Johnson, Shayoni Mitra, Hana Worthen

Associate Professors of Professional Practice: Sandra Goldmark, Alice Reagan

Lecturer: Gisela Cardenas

Adjunct Lecturers: Mana Allen, Daniel Baker, Andy Bragen, Steven Chaikelson, Kyle deCamp, Crystal Finn, Sharon Fogarty, Tiffany Nicole Greene, Rita Pietropinto, Lisa Rothe, Shannon Sindelar, Wendy Waterman

Affiliated Faculty:

Associate Professor: Maja Horn (Spanish and Latin American Cultures)

Senior Lecturers: Pam Cobrin (English, Director, Writing Program), Patricia Denison (English, Co-Director of Undergraduate Studies, Drama and Theatre Arts)

Other officers of the University offering courses listed below:

Professors: Austin E. Quigley, Julie Stone Peters

Professor of Professional Practice: Steven Chaikelson

Department Administrator: Coretta Grant

Technical Director: Greg Winkler

Production Manager: Michael Banta

Costume Shop Manager: Kara Feely

Faculty Department Assistant: Valerie Coates

REQUIREMENTS FOR THE MAJOR

Download the Theatre major self-audit form (http://bulletin.columbia.edu/general-studies/majors-concentrations/drama-theatre-arts/Major_Audit_Sheet.pdf)

Students intending to major in Theatre should consult with the Department Chair in their sophomore year or earlier to plan a

program: this consultation is required for Barnard students and strongly recommended for Columbia students. Twelve courses and one senior thesis (in Performance or in Research) are required as follows:

Dramatic Literature and Theatre History

World theatre and performance histories:

Both required:

THTR UN3150	Western Theatre Traditions: Classic to Romantic
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THTR UN3151	Western Theatre Traditions: Modern
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Select one of the following:

THTR UN3154	Theatre Traditions in a Global Context
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THTR UN3155	Traditional Indian Theatre
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THTR UN3156	Modern Asian Performance
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Select one course in Drama, Theatre, and Performance Theory:

THTR UN3140	Performing Women
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THTR UN3160	Queer Performance
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THTR UN3165	Theories of Performance Studies
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THTR UN3166	Drama, Theatre, and Theory
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ENTA UN3701	Drama, Theatre, Theory
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Select one course in Shakespeare

Select Two courses in dramatic literature, theatre studies, and/or performance studies, taken in the Theatre Department or in another department with advisor's approval. One course must be a seminar.

Theatre Practice

Select one course each in 3 of the following 4 areas:

Acting

THTR UN3004	Acting Lab
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THTR UN3007	Scene Lab
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Design

THTR UN3401	Sound Design
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THTR UN3402	Costume Design
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THTR UN3403	Lighting Design
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THTR UN3404	Scenic Design
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THTR UN3405	Problems in Design
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THTR UN 3203 Collaboration may be counted if not counted toward Directing

Directing

THTR UN3200	Directing I
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THTR UN3201	Directing II
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THTR UN 3203 Collaboration may be counted if not counted toward Design

Playwriting

THTR UN3300	Playwriting Workshop
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THTR UN3301	Playwriting Lab
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Concentration

All majors must take an additional TWO courses in the field of the Senior Thesis. *See below.

Senior Thesis

All students must take either THTR UN3997 or THTR UN3998:

THTR UN3997	Senior Thesis: Performance (Acting, Design, Directing, Dramaturgy, Playwriting, Solo Performance) *
THTR UN3998	Senior Thesis: Research **

* *Prior to completing the Senior Thesis: Performance, majors must take an additional two courses in the field of the thesis (acting, design, dramaturgy, directing, playwriting, solo performance). Courses in acting, design, and directing are offered through the Department of Theatre. Courses in playwriting are offered through the Department of Theatre and the Department of English; a student who takes one of the playwriting classes above as part of the Theatre Practice requirement may take a playwriting course in English as one of the two additional playwriting courses required for the thesis. For theses in directing, students must take a dramaturgy course prior to the thesis year. For theses in dramaturgy, students take two additional courses in dramatic literature, theatre studies, or performance studies research; these courses may be drawn from courses in dramatic literature, theatre studies, and global performance traditions offered in the Theatre department, or from dramatic literature courses offered in other departments with the adviser's approval. Dramaturgy thesis students may substitute one course in playwriting for one of the two additional courses. Students pursuing a solo performance thesis are required to have taken the Solo Performance course prior to the thesis semester (spring), among the three required courses in acting.

** **Prior to completing the Senior Thesis: Research, majors must take an additional two courses in drama, theatre, or performance research. These courses may be drawn from course in dramatic literature, theatre studies, and global performance traditions offered in the Theatre department, or from dramatic literature or performance studies courses offered in other departments with adviser's approval. These courses should be discussed with the student's major advisor, as well as with the sponsor of the thesis.

Production Crew

Theatre majors planning on completing a Senior Thesis in Performance (acting, design, directing, dramaturgy, playwriting, solo performance) are required to complete a run crew assignment and a crew head assignment prior to their final semester; to be in the strongest position for the thesis, ideally these assignments are completed during the junior year. Please see the section on Production Crew (<http://theatre.barnard.edu/department-and-production-information/#productioncrew>) for more information.

Studio Courses

Please note that for Barnard students there is a limit on studio courses. Theatre majors may take 24 studio points in Theatre and

an additional six in another discipline for a total of 30 studio points. Theatre Department studio courses are:

THTR UN2003	Voice and Speech	2
THTR UN2004	Movement for Actors	2
THTR UN2005	Acting Workshop	3
THTR UN2420	Technical Production	3
THTR UN3004	Acting Lab	3
THTR UN3005	Acting Lab	3
THTR UN3006	Advanced Acting Lab	3
THTR UN3007	Scene Lab	3

Graduate Courses

Only under special circumstances, and with the permission of the instructor, can undergraduates take graduate classes.

EARTH AND ENVIRONMENTAL SCIENCES

Departmental Offices:

556-7 Schermerhorn Hall Extension | 212-854-4525
106 Geoscience, Lamont-Doherty Earth Observatory |
845-365-8550
<http://eesc.columbia.edu>

Chair of Department:

Prof. Sidney Hemming, sidney@ldeo.columbia.edu

Director of Undergraduate Studies:

Prof. Kerry Key

305C Oceanography, Lamont-Doherty Earth Observatory |
557 Schermerhorn Hall Extension

845-365-8604 | kkey@ldeo.columbia.edu
(odland@ldeo.columbia.edu)

Director of Academic Administration and Finance:

Sally Odland

108 Geoscience, Lamont-Doherty Earth Observatory

845-365-8633 | odland@ldeo.columbia.edu

Undergraduate Program Manager:

Anastasia Yankopoulos, 557 Schermerhorn Hall Extension

212-854-3614 | a.t.yankopoulos@columbia.edu
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The undergraduate major in Earth and environmental sciences provides an understanding of the natural functioning of our planet and considers the consequences of human

interactions with it. Our program for majors aims to convey an understanding of how the complex Earth system works at a level that encourages students to think creatively about the Earth system processes and how to address multidisciplinary environmental problems. The breadth of material covered provides an excellent background for those planning to enter the professions of law, business, diplomacy, public policy, teaching, journalism, etc. At the same time, the program provides sufficient depth so that our graduates are prepared for graduate school in one of the Earth sciences. The program can be adjusted to accommodate students with particular career goals in mind.

The department's close affiliations with the Lamont-Doherty Earth Observatory, the American Museum of Natural History (AMNH), NASA's Goddard Institute for Space Studies (GISS), the Earth Institute at Columbia (EI), and several departments within the Fu Foundation School of Engineering and Applied Sciences afford opportunities for student participation in a wide variety of current research programs. Summer employment, research, and additional educational opportunities are available at Lamont and GISS. The department encourages majors to become involved in a research project by their junior year.

All majors and concentrators, when planning their programs of study, should regularly consult the directors of undergraduate studies and make themselves aware of the requirements for their particular program.

PROGRAMS OF STUDY

Environmental Science Major

The environmental science major curriculum provides an introduction to a variety of fields of study relevant to the environment. Environmental science majors are required to take three semesters of introductory courses and to develop a grounding in basic physics, chemistry, biology, and mathematics. Here, students may select courses depending on their interest. With this introduction to the Earth's environment and equipped with a knowledge of the basic sciences, students are prepared to choose a set of upper-level courses in consultation with an undergraduate adviser. All environmental science majors are required to complete a research project, providing a practical application of mastered course work. This research culminates in a senior thesis. The research and the thesis are usually done at Lamont-Doherty Earth Observatory with guidance from a faculty member or a research scientist. However, other options are also possible.

Environmental science majors have an option to complete the special concentration in environmental biology for environmental science majors.

Earth Science Major

The major in Earth science follows a similar rationale but is designed to allow students to pursue particular fields of the Earth sciences in greater depth. Compared with the

environmental science major, one fewer introductory course is required, while one additional advanced course should be part of the plan of study. The Earth science major also offers the possibility of in-depth field experience through a six- to eight-week geology summer field course, arrangements for which are made through another university. The research and senior thesis capstone requirements are the same as for the environmental science major. The geology summer field course may be used as an alternative means of fulfilling the capstone requirement in the Earth science major.

Concentrations

The program for concentrators serves students who want more exposure to Earth and environmental science than is provided by introductory-level courses. The program aims to provide concentrators with experience in data analysis and a thorough introduction to the Earth's systems.

The concentrations in environmental science and in Earth science are designed to give students an understanding of how the Earth works and an introduction to the methods used to investigate Earth processes, including their capabilities and limitations. Concentrators often join the social professions (e.g., business, law, medicine, etc.) and take with them a strong scientific background. They take the same introductory courses as the majors, but fewer basic science and upper-level courses are required.

In addition to the environmental science and Earth science concentrations, the department sponsors a special concentration which must be done in conjunction with the environmental biology major. Students should be aware that they must complete the environmental biology major in order to receive credit for the special concentration. There is also a special concentration in environmental biology for environmental science majors sponsored by the Department of Ecology, Evolution, and Environmental Biology.

DEPARTMENTAL HONORS

The Department of Earth and Environmental Science awards departmental honors to the major or majors in Earth science or environmental science judged to have the best overall academic record. The award is accorded to no more than 10% of the graduating class, or one student in the case of a class smaller than 10. A grade point average of at least 3.6 in the major and a senior thesis or equivalent research of high quality are required. Students who wish to be considered should contact the director of undergraduate studies early in their senior year.

PROFESSORS

Nicholas Christie-Blick
 Joel E. Cohen
 Peter B. de Menocal
 Hugh Ducklow
 Sonya Dyhrman
 Peter Eisenberger

Göran Ekström
 Arlene M. Fiore
 Steven L. Goldstein
 Arnold L. Gordon
 Kevin L. Griffin
 Alex Halliday
 Sidney R. Hemming (Chair)
 Bärbel Hönlisch
 Peter B. Kelemen
 Galen McKinley
 Jerry F. McManus (Associate Chair)
 William H. Menke
 John C. Mutter
 Meredith Nettles
 Paul E. Olsen
 Terry A. Plank
 Lorenzo M. Polvani
 G. Michael Purdy
 Peter Schlosser
 Christopher H. Scholz
 Adam H. Sobel
 Sean C. Solomon
 Marc Spiegelman
 Martin Stute (Barnard)
 Maria Tolstoy
 Renata Wentzcovich

ASSOCIATE PROFESSORS

Ryan Abernathey
 Kerry Key
 Heather Savage

ASSISTANT PROFESSORS

Jacqueline Austermann
 Roisin Commane
 Jonathan Kingslake
 Yves Moussallam

ADJUNCT PROFESSORS

Robert F. Anderson
 W. Roger Buck IV
 Denton Ebel
 John J. Flynn
 James Gaherty
 Lisa M. Goddard
 Arthur Lerner-Lam
 Alberto Malinverno
 Douglas G. Martinson
 Ronald L. Miller
 Mark A. Norell
 Dorothy M. Peteet
 Maureen Raymo
 Andrew Robertson
 Joerg M. Schaefer
 Christopher Small
 Minfang Ting

Felix Waldhauser
 Spahr C. Webb
 Gisela Winckler

ADJUNCT ASSOCIATE PROFESSORS

Alessandra Giannini
 Andrew Juhl

LECTURERS

Pietro Ceccato
 Cornelia Class
 Andreas Turnherr
 Kevin Uno
 Christopher Zappa

ASSOCIATES

Erin Coughlin
 Brian Kahn
 Andrew Kruczkiewicz
 Catherine Vaughan

EMERITUS

Mark Cane
 James Hays
 Paul Richards
 Lynn Sykes
 David Walker

GUIDELINES FOR ALL EARTH AND ENVIRONMENTAL SCIENCES MAJORS, CONCENTRATORS, AND SPECIAL CONCENTRATORS

Advising

All majors and concentrators, when planning their programs of study, should regularly consult the directors of undergraduate studies, who can be contacted through the department office on the fifth floor of Schermerhorn. The requirements are different for each major and concentration and must be met in conjunction with the general requirements for the bachelor's degree. Declaration of the major must be approved by the department and filed in the departmental office.

Substitutions and Exceptions

1. Higher-level courses may be used to satisfy supporting mathematics and science requirements for students with Advanced Placement preparation with the permission of the major adviser.
2. In addition to the courses listed for the depth, and breadth and related courses requirements, several graduate-level courses offered in the department as well as several advanced courses offered at Barnard may be substituted with the permission of the major adviser.

3. 1000-level courses in the Earth and Environmental Sciences Department can not be used toward meeting the requirements of any of the majors, concentrations, or special concentrations.
4. The following course is not suitable for undergraduates and can not be used toward meeting any of the requirements for the majors, concentrations, or special concentrations: EESC GU4930 Earth's Oceans and Atmosphere.

Grading

A grade of C- or better must be obtained for a course to count toward the majors, concentrations, or special concentrations. The grade of P is not acceptable, but a course taken Pass/D/ Fail may be counted if and only if the P is uncovered by the Registrar's deadline.

MAJOR IN EARTH SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The major in Earth science requires a minimum of 45.5 points, distributed as follows:

Foundation Courses

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System

Students who wish to take both EESC UN2100 Earth's Environmental Systems: The Climate System and EESC UN2300 Earth's Environmental Systems: The Life System can include one of these under breadth and related fields below.

Supporting Mathematics and Science Courses

One semester of Calculus at the level of Calculus I or higher (3 credits)

MATH UN1101	Calculus I
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Select one of the following three-course sequences:

CHEM UN1403 - CHEM UN1404 - PHYS UN1201	General Chemistry I (Lecture) and General Chemistry II (Lecture) and General Physics I
CHEM UN1403 - PHYS UN1201 - PHYS UN1202	General Chemistry I (Lecture) and General Physics I and General Physics II

Capstone Experience

Select one of the following:

EESC BC3800 - EESC UN3901	Senior Research Seminar and Environmental Science Senior Seminar
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EESC BC3801 - EESC UN3901	Senior Research Seminar and Environmental Science Senior Seminar
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A six to eight week summer geology field course

Breadth and Related Fields Requirement

A minimum of 6 points (two courses) chosen with the major adviser are required.

Breadth and related field courses are science courses relevant for an Earth science major that do not require an Earth science background. Several such courses are offered at the 2000-, 3000- and 4000-level in the department and at Barnard.

Examples include:

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2300	Earth's Environmental Systems: The Life System
EESC UN3010	Field Geology
EESC BC3017	Environmental Data Analysis
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
EESC GU4600	Earth Resources and Sustainable Development
EESC GU4917	Earth/Human Interactions
EAAE E2002	Alternative energy resources

Also included among breadth and related fields courses are science, mathematics, statistics, and engineering courses offered by other departments that count toward fulfilling degree requirements in those departments.

Depth Requirement

A minimum of 12 points (four courses) chosen with the major adviser to provide depth in the field of Earth science.

These courses build on the foundation and supporting courses listed above and provide a coherent focus in some area of Earth science. Students should include at least one of the following in their course of study:

EESC UN3101	Geochemistry for a Habitable Planet
or EESC UN3201	Solid Earth Dynamics

Areas of focus include one of the courses listed above and three or more additional courses. Students are not required to specialize in a focus area, but examples are given below for those who choose to do so.

Geological Science

EESC GU4090	Introduction to Geochronology and Thermochronology
EESC GU4113	Introduction to Mineralogy
EESC GU4223	Sedimentary Geology
EESC GU4230	Crustal Deformation

EESC GU4701	Introduction to Igneous Petrology
EESC GU4887	Isotope Geology I
EESC GU4947	Plate Tectonics

It is strongly recommended that students focusing in geological science take the summer geology field course as their capstone experience.

Geochemistry

EESC UN3015	The Earth's Carbon Cycle
EESC BC3016	Environmental Measurements
EESC BC3200	Ecotoxicology
EESC GU4090	Introduction to Geochronology and Thermochronology
EESC GU4113	Introduction to Mineralogy
EESC GU4701	Introduction to Igneous Petrology
EESC GU4885	The Chemistry of Continental Waters
EESC GU4887	Isotope Geology I
EESC GU4926	Principles of Chemical Oceanography

It is recommended that students focusing in geochemistry take CHEM UN1403-CHEM UN1404 General Chemistry I and II, and PHYS UN1201 General Physics I as their supporting science sequence.

Atmosphere and Ocean Science

EESC GU4008	Introduction to Atmospheric Science
EESC GU4920	Paleoceanography
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4925	Principles of Physical Oceanography
EESC GU4926	Principles of Chemical Oceanography

It is recommended that students focusing on atmosphere and ocean science also take a course in fluid dynamics and a course in differential equations.

Solid Earth Geophysics

EESC GU4230	Crustal Deformation
EESC GU4300	The Earth's Deep Interior
EESC GU4937	Cenozoic Paleogeography
EESC GU4947	Plate Tectonics
EESC GU4949	Introduction to Seismology

It is recommended that students focusing in solid Earth geophysics take PHYS UN1201-PHYS UN1202 General Physics I and II, and CHEM UN1403 General Chemistry I as their supporting science sequence and also take MATH UN1201 Calculus II.

Climate

EESC UN3015	The Earth's Carbon Cycle
EESC BC3025	Hydrology
EESC GU4008	Introduction to Atmospheric Science
EESC GU4330	Introduction to Terrestrial Paleoclimate
EESC GU4835	Wetlands and Climate Change

EESC GU4920	Paleoceanography
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4925	Principles of Physical Oceanography
EESC GU4937	Cenozoic Paleogeography

Paleontology

EESC GU4223	Sedimentary Geology
EESC GU4550	Plant Ecophysiology
EESC GU4920	Paleoceanography
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4937	Cenozoic Paleogeography

It is recommended that students focusing in paleontology take EESC UN2300 Earth's Environmental Systems: The Life System, as one of their foundation courses.

MAJOR IN ENVIRONMENTAL SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The major in environmental science requires a minimum of 47 points, distributed as follows:

Foundation Courses

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System

Supporting Mathematics and Science Courses

One semester of Calculus at the level of Calculus I or higher (3 credits)

MATH UN1101	Calculus I
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Select one of the following three-course sequences:

CHEM UN1403 - CHEM UN1404 - PHYS UN1201	General Chemistry I (Lecture) and General Chemistry II (Lecture) and General Physics I
CHEM UN1403 - PHYS UN1201 - PHYS UN1202	General Chemistry I (Lecture) and General Physics I and General Physics II
CHEM UN1403 - EEEB UN2001 - PHYS UN1201	General Chemistry I (Lecture) and Environmental Biology I: Elements to Organisms and General Physics I

Capstone Experience

EESC BC3800 or EESC BC3801	Senior Research Seminar Senior Research Seminar
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EESC UN3901	Environmental Science Senior Seminar
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Breadth and Related Fields Requirement

A minimum of 6 points (two courses) chosen with the major adviser are required.

Breadth and related field courses are science courses relevant for an environmental science major that do not require an environmental science background. Several such courses are offered at the 2000-, 3000- and 4000-level in the department and at Barnard. Examples include:

EESC BC3017	Environmental Data Analysis
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
EESC GU4600	Earth Resources and Sustainable Development
EESC GU4917	Earth/Human Interactions
EESC UN3010	Field Geology

Also included among breadth and related fields courses are science, mathematics, statistics, and engineering courses offered by other departments that count toward fulfilling degree requirements in those departments.

Depth Requirement

A minimum of 9 points (three courses) chosen with the major adviser to provide depth in the field of environmental science.

These courses build on the foundation and supporting courses listed above and provide a coherent focus in some area of environmental science. Students should include at least one of the following in their course of study:

EESC UN3101	Geochemistry for a Habitable Planet
or EESC UN3201	Solid Earth Dynamics

Areas of focus include one of the courses listed above and two or more additional courses. Students are not required to specialize in a focus area, but examples are given below for those who choose to do so.

Environmental Geology

EESC GU4076	Geologic Mapping
EESC GU4480	Paleobiology and Earth System History
EAEE E3221	Environmental geophysics

It is recommended that students focusing in environmental geology also take EESC W4050 Remote Sensing.

Environmental Geochemistry

EESC UN3015	The Earth's Carbon Cycle
EESC GU4885	The Chemistry of Continental Waters
EESC GU4887	Isotope Geology I

EESC GU4924	Introduction to Atmospheric Chemistry
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EESC GU4888	Stable Isotope Geochemistry
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EESC GU4926	Principles of Chemical Oceanography
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Hydrology

EESC GU4076	Geologic Mapping
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EESC GU4835	Wetlands and Climate Change
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EESC GU4885	The Chemistry of Continental Waters
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EESC BC3025	Hydrology
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EAEE E3221	Environmental geophysics
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Climate Change

EESC UN3015	The Earth's Carbon Cycle
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EESC GU4008	Introduction to Atmospheric Science
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EESC GU4330	Introduction to Terrestrial Paleoclimate
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EESC GU4480	Paleobiology and Earth System History
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EESC GU4835	Wetlands and Climate Change
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EESC GU4920	Paleoceanography
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It is recommended that students focusing in environmental geology also take EESC GU4050 Remote Sensing.

Energy and Resources

EESC GU4076	Geologic Mapping
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EESC GU4701	Introduction to Igneous Petrology
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EAEE E2002	Alternative energy resources
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CONCENTRATION IN EARTH SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The concentration in Earth science requires a minimum of 25 points, distributed as follows:

Foundation Courses

EESC UN2100	Earth's Environmental Systems: The Climate System
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or EESC UN2300	Earth's Environmental Systems: The Life System
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EESC UN2200	Earth's Environmental Systems: The Solid Earth System
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Supporting Mathematics and Science Courses

Two science or mathematics courses (6-7 points) selected from among those listed for the Earth science major above.

Depth and Breadth and Related Fields Requirements

A minimum of 10 points (typically three courses) is required as follows:

EESC UN3101	Geochemistry for a Habitable Planet
or EESC UN3201	Solid Earth Dynamics

One additional course chosen from those listed under Depth Requirement for the earth science major above.

The third course selected from those listed under either Depth Requirement or Breadth and Related Fields Requirement for the earth science major above.

CONCENTRATION IN ENVIRONMENTAL SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The concentration in environmental science requires a minimum of 25.5 points, distributed as follows:

Foundation Courses

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System

Supporting Mathematics and Science Courses

Two science or mathematics courses (6-7 points) selected from among those listed for the environmental science major above.

Depth and Breadth and Related Fields Requirements

A minimum of 6 points (two courses) is required as follows:

EESC UN3101	Geochemistry for a Habitable Planet
or EESC UN3201	Solid Earth Dynamics

One additional course selected from those listed under either Depth Requirement or Breadth and Related Fields Requirement for the environmental science major above.

SPECIAL CONCENTRATION IN ENVIRONMENTAL SCIENCE FOR MAJORS IN ENVIRONMENTAL BIOLOGY

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The Department of Earth and Environmental Sciences sponsors a special concentration which must be done in conjunction with the environmental biology major. Students should be aware that they must complete the environmental biology major in order to receive credit for the special concentration.

The special concentration in environmental science requires a minimum of 31.5 points, distributed as follows:

Introductory Environmental Science (13.5 points)

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System

Introductory Science (6 points)

Two courses in chemistry, physics, mathematics, or environmental biology from the supporting mathematics and science list for the environmental science major above.

Advanced Environmental Science (12 points)

Four courses at the 3000-level or above chosen from those recommended for the environmental science major above.

Advanced courses used to fulfill requirements in the environmental biology major cannot count toward requirements for the special concentration.

SPECIAL CONCENTRATION IN ENVIRONMENTAL BIOLOGY FOR MAJORS IN ENVIRONMENTAL SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The Department of Ecology, Evolution, and Environmental Biology sponsors a special concentration which must be done in conjunction with the environmental science major. Students should be aware that they must complete the environmental science major in order to receive credit for the special concentration.

The special concentration in environmental biology requires a minimum of 39 points, distributed as follows:

Introductory Environmental Biology and Environmental Science (17 points)

EEEB UN2001	Environmental Biology I: Elements to Organisms
EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EEEB UN2002	Environmental Biology II: Organisms to the Biosphere

Introductory Science (13 points)

Select one of the following chemistry sequences:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
CHEM UN1604 - CHEM UN2507	Intensive General Chemistry (Lecture) and Intensive General Chemistry Laboratory

One term of statistics such as the following:

STAT UN1101	Introduction to Statistics
STAT UN1201	Calculus-Based Introduction to Statistics
BIOL BC2286	Statistics and Research Design
EEEB UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
EEEB UN3087	Conservation Biology

Advanced Environmental Biology (9 points)

Three additional advanced EEEB courses (3000-level and above), each chosen from a different curricular area (evolution/genetics, ecology/behavior/conservation, anatomy/physiology/diversity, biology laboratory courses).

Advanced courses used to fulfill requirements in the environmental science major cannot count toward requirements for the special concentration.

Sustainable Development

Students interested in sustainable development should refer to the *Sustainable Development* section in this Bulletin.

EAST ASIAN STUDIES

Departmental Office: 407 Kent; 212-854-5027
ealac.columbia.edu/ (<http://ealac.columbia.edu/>)

Director of Undergraduate Studies: Prof. John Phan, 500A Kent; (212) 854-5744; jp3720@columbia.edu

The program in East Asian studies offers a wide range of courses in a variety of disciplines, as well as training in the Chinese, Japanese, Korean, and Tibetan languages. The program is designed to provide a coherent curriculum for undergraduates wishing to major in East Asian studies, with disciplinary specialization in anthropology, art history, economics, history, literature, philosophy, political science, sociology, or religion. The department also offers a series of introductory and thematic courses especially designed for students seeking to acquire some knowledge of East Asia as part of their broader undergraduate experience.

ADMISSION TO LANGUAGE COURSES

All students wishing to enter the language program at another point besides the first term of the first level must pass a language placement test before registering. The language placement exams are held during the change of program period, the week before classes begin.

Students who have been absent from the campus for one term or more must take a placement test before enrolling in a language course beyond the first term of the first level.

Students who wish to place out of the Columbia College Foreign Language Requirement for a language taught in the department of East Asian Languages and Cultures must consult with the director of the relevant language program. The names of the directors, and additional information about East Asian language programs, can be accessed via the department website at ealac.columbia.edu (<http://ealac.columbia.edu/>).

LANGUAGE LABORATORY

An additional hour of study in the language laboratory is required in first-year Japanese (JPNS UN101 and JPNS UN1102).

JPNS UN1101 - JPNS UN1102	First-Year Japanese I and First-Year Japanese II
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Students taking these courses must attend all assigned language laboratory sessions. Grades for written and oral work in the language laboratory and for additional work in oral drill sessions count as 10% of the final grade in the course. Assignments of laboratory hours are made during the first session of the regular classes.

COURSE NUMBERING

The following are general guidelines to the numbering of department courses open to undergraduates. Students with questions about the nature of a course should consult with the instructor or the director of undergraduate studies.

- 1000-level: Introductory-level undergraduate courses and first-year language courses
- 2000-level: Intermediate-level undergraduate courses and second-year language courses

- *3000*-level: Advanced-level undergraduate courses and third-year language courses
- *4000*-level: Advanced courses geared toward undergraduate students available to graduate students or geared toward both undergraduate and graduate students, fourth-year and above language courses

STUDY ABROAD

East Asian Studies majors or concentrators who plan to spend their junior spring abroad must contact the director of undergraduate studies for information about course selection in the sophomore year.

The Kyoto Center for Japanese Studies

The Kyoto Center offers Columbia students the opportunity to study in Japan in a program combining intensive instruction in the Japanese language with courses taught in English on a wide range of topics in Japanese studies. Students should have at least the equivalent of two years of Japanese by the time of their departure. The program is most appropriate for the junior year, although other arrangements are considered.

East Asian Studies majors or concentrators who opt to spend their junior spring at the Kyoto Center must take the required disciplinary and senior thesis-related courses in the spring of their sophomore year (contact the director of undergraduate studies for details). For further information about the Kyoto Center, please consult Robin Leephaibul: rl2705@columbia.edu.

GRADING

Courses in which the grade of D or P has been received do not count toward the major or concentration requirements.

DEPARTMENTAL HONORS

Departmental honors are conferred only on East Asian Studies majors who have earned a grade point average of at least 3.6 for courses in the major, have pursued a rigorous and ambitious program of study, and have submitted senior theses of superior quality, clearly demonstrating originality and excellent scholarship. Qualified seniors are nominated by their thesis advisers. Normally no more than 10% of graduating majors receive departmental honors in a given academic year. Concentrators are not eligible for departmental honors.

PROFESSORS

Paul Anderer
Bernard Faure
Carol Gluck (History)
Robert Hymes
Theodore Hughes
Dorothy Ko (Barnard History)
Eugenia Lean
Feng Li
Lening Liu

Lydia Liu
D. Max Moerman (Barnard)
Wei Shang (Vice Chair)
Haruo Shirane (Chair)
Tomi Suzuki
Gray Tuttle
Madeleine Zelin

ASSOCIATE PROFESSORS

Michael Como (Religion)
David Lurie
Lien-Hang Nguyen (History)
Gregory Pflugfelder

ASSISTANT PROFESSORS

Nicholas Barlett (Barnard)
Jue Guo (Barnard)
Harrison Huang
Jungwon Kim
Seong Uk Kim
Paul Kreitman
John Phan
Ying Qian
Takuya Tsunoda
Zhaohua Yang (Religion)

AFFILIATED FACULTY

Robert Harrist (Art History)
Matthew McKelway (Art History)
Jonathan Reynolds (Art History, Barnard)

SENIOR LECTURERS

Shigeru Eguchi
Yuan-Yuan Meng
Fumiko Nazikian
Miharu Nittono
Zhongqi Shi
Joowon Suh
Zhirong Wang
Ling Yan

LECTURERS

Yu-Shan Chen
Eunice Chung
Lingjun Hu
Tianqi Jiang
Ji-Young Jung
Ulug Kuzuoglu
Beom Lee
Huijuan Liu
Liping Liu
Kyoko Loetscher
Yuka Nakazato
Chung Nguyen
Keiko Okamoto

Jisuk Park
 Shaoyan Qi
 Junli Shen
 Sunhee Song
 Naofumi Tatsumi
 Sonam Tsering
 Feng Wang
 Hailong Wang
 Xiaodan Wang
 Chen Wu
 Jia Xu
 Hyunkyū Yi

ADJUNCT FACULTY

Seunghye Back
 Pema Bhum
 Patrick Booz
 Yongjun Choi
 Karl Debreczeny
 Leta Hong Fincher
 Hey-Ryoun Hong
 Vinh Nguyen
 Andrew Plaks
 Morris Rossabi
 Seunghyo Ryu
 Gahye Song
 Ximo (Molly Tong)
 Konchog Tseten
 Yan Wang
 Eveline Washul
 Charles Woolley
 Yaxi Zheng

ON LEAVE (FALL 2019)

Paul Anderer
 Eunice Chung
 Harrison Huang
 Theodore Hughes
 Robert Hymes
 Jisuk Park
 Paul Kreitman
 D. Max Moerman

MAJOR IN EAST ASIAN STUDIES

The requirements for this program were modified in the Spring 2017 semester. Students who declared an EAS major before this semester have the option of following the old or the new requirements. If you have any questions, please contact the Director of Undergraduate Studies.

Prerequisite

Students must meet the following prerequisite prior to declaring the East Asian Studies major: two years of Chinese, Japanese, Korean, or Tibetan, or the proficiency equivalent (to be demonstrated by placement examination).

Language Requirement

Third-year Chinese, Japanese, Korean, or Tibetan (completion of the UN3005-UN3006 level in Chinese, Japanese, or Korean; TIBT UN3611-UN3612 level in Tibetan), or the proficiency equivalent (to be demonstrated by placement examination).

Students of Chinese may also complete UN3003-UN3004 to meet the third-year requirement.

One of the following sequences (in the target language):

CHNS UN3003 - CHNS UN3004	Third-Year Chinese I (N) and Third-Year Chinese II (N)
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Or, for heritage students:

CHNS UN3005 - CHNS UN3006	Third-Year Chinese I (W) and Third-Year Chinese II (W)
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JPNS UN3005 - JPNS UN3006	Third-Year Japanese I and Third-Year Japanese II
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KORN UN3005 - KORN UN3006	Third-Year Korean I and Third-Year Korean II
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TIBT UN3611 - TIBT UN3612	Third Year Modern Colloquial Tibetan I and Third Year Modern Colloquial Tibetan II
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Students who test out of three years or more of a language must take an additional year of that language or another East Asian language at Columbia in order to satisfy the language requirement.

Introductory Courses

Students are required to take:

AHUM UN1400	Colloquium on Major Texts: East Asia
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Students must also select two of the following:

ASCE UN1359	Introduction to East Asian Civilizations: China
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ASCE UN1361	Introduction to East Asian Civilizations: Japan
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ASCE UN1363	Introduction to East Asian Civilizations: Korea
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ASCE UN1365	Introduction to East Asian Civilizations: Tibet
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ASCE UN1367	Introduction to East Asian Civilizations: Vietnam
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First-year students and sophomores, prior to declaring an East Asian studies major, are strongly urged to take one or more of the introductory courses.

Methodology Course

All majors must also take EAAS UN3990 Approaches to East Asian Studies which is offered every spring.

Elective Courses

For students must take four elective courses in East Asian studies, to be chosen in consultation with the DUS. Two of these courses must be EALAC or AMEC courses. Courses in a

second East Asian language (one year minimum) or a classical East Asian language (one semester minimum) may be used to fulfill one elective course.

Senior Thesis Program

East Asian Studies majors who wish to write a senior thesis apply to the EALAC Senior Thesis Program at the end of their junior year. Students must have a minimum grade point average of 3.6 in courses taken in the major at the time of the application. Students interested in applying to the Senior Thesis Program should submit the EALAC Senior Thesis Program Application (see Undergraduate Planning Sheets and Forms (<http://ealac.columbia.edu/undergraduate/planning-sheets-forms/>)) to the DUS by Friday, May 26, 2019. Decisions will be made by Friday, May 10.

All potential thesis writers are required to enroll in the Senior Thesis Research Workshop (EAAS UN3999) in the fall of the senior year. Students who perform satisfactorily in this workshop, successfully complete a thesis proposal, and find a faculty adviser will then write the Senior Thesis itself in the spring semester under the direction of the adviser and a graduate student tutor (EAAS UN3901).

The senior thesis typically consists of about 30-35 pages of text (double-spaced, normal typeface and margins) and 5-8 pages of references. Under no circumstances should a thesis exceed a total of 50 pages (including references), without the special permission of the faculty adviser.

Successful completion of the thesis by the April 1 deadline in the spring semester will be necessary but not sufficient for a student to receive departmental honors. Normally no more than 10% of graduating majors receive departmental honors in a given academic year; as such, not all thesis writers will receive honors.

CONCENTRATION IN EAST ASIAN STUDIES

Prerequisite

Students must meet the following prerequisite prior to declaring the East Asian Studies concentration: two years of Chinese, Japanese, Korean, or Tibetan, or the proficiency equivalent (to be demonstrated by placement examination).

Language Requirement

Third-year Chinese, Japanese, Korean, or Tibetan (completion of the UN3005-UN3006 level in Chinese, Japanese, or Korean; TIBT UN3611-UN3612 level in Tibetan), or the proficiency equivalent (to be demonstrated by placement examination).

Students of Chinese may also complete UN3003-UN3004 to meet the third-year requirement.

One of the following sequences (in the target language):

CHNS UN3003	Third-Year Chinese I (N)
- CHNS UN3004	and Third-Year Chinese II (N)

Or, for heritage students:

CHNS UN3005	Third-Year Chinese I (W)
- CHNS UN3006	and Third-Year Chinese II (W)

JPNS UN3005	Third-Year Japanese I
- JPNS UN3006	and Third-Year Japanese II

KORN UN3005	Third-Year Korean I
- KORN UN3006	and Third-Year Korean II

TIBT UN3611	Third Year Modern Colloquial
- TIBT UN3612	Tibetan I
	and Third Year Modern Colloquial
	Tibetan II

Students who test out of a third-year level East Asian language must take either an additional year of the same language, one year of a classical East Asian language, one year of an additional East Asian language, or two electives.

Introductory Courses

AHUM UN1400	Colloquium on Major Texts: East Asia
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Select one of the following:

ASCE UN1359	Introduction to East Asian Civilizations: China
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ASCE UN1361	Introduction to East Asian Civilizations: Japan
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ASCE UN1363	Introduction to East Asian Civilizations: Korea
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ASCE UN1365	Introduction to East Asian Civilizations: Tibet
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ASCE UN1367	Introduction to East Asian Civilizations: Vietnam
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Electives

Two courses in East Asian Studies at Columbia or Barnard at the 3000- or 4000-level, subject to approval by the DUS. Concentrators may count Classical Chinese, Classical Japanese, or Classical Tibetan as one of the electives for this requirement.

Concentrators are not eligible for the Senior Thesis Program or for departmental honors.

ECONOMICS

Departmental Office: 1022 International Affairs Building; 212-854-3680
<http://www.columbia.edu/cu/economics/>

Director of Undergraduate Studies: Dr. Susan Elmes, 1006 International Affairs Building; 212-854-9124; se5@columbia.edu

Director of Departmental Honors Program: Dr. Susan Elmes, 1006 International Affairs Building; 212-854-9124; se5@columbia.edu

Economics is the study of the ways in which society allocates its scarce resources among alternative uses and the consequences of these decisions. The areas of inquiry deal with a varied range of topics such as international trade, domestic and international financial systems, labor market analysis, and the study of less developed economies. Broadly speaking, the goal of an economics major is to train students to think analytically about social issues and, as such, provide a solid foundation for not only further study and careers in economics, but also for careers in law, public service, business, and related fields.

The Economics Department offers a general economics major in addition to five interdisciplinary majors structured to suit the interests and professional goals of a heterogeneous student body. All of these programs have different specific requirements but share the common structure of core theoretical courses that provide the foundation for higher-level elective courses culminating in a senior seminar. Students are urged to carefully look through the details of each of these programs and to contact an appropriate departmental adviser to discuss their particular interests.

ADVANCED PLACEMENT

Tests must be taken in **both** microeconomics and macroeconomics, with a score of 5 on one test and at least a 4 on the other. Provided that this is achieved, the department grants 4 credits for a score of 4 and 5 on the AP Economics exam along with exemption from *ECON UN1105 Principles of Economics*.

ADVISING

The Department of Economics offers a variety of advising resources to provide prospective and current undergraduate majors and concentrators with the information and support needed to successfully navigate through the program. These resources are described below.

Frequently Asked Questions

Please see: <http://econ.columbia.edu/frequently-asked-questions-0> (<http://econ.columbia.edu/frequently-asked-questions-0/>)

As a first step, students are encouraged to visit the department's FAQ page, which provides comprehensive information and answers to the most frequently asked questions about the departmental majors and requirements. This page also includes a section that answers specific questions of first-years, sophomores, and non-majors.

Graduate Student Advisers

For answers to the most common questions that students have about the majors, the department has graduate student advisers,

who are available by e-mail at econ-advising@columbia.edu, or during weekly office hours to meet with students.

Students should direct all questions and concerns about their major to the graduate student advisers either in person or via e-mail. The graduate student advisers can discuss major requirements, scheduling, and major course selection, as well as review student checklists and discuss progress in the major. Occasionally, graduate student advisers may refer a student to someone else in the department (such as the director of undergraduate studies) or in the student's school for additional advising.

Contact information and office hours for the graduate student advisers are posted on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) in the week prior to the beginning of the semester. Students considering one of the interdepartmental majors should speak to both a graduate student adviser from the Economics Department and the adviser from the other department early in the sophomore year.

Faculty Advisers

Faculty advisers are available to discuss students' academic and career goals, both in terms of the undergraduate career and post-graduate degrees and research. Students wishing to discuss these types of substantive topics may request a faculty adviser by completing the form available on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) and depositing it in the mailbox of the director of undergraduate studies in the department's main office, 1022 International Affairs Building.

The department does its best to match students with faculty members that share similar academic interests. While faculty advisers do not discuss major requirements—that is the role of the graduate student advisers—they do provide guidance in course selection as it relates to meeting a student's intellectual goals and interests, as well as advise on career and research options. It is recommended that students who plan on attending a Ph.D. program in economics or are interested in pursuing economics research after graduation request a faculty adviser.

ON-LINE INFORMATION

Students can access useful information on-line, including: a comprehensive FAQ page; requirement changes to the major and concentration; sample programs and checklists; faculty office hours, contact information and fields of specialization; adviser information; teaching assistant information; research assistant opportunities; list of tutors; and Columbia-Barnard Economics Society information.

DEPARTMENTAL HONORS

Economics majors and economics joint majors who wish to be considered for departmental honors in economics must:

1. Have at least a 3.7 GPA in their major courses;
2. Take ECON GU4999 Senior Honors Thesis (a one-year course);
3. Receive at least a grade of A- in ECON GU4999 Senior Honors Thesis.

Students must consult and obtain the approval of the departmental undergraduate director in order to be admitted to the workshop. Please note that ECON GU4999 Senior Honors Thesis may be taken to fulfill the **seminar requirement** for the economics major and all economics joint majors. Students who wish to write a senior thesis (ECON GU4999 Senior Honors Thesis) must have completed the core major requirements. Normally no more than 10% of graduating majors receive departmental honors in a given academic year. Please see the *Honors Prizes* page on the department's website for more information.

UNDERGRADUATE PRIZES

All prize recipients are announced at the end of the spring semester each academic year.

The Dean's Prize in Economics

Awarded to General Studies students for excellence in the study of Economics.

Romine Prize

Established in 1997, this prize is awarded annually to two students (Columbia College or General Studies) majoring in economics: one for the best honors thesis paper, and the other for the best economics seminar paper.

Parker Prize for Summer Research

PROFESSORS

Douglas Almond (also School of International and Public Affairs)
 Jushan Bai
 Jagdish N. Bhagwati
 Sandra Black
 Patrick Bolton (also Business School)
 André Burgstaller (Barnard)
 Alessandra Casella (also Political Science Department)
 Yeon-Koo Che
 Pierre-André Chiappori
 Graciela Chichilnisky
 Richard Clarida (also School of International and Public Affairs)
 Donald Davis
 Padma Desai (*emerita*)
 Prajit Dutta
 Harrison Hong
 R. Glenn Hubbard (also Business School)
 Navin Kartik

Wojciech Kopczuk (also School of International and Public Affairs)
 Sokbae (Simon) Lee
 W. Bentley McLeod (also School of International and Public Affairs)
 Perry Mehrling (Barnard)
 Robert Mundell (*emeritus*)
 Suresh Naidu (also School of International and Public Affairs)
 Serena Ng
 Brendan O'Flaherty
 Edmund S. Phelps
 Andrea Prat (also Business School)
 Michael Riordan
 Jeffrey Sachs (also Earth Institute)
 Xavier Sala-i-Martin
 Bernard Salanié (Chair)
 José A. Scheinkman
 Stephanie Schmitt-Grohé
 Rajiv Sethi (Barnard)
 Joseph Stiglitz (also Business School)
 Martín Uribe
 Miguel Urquiola (also School of International and Public Affairs)
 Eric Verhoogen (also School of International and Public Affairs)
 David Weiman (Barnard)
 David Weinstein
 Michael Woodford

ASSOCIATE PROFESSORS

Mark Dean
 Lena Edlund
 Jennifer La'O
 Qingmin Liu

ASSISTANT PROFESSORS

Hassan Afrouzi
 Michael Best
 Andres Drenik
 Matthieu Gomez
 Reka Juhasz
 Elliot Lipnowski
 Jose Luis Montiel Olea
 Xiaosheng Mu
 Evan Sadler
 Jack Willis

LECTURERS

Irasema Alonso
 Tri Vi Dang
 Susan Elmes
 Seyhan Erden
 Tamrat Gashaw
 Sunil Gulati

Ronald Miller
Wouter Vergote

ADJUNCT FACULTY

Tim Goodspeed
Claudia Halbac
Ed Lincoln
Neal Masia
Caterina Musatti
Waseem Noor
Ingmar Nyman
Maxim Pinkovskiy

ON LEAVE

Profs. Clarida, Drenik, Hubbard, Kopczuk, Liu, Riordan
(2019-2020)
Profs. Best, Salanie, Scheinkman (Fall 2019)
Profs. Lee, Montiel Olea, Weinstein (Spring 2020)

GUIDELINES FOR ALL ECONOMICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Checklists and Requirement

Checklists and Requirement information are available on the Department website (<https://econ.columbia.edu/undergraduate/requirements-and-forms/>).

Course List

Economics Core Courses

All of the core courses must be completed **no later than the spring semester** of the student's **junior year** and must be taken at Columbia. *Students who take any core course during the fall semester of their senior year must obtain written permission from the department's director of undergraduate studies.* Unless otherwise specified below, all students must complete the following core courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Prerequisites

Course prerequisites are strictly enforced. Prerequisites must be taken before the course, not after or concurrently.

Economics courses taken before the completion of any of its prerequisites, even with instructor approval, are **not** counted toward the major, concentration, or interdepartmental majors. Exemptions from a prerequisite requirement may only be made, in writing, by the department's director of undergraduate studies. Credits from a course taken *prior* to the completion of its prerequisites are **not** counted towards the

major requirements. As a consequence, students are required to complete **additional**, specific courses in economics at the direction of the director of undergraduate studies.

The prerequisites for required courses are as follows:

Course	Prerequisites
ECON UN1105 Principles of Economics	None
MATH UN1101 Calculus I	
STAT UN1201 Calculus-Based Introduction to Statistics	MATH UN1101 Calculus I
ECON UN3211 Intermediate Microeconomics	ECON UN1105 Principles of Economics MATH UN1201 Calculus III or UN1205
ECON UN3213 Intermediate Macroeconomics	ECON UN1105 Principles of Economics MATH UN1101 Calculus I Co-requisite: MATH UN1201 Calculus III or UN1205
ECON UN3412 Introduction To Econometrics	MATH UN1201 Calculus III or UN1205 ECON UN3211 Intermediate Microeconomics or UN3213 STAT UN1201 Calculus-Based Introduction to Statistics
ECON 2000-level electives	ECON UN1105 Principles of Economics
ECON GU4211 Advanced Microeconomics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics MATH UN2010 Linear Algebra Corequisites: MATH UN2500 Analysis and Optimization or GU4061
ECON GU4412 Advanced Econometrics	ECON UN3211 Intermediate Microeconomics
ECON GU4213 Advanced Macroeconomics	ECON UN3213 Intermediate Macroeconomics
ECON GU4413 Econometrics of Time Series and Forecasting	ECON UN3412 Introduction To Econometrics MATH UN2010 Linear Algebra

ECON UN3025 Financial Economics	ECON UN3211 Intermediate Microeconomics	ECPH GU4950 Economics and Philosophy Seminar	ECON UN3211 Intermediate Microeconomics
ECON GU4020 Economics of Uncertainty and Information	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4230 Economics of New York City	STAT UN1201 Calculus-Based Introduction to Statistics		ECON UN3412 Introduction To Econometrics
ECON GU4260 Market Design		Barnard electives	See Barnard bulletin
ECON GU4280 Corporate Finance			
ECON GU4370 Political Economy			
ECON GU4700 Financial Crises			
ECON GU4710 Finance and the Real Economy			
ECON GU4850 Cognitive Mechanisms and Economic Behavior			
ECON GU4860 Behavioral Finance	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
All other ECON 3000- and 4000-level electives	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
ECON UN3901 Economics of Education	ECON UN3211 Intermediate Microeconomics		
ECON UN3952 Seminar in Macroeconomics and Formation of Expectations	ECON UN3213 Intermediate Macroeconomics		
ECON UN3981 Applied Econometrics	ECON UN3412 Introduction To Econometrics		
ECON GU4911 Seminar In Microeconomics			
ECON GU4913 Seminar In Macroeconomics			
ECON GU4918 Seminar In Econometrics			
ECPS GU4921 Seminar In Political Economy	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
	ECON GU4370 Political Economy		

It is **strongly recommended** that students take ECON UN3412 Introduction To Econometrics in the semester **immediately** following the completion of the statistics course.

Grading

No course with a grade of D or lower, including calculus and statistics courses, can count toward the major, concentration, or interdepartmental majors. Economics core courses with a grade of D or F must be retaken and completed with a grade of C- or better.

Students who receive a grade of D or F in a core course are permitted to take a higher-level elective course that has that core course as a prerequisite, so long as it is taken concurrently with the retaking of that core course. For example, if a student fails ECON UN3211 Intermediate Microeconomics, the student must retake it and, in the same semester, may enroll in an elective course for which it is a prerequisite, provided that all other prerequisites for the elective have been completed. The same rule applies to the required math and statistics courses. For example, if a student fails *MATH UN1201 Calculus III*, the student may retake calculus III concurrently with *Intermediate Microeconomics*. Students who must retake any core economics or math course may not retake it concurrently with a senior seminar; the economics core courses *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, and *ECON UN3412 Introduction To Econometrics* must be successfully completed before a student may enroll in a seminar.

A grade of W is not equivalent to a grade of D or F; it does not qualify a student to retake the course concurrently with a higher level course that lists the course as a prerequisite. Students who receive a grade of W in a core course must complete the course with a grade of C- or better before taking a course that lists it as a prerequisite.

Only ECON UN1105 Principles of Economics may be taken for a grade of Pass/D/Fail, and the student must receive a grade of P for it to count towards the requirements for the major, concentration, or interdepartmental majors.

Economics Electives

Only those courses identified in the Economics Department listings in this Bulletin may be taken for elective credit. All 3000-level or higher electives offered by the Economics Department have ECON UN3211 Intermediate Microeconomics and ECON UN3213 Intermediate

Macroeconomics as prerequisites. However, some electives have additional prerequisites and students should ensure that all prerequisites have been completed (see the table of prerequisites printed above). *Seminars do not count as electives.*

Seminars

Seminars can be taken only after all of the required core courses in economics have been successfully completed. Students may not take or re-take ECON UN3211 Intermediate Microeconomics, ECON UN3213 Intermediate Macroeconomics, or ECON UN3412 Introduction To Econometrics concurrently with any senior seminar. *Seminars do not count as electives.* Each seminar is limited to sixteen students, with priority given to seniors. For ECPS GU4921 Seminar In Political Economy and ECPH GU4950 Economics and Philosophy Seminar, priority is given to economics–political science and economics–philosophy majors, respectively.

For seminar registration details, read the information posted on the department's *Senior Seminar Registration* page: <http://econ.columbia.edu/senior-seminars-registration> (<http://econ.columbia.edu/senior-seminars-registration/>).

Mathematics

Students must consult with the Mathematics Department for the appropriate placement in the calculus sequence. Students must complete one of the following sequences:

Select one of the following sequences:

MATH UN1101 - MATH UN1201	Calculus I and Calculus III
MATH UN1101 - MATH UN1205	Calculus I and Accelerated Multivariable Calculus
MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B

In addition:

1. Students who receive a grade of D or F in MATH UN1201 Calculus III or MATH UN1205 must retake the course, but may enroll in ECON UN3211 Intermediate Microeconomics.
2. Students who receive a grade of D or F in MATH UN1207 Honors Mathematics A may either retake the course, or take MATH UN1201 Calculus III or MATH UN1205, and enroll in ECON UN3211 Intermediate Microeconomics concurrently.

Statistics

Unless otherwise specified below, all students must take STAT UN1201 Calculus-Based Introduction to Statistics, or a higher level course, such as STAT GU4204 Statistical Inference, or STAT GU4001.

Barnard Courses

A limited number of Barnard economics electives may count toward the major, concentration, and interdepartmental majors. Students should pay careful attention to the limit of Barnard electives indicated in their program requirements. Please see the *Transfer Credit* section below for information on the number of Barnard electives that may be taken to fulfill major requirements. In addition, students may receive credit for the major, concentration, and interdepartmental majors only for those Barnard economics courses listed in this Bulletin. However, students may not receive credit for two courses whose content overlaps. Barnard and Columbia economics electives with overlapping content include but are not limited to:

ECON BC3029 - ECON GU4321	Empirical Development Economics and Economic Development
ECON BC3038 - ECON GU4505	International Money and Finance and International Macroeconomics
ECON BC3019 - ECON GU4400	Labor Economics and Labor Economics
ECON BC3047 - ECON GU4500	International Trade and International Trade
ECON BC3039 - ECON GU4625	Environmental and Natural Resource Economics and Economics of the Environment
ECON BC3041 - ECON GU4235	Theoretical Foundations of Political Economy and HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4400	Labor Economics
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes

Students should always first consult with *econ-advising* to confirm that the Barnard elective they wish to take does not overlap with a Columbia elective that they have already taken or plan to take. Students may *not* take the Barnard core economics, math, statistics, or seminar courses for credit towards the completion of major requirements.

School of Professional Studies Courses

The Department of Economics does not accept *any* of the courses offered through the School of Professional Studies for credit towards the economics major, concentration, or interdepartmental majors with the exception of the courses offered by the Economics Department during the summer session at Columbia.

Other Department and School Courses

Please note that with the exception of the above Barnard courses and the specific courses listed below for the financial

economics major, no other courses offered through the different departments and schools at Columbia count toward the economics majors or concentration.

Transfer Credits

Students are required to take a minimum number of courses in the Columbia Economics Department. For all majors and interdepartmental majors, students must complete a minimum of *five* lecture courses in the Columbia department. Students may fulfill their remaining requirements for economics lecture courses through AP (or IB or GCE) credits, Barnard electives, transfer courses, and study abroad courses (the latter two are subject to the approval of the Economics Department). The following table summarizes the new rules:

Program	Number of required economics lecture courses	Minimum number which must be taken in the department	Maximum number of outside allowed
Economics major	9	5	4
Financial economics	8	5	3
Economics-mathematics	7	5	2
Economics-political science	7	5	2
Economics-statistics	7	5	2
Economics-philosophy	7	5	2
Economics concentration	7	4	3

- Lecture courses** do not include seminars, which must be taken in the Columbia Economics Department. The lecture course counts are counts of economics courses only and do **not** include math, statistics, or courses in other departments;
- At least two of the three *3000*-level economics core courses must be taken in the department and no corresponding Barnard courses are accepted. ECON UN3025 Financial Economics and ECON UN3265 The Economics of Money and Banking are counted as departmental courses regardless of the instructor;
- Outside courses** include AP (or IB or GCE) credits, transfer credits, Barnard *2000*- and *3000*-level elective courses and transfer credits from other universities. In the case where two or more courses taken outside of Columbia are used as the equivalent of ECON UN1105 Principles of Economics, those courses are counted as one transfer course.

Approval of transfer credits to fulfill economics requirements must be obtained in writing from the Department of Economics (see the departmental website (<http://www.columbia.edu/cu/economics/>) or speak with your advising dean for information regarding applications for transfer credit). Approval is granted only for courses that are considered to be comparable to those offered at Columbia.

Summer courses taken at other institutions must be approved in writing by the department's transfer credit adviser before the course is taken. The department does not accept transfer credits for any *3000* level core courses taken during a summer session outside of Columbia University. Summer courses taken from the department of economics at Columbia University do not need approval.

Guidelines and instructions on how to request transfer credit approval can be found in the *Transfer Credit Information* page of the departmental website (<http://www.columbia.edu/cu/economics/>).

MAJOR IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 155) above.

The economics major requires a minimum of 35 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 44 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least five electives, of which no more than one may be taken at the *2000*-level (including Barnard courses)

Economics Seminar

Select one economics seminar course

CONCENTRATION IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 155) above.

The economics concentration requires a minimum of 25 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 34 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least three electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

MAJOR IN FINANCIAL ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 155) above.

The Department of Economics offers the major in financial economics, which provides an academic framework to explore the role of financial markets and intermediaries in the allocation (and misallocation) of capital. Among the topics studied in financial economics are financial markets, banks and other financial intermediaries, asset valuation, portfolio allocation, regulation and corporate governance.

The financial economics major requires 26 points in economics, 6 points in mathematics, 3 points in statistics, 3 points in business, and 12 points from a list of selected courses for a total minimum of 50 points as follows:

Economics Core Courses

All economics core courses

Finance Core Courses*

ECON UN3025	Financial Economics
ECON GU4280	Corporate Finance
BUSI UN3013	Financial Accounting

*NOTE: The department considers BUSI UN3013 and IEOR E2261 as overlapping courses. Students who take both courses shall be credited with one course only. Financial economics majors who are also in the Business Management concentration program (CNBUMG) must take an additional elective from either the financial economics prescribed elective list (below) or from the CNBUMB prescribed list.

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Electives

Select four of the following, of which two must be from the Columbia or Barnard economics departments, or equivalent economics transfer credits:

ECON BC3014	Entrepreneurship
ECON BC3017	Economics of Business Organization
ECON UN3265	The Economics of Money and Banking
ECON UN3952	Seminar in Macroeconomics and Formation of Expectations
ECON GU4020	Economics of Uncertainty and Information

ECON GU4213	Advanced Macroeconomics
ECON GU4251	Industrial Organization
ECON GU4260	Market Design
ECON GU4412	Advanced Econometrics
ECON GU4415	Game Theory
ECON GU4465	Public Economics
ECON GU4500	International Trade
ECON GU4505	International Macroeconomics
or ECON BC3038	International Money and Finance
ECON G4526	Transition Reforms, Globalization and Financial Crisis
ECON GU4700	Financial Crises
ECON GU4710	Finance and the Real Economy
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON GU4860	Behavioral Finance
BIOT GU4180	Entrepreneurship in Biotechnology
BUSI UN3021	Marketing Management
BUSI UN3701	Strategy Formulation
BUSI UN3702	Venturing to Change the World
BUSI UN3703	Leadership in Organizations
BUSI UN3704	Making History Through Venturing
COMS W1002	Computing in Context
HIST W2904	History of Finance
IEOR E3106	Stochastic Systems and Applications
IEOR E4700	Introduction to Financial Engineering
MATH UN3050	Discrete Time Models in Finance
POLS UN3630	Politics of International Economic Relations
STAT W3201	Math Finance in Continuous Time
STAT GU4261	Statistical Methods in Finance
STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance

Seminar

The seminar must be chosen from a list of seminars eligible for the financial economics major. The department indicates which seminars are eligible for the major on the Senior Seminars page of the departmental website.

Students must have completed at least one of ECON UN3025 or ECON GU4280 prior to taking their senior seminar.

* Students must complete the finance core no later than fall of their senior year.

MAJOR IN ECONOMICS-MATHEMATICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 155) above.

The major in economics and mathematics provides students with a grounding in economic theory comparable to that provided by the general economics major and exposes students to rigorous and extensive training in mathematics. The program is recommended for any student planning to do graduate work in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Mathematics has an assigned adviser with whom students may consult on mathematics requirements. The economics adviser can only advise on economics requirements; the mathematics adviser can only advise on mathematics requirements.

The economics-mathematics major requires a total of 52 or 56 points (depending on mathematics sequence) : 29 points in economics and 23-27 points in mathematics and statistics as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	Calculus and Linear Algebra

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Note: Students who take MATH UN1205 may not receive credit for both MATH UN1201 and MATH UN1202.

Analysis requirement:

MATH UN2500	Analysis and Optimization
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Select three of the following:

MATH UN1202	Calculus IV
MATH UN2030	Ordinary Differential Equations

Any mathematics course at the 3000-level or above

Note: Students who take MATH UN1205 will not receive credit for MATH UN1202.

Statistics

Select one of the following sequences:

STAT GU4001	Introduction to Probability and Statistics
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STAT GU4203 - STAT GU4204	PROBABILITY THEORY and Statistical Inference
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Economics Seminar

Select an economics seminar

NOTE:

1. Students who fulfill the statistics requirement with STAT GU4203 and STAT GU4204, may count STAT GU4203 or STAT GU4204 as one of the three required mathematics electives.
2. Students who choose the one year sequence (STAT GU4203/ STAT GU4204), must complete the year long sequence *prior* to taking ECON UN3412. Students receive elective credit for the probability course.

MAJOR IN ECONOMICS-PHILOSOPHY

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 155) above.

Economics-philosophy is an interdisciplinary major that introduces students to basic methodologies of economics and philosophy and stresses areas of particular concern to both, e.g. rationality and decision making, justice and efficiency, freedom and collective choice, logic of empirical theories and testing. Many issues are dealt with historically. Classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Philosophy has an assigned adviser with whom students may consult on philosophy requirements. The economics adviser can only advise on economics requirements; the philosophy adviser can only advise on philosophy requirements.

The economics-philosophy major requires a total minimum of 54 points: 25 points in economics, 16 points in philosophy, 6 points in mathematics, 3 points in statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105	Principles of Economics
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ECON UN3211	Intermediate Microeconomics
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ECON UN3213	Intermediate Macroeconomics
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ECON UN3412	Introduction To Econometrics
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Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three Electives are required; two must be selected from the below list, and the remaining elective may be any economics elective at the 3000-level or above.

ECON GU4020	Economics of Uncertainty and Information
ECON GU4211	Advanced Microeconomics
ECON GU4213	Advanced Macroeconomics
ECON GU4228	Urban Economics
ECON GU4230	Economics of New York City
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4301	Economic Growth and Development
ECON GU4370	Political Economy
ECON GU4400	Labor Economics
ECON GU4415	Game Theory
ECON GU4438	Economics of Race in the U.S.
ECON GU4465	Public Economics
ECON GU4480	Gender and Applied Economics
ECON GU4500	International Trade
ECON W4615	Law and Economics
ECON GU4625 or ECON BC3039	Economics of the Environment Environmental and Natural Resource Economics
ECON GU4750	Globalization and Its Risks
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON BC3011	Inequality and Poverty
Philosophy Courses	
PHIL UN1010	Methods and Problems of Philosophical Thought
PHIL UN3411	Symbolic Logic
PHIL UN3701	Ethics
PHIL UN3551 or PHIL UN3960	Philosophy of Science Epistemology
PHIL GU4561	Probability and Decision Theory
Seminar	
ECPH GU4950	Economics and Philosophy Seminar

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN ECONOMICS–POLITICAL SCIENCE

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 155) above.

Political economy is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Political Science has an assigned adviser with whom students may consult on political science requirements. The economics adviser can only advise on economics requirements; the political science adviser can only advise on political science requirements.

The economics–political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows.

The political science courses are grouped into four areas, i.e. subfields: (1) American Politics, (2) Comparative Politics, (3) International Relations, and (4) Political Theory. For the political science part of the major, students are required to select one area as a major subfield and one as a minor subfield. The corresponding introductory courses in both subfields must be taken, plus two electives in the major subfield, and one in the minor subfield.

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON GU4370	Political Economy

Mathematics

Select a mathematics sequence

Statistical Methods

STAT UN1201	Calculus-Based Introduction to Statistics
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Select one of the following:

ECON UN3412	Introduction To Econometrics
POLS GU4712	PRINC OF QUANT POL RESEARCH 2

Economics Electives

Select two electives (6 points) at the 3000-level or above

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921 Seminar In Political Economy
and a Political Science Department seminar, in the student's
Primary Subfield. Please select one of the following: *

- POLS UN3911 Seminar in Political Theory
or POLS UN3912 Seminar in Political Theory
- POLS UN3921 Seminar in American Politics
or POLS UN3922 Seminar in American Politics
- POLS UN3951 Seminar in Comparative Politics
or POLS UN3952 Seminar in Comparative Politics
- POLS UN3961 International Politics Seminar
or POLS UN3962 INTERNATIONAL POLITICS
SEMINAR

- Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN ECONOMICS- STATISTICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 155) above.

The major in economics-statistics provides students with a grounding in economic theory comparable to that provided by the general economics major, but also exposes students to a significantly more rigorous and extensive statistics training than is provided by the general major. This program is recommended for students with strong quantitative skills and for those contemplating graduate studies in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Statistics has an assigned adviser with whom students may consult on statistics requirements. The economics adviser can only advise on economics requirements; the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, 3 points in computer science as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Calculus III
- MATH UN1201 and Linear Algebra

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Accelerated Multivariable
- MATH UN1205 Calculus
- MATH UN2010 and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Statistics

STAT UN1201 Calculus-Based Introduction to
Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

One elective in statistics from among courses numbered
STAT GU 4206 through GU 4266.

Computer Science

Select one of the following:

COMS W1004 Introduction to Computer Science
and Programming in Java

COMS W1005 Introduction to Computer Science
and Programming in MATLAB

COMS W1007 Honors Introduction to Computer
Science

ENGI E1006 Introduction to Computing for
Engineers and Applied Scientists

STAT UN2102 Applied Statistical Computing

Economics Seminar

ECON GU4918 Seminar In Econometrics

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

ECONOMICS - MATHEMATICS

Departmental Office: 1022 International Affairs Building;
212-854-3680
<http://www.columbia.edu/cu/economics/>

Director of Undergraduate Studies: Dr. Susan Elmes,
1006 International Affairs Building; 212-854-9124;
se5@columbia.edu

Director of Departmental Honors Program: Dr. Susan
Elmes, 1006 International Affairs Building; 212-854-9124;
se5@columbia.edu

Economics is the study of the ways in which society allocates its scarce resources among alternative uses and the consequences of

these decisions. The areas of inquiry deal with a varied range of topics such as international trade, domestic and international financial systems, labor market analysis, and the study of less developed economies. Broadly speaking, the goal of an economics major is to train students to think analytically about social issues and, as such, provide a solid foundation for not only further study and careers in economics, but also for careers in law, public service, business, and related fields.

The Economics Department offers a general economics major in addition to five interdisciplinary majors structured to suit the interests and professional goals of a heterogeneous student body. All of these programs have different specific requirements but share the common structure of core theoretical courses that provide the foundation for higher-level elective courses culminating in a senior seminar. Students are urged to carefully look through the details of each of these programs and to contact an appropriate departmental adviser to discuss their particular interests.

ADVANCED PLACEMENT

Tests must be taken in **both** microeconomics and macroeconomics, with a score of 5 on one test and at least a 4 on the other. Provided that this is achieved, the department grants 4 credits for a score of 4 and 5 on the AP Economics exam along with exemption from *ECON UN1105 Principles of Economics*.

ADVISING

The Department of Economics offers a variety of advising resources to provide prospective and current undergraduate majors and concentrators with the information and support needed to successfully navigate through the program. These resources are described below.

Frequently Asked Questions

Please see: <http://econ.columbia.edu/frequently-asked-questions-0> (<http://econ.columbia.edu/frequently-asked-questions-0/>)

As a first step, students are encouraged to visit the department's FAQ page, which provides comprehensive information and answers to the most frequently asked questions about the departmental majors and requirements. This page also includes a section that answers specific questions of first-years, sophomores, and non-majors.

Graduate Student Advisers

For answers to the most common questions that students have about the majors, the department has graduate student advisers, who are available by e-mail at econ-advising@columbia.edu, or during weekly office hours to meet with students.

Students should direct all questions and concerns about their major to the graduate student advisers either in person or via e-mail. The graduate student advisers can discuss major

requirements, scheduling, and major course selection, as well as review student checklists and discuss progress in the major. Occasionally, graduate student advisers may refer a student to someone else in the department (such as the director of undergraduate studies) or in the student's school for additional advising.

Contact information and office hours for the graduate student advisers are posted on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) in the week prior to the beginning of the semester. Students considering one of the interdepartmental majors should speak to both a graduate student adviser from the Economics Department and the adviser from the other department early in the sophomore year.

Faculty Advisers

Faculty advisers are available to discuss students' academic and career goals, both in terms of the undergraduate career and post-graduate degrees and research. Students wishing to discuss these types of substantive topics may request a faculty adviser by completing the form available on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) and depositing it in the mailbox of the director of undergraduate studies in the department's main office, 1022 International Affairs Building.

The department does its best to match students with faculty members that share similar academic interests. While faculty advisers do not discuss major requirements—that is the role of the graduate student advisers—they do provide guidance in course selection as it relates to meeting a student's intellectual goals and interests, as well as advise on career and research options. It is recommended that students who plan on attending a Ph.D. program in economics or are interested in pursuing economics research after graduation request a faculty adviser.

ON-LINE INFORMATION

Students can access useful information on-line, including: a comprehensive FAQ page; requirement changes to the major and concentration; sample programs and checklists; faculty office hours, contact information and fields of specialization; adviser information; teaching assistant information; research assistant opportunities; list of tutors; and Columbia-Barnard Economics Society information.

DEPARTMENTAL HONORS

Economics majors and economics joint majors who wish to be considered for departmental honors in economics must:

1. Have at least a 3.7 GPA in their major courses;
2. Take ECON GU4999 Senior Honors Thesis (a one-year course);
3. Receive at least a grade of A- in ECON GU4999 Senior Honors Thesis.

Students must consult and obtain the approval of the departmental undergraduate director in order to be admitted to the workshop. Please note that ECON GU4999 Senior Honors Thesis may be taken to fulfill the **seminar requirement** for the economics major and all economics joint majors. Students who wish to write a senior thesis (ECON GU4999 Senior Honors Thesis) must have completed the core major requirements. Normally no more than 10% of graduating majors receive departmental honors in a given academic year. Please see the *Honors Prizes* page on the department's website for more information.

UNDERGRADUATE PRIZES

All prize recipients are announced at the end of the spring semester each academic year.

The Dean's Prize in Economics

Awarded to General Studies students for excellence in the study of Economics.

Romine Prize

Established in 1997, this prize is awarded annually to two students (Columbia College or General Studies) majoring in economics: one for the best honors thesis paper, and the other for the best economics seminar paper.

Parker Prize for Summer Research

PROFESSORS

Douglas Almond (also School of International and Public Affairs)
 Jushan Bai
 Jagdish N. Bhagwati
 Sandra Black
 Patrick Bolton (also Business School)
 André Burgstaller (Barnard)
 Alessandra Casella (also Political Science Department)
 Yeon-Koo Che
 Pierre-André Chiappori
 Graciela Chichilnisky
 Richard Clarida (also School of International and Public Affairs)
 Donald Davis
 Padma Desai (*emerita*)
 Prajit Dutta
 Harrison Hong
 R. Glenn Hubbard (also Business School)
 Navin Kartik
 Wojciech Kopczuk (also School of International and Public Affairs)
 Sokbae (Simon) Lee
 W. Bentley McLeod (also School of International and Public Affairs)
 Perry Mehrling (Barnard)
 Robert Mundell (*emeritus*)

Suresh Naidu (also School of International and Public Affairs)
 Serena Ng
 Brendan O'Flaherty
 Edmund S. Phelps
 Andrea Prat (also Business School)
 Michael Riordan
 Jeffrey Sachs (also Earth Institute)
 Xavier Sala-i-Martin
 Bernard Salanié (Chair)
 José A. Scheinkman
 Stephanie Schmitt-Grohé
 Rajiv Sethi (Barnard)
 Joseph Stiglitz (also Business School)
 Martín Uribe
 Miguel Urquiola (also School of International and Public Affairs)
 Eric Verhoogen (also School of International and Public Affairs)
 David Weiman (Barnard)
 David Weinstein
 Michael Woodford

ASSOCIATE PROFESSORS

Mark Dean
 Lena Edlund
 Jennifer La'O
 Qingmin Liu

ASSISTANT PROFESSORS

Hassan Afrouzi
 Michael Best
 Andres Drenik
 Matthieu Gomez
 Reka Juhasz
 Elliot Lipnowski
 Jose Luis Montiel Olea
 Xiaosheng Mu
 Evan Sadler
 Jack Willis

LECTURERS

Irasema Alonso
 Tri Vi Dang
 Susan Elmes
 Seyhan Erden
 Tamrat Gashaw
 Sunil Gulati
 Ronald Miller
 Wouter Vergote

ADJUNCT FACULTY

Tim Goodspeed
 Claudia Halbac
 Ed Lincoln
 Neal Masia

Caterina Musatti
Waseem Noor
Ingmar Nyman
Maxim Pinkovskiy

ON LEAVE

Profs. Clarida, Drenik, Hubbard, Kopczuk, Liu, Riordan
(2019-2020)

Profs. Best, Salanie, Scheinkman (Fall 2019)

Profs. Lee, Montiel Olea, Weinstein (Spring 2020)

GUIDELINES FOR ALL ECONOMICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Checklists and Requirement

Checklists and Requirement information are available on the Department website (<https://econ.columbia.edu/undergraduate/requirements-and-forms/>).

Course List

Economics Core Courses

All of the core courses must be completed **no later than the spring semester** of the student's **junior year** and must be taken at Columbia. *Students who take any core course during the fall semester of their senior year must obtain written permission from the department's director of undergraduate studies.* Unless otherwise specified below, all students must complete the following core courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Prerequisites

Course prerequisites are strictly enforced. Prerequisites must be taken before the course, not after or concurrently.

Economics courses taken before the completion of any of its prerequisites, even with instructor approval, are **not** counted toward the major, concentration, or interdepartmental majors. Exemptions from a prerequisite requirement may only be made, in writing, by the department's director of undergraduate studies. Credits from a course taken *prior* to the completion of its prerequisites are **not** counted towards the major requirements. As a consequence, students are required to complete **additional**, specific courses in economics at the direction of the director of undergraduate studies.

The prerequisites for required courses are as follows:

Course	Prerequisites
ECON UN1105 Principles of Economics	None
MATH UN1101 Calculus I	
STAT UN1201 Calculus-Based Introduction to Statistics	MATH UN1101 Calculus I
ECON UN3211 Intermediate Microeconomics	ECON UN1105 Principles of Economics MATH UN1201 Calculus III or UN1205
ECON UN3213 Intermediate Macroeconomics	ECON UN1105 Principles of Economics MATH UN1101 Calculus I Co-requisite: MATH UN1201 Calculus III or UN1205
ECON UN3412 Introduction To Econometrics	MATH UN1201 Calculus III or UN1205 ECON UN3211 Intermediate Microeconomics or UN3213 STAT UN1201 Calculus-Based Introduction to Statistics
ECON 2000-level electives	ECON UN1105 Principles of Economics
ECON GU4211 Advanced Microeconomics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics MATH UN2010 Linear Algebra Corequisites: MATH UN2500 Analysis and Optimization or GU4061
ECON GU4412 Advanced Econometrics	ECON UN3211 Intermediate Microeconomics
ECON GU4213 Advanced Macroeconomics	ECON UN3213 Intermediate Macroeconomics
ECON GU4413 Econometrics of Time Series and Forecasting	ECON UN3412 Introduction To Econometrics MATH UN2010 Linear Algebra

ECON UN3025 Financial Economics	ECON UN3211 Intermediate Microeconomics	ECPH GU4950 Economics and Philosophy Seminar	ECON UN3211 Intermediate Microeconomics
ECON GU4020 Economics of Uncertainty and Information	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4230 Economics of New York City	STAT UN1201 Calculus-Based Introduction to Statistics		ECON UN3412 Introduction To Econometrics
ECON GU4260 Market Design		Barnard electives	See Barnard bulletin
ECON GU4280 Corporate Finance			
ECON GU4370 Political Economy			
ECON GU4700 Financial Crises			
ECON GU4710 Finance and the Real Economy			
ECON GU4850 Cognitive Mechanisms and Economic Behavior			
ECON GU4860 Behavioral Finance	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
All other ECON 3000- and 4000-level electives	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
ECON UN3901 Economics of Education	ECON UN3211 Intermediate Microeconomics		
ECON UN3952 Seminar in Macroeconomics and Formation of Expectations	ECON UN3213 Intermediate Macroeconomics		
ECON UN3981 Applied Econometrics	ECON UN3412 Introduction To Econometrics		
ECON GU4911 Seminar In Microeconomics			
ECON GU4913 Seminar In Macroeconomics			
ECON GU4918 Seminar In Econometrics			
ECPS GU4921 Seminar In Political Economy	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
	ECON GU4370 Political Economy		

It is **strongly recommended** that students take ECON UN3412 Introduction To Econometrics in the semester **immediately** following the completion of the statistics course.

Grading

No course with a grade of D or lower, including calculus and statistics courses, can count toward the major, concentration, or interdepartmental majors. Economics core courses with a grade of D or F must be retaken and completed with a grade of C- or better.

Students who receive a grade of D or F in a core course are permitted to take a higher-level elective course that has that core course as a prerequisite, so long as it is taken concurrently with the retaking of that core course. For example, if a student fails ECON UN3211 Intermediate Microeconomics, the student must retake it and, in the same semester, may enroll in an elective course for which it is a prerequisite, provided that all other prerequisites for the elective have been completed. The same rule applies to the required math and statistics courses. For example, if a student fails *MATH UN1201 Calculus III*, the student may retake calculus III concurrently with *Intermediate Microeconomics*. Students who must retake any core economics or math course may not retake it concurrently with a senior seminar; the economics core courses *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, and *ECON UN3412 Introduction To Econometrics* must be successfully completed before a student may enroll in a seminar.

A grade of W is not equivalent to a grade of D or F; it does not qualify a student to retake the course concurrently with a higher level course that lists the course as a prerequisite. Students who receive a grade of W in a core course must complete the course with a grade of C- or better before taking a course that lists it as a prerequisite.

Only ECON UN1105 Principles of Economics may be taken for a grade of Pass/D/Fail, and the student must receive a grade of P for it to count towards the requirements for the major, concentration, or interdepartmental majors.

Economics Electives

Only those courses identified in the Economics Department listings in this Bulletin may be taken for elective credit. All 3000-level or higher electives offered by the Economics Department have ECON UN3211 Intermediate Microeconomics and ECON UN3213 Intermediate

Macroeconomics as prerequisites. However, some electives have additional prerequisites and students should ensure that all prerequisites have been completed (see the table of prerequisites printed above). *Seminars do not count as electives.*

Seminars

Seminars can be taken only after all of the required core courses in economics have been successfully completed. Students may not take or re-take ECON UN3211 Intermediate Microeconomics, ECON UN3213 Intermediate Macroeconomics, or ECON UN3412 Introduction To Econometrics concurrently with any senior seminar. *Seminars do not count as electives.* Each seminar is limited to sixteen students, with priority given to seniors. For ECPS GU4921 Seminar In Political Economy and ECPH GU4950 Economics and Philosophy Seminar, priority is given to economics–political science and economics–philosophy majors, respectively.

For seminar registration details, read the information posted on the department's *Senior Seminar Registration* page: <http://econ.columbia.edu/senior-seminars-registration> (<http://econ.columbia.edu/senior-seminars-registration/>).

Mathematics

Students must consult with the Mathematics Department for the appropriate placement in the calculus sequence. Students must complete one of the following sequences:

Select one of the following sequences:

MATH UN1101 - MATH UN1201	Calculus I and Calculus III
MATH UN1101 - MATH UN1205	Calculus I and Accelerated Multivariable Calculus
MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B

In addition:

1. Students who receive a grade of D or F in MATH UN1201 Calculus III or MATH UN1205 must retake the course, but may enroll in ECON UN3211 Intermediate Microeconomics.
2. Students who receive a grade of D or F in MATH UN1207 Honors Mathematics A may either retake the course, or take MATH UN1201 Calculus III or MATH UN1205, and enroll in ECON UN3211 Intermediate Microeconomics concurrently.

Statistics

Unless otherwise specified below, all students must take STAT UN1201 Calculus-Based Introduction to Statistics, or a higher level course, such as STAT GU4204 Statistical Inference, or STAT GU4001.

Barnard Courses

A limited number of Barnard economics electives may count toward the major, concentration, and interdepartmental majors. Students should pay careful attention to the limit of Barnard electives indicated in their program requirements. Please see the *Transfer Credit* section below for information on the number of Barnard electives that may be taken to fulfill major requirements. In addition, students may receive credit for the major, concentration, and interdepartmental majors only for those Barnard economics courses listed in this Bulletin. However, students may not receive credit for two courses whose content overlaps. Barnard and Columbia economics electives with overlapping content include but are not limited to:

ECON BC3029 - ECON GU4321	Empirical Development Economics and Economic Development
ECON BC3038 - ECON GU4505	International Money and Finance and International Macroeconomics
ECON BC3019 - ECON GU4400	Labor Economics and Labor Economics
ECON BC3047 - ECON GU4500	International Trade and International Trade
ECON BC3039 - ECON GU4625	Environmental and Natural Resource Economics and Economics of the Environment
ECON BC3041 - ECON GU4235	Theoretical Foundations of Political Economy and HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4400	Labor Economics
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes

Students should always first consult with *econ-advising* to confirm that the Barnard elective they wish to take does not overlap with a Columbia elective that they have already taken or plan to take. Students may *not* take the Barnard core economics, math, statistics, or seminar courses for credit towards the completion of major requirements.

School of Professional Studies Courses

The Department of Economics does not accept *any* of the courses offered through the School of Professional Studies for credit towards the economics major, concentration, or interdepartmental majors with the exception of the courses offered by the Economics Department during the summer session at Columbia.

Other Department and School Courses

Please note that with the exception of the above Barnard courses and the specific courses listed below for the financial

economics major, no other courses offered through the different departments and schools at Columbia count toward the economics majors or concentration.

Transfer Credits

Students are required to take a minimum number of courses in the Columbia Economics Department. For all majors and interdepartmental majors, students must complete a minimum of *five* lecture courses in the Columbia department. Students may fulfill their remaining requirements for economics lecture courses through AP (or IB or GCE) credits, Barnard electives, transfer courses, and study abroad courses (the latter two are subject to the approval of the Economics Department). The following table summarizes the new rules:

Program	Number of required economics lecture courses	Minimum number which must be taken in the department	Maximum number of outside allowed
Economics major	9	5	4
Financial economics	8	5	3
Economics-mathematics	7	5	2
Economics-political science	7	5	2
Economics-statistics	7	5	2
Economics-philosophy	7	5	2
Economics concentration	7	4	3

- Lecture courses** do not include seminars, which must be taken in the Columbia Economics Department. The lecture course counts are counts of economics courses only and do **not** include math, statistics, or courses in other departments;
- At least two of the three *3000*-level economics core courses must be taken in the department and no corresponding Barnard courses are accepted. ECON UN3025 Financial Economics and ECON UN3265 The Economics of Money and Banking are counted as departmental courses regardless of the instructor;
- Outside courses** include AP (or IB or GCE) credits, transfer credits, Barnard *2000*- and *3000*-level elective courses and transfer credits from other universities. In the case where two or more courses taken outside of Columbia are used as the equivalent of ECON UN1105 Principles of Economics, those courses are counted as one transfer course.

Approval of transfer credits to fulfill economics requirements must be obtained in writing from the Department of Economics (see the departmental website (<http://www.columbia.edu/cu/economics/>) or speak with your advising dean for information regarding applications for transfer credit). Approval is granted only for courses that are considered to be comparable to those offered at Columbia.

Summer courses taken at other institutions must be approved in writing by the department's transfer credit adviser before the course is taken. The department does not accept transfer credits for any *3000* level core courses taken during a summer session outside of Columbia University. Summer courses taken from the department of economics at Columbia University do not need approval.

Guidelines and instructions on how to request transfer credit approval can be found in the *Transfer Credit Information* page of the departmental website (<http://www.columbia.edu/cu/economics/>).

MAJOR IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 165) above.

The economics major requires a minimum of 35 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 44 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least five electives, of which no more than one may be taken at the *2000*-level (including Barnard courses)

Economics Seminar

Select one economics seminar course

CONCENTRATION IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 165) above.

The economics concentration requires a minimum of 25 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 34 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least three electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

MAJOR IN FINANCIAL ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 165) above.

The Department of Economics offers the major in financial economics, which provides an academic framework to explore the role of financial markets and intermediaries in the allocation (and misallocation) of capital. Among the topics studied in financial economics are financial markets, banks and other financial intermediaries, asset valuation, portfolio allocation, regulation and corporate governance.

The financial economics major requires 26 points in economics, 6 points in mathematics, 3 points in statistics, 3 points in business, and 12 points from a list of selected courses for a total minimum of 50 points as follows:

Economics Core Courses

All economics core courses

Finance Core Courses*

ECON UN3025	Financial Economics
ECON GU4280	Corporate Finance
BUSI UN3013	Financial Accounting

*NOTE: The department considers BUSI UN3013 and IEOR E2261 as overlapping courses. Students who take both courses shall be credited with one course only. Financial economics majors who are also in the Business Management concentration program (CNBUMG) must take an additional elective from either the financial economics prescribed elective list (below) or from the CNBUMB prescribed list.

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Electives

Select four of the following, of which two must be from the Columbia or Barnard economics departments, or equivalent economics transfer credits:

ECON BC3014	Entrepreneurship
ECON BC3017	Economics of Business Organization
ECON UN3265	The Economics of Money and Banking
ECON UN3952	Seminar in Macroeconomics and Formation of Expectations
ECON GU4020	Economics of Uncertainty and Information

ECON GU4213	Advanced Macroeconomics
ECON GU4251	Industrial Organization
ECON GU4260	Market Design
ECON GU4412	Advanced Econometrics
ECON GU4415	Game Theory
ECON GU4465	Public Economics
ECON GU4500	International Trade
ECON GU4505	International Macroeconomics
or ECON BC3038	International Money and Finance
ECON G4526	Transition Reforms, Globalization and Financial Crisis
ECON GU4700	Financial Crises
ECON GU4710	Finance and the Real Economy
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON GU4860	Behavioral Finance
BIOT GU4180	Entrepreneurship in Biotechnology
BUSI UN3021	Marketing Management
BUSI UN3701	Strategy Formulation
BUSI UN3702	Venturing to Change the World
BUSI UN3703	Leadership in Organizations
BUSI UN3704	Making History Through Venturing
COMS W1002	Computing in Context
HIST W2904	History of Finance
IEOR E3106	Stochastic Systems and Applications
IEOR E4700	Introduction to Financial Engineering
MATH UN3050	Discrete Time Models in Finance
POLS UN3630	Politics of International Economic Relations
STAT W3201	Math Finance in Continuous Time
STAT GU4261	Statistical Methods in Finance
STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance

Seminar

The seminar must be chosen from a list of seminars eligible for the financial economics major. The department indicates which seminars are eligible for the major on the Senior Seminars page of the departmental website.

Students must have completed at least one of ECON UN3025 or ECON GU4280 prior to taking their senior seminar.

* Students must complete the finance core no later than fall of their senior year.

MAJOR IN ECONOMICS-MATHEMATICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 165) above.

The major in economics and mathematics provides students with a grounding in economic theory comparable to that provided by the general economics major and exposes students to rigorous and extensive training in mathematics. The program is recommended for any student planning to do graduate work in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Mathematics has an assigned adviser with whom students may consult on mathematics requirements. The economics adviser can only advise on economics requirements; the mathematics adviser can only advise on mathematics requirements.

The economics-mathematics major requires a total of 52 or 56 points (depending on mathematics sequence) : 29 points in economics and 23-27 points in mathematics and statistics as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
 - MATH UN1102 and Calculus II
 - MATH UN1201 and Calculus III
 - MATH UN2010 and Linear Algebra

MATH UN1101 Calculus I
 - MATH UN1102 and Calculus II
 - MATH UN1205 and Accelerated Multivariable
 - MATH UN2010 Calculus
 and Linear Algebra

MATH UN1207 Honors Mathematics A
 - MATH UN1208 and Honors Mathematics B

Note: Students who take MATH UN1205 may not receive credit for both MATH UN1201 and MATH UN1202.

Analysis requirement:

MATH UN2500 Analysis and Optimization

Select three of the following:

MATH UN1202 Calculus IV
 MATH UN2030 Ordinary Differential Equations

Any mathematics course at the 3000-level or above

Note: Students who take MATH UN1205 will not receive credit for MATH UN1202.

Statistics

Select one of the following sequences:

STAT GU4001 Introduction to Probability and
 Statistics

STAT GU4203 PROBABILITY THEORY
 - STAT GU4204 and Statistical Inference

Economics Seminar

Select an economics seminar

NOTE:

1. Students who fulfill the statistics requirement with STAT GU4203 and STAT GU4204, may count STAT GU4203 or STAT GU4204 as one of the three required mathematics electives.
2. Students who choose the one year sequence (STAT GU4203/ STAT GU4204), must complete the year long sequence *prior* to taking ECON UN3412. Students receive elective credit for the probability course.

MAJOR IN ECONOMICS-PHILOSOPHY

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 165) above.

Economics-philosophy is an interdisciplinary major that introduces students to basic methodologies of economics and philosophy and stresses areas of particular concern to both, e.g. rationality and decision making, justice and efficiency, freedom and collective choice, logic of empirical theories and testing. Many issues are dealt with historically. Classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Philosophy has an assigned adviser with whom students may consult on philosophy requirements. The economics adviser can only advise on economics requirements; the philosophy adviser can only advise on philosophy requirements.

The economics-philosophy major requires a total minimum of 54 points: 25 points in economics, 16 points in philosophy, 6 points in mathematics, 3 points in statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105 Principles of Economics

ECON UN3211 Intermediate Microeconomics

ECON UN3213 Intermediate Macroeconomics

ECON UN3412 Introduction To Econometrics

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three Electives are required; two must be selected from the below list, and the remaining elective may be any economics elective at the 3000-level or above.

ECON GU4020	Economics of Uncertainty and Information
ECON GU4211	Advanced Microeconomics
ECON GU4213	Advanced Macroeconomics
ECON GU4228	Urban Economics
ECON GU4230	Economics of New York City
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4301	Economic Growth and Development
ECON GU4370	Political Economy
ECON GU4400	Labor Economics
ECON GU4415	Game Theory
ECON GU4438	Economics of Race in the U.S.
ECON GU4465	Public Economics
ECON GU4480	Gender and Applied Economics
ECON GU4500	International Trade
ECON W4615	Law and Economics
ECON GU4625 or ECON BC3039	Economics of the Environment Environmental and Natural Resource Economics
ECON GU4750	Globalization and Its Risks
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON BC3011	Inequality and Poverty
Philosophy Courses	
PHIL UN1010	Methods and Problems of Philosophical Thought
PHIL UN3411	Symbolic Logic
PHIL UN3701	Ethics
PHIL UN3551 or PHIL UN3960	Philosophy of Science Epistemology
PHIL GU4561	Probability and Decision Theory
Seminar	
ECPH GU4950	Economics and Philosophy Seminar

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN ECONOMICS–POLITICAL SCIENCE

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 165) above.

Political economy is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Political Science has an assigned adviser with whom students may consult on political science requirements. The economics adviser can only advise on economics requirements; the political science adviser can only advise on political science requirements.

The economics–political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows.

The political science courses are grouped into four areas, i.e. subfields: (1) American Politics, (2) Comparative Politics, (3) International Relations, and (4) Political Theory. For the political science part of the major, students are required to select one area as a major subfield and one as a minor subfield. The corresponding introductory courses in both subfields must be taken, plus two electives in the major subfield, and one in the minor subfield.

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON GU4370	Political Economy

Mathematics

Select a mathematics sequence

Statistical Methods

STAT UN1201	Calculus-Based Introduction to Statistics
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Select one of the following:

ECON UN3412	Introduction To Econometrics
POLS GU4712	PRINC OF QUANT POL RESEARCH 2

Economics Electives

Select two electives (6 points) at the 3000-level or above

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921 Seminar In Political Economy
and a Political Science Department seminar, in the student's
Primary Subfield. Please select one of the following: *

- POLS UN3911 Seminar in Political Theory
or POLS UN3912 Seminar in Political Theory
- POLS UN3921 Seminar in American Politics
or POLS UN3922 Seminar in American Politics
- POLS UN3951 Seminar in Comparative Politics
or POLS UN3952 Seminar in Comparative Politics
- POLS UN3961 International Politics Seminar
or POLS UN3962 INTERNATIONAL POLITICS
SEMINAR

- Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN ECONOMICS- STATISTICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 165) above.

The major in economics-statistics provides students with a grounding in economic theory comparable to that provided by the general economics major, but also exposes students to a significantly more rigorous and extensive statistics training than is provided by the general major. This program is recommended for students with strong quantitative skills and for those contemplating graduate studies in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Statistics has an assigned adviser with whom students may consult on statistics requirements. The economics adviser can only advise on economics requirements; the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, 3 points in computer science as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Calculus III
- MATH UN1201 and Linear Algebra
- MATH UN2010

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Accelerated Multivariable
- MATH UN1205 Calculus
- MATH UN2010 and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Statistics

STAT UN1201 Calculus-Based Introduction to
Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

One elective in statistics from among courses numbered
STAT GU 4206 through GU 4266.

Computer Science

Select one of the following:

COMS W1004 Introduction to Computer Science
and Programming in Java

COMS W1005 Introduction to Computer Science
and Programming in MATLAB

COMS W1007 Honors Introduction to Computer
Science

ENGI E1006 Introduction to Computing for
Engineers and Applied Scientists

STAT UN2102 Applied Statistical Computing

Economics Seminar

ECON GU4918 Seminar In Econometrics

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

ECONOMICS - PHILOSOPHY

Departmental Office: 1022 International Affairs Building;
212-854-3680
<http://www.columbia.edu/cu/economics/>

Director of Undergraduate Studies: Dr. Susan Elmes,
1006 International Affairs Building; 212-854-9124;
se5@columbia.edu

Director of Departmental Honors Program: Dr. Susan
Elmes, 1006 International Affairs Building; 212-854-9124;
se5@columbia.edu

Economics is the study of the ways in which society allocates its scarce resources among alternative uses and the consequences of

these decisions. The areas of inquiry deal with a varied range of topics such as international trade, domestic and international financial systems, labor market analysis, and the study of less developed economies. Broadly speaking, the goal of an economics major is to train students to think analytically about social issues and, as such, provide a solid foundation for not only further study and careers in economics, but also for careers in law, public service, business, and related fields.

The Economics Department offers a general economics major in addition to five interdisciplinary majors structured to suit the interests and professional goals of a heterogeneous student body. All of these programs have different specific requirements but share the common structure of core theoretical courses that provide the foundation for higher-level elective courses culminating in a senior seminar. Students are urged to carefully look through the details of each of these programs and to contact an appropriate departmental adviser to discuss their particular interests.

ADVANCED PLACEMENT

Tests must be taken in **both** microeconomics and macroeconomics, with a score of 5 on one test and at least a 4 on the other. Provided that this is achieved, the department grants 4 credits for a score of 4 and 5 on the AP Economics exam along with exemption from *ECON UN1105 Principles of Economics*.

ADVISING

The Department of Economics offers a variety of advising resources to provide prospective and current undergraduate majors and concentrators with the information and support needed to successfully navigate through the program. These resources are described below.

Frequently Asked Questions

Please see: <http://econ.columbia.edu/frequently-asked-questions-0> (<http://econ.columbia.edu/frequently-asked-questions-0/>)

As a first step, students are encouraged to visit the department's FAQ page, which provides comprehensive information and answers to the most frequently asked questions about the departmental majors and requirements. This page also includes a section that answers specific questions of first-years, sophomores, and non-majors.

Graduate Student Advisers

For answers to the most common questions that students have about the majors, the department has graduate student advisers, who are available by e-mail at econ-advising@columbia.edu, or during weekly office hours to meet with students.

Students should direct all questions and concerns about their major to the graduate student advisers either in person or via e-mail. The graduate student advisers can discuss major

requirements, scheduling, and major course selection, as well as review student checklists and discuss progress in the major. Occasionally, graduate student advisers may refer a student to someone else in the department (such as the director of undergraduate studies) or in the student's school for additional advising.

Contact information and office hours for the graduate student advisers are posted on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) in the week prior to the beginning of the semester. Students considering one of the interdepartmental majors should speak to both a graduate student adviser from the Economics Department and the adviser from the other department early in the sophomore year.

Faculty Advisers

Faculty advisers are available to discuss students' academic and career goals, both in terms of the undergraduate career and post-graduate degrees and research. Students wishing to discuss these types of substantive topics may request a faculty adviser by completing the form available on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) and depositing it in the mailbox of the director of undergraduate studies in the department's main office, 1022 International Affairs Building.

The department does its best to match students with faculty members that share similar academic interests. While faculty advisers do not discuss major requirements—that is the role of the graduate student advisers—they do provide guidance in course selection as it relates to meeting a student's intellectual goals and interests, as well as advise on career and research options. It is recommended that students who plan on attending a Ph.D. program in economics or are interested in pursuing economics research after graduation request a faculty adviser.

ON-LINE INFORMATION

Students can access useful information on-line, including: a comprehensive FAQ page; requirement changes to the major and concentration; sample programs and checklists; faculty office hours, contact information and fields of specialization; adviser information; teaching assistant information; research assistant opportunities; list of tutors; and Columbia-Barnard Economics Society information.

DEPARTMENTAL HONORS

Economics majors and economics joint majors who wish to be considered for departmental honors in economics must:

1. Have at least a 3.7 GPA in their major courses;
2. Take ECON GU4999 Senior Honors Thesis (a one-year course);
3. Receive at least a grade of A- in ECON GU4999 Senior Honors Thesis.

Students must consult and obtain the approval of the departmental undergraduate director in order to be admitted to the workshop. Please note that ECON GU4999 Senior Honors Thesis may be taken to fulfill the **seminar requirement** for the economics major and all economics joint majors. Students who wish to write a senior thesis (ECON GU4999 Senior Honors Thesis) must have completed the core major requirements. Normally no more than 10% of graduating majors receive departmental honors in a given academic year. Please see the *Honors Prizes* page on the department's website for more information.

UNDERGRADUATE PRIZES

All prize recipients are announced at the end of the spring semester each academic year.

The Dean's Prize in Economics

Awarded to General Studies students for excellence in the study of Economics.

Romine Prize

Established in 1997, this prize is awarded annually to two students (Columbia College or General Studies) majoring in economics: one for the best honors thesis paper, and the other for the best economics seminar paper.

Parker Prize for Summer Research

PROFESSORS

Douglas Almond (also School of International and Public Affairs)
 Jushan Bai
 Jagdish N. Bhagwati
 Sandra Black
 Patrick Bolton (also Business School)
 André Burgstaller (Barnard)
 Alessandra Casella (also Political Science Department)
 Yeon-Koo Che
 Pierre-André Chiappori
 Graciela Chichilnisky
 Richard Clarida (also School of International and Public Affairs)
 Donald Davis
 Padma Desai (*emerita*)
 Prajit Dutta
 Harrison Hong
 R. Glenn Hubbard (also Business School)
 Navin Kartik
 Wojciech Kopczuk (also School of International and Public Affairs)
 Sokbae (Simon) Lee
 W. Bentley McLeod (also School of International and Public Affairs)
 Perry Mehrling (Barnard)
 Robert Mundell (*emeritus*)

Suresh Naidu (also School of International and Public Affairs)
 Serena Ng
 Brendan O'Flaherty
 Edmund S. Phelps
 Andrea Prat (also Business School)
 Michael Riordan
 Jeffrey Sachs (also Earth Institute)
 Xavier Sala-i-Martin
 Bernard Salanié (Chair)
 José A. Scheinkman
 Stephanie Schmitt-Grohé
 Rajiv Sethi (Barnard)
 Joseph Stiglitz (also Business School)
 Martín Uribe
 Miguel Urquiola (also School of International and Public Affairs)
 Eric Verhoogen (also School of International and Public Affairs)
 David Weiman (Barnard)
 David Weinstein
 Michael Woodford

ASSOCIATE PROFESSORS

Mark Dean
 Lena Edlund
 Jennifer La'O
 Qingmin Liu

ASSISTANT PROFESSORS

Hassan Afrouzi
 Michael Best
 Andres Drenik
 Matthieu Gomez
 Reka Juhasz
 Elliot Lipnowski
 Jose Luis Montiel Olea
 Xiaosheng Mu
 Evan Sadler
 Jack Willis

LECTURERS

Irasema Alonso
 Tri Vi Dang
 Susan Elmes
 Seyhan Erden
 Tamrat Gashaw
 Sunil Gulati
 Ronald Miller
 Wouter Vergote

ADJUNCT FACULTY

Tim Goodspeed
 Claudia Halbac
 Ed Lincoln
 Neal Masia

Caterina Musatti
Waseem Noor
Ingmar Nyman
Maxim Pinkovskiy

ON LEAVE

Profs. Clarida, Drenik, Hubbard, Kopczuk, Liu, Riordan (2019-2020)

Profs. Best, Salanie, Scheinkman (Fall 2019)

Profs. Lee, Montiel Olea, Weinstein (Spring 2020)

GUIDELINES FOR ALL ECONOMICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Checklists and Requirement

Checklists and Requirement information are available on the Department website (<https://econ.columbia.edu/undergraduate/requirements-and-forms/>).

Course List

Economics Core Courses

All of the core courses must be completed **no later than the spring semester** of the student's **junior year** and must be taken at Columbia. *Students who take any core course during the fall semester of their senior year must obtain written permission from the department's director of undergraduate studies.* Unless otherwise specified below, all students must complete the following core courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Prerequisites

Course prerequisites are strictly enforced. Prerequisites must be taken before the course, not after or concurrently.

Economics courses taken before the completion of any of its prerequisites, even with instructor approval, are **not** counted toward the major, concentration, or interdepartmental majors. Exemptions from a prerequisite requirement may only be made, in writing, by the department's director of undergraduate studies. Credits from a course taken *prior* to the completion of its prerequisites are **not** counted towards the major requirements. As a consequence, students are required to complete **additional**, specific courses in economics at the direction of the director of undergraduate studies.

The prerequisites for required courses are as follows:

Course	Prerequisites
ECON UN1105 Principles of Economics	None
MATH UN1101 Calculus I	
STAT UN1201 Calculus-Based Introduction to Statistics	MATH UN1101 Calculus I
ECON UN3211 Intermediate Microeconomics	ECON UN1105 Principles of Economics MATH UN1201 Calculus III or UN1205
ECON UN3213 Intermediate Macroeconomics	ECON UN1105 Principles of Economics MATH UN1101 Calculus I Co-requisite: MATH UN1201 Calculus III or UN1205
ECON UN3412 Introduction To Econometrics	MATH UN1201 Calculus III or UN1205 ECON UN3211 Intermediate Microeconomics or UN3213 STAT UN1201 Calculus-Based Introduction to Statistics
ECON 2000-level electives	ECON UN1105 Principles of Economics
ECON GU4211 Advanced Microeconomics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics MATH UN2010 Linear Algebra Corequisites: MATH UN2500 Analysis and Optimization or GU4061
ECON GU4412 Advanced Econometrics	ECON UN3211 Intermediate Microeconomics
ECON GU4213 Advanced Macroeconomics	ECON UN3213 Intermediate Macroeconomics
ECON GU4413 Econometrics of Time Series and Forecasting	ECON UN3412 Introduction To Econometrics MATH UN2010 Linear Algebra

ECON UN3025 Financial Economics	ECON UN3211 Intermediate Microeconomics	ECPH GU4950 Economics and Philosophy Seminar	ECON UN3211 Intermediate Microeconomics
ECON GU4020 Economics of Uncertainty and Information	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4230 Economics of New York City	STAT UN1201 Calculus-Based Introduction to Statistics		ECON UN3412 Introduction To Econometrics
ECON GU4260 Market Design		Barnard electives	See Barnard bulletin
ECON GU4280 Corporate Finance			
ECON GU4370 Political Economy			
ECON GU4700 Financial Crises			
ECON GU4710 Finance and the Real Economy			
ECON GU4850 Cognitive Mechanisms and Economic Behavior			
ECON GU4860 Behavioral Finance	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
All other ECON 3000- and 4000-level electives	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
ECON UN3901 Economics of Education	ECON UN3211 Intermediate Microeconomics		
ECON UN3952 Seminar in Macroeconomics and Formation of Expectations	ECON UN3213 Intermediate Macroeconomics		
ECON UN3981 Applied Econometrics	ECON UN3412 Introduction To Econometrics		
ECON GU4911 Seminar In Microeconomics			
ECON GU4913 Seminar In Macroeconomics			
ECON GU4918 Seminar In Econometrics			
ECPH GU4921 Seminar In Political Economy	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
	ECON GU4370 Political Economy		

It is **strongly recommended** that students take ECON UN3412 Introduction To Econometrics in the semester **immediately** following the completion of the statistics course.

Grading

No course with a grade of D or lower, including calculus and statistics courses, can count toward the major, concentration, or interdepartmental majors. Economics core courses with a grade of D or F must be retaken and completed with a grade of C- or better.

Students who receive a grade of D or F in a core course are permitted to take a higher-level elective course that has that core course as a prerequisite, so long as it is taken concurrently with the retaking of that core course. For example, if a student fails ECON UN3211 Intermediate Microeconomics, the student must retake it and, in the same semester, may enroll in an elective course for which it is a prerequisite, provided that all other prerequisites for the elective have been completed. The same rule applies to the required math and statistics courses. For example, if a student fails *MATH UN1201 Calculus III*, the student may retake calculus III concurrently with *Intermediate Microeconomics*. Students who must retake any core economics or math course may not retake it concurrently with a senior seminar; the economics core courses *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, and *ECON UN3412 Introduction To Econometrics* must be successfully completed before a student may enroll in a seminar.

A grade of W is not equivalent to a grade of D or F; it does not qualify a student to retake the course concurrently with a higher level course that lists the course as a prerequisite. Students who receive a grade of W in a core course must complete the course with a grade of C- or better before taking a course that lists it as a prerequisite.

Only ECON UN1105 Principles of Economics may be taken for a grade of Pass/D/Fail, and the student must receive a grade of P for it to count towards the requirements for the major, concentration, or interdepartmental majors.

Economics Electives

Only those courses identified in the Economics Department listings in this Bulletin may be taken for elective credit. All 3000-level or higher electives offered by the Economics Department have ECON UN3211 Intermediate Microeconomics and ECON UN3213 Intermediate

Macroeconomics as prerequisites. However, some electives have additional prerequisites and students should ensure that all prerequisites have been completed (see the table of prerequisites printed above). *Seminars do not count as electives.*

Seminars

Seminars can be taken only after all of the required core courses in economics have been successfully completed. Students may not take or re-take ECON UN3211 Intermediate Microeconomics, ECON UN3213 Intermediate Macroeconomics, or ECON UN3412 Introduction To Econometrics concurrently with any senior seminar. *Seminars do not count as electives.* Each seminar is limited to sixteen students, with priority given to seniors. For ECPS GU4921 Seminar In Political Economy and ECPH GU4950 Economics and Philosophy Seminar, priority is given to economics–political science and economics–philosophy majors, respectively.

For seminar registration details, read the information posted on the department's *Senior Seminar Registration* page: <http://econ.columbia.edu/senior-seminars-registration> (<http://econ.columbia.edu/senior-seminars-registration/>).

Mathematics

Students must consult with the Mathematics Department for the appropriate placement in the calculus sequence. Students must complete one of the following sequences:

Select one of the following sequences:

MATH UN1101 - MATH UN1201	Calculus I and Calculus III
MATH UN1101 - MATH UN1205	Calculus I and Accelerated Multivariable Calculus
MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B

In addition:

1. Students who receive a grade of D or F in MATH UN1201 Calculus III or MATH UN1205 must retake the course, but may enroll in ECON UN3211 Intermediate Microeconomics.
2. Students who receive a grade of D or F in MATH UN1207 Honors Mathematics A may either retake the course, or take MATH UN1201 Calculus III or MATH UN1205, and enroll in ECON UN3211 Intermediate Microeconomics concurrently.

Statistics

Unless otherwise specified below, all students must take STAT UN1201 Calculus-Based Introduction to Statistics, or a higher level course, such as STAT GU4204 Statistical Inference, or STAT GU4001.

Barnard Courses

A limited number of Barnard economics electives may count toward the major, concentration, and interdepartmental majors. Students should pay careful attention to the limit of Barnard electives indicated in their program requirements. Please see the *Transfer Credit* section below for information on the number of Barnard electives that may be taken to fulfill major requirements. In addition, students may receive credit for the major, concentration, and interdepartmental majors only for those Barnard economics courses listed in this Bulletin. However, students may not receive credit for two courses whose content overlaps. Barnard and Columbia economics electives with overlapping content include but are not limited to:

ECON BC3029 - ECON GU4321	Empirical Development Economics and Economic Development
ECON BC3038 - ECON GU4505	International Money and Finance and International Macroeconomics
ECON BC3019 - ECON GU4400	Labor Economics and Labor Economics
ECON BC3047 - ECON GU4500	International Trade and International Trade
ECON BC3039 - ECON GU4625	Environmental and Natural Resource Economics and Economics of the Environment
ECON BC3041 - ECON GU4235	Theoretical Foundations of Political Economy and HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4400	Labor Economics
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes

Students should always first consult with *econ-advising* to confirm that the Barnard elective they wish to take does not overlap with a Columbia elective that they have already taken or plan to take. Students may *not* take the Barnard core economics, math, statistics, or seminar courses for credit towards the completion of major requirements.

School of Professional Studies Courses

The Department of Economics does not accept *any* of the courses offered through the School of Professional Studies for credit towards the economics major, concentration, or interdepartmental majors with the exception of the courses offered by the Economics Department during the summer session at Columbia.

Other Department and School Courses

Please note that with the exception of the above Barnard courses and the specific courses listed below for the financial

economics major, no other courses offered through the different departments and schools at Columbia count toward the economics majors or concentration.

Transfer Credits

Students are required to take a minimum number of courses in the Columbia Economics Department. For all majors and interdepartmental majors, students must complete a minimum of *five* lecture courses in the Columbia department. Students may fulfill their remaining requirements for economics lecture courses through AP (or IB or GCE) credits, Barnard electives, transfer courses, and study abroad courses (the latter two are subject to the approval of the Economics Department). The following table summarizes the new rules:

Program	Number of required economics lecture courses	Minimum number which must be taken in the department	Maximum number of outside allowed
Economics major	9	5	4
Financial economics	8	5	3
Economics-mathematics	7	5	2
Economics-political science	7	5	2
Economics-statistics	7	5	2
Economics-philosophy	7	5	2
Economics concentration	7	4	3

- Lecture courses** do not include seminars, which must be taken in the Columbia Economics Department. The lecture course counts are counts of economics courses only and do **not** include math, statistics, or courses in other departments;
- At least two of the three *3000*-level economics core courses must be taken in the department and no corresponding Barnard courses are accepted. ECON UN3025 Financial Economics and ECON UN3265 The Economics of Money and Banking are counted as departmental courses regardless of the instructor;
- Outside courses** include AP (or IB or GCE) credits, transfer credits, Barnard *2000*- and *3000*-level elective courses and transfer credits from other universities. In the case where two or more courses taken outside of Columbia are used as the equivalent of ECON UN1105 Principles of Economics, those courses are counted as one transfer course.

Approval of transfer credits to fulfill economics requirements must be obtained in writing from the Department of Economics (see the departmental website (<http://www.columbia.edu/cu/economics/>) or speak with your advising dean for information regarding applications for transfer credit). Approval is granted only for courses that are considered to be comparable to those offered at Columbia.

Summer courses taken at other institutions must be approved in writing by the department's transfer credit adviser before the course is taken. The department does not accept transfer credits for any *3000* level core courses taken during a summer session outside of Columbia University. Summer courses taken from the department of economics at Columbia University do not need approval.

Guidelines and instructions on how to request transfer credit approval can be found in the *Transfer Credit Information* page of the departmental website (<http://www.columbia.edu/cu/economics/>).

MAJOR IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 175) above.

The economics major requires a minimum of 35 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 44 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least five electives, of which no more than one may be taken at the *2000*-level (including Barnard courses)

Economics Seminar

Select one economics seminar course

CONCENTRATION IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 175) above.

The economics concentration requires a minimum of 25 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 34 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least three electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

MAJOR IN FINANCIAL ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 175) above.

The Department of Economics offers the major in financial economics, which provides an academic framework to explore the role of financial markets and intermediaries in the allocation (and misallocation) of capital. Among the topics studied in financial economics are financial markets, banks and other financial intermediaries, asset valuation, portfolio allocation, regulation and corporate governance.

The financial economics major requires 26 points in economics, 6 points in mathematics, 3 points in statistics, 3 points in business, and 12 points from a list of selected courses for a total minimum of 50 points as follows:

Economics Core Courses

All economics core courses

Finance Core Courses*

ECON UN3025	Financial Economics
ECON GU4280	Corporate Finance
BUSI UN3013	Financial Accounting

*NOTE: The department considers BUSI UN3013 and IEOR E2261 as overlapping courses. Students who take both courses shall be credited with one course only. Financial economics majors who are also in the Business Management concentration program (CNBUMG) must take an additional elective from either the financial economics prescribed elective list (below) or from the CNBUMB prescribed list.

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Electives

Select four of the following, of which two must be from the Columbia or Barnard economics departments, or equivalent economics transfer credits:

ECON BC3014	Entrepreneurship
ECON BC3017	Economics of Business Organization
ECON UN3265	The Economics of Money and Banking
ECON UN3952	Seminar in Macroeconomics and Formation of Expectations
ECON GU4020	Economics of Uncertainty and Information

ECON GU4213	Advanced Macroeconomics
ECON GU4251	Industrial Organization
ECON GU4260	Market Design
ECON GU4412	Advanced Econometrics
ECON GU4415	Game Theory
ECON GU4465	Public Economics
ECON GU4500	International Trade
ECON GU4505	International Macroeconomics
or ECON BC3038	International Money and Finance
ECON G4526	Transition Reforms, Globalization and Financial Crisis
ECON GU4700	Financial Crises
ECON GU4710	Finance and the Real Economy
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON GU4860	Behavioral Finance
BIOT GU4180	Entrepreneurship in Biotechnology
BUSI UN3021	Marketing Management
BUSI UN3701	Strategy Formulation
BUSI UN3702	Venturing to Change the World
BUSI UN3703	Leadership in Organizations
BUSI UN3704	Making History Through Venturing
COMS W1002	Computing in Context
HIST W2904	History of Finance
IEOR E3106	Stochastic Systems and Applications
IEOR E4700	Introduction to Financial Engineering
MATH UN3050	Discrete Time Models in Finance
POLS UN3630	Politics of International Economic Relations
STAT W3201	Math Finance in Continuous Time
STAT GU4261	Statistical Methods in Finance
STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance

Seminar

The seminar must be chosen from a list of seminars eligible for the financial economics major. The department indicates which seminars are eligible for the major on the Senior Seminars page of the departmental website.

Students must have completed at least one of ECON UN3025 or ECON GU4280 prior to taking their senior seminar.

* Students must complete the finance core no later than fall of their senior year.

MAJOR IN ECONOMICS-MATHEMATICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 175) above.

The major in economics and mathematics provides students with a grounding in economic theory comparable to that provided by the general economics major and exposes students to rigorous and extensive training in mathematics. The program is recommended for any student planning to do graduate work in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Mathematics has an assigned adviser with whom students may consult on mathematics requirements. The economics adviser can only advise on economics requirements; the mathematics adviser can only advise on mathematics requirements.

The economics-mathematics major requires a total of 52 or 56 points (depending on mathematics sequence) : 29 points in economics and 23-27 points in mathematics and statistics as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	Calculus and Linear Algebra

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Note: Students who take MATH UN1205 may not receive credit for both MATH UN1201 and MATH UN1202.

Analysis requirement:

MATH UN2500	Analysis and Optimization
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Select three of the following:

MATH UN1202	Calculus IV
MATH UN2030	Ordinary Differential Equations

Any mathematics course at the 3000-level or above

Note: Students who take MATH UN1205 will not receive credit for MATH UN1202.

Statistics

Select one of the following sequences:

STAT GU4001	Introduction to Probability and Statistics
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STAT GU4203 - STAT GU4204	PROBABILITY THEORY and Statistical Inference
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Economics Seminar

Select an economics seminar

NOTE:

1. Students who fulfill the statistics requirement with STAT GU4203 and STAT GU4204, may count STAT GU4203 or STAT GU4204 as one of the three required mathematics electives.
2. Students who choose the one year sequence (STAT GU4203/ STAT GU4204), must complete the year long sequence *prior* to taking ECON UN3412. Students receive elective credit for the probability course.

MAJOR IN ECONOMICS-PHILOSOPHY

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 175) above.

Economics-philosophy is an interdisciplinary major that introduces students to basic methodologies of economics and philosophy and stresses areas of particular concern to both, e.g. rationality and decision making, justice and efficiency, freedom and collective choice, logic of empirical theories and testing. Many issues are dealt with historically. Classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Philosophy has an assigned adviser with whom students may consult on philosophy requirements. The economics adviser can only advise on economics requirements; the philosophy adviser can only advise on philosophy requirements.

The economics-philosophy major requires a total minimum of 54 points: 25 points in economics, 16 points in philosophy, 6 points in mathematics, 3 points in statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105	Principles of Economics
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ECON UN3211	Intermediate Microeconomics
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ECON UN3213	Intermediate Macroeconomics
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ECON UN3412	Introduction To Econometrics
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Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three Electives are required; two must be selected from the below list, and the remaining elective may be any economics elective at the 3000-level or above.

ECON GU4020	Economics of Uncertainty and Information
ECON GU4211	Advanced Microeconomics
ECON GU4213	Advanced Macroeconomics
ECON GU4228	Urban Economics
ECON GU4230	Economics of New York City
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4301	Economic Growth and Development
ECON GU4370	Political Economy
ECON GU4400	Labor Economics
ECON GU4415	Game Theory
ECON GU4438	Economics of Race in the U.S.
ECON GU4465	Public Economics
ECON GU4480	Gender and Applied Economics
ECON GU4500	International Trade
ECON W4615	Law and Economics
ECON GU4625 or ECON BC3039	Economics of the Environment Environmental and Natural Resource Economics
ECON GU4750	Globalization and Its Risks
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON BC3011	Inequality and Poverty
Philosophy Courses	
PHIL UN1010	Methods and Problems of Philosophical Thought
PHIL UN3411	Symbolic Logic
PHIL UN3701	Ethics
PHIL UN3551 or PHIL UN3960	Philosophy of Science Epistemology
PHIL GU4561	Probability and Decision Theory
Seminar	
ECPH GU4950	Economics and Philosophy Seminar

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN ECONOMICS–POLITICAL SCIENCE

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 175) above.

Political economy is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Political Science has an assigned adviser with whom students may consult on political science requirements. The economics adviser can only advise on economics requirements; the political science adviser can only advise on political science requirements.

The economics–political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows.

The political science courses are grouped into four areas, i.e. subfields: (1) American Politics, (2) Comparative Politics, (3) International Relations, and (4) Political Theory. For the political science part of the major, students are required to select one area as a major subfield and one as a minor subfield. The corresponding introductory courses in both subfields must be taken, plus two electives in the major subfield, and one in the minor subfield.

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON GU4370	Political Economy

Mathematics

Select a mathematics sequence

Statistical Methods

STAT UN1201	Calculus-Based Introduction to Statistics
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Select one of the following:

ECON UN3412	Introduction To Econometrics
POLS GU4712	PRINC OF QUANT POL RESEARCH 2

Economics Electives

Select two electives (6 points) at the 3000-level or above

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921 Seminar In Political Economy
and a Political Science Department seminar, in the student's
Primary Subfield. Please select one of the following: *

- POLS UN3911 Seminar in Political Theory
or POLS UN3912 Seminar in Political Theory
- POLS UN3921 Seminar in American Politics
or POLS UN3922 Seminar in American Politics
- POLS UN3951 Seminar in Comparative Politics
or POLS UN3952 Seminar in Comparative Politics
- POLS UN3961 International Politics Seminar
or POLS UN3962 INTERNATIONAL POLITICS
SEMINAR

- Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN ECONOMICS- STATISTICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 175) above.

The major in economics-statistics provides students with a grounding in economic theory comparable to that provided by the general economics major, but also exposes students to a significantly more rigorous and extensive statistics training than is provided by the general major. This program is recommended for students with strong quantitative skills and for those contemplating graduate studies in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Statistics has an assigned adviser with whom students may consult on statistics requirements. The economics adviser can only advise on economics requirements; the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, 3 points in computer science as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Calculus III
- MATH UN1201 and Linear Algebra

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Accelerated Multivariable
- MATH UN1205 Calculus
- MATH UN2010 and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Statistics

STAT UN1201 Calculus-Based Introduction to
Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

One elective in statistics from among courses numbered
STAT GU 4206 through GU 4266.

Computer Science

Select one of the following:

COMS W1004 Introduction to Computer Science
and Programming in Java

COMS W1005 Introduction to Computer Science
and Programming in MATLAB

COMS W1007 Honors Introduction to Computer
Science

ENGI E1006 Introduction to Computing for
Engineers and Applied Scientists

STAT UN2102 Applied Statistical Computing

Economics Seminar

ECON GU4918 Seminar In Econometrics

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

ECONOMICS - POLITICAL SCIENCE

Departmental Office: 1022 International Affairs Building;
212-854-3680
<http://www.columbia.edu/cu/economics/>

Director of Undergraduate Studies: Dr. Susan Elmes,
1006 International Affairs Building; 212-854-9124;
se5@columbia.edu

Director of Departmental Honors Program: Dr. Susan
Elmes, 1006 International Affairs Building; 212-854-9124;
se5@columbia.edu

Economics is the study of the ways in which society allocates its scarce resources among alternative uses and the consequences of

these decisions. The areas of inquiry deal with a varied range of topics such as international trade, domestic and international financial systems, labor market analysis, and the study of less developed economies. Broadly speaking, the goal of an economics major is to train students to think analytically about social issues and, as such, provide a solid foundation for not only further study and careers in economics, but also for careers in law, public service, business, and related fields.

The Economics Department offers a general economics major in addition to five interdisciplinary majors structured to suit the interests and professional goals of a heterogeneous student body. All of these programs have different specific requirements but share the common structure of core theoretical courses that provide the foundation for higher-level elective courses culminating in a senior seminar. Students are urged to carefully look through the details of each of these programs and to contact an appropriate departmental adviser to discuss their particular interests.

ADVANCED PLACEMENT

Tests must be taken in **both** microeconomics and macroeconomics, with a score of 5 on one test and at least a 4 on the other. Provided that this is achieved, the department grants 4 credits for a score of 4 and 5 on the AP Economics exam along with exemption from *ECON UN1105 Principles of Economics*.

ADVISING

The Department of Economics offers a variety of advising resources to provide prospective and current undergraduate majors and concentrators with the information and support needed to successfully navigate through the program. These resources are described below.

Frequently Asked Questions

Please see: <http://econ.columbia.edu/frequently-asked-questions-0> (<http://econ.columbia.edu/frequently-asked-questions-0/>)

As a first step, students are encouraged to visit the department's FAQ page, which provides comprehensive information and answers to the most frequently asked questions about the departmental majors and requirements. This page also includes a section that answers specific questions of first-years, sophomores, and non-majors.

Graduate Student Advisers

For answers to the most common questions that students have about the majors, the department has graduate student advisers, who are available by e-mail at econ-advising@columbia.edu, or during weekly office hours to meet with students.

Students should direct all questions and concerns about their major to the graduate student advisers either in person or via e-mail. The graduate student advisers can discuss major

requirements, scheduling, and major course selection, as well as review student checklists and discuss progress in the major. Occasionally, graduate student advisers may refer a student to someone else in the department (such as the director of undergraduate studies) or in the student's school for additional advising.

Contact information and office hours for the graduate student advisers are posted on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) in the week prior to the beginning of the semester. Students considering one of the interdepartmental majors should speak to both a graduate student adviser from the Economics Department and the adviser from the other department early in the sophomore year.

Faculty Advisers

Faculty advisers are available to discuss students' academic and career goals, both in terms of the undergraduate career and post-graduate degrees and research. Students wishing to discuss these types of substantive topics may request a faculty adviser by completing the form available on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) and depositing it in the mailbox of the director of undergraduate studies in the department's main office, 1022 International Affairs Building.

The department does its best to match students with faculty members that share similar academic interests. While faculty advisers do not discuss major requirements—that is the role of the graduate student advisers—they do provide guidance in course selection as it relates to meeting a student's intellectual goals and interests, as well as advise on career and research options. It is recommended that students who plan on attending a Ph.D. program in economics or are interested in pursuing economics research after graduation request a faculty adviser.

ON-LINE INFORMATION

Students can access useful information on-line, including: a comprehensive FAQ page; requirement changes to the major and concentration; sample programs and checklists; faculty office hours, contact information and fields of specialization; adviser information; teaching assistant information; research assistant opportunities; list of tutors; and Columbia-Barnard Economics Society information.

DEPARTMENTAL HONORS

Economics majors and economics joint majors who wish to be considered for departmental honors in economics must:

1. Have at least a 3.7 GPA in their major courses;
2. Take ECON GU4999 Senior Honors Thesis (a one-year course);
3. Receive at least a grade of A- in ECON GU4999 Senior Honors Thesis.

Students must consult and obtain the approval of the departmental undergraduate director in order to be admitted to the workshop. Please note that ECON GU4999 Senior Honors Thesis may be taken to fulfill the **seminar requirement** for the economics major and all economics joint majors. Students who wish to write a senior thesis (ECON GU4999 Senior Honors Thesis) must have completed the core major requirements. Normally no more than 10% of graduating majors receive departmental honors in a given academic year. Please see the *Honors Prizes* page on the department's website for more information.

UNDERGRADUATE PRIZES

All prize recipients are announced at the end of the spring semester each academic year.

The Dean's Prize in Economics

Awarded to General Studies students for excellence in the study of Economics.

Romine Prize

Established in 1997, this prize is awarded annually to two students (Columbia College or General Studies) majoring in economics: one for the best honors thesis paper, and the other for the best economics seminar paper.

Parker Prize for Summer Research

PROFESSORS

Douglas Almond (also School of International and Public Affairs)
 Jushan Bai
 Jagdish N. Bhagwati
 Sandra Black
 Patrick Bolton (also Business School)
 André Burgstaller (Barnard)
 Alessandra Casella (also Political Science Department)
 Yeon-Koo Che
 Pierre-André Chiappori
 Graciela Chichilnisky
 Richard Clarida (also School of International and Public Affairs)
 Donald Davis
 Padma Desai (*emerita*)
 Prajit Dutta
 Harrison Hong
 R. Glenn Hubbard (also Business School)
 Navin Kartik
 Wojciech Kopczuk (also School of International and Public Affairs)
 Sokbae (Simon) Lee
 W. Bentley McLeod (also School of International and Public Affairs)
 Perry Mehrling (Barnard)
 Robert Mundell (*emeritus*)

Suresh Naidu (also School of International and Public Affairs)
 Serena Ng
 Brendan O'Flaherty
 Edmund S. Phelps
 Andrea Prat (also Business School)
 Michael Riordan
 Jeffrey Sachs (also Earth Institute)
 Xavier Sala-i-Martin
 Bernard Salanié (Chair)
 José A. Scheinkman
 Stephanie Schmitt-Grohé
 Rajiv Sethi (Barnard)
 Joseph Stiglitz (also Business School)
 Martín Uribe
 Miguel Urquiola (also School of International and Public Affairs)
 Eric Verhoogen (also School of International and Public Affairs)
 David Weiman (Barnard)
 David Weinstein
 Michael Woodford

ASSOCIATE PROFESSORS

Mark Dean
 Lena Edlund
 Jennifer La'O
 Qingmin Liu

ASSISTANT PROFESSORS

Hassan Afrouzi
 Michael Best
 Andres Drenik
 Matthieu Gomez
 Reka Juhasz
 Elliot Lipnowski
 Jose Luis Montiel Olea
 Xiaosheng Mu
 Evan Sadler
 Jack Willis

LECTURERS

Irasema Alonso
 Tri Vi Dang
 Susan Elmes
 Seyhan Erden
 Tamrat Gashaw
 Sunil Gulati
 Ronald Miller
 Wouter Vergote

ADJUNCT FACULTY

Tim Goodspeed
 Claudia Halbac
 Ed Lincoln
 Neal Masia

Caterina Musatti
Waseem Noor
Ingmar Nyman
Maxim Pinkovskiy

ON LEAVE

Profs. Clarida, Drenik, Hubbard, Kopczuk, Liu, Riordan (2019-2020)

Profs. Best, Salanie, Scheinkman (Fall 2019)

Profs. Lee, Montiel Olea, Weinstein (Spring 2020)

GUIDELINES FOR ALL ECONOMICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Checklists and Requirement

Checklists and Requirement information are available on the Department website (<https://econ.columbia.edu/undergraduate/requirements-and-forms/>).

Course List

Economics Core Courses

All of the core courses must be completed **no later than the spring semester** of the student's **junior year** and must be taken at Columbia. *Students who take any core course during the fall semester of their senior year must obtain written permission from the department's director of undergraduate studies.* Unless otherwise specified below, all students must complete the following core courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Prerequisites

Course prerequisites are strictly enforced. Prerequisites must be taken before the course, not after or concurrently.

Economics courses taken before the completion of any of its prerequisites, even with instructor approval, are **not** counted toward the major, concentration, or interdepartmental majors. Exemptions from a prerequisite requirement may only be made, in writing, by the department's director of undergraduate studies. Credits from a course taken *prior* to the completion of its prerequisites are **not** counted towards the major requirements. As a consequence, students are required to complete **additional**, specific courses in economics at the direction of the director of undergraduate studies.

The prerequisites for required courses are as follows:

Course	Prerequisites
ECON UN1105 Principles of Economics	None
MATH UN1101 Calculus I	
STAT UN1201 Calculus-Based Introduction to Statistics	MATH UN1101 Calculus I
ECON UN3211 Intermediate Microeconomics	ECON UN1105 Principles of Economics MATH UN1201 Calculus III or UN1205
ECON UN3213 Intermediate Macroeconomics	ECON UN1105 Principles of Economics MATH UN1101 Calculus I Co-requisite: MATH UN1201 Calculus III or UN1205
ECON UN3412 Introduction To Econometrics	MATH UN1201 Calculus III or UN1205 ECON UN3211 Intermediate Microeconomics or UN3213 STAT UN1201 Calculus-Based Introduction to Statistics
ECON 2000-level electives	ECON UN1105 Principles of Economics
ECON GU4211 Advanced Microeconomics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics MATH UN2010 Linear Algebra Corequisites: MATH UN2500 Analysis and Optimization or GU4061
ECON GU4412 Advanced Econometrics	ECON UN3211 Intermediate Microeconomics
ECON GU4213 Advanced Macroeconomics	ECON UN3213 Intermediate Macroeconomics
ECON GU4413 Econometrics of Time Series and Forecasting	ECON UN3412 Introduction To Econometrics MATH UN2010 Linear Algebra

ECON UN3025 Financial Economics	ECON UN3211 Intermediate Microeconomics	ECPH GU4950 Economics and Philosophy Seminar	ECON UN3211 Intermediate Microeconomics
ECON GU4020 Economics of Uncertainty and Information	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4230 Economics of New York City	STAT UN1201 Calculus-Based Introduction to Statistics		ECON UN3412 Introduction To Econometrics
ECON GU4260 Market Design		Barnard electives	See Barnard bulletin
ECON GU4280 Corporate Finance			
ECON GU4370 Political Economy			
ECON GU4700 Financial Crises			
ECON GU4710 Finance and the Real Economy			
ECON GU4850 Cognitive Mechanisms and Economic Behavior			
ECON GU4860 Behavioral Finance	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
All other ECON 3000- and 4000-level electives	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
ECON UN3901 Economics of Education	ECON UN3211 Intermediate Microeconomics		
ECON UN3952 Seminar in Macroeconomics and Formation of Expectations	ECON UN3213 Intermediate Macroeconomics		
ECON UN3981 Applied Econometrics	ECON UN3412 Introduction To Econometrics		
ECON GU4911 Seminar In Microeconomics			
ECON GU4913 Seminar In Macroeconomics			
ECON GU4918 Seminar In Econometrics			
ECPS GU4921 Seminar In Political Economy	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
	ECON GU4370 Political Economy		

It is **strongly recommended** that students take ECON UN3412 Introduction To Econometrics in the semester **immediately** following the completion of the statistics course.

Grading

No course with a grade of D or lower, including calculus and statistics courses, can count toward the major, concentration, or interdepartmental majors. Economics core courses with a grade of D or F must be retaken and completed with a grade of C- or better.

Students who receive a grade of D or F in a core course are permitted to take a higher-level elective course that has that core course as a prerequisite, so long as it is taken concurrently with the retaking of that core course. For example, if a student fails ECON UN3211 Intermediate Microeconomics, the student must retake it and, in the same semester, may enroll in an elective course for which it is a prerequisite, provided that all other prerequisites for the elective have been completed. The same rule applies to the required math and statistics courses. For example, if a student fails *MATH UN1201 Calculus III*, the student may retake calculus III concurrently with *Intermediate Microeconomics*. Students who must retake any core economics or math course may not retake it concurrently with a senior seminar; the economics core courses *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, and *ECON UN3412 Introduction To Econometrics* must be successfully completed before a student may enroll in a seminar.

A grade of W is not equivalent to a grade of D or F; it does not qualify a student to retake the course concurrently with a higher level course that lists the course as a prerequisite. Students who receive a grade of W in a core course must complete the course with a grade of C- or better before taking a course that lists it as a prerequisite.

Only ECON UN1105 Principles of Economics may be taken for a grade of Pass/D/Fail, and the student must receive a grade of P for it to count towards the requirements for the major, concentration, or interdepartmental majors.

Economics Electives

Only those courses identified in the Economics Department listings in this Bulletin may be taken for elective credit. All 3000-level or higher electives offered by the Economics Department have ECON UN3211 Intermediate Microeconomics and ECON UN3213 Intermediate

Macroeconomics as prerequisites. However, some electives have additional prerequisites and students should ensure that all prerequisites have been completed (see the table of prerequisites printed above). *Seminars do not count as electives.*

Seminars

Seminars can be taken only after all of the required core courses in economics have been successfully completed. Students may not take or re-take ECON UN3211 Intermediate Microeconomics, ECON UN3213 Intermediate Macroeconomics, or ECON UN3412 Introduction To Econometrics concurrently with any senior seminar. *Seminars do not count as electives.* Each seminar is limited to sixteen students, with priority given to seniors. For ECPS GU4921 Seminar In Political Economy and ECPH GU4950 Economics and Philosophy Seminar, priority is given to economics–political science and economics–philosophy majors, respectively.

For seminar registration details, read the information posted on the department's *Senior Seminar Registration* page: <http://econ.columbia.edu/senior-seminars-registration> (<http://econ.columbia.edu/senior-seminars-registration/>).

Mathematics

Students must consult with the Mathematics Department for the appropriate placement in the calculus sequence. Students must complete one of the following sequences:

Select one of the following sequences:

MATH UN1101 - MATH UN1201	Calculus I and Calculus III
MATH UN1101 - MATH UN1205	Calculus I and Accelerated Multivariable Calculus
MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B

In addition:

1. Students who receive a grade of D or F in MATH UN1201 Calculus III or MATH UN1205 must retake the course, but may enroll in ECON UN3211 Intermediate Microeconomics.
2. Students who receive a grade of D or F in MATH UN1207 Honors Mathematics A may either retake the course, or take MATH UN1201 Calculus III or MATH UN1205, and enroll in ECON UN3211 Intermediate Microeconomics concurrently.

Statistics

Unless otherwise specified below, all students must take STAT UN1201 Calculus-Based Introduction to Statistics, or a higher level course, such as STAT GU4204 Statistical Inference, or STAT GU4001.

Barnard Courses

A limited number of Barnard economics electives may count toward the major, concentration, and interdepartmental majors. Students should pay careful attention to the limit of Barnard electives indicated in their program requirements. Please see the *Transfer Credit* section below for information on the number of Barnard electives that may be taken to fulfill major requirements. In addition, students may receive credit for the major, concentration, and interdepartmental majors only for those Barnard economics courses listed in this Bulletin. However, students may not receive credit for two courses whose content overlaps. Barnard and Columbia economics electives with overlapping content include but are not limited to:

ECON BC3029 - ECON GU4321	Empirical Development Economics and Economic Development
ECON BC3038 - ECON GU4505	International Money and Finance and International Macroeconomics
ECON BC3019 - ECON GU4400	Labor Economics and Labor Economics
ECON BC3047 - ECON GU4500	International Trade and International Trade
ECON BC3039 - ECON GU4625	Environmental and Natural Resource Economics and Economics of the Environment
ECON BC3041 - ECON GU4235	Theoretical Foundations of Political Economy and HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4400	Labor Economics
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes

Students should always first consult with *econ-advising* to confirm that the Barnard elective they wish to take does not overlap with a Columbia elective that they have already taken or plan to take. Students may *not* take the Barnard core economics, math, statistics, or seminar courses for credit towards the completion of major requirements.

School of Professional Studies Courses

The Department of Economics does not accept *any* of the courses offered through the School of Professional Studies for credit towards the economics major, concentration, or interdepartmental majors with the exception of the courses offered by the Economics Department during the summer session at Columbia.

Other Department and School Courses

Please note that with the exception of the above Barnard courses and the specific courses listed below for the financial

economics major, no other courses offered through the different departments and schools at Columbia count toward the economics majors or concentration.

Transfer Credits

Students are required to take a minimum number of courses in the Columbia Economics Department. For all majors and interdepartmental majors, students must complete a minimum of *five* lecture courses in the Columbia department. Students may fulfill their remaining requirements for economics lecture courses through AP (or IB or GCE) credits, Barnard electives, transfer courses, and study abroad courses (the latter two are subject to the approval of the Economics Department). The following table summarizes the new rules:

Program	Number of required economics lecture courses	Minimum number which must be taken in the department	Maximum number of outside allowed
Economics major	9	5	4
Financial economics	8	5	3
Economics-mathematics	7	5	2
Economics-political science	7	5	2
Economics-statistics	7	5	2
Economics-philosophy	7	5	2
Economics concentration	7	4	3

- Lecture courses** do not include seminars, which must be taken in the Columbia Economics Department. The lecture course counts are counts of economics courses only and do **not** include math, statistics, or courses in other departments;
- At least two of the three *3000*-level economics core courses must be taken in the department and no corresponding Barnard courses are accepted. ECON UN3025 Financial Economics and ECON UN3265 The Economics of Money and Banking are counted as departmental courses regardless of the instructor;
- Outside courses** include AP (or IB or GCE) credits, transfer credits, Barnard *2000*- and *3000*-level elective courses and transfer credits from other universities. In the case where two or more courses taken outside of Columbia are used as the equivalent of ECON UN1105 Principles of Economics, those courses are counted as one transfer course.

Approval of transfer credits to fulfill economics requirements must be obtained in writing from the Department of Economics (see the departmental website (<http://www.columbia.edu/cu/economics/>) or speak with your advising dean for information regarding applications for transfer credit). Approval is granted only for courses that are considered to be comparable to those offered at Columbia.

Summer courses taken at other institutions must be approved in writing by the department's transfer credit adviser before the course is taken. The department does not accept transfer credits for any *3000* level core courses taken during a summer session outside of Columbia University. Summer courses taken from the department of economics at Columbia University do not need approval.

Guidelines and instructions on how to request transfer credit approval can be found in the *Transfer Credit Information* page of the departmental website (<http://www.columbia.edu/cu/economics/>).

MAJOR IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 185) above.

The economics major requires a minimum of 35 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 44 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least five electives, of which no more than one may be taken at the *2000*-level (including Barnard courses)

Economics Seminar

Select one economics seminar course

CONCENTRATION IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 185) above.

The economics concentration requires a minimum of 25 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 34 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least three electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

MAJOR IN FINANCIAL ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 185) above.

The Department of Economics offers the major in financial economics, which provides an academic framework to explore the role of financial markets and intermediaries in the allocation (and misallocation) of capital. Among the topics studied in financial economics are financial markets, banks and other financial intermediaries, asset valuation, portfolio allocation, regulation and corporate governance.

The financial economics major requires 26 points in economics, 6 points in mathematics, 3 points in statistics, 3 points in business, and 12 points from a list of selected courses for a total minimum of 50 points as follows:

Economics Core Courses

All economics core courses

Finance Core Courses*

ECON UN3025	Financial Economics
ECON GU4280	Corporate Finance
BUSI UN3013	Financial Accounting

*NOTE: The department considers BUSI UN3013 and IEOR E2261 as overlapping courses. Students who take both courses shall be credited with one course only. Financial economics majors who are also in the Business Management concentration program (CNBUMG) must take an additional elective from either the financial economics prescribed elective list (below) or from the CNBUMB prescribed list.

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Electives

Select four of the following, of which two must be from the Columbia or Barnard economics departments, or equivalent economics transfer credits:

ECON BC3014	Entrepreneurship
ECON BC3017	Economics of Business Organization
ECON UN3265	The Economics of Money and Banking
ECON UN3952	Seminar in Macroeconomics and Formation of Expectations
ECON GU4020	Economics of Uncertainty and Information

ECON GU4213	Advanced Macroeconomics
ECON GU4251	Industrial Organization
ECON GU4260	Market Design
ECON GU4412	Advanced Econometrics
ECON GU4415	Game Theory
ECON GU4465	Public Economics
ECON GU4500	International Trade
ECON GU4505	International Macroeconomics
or ECON BC3038	International Money and Finance
ECON G4526	Transition Reforms, Globalization and Financial Crisis
ECON GU4700	Financial Crises
ECON GU4710	Finance and the Real Economy
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON GU4860	Behavioral Finance
BIOT GU4180	Entrepreneurship in Biotechnology
BUSI UN3021	Marketing Management
BUSI UN3701	Strategy Formulation
BUSI UN3702	Venturing to Change the World
BUSI UN3703	Leadership in Organizations
BUSI UN3704	Making History Through Venturing
COMS W1002	Computing in Context
HIST W2904	History of Finance
IEOR E3106	Stochastic Systems and Applications
IEOR E4700	Introduction to Financial Engineering
MATH UN3050	Discrete Time Models in Finance
POLS UN3630	Politics of International Economic Relations
STAT W3201	Math Finance in Continuous Time
STAT GU4261	Statistical Methods in Finance
STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance

Seminar

The seminar must be chosen from a list of seminars eligible for the financial economics major. The department indicates which seminars are eligible for the major on the Senior Seminars page of the departmental website.

Students must have completed at least one of ECON UN3025 or ECON GU4280 prior to taking their senior seminar.

* Students must complete the finance core no later than fall of their senior year.

MAJOR IN ECONOMICS-MATHEMATICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 185) above.

The major in economics and mathematics provides students with a grounding in economic theory comparable to that provided by the general economics major and exposes students to rigorous and extensive training in mathematics. The program is recommended for any student planning to do graduate work in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Mathematics has an assigned adviser with whom students may consult on mathematics requirements. The economics adviser can only advise on economics requirements; the mathematics adviser can only advise on mathematics requirements.

The economics-mathematics major requires a total of 52 or 56 points (depending on mathematics sequence) : 29 points in economics and 23-27 points in mathematics and statistics as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
 - MATH UN1102 and Calculus II
 - MATH UN1201 and Calculus III
 - MATH UN2010 and Linear Algebra

MATH UN1101 Calculus I
 - MATH UN1102 and Calculus II
 - MATH UN1205 and Accelerated Multivariable
 - MATH UN2010 Calculus
 and Linear Algebra

MATH UN1207 Honors Mathematics A
 - MATH UN1208 and Honors Mathematics B

Note: Students who take MATH UN1205 may not receive credit for both MATH UN1201 and MATH UN1202.

Analysis requirement:

MATH UN2500 Analysis and Optimization

Select three of the following:

MATH UN1202 Calculus IV
 MATH UN2030 Ordinary Differential Equations

Any mathematics course at the 3000-level or above

Note: Students who take MATH UN1205 will not receive credit for MATH UN1202.

Statistics

Select one of the following sequences:

STAT GU4001 Introduction to Probability and
 Statistics

STAT GU4203 PROBABILITY THEORY
 - STAT GU4204 and Statistical Inference

Economics Seminar

Select an economics seminar

NOTE:

1. Students who fulfill the statistics requirement with STAT GU4203 and STAT GU4204, may count STAT GU4203 or STAT GU4204 as one of the three required mathematics electives.
2. Students who choose the one year sequence (STAT GU4203/ STAT GU4204), must complete the year long sequence *prior* to taking ECON UN3412. Students receive elective credit for the probability course.

MAJOR IN ECONOMICS-PHILOSOPHY

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 185) above.

Economics-philosophy is an interdisciplinary major that introduces students to basic methodologies of economics and philosophy and stresses areas of particular concern to both, e.g. rationality and decision making, justice and efficiency, freedom and collective choice, logic of empirical theories and testing. Many issues are dealt with historically. Classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Philosophy has an assigned adviser with whom students may consult on philosophy requirements. The economics adviser can only advise on economics requirements; the philosophy adviser can only advise on philosophy requirements.

The economics-philosophy major requires a total minimum of 54 points: 25 points in economics, 16 points in philosophy, 6 points in mathematics, 3 points in statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105 Principles of Economics

ECON UN3211 Intermediate Microeconomics

ECON UN3213 Intermediate Macroeconomics

ECON UN3412 Introduction To Econometrics

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three Electives are required; two must be selected from the below list, and the remaining elective may be any economics elective at the 3000-level or above.

ECON GU4020	Economics of Uncertainty and Information
ECON GU4211	Advanced Microeconomics
ECON GU4213	Advanced Macroeconomics
ECON GU4228	Urban Economics
ECON GU4230	Economics of New York City
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4301	Economic Growth and Development
ECON GU4370	Political Economy
ECON GU4400	Labor Economics
ECON GU4415	Game Theory
ECON GU4438	Economics of Race in the U.S.
ECON GU4465	Public Economics
ECON GU4480	Gender and Applied Economics
ECON GU4500	International Trade
ECON W4615	Law and Economics
ECON GU4625 or ECON BC3039	Economics of the Environment Environmental and Natural Resource Economics
ECON GU4750	Globalization and Its Risks
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON BC3011	Inequality and Poverty
Philosophy Courses	
PHIL UN1010	Methods and Problems of Philosophical Thought
PHIL UN3411	Symbolic Logic
PHIL UN3701	Ethics
PHIL UN3551 or PHIL UN3960	Philosophy of Science Epistemology
PHIL GU4561	Probability and Decision Theory
Seminar	
ECPH GU4950	Economics and Philosophy Seminar

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN ECONOMICS–POLITICAL SCIENCE

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 185) above.

Political economy is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Political Science has an assigned adviser with whom students may consult on political science requirements. The economics adviser can only advise on economics requirements; the political science adviser can only advise on political science requirements.

The economics–political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows.

The political science courses are grouped into four areas, i.e. subfields: (1) American Politics, (2) Comparative Politics, (3) International Relations, and (4) Political Theory. For the political science part of the major, students are required to select one area as a major subfield and one as a minor subfield. The corresponding introductory courses in both subfields must be taken, plus two electives in the major subfield, and one in the minor subfield.

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON GU4370	Political Economy

Mathematics

Select a mathematics sequence

Statistical Methods

STAT UN1201	Calculus-Based Introduction to Statistics
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Select one of the following:

ECON UN3412	Introduction To Econometrics
POLS GU4712	PRINC OF QUANT POL RESEARCH 2

Economics Electives

Select two electives (6 points) at the 3000-level or above

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921 Seminar In Political Economy
and a Political Science Department seminar, in the student's
Primary Subfield. Please select one of the following: *

- POLS UN3911 Seminar in Political Theory
or POLS UN3912 Seminar in Political Theory
- POLS UN3921 Seminar in American Politics
or POLS UN3922 Seminar in American Politics
- POLS UN3951 Seminar in Comparative Politics
or POLS UN3952 Seminar in Comparative Politics
- POLS UN3961 International Politics Seminar
or POLS UN3962 INTERNATIONAL POLITICS
SEMINAR

- Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN ECONOMICS- STATISTICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 185) above.

The major in economics-statistics provides students with a grounding in economic theory comparable to that provided by the general economics major, but also exposes students to a significantly more rigorous and extensive statistics training than is provided by the general major. This program is recommended for students with strong quantitative skills and for those contemplating graduate studies in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Statistics has an assigned adviser with whom students may consult on statistics requirements. The economics adviser can only advise on economics requirements; the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, 3 points in computer science as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Calculus III
- MATH UN1201 and Linear Algebra

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Accelerated Multivariable
- MATH UN1205 Calculus
- MATH UN2010 and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Statistics

STAT UN1201 Calculus-Based Introduction to
Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

One elective in statistics from among courses numbered
STAT GU 4206 through GU 4266.

Computer Science

Select one of the following:

COMS W1004 Introduction to Computer Science
and Programming in Java

COMS W1005 Introduction to Computer Science
and Programming in MATLAB

COMS W1007 Honors Introduction to Computer
Science

ENGI E1006 Introduction to Computing for
Engineers and Applied Scientists

STAT UN2102 Applied Statistical Computing

Economics Seminar

ECON GU4918 Seminar In Econometrics

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

ECONOMICS - STATISTICS

Departmental Office: 1022 International Affairs Building;
212-854-3680
<http://www.columbia.edu/cu/economics/>

Director of Undergraduate Studies: Dr. Susan Elmes,
1006 International Affairs Building; 212-854-9124;
se5@columbia.edu

Director of Departmental Honors Program: Dr. Susan
Elmes, 1006 International Affairs Building; 212-854-9124;
se5@columbia.edu

Economics is the study of the ways in which society allocates its scarce resources among alternative uses and the consequences of

these decisions. The areas of inquiry deal with a varied range of topics such as international trade, domestic and international financial systems, labor market analysis, and the study of less developed economies. Broadly speaking, the goal of an economics major is to train students to think analytically about social issues and, as such, provide a solid foundation for not only further study and careers in economics, but also for careers in law, public service, business, and related fields.

The Economics Department offers a general economics major in addition to five interdisciplinary majors structured to suit the interests and professional goals of a heterogeneous student body. All of these programs have different specific requirements but share the common structure of core theoretical courses that provide the foundation for higher-level elective courses culminating in a senior seminar. Students are urged to carefully look through the details of each of these programs and to contact an appropriate departmental adviser to discuss their particular interests.

ADVANCED PLACEMENT

Tests must be taken in **both** microeconomics and macroeconomics, with a score of 5 on one test and at least a 4 on the other. Provided that this is achieved, the department grants 4 credits for a score of 4 and 5 on the AP Economics exam along with exemption from *ECON UN1105 Principles of Economics*.

ADVISING

The Department of Economics offers a variety of advising resources to provide prospective and current undergraduate majors and concentrators with the information and support needed to successfully navigate through the program. These resources are described below.

Frequently Asked Questions

Please see: <http://econ.columbia.edu/frequently-asked-questions-0> (<http://econ.columbia.edu/frequently-asked-questions-0/>)

As a first step, students are encouraged to visit the department's FAQ page, which provides comprehensive information and answers to the most frequently asked questions about the departmental majors and requirements. This page also includes a section that answers specific questions of first-years, sophomores, and non-majors.

Graduate Student Advisers

For answers to the most common questions that students have about the majors, the department has graduate student advisers, who are available by e-mail at econ-advising@columbia.edu, or during weekly office hours to meet with students.

Students should direct all questions and concerns about their major to the graduate student advisers either in person or via e-mail. The graduate student advisers can discuss major

requirements, scheduling, and major course selection, as well as review student checklists and discuss progress in the major. Occasionally, graduate student advisers may refer a student to someone else in the department (such as the director of undergraduate studies) or in the student's school for additional advising.

Contact information and office hours for the graduate student advisers are posted on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) in the week prior to the beginning of the semester. Students considering one of the interdepartmental majors should speak to both a graduate student adviser from the Economics Department and the adviser from the other department early in the sophomore year.

Faculty Advisers

Faculty advisers are available to discuss students' academic and career goals, both in terms of the undergraduate career and post-graduate degrees and research. Students wishing to discuss these types of substantive topics may request a faculty adviser by completing the form available on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) and depositing it in the mailbox of the director of undergraduate studies in the department's main office, 1022 International Affairs Building.

The department does its best to match students with faculty members that share similar academic interests. While faculty advisers do not discuss major requirements—that is the role of the graduate student advisers—they do provide guidance in course selection as it relates to meeting a student's intellectual goals and interests, as well as advise on career and research options. It is recommended that students who plan on attending a Ph.D. program in economics or are interested in pursuing economics research after graduation request a faculty adviser.

ON-LINE INFORMATION

Students can access useful information on-line, including: a comprehensive FAQ page; requirement changes to the major and concentration; sample programs and checklists; faculty office hours, contact information and fields of specialization; adviser information; teaching assistant information; research assistant opportunities; list of tutors; and Columbia-Barnard Economics Society information.

DEPARTMENTAL HONORS

Economics majors and economics joint majors who wish to be considered for departmental honors in economics must:

1. Have at least a 3.7 GPA in their major courses;
2. Take ECON GU4999 Senior Honors Thesis (a one-year course);
3. Receive at least a grade of A- in ECON GU4999 Senior Honors Thesis.

Students must consult and obtain the approval of the departmental undergraduate director in order to be admitted to the workshop. Please note that ECON GU4999 Senior Honors Thesis may be taken to fulfill the **seminar requirement** for the economics major and all economics joint majors. Students who wish to write a senior thesis (ECON GU4999 Senior Honors Thesis) must have completed the core major requirements. Normally no more than 10% of graduating majors receive departmental honors in a given academic year. Please see the *Honors Prizes* page on the department's website for more information.

UNDERGRADUATE PRIZES

All prize recipients are announced at the end of the spring semester each academic year.

The Dean's Prize in Economics

Awarded to General Studies students for excellence in the study of Economics.

Romine Prize

Established in 1997, this prize is awarded annually to two students (Columbia College or General Studies) majoring in economics: one for the best honors thesis paper, and the other for the best economics seminar paper.

Parker Prize for Summer Research

PROFESSORS

Douglas Almond (also School of International and Public Affairs)
 Jushan Bai
 Jagdish N. Bhagwati
 Sandra Black
 Patrick Bolton (also Business School)
 André Burgstaller (Barnard)
 Alessandra Casella (also Political Science Department)
 Yeon-Koo Che
 Pierre-André Chiappori
 Graciela Chichilnisky
 Richard Clarida (also School of International and Public Affairs)
 Donald Davis
 Padma Desai (*emerita*)
 Prajit Dutta
 Harrison Hong
 R. Glenn Hubbard (also Business School)
 Navin Kartik
 Wojciech Kopczuk (also School of International and Public Affairs)
 Sokbae (Simon) Lee
 W. Bentley McLeod (also School of International and Public Affairs)
 Perry Mehrling (Barnard)
 Robert Mundell (*emeritus*)

Suresh Naidu (also School of International and Public Affairs)
 Serena Ng
 Brendan O'Flaherty
 Edmund S. Phelps
 Andrea Prat (also Business School)
 Michael Riordan
 Jeffrey Sachs (also Earth Institute)
 Xavier Sala-i-Martin
 Bernard Salanié (Chair)
 José A. Scheinkman
 Stephanie Schmitt-Grohé
 Rajiv Sethi (Barnard)
 Joseph Stiglitz (also Business School)
 Martín Uribe
 Miguel Urquiola (also School of International and Public Affairs)
 Eric Verhoogen (also School of International and Public Affairs)
 David Weiman (Barnard)
 David Weinstein
 Michael Woodford

ASSOCIATE PROFESSORS

Mark Dean
 Lena Edlund
 Jennifer La'O
 Qingmin Liu

ASSISTANT PROFESSORS

Hassan Afrouzi
 Michael Best
 Andres Drenik
 Matthieu Gomez
 Reka Juhasz
 Elliot Lipnowski
 Jose Luis Montiel Olea
 Xiaosheng Mu
 Evan Sadler
 Jack Willis

LECTURERS

Irasema Alonso
 Tri Vi Dang
 Susan Elmes
 Seyhan Erden
 Tamrat Gashaw
 Sunil Gulati
 Ronald Miller
 Wouter Vergote

ADJUNCT FACULTY

Tim Goodspeed
 Claudia Halbac
 Ed Lincoln
 Neal Masia

Caterina Musatti
Waseem Noor
Ingmar Nyman
Maxim Pinkovskiy

ON LEAVE

Profs. Clarida, Drenik, Hubbard, Kopczuk, Liu, Riordan
(2019-2020)

Profs. Best, Salanie, Scheinkman (Fall 2019)

Profs. Lee, Montiel Olea, Weinstein (Spring 2020)

GUIDELINES FOR ALL ECONOMICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Checklists and Requirement

Checklists and Requirement information are available on the Department website (<https://econ.columbia.edu/undergraduate/requirements-and-forms/>).

Course List

Economics Core Courses

All of the core courses must be completed **no later than the spring semester** of the student's **junior year** and must be taken at Columbia. *Students who take any core course during the fall semester of their senior year must obtain written permission from the department's director of undergraduate studies.* Unless otherwise specified below, all students must complete the following core courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Prerequisites

Course prerequisites are strictly enforced. Prerequisites must be taken before the course, not after or concurrently.

Economics courses taken before the completion of any of its prerequisites, even with instructor approval, are **not** counted toward the major, concentration, or interdepartmental majors. Exemptions from a prerequisite requirement may only be made, in writing, by the department's director of undergraduate studies. Credits from a course taken *prior* to the completion of its prerequisites are **not** counted towards the major requirements. As a consequence, students are required to complete **additional**, specific courses in economics at the direction of the director of undergraduate studies.

The prerequisites for required courses are as follows:

Course	Prerequisites
ECON UN1105 Principles of Economics	None
MATH UN1101 Calculus I	
STAT UN1201 Calculus-Based Introduction to Statistics	MATH UN1101 Calculus I
ECON UN3211 Intermediate Microeconomics	ECON UN1105 Principles of Economics MATH UN1201 Calculus III or UN1205
ECON UN3213 Intermediate Macroeconomics	ECON UN1105 Principles of Economics MATH UN1101 Calculus I Co-requisite: MATH UN1201 Calculus III or UN1205
ECON UN3412 Introduction To Econometrics	MATH UN1201 Calculus III or UN1205 ECON UN3211 Intermediate Microeconomics or UN3213 STAT UN1201 Calculus-Based Introduction to Statistics
ECON 2000-level electives	ECON UN1105 Principles of Economics
ECON GU4211 Advanced Microeconomics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics MATH UN2010 Linear Algebra Corequisites: MATH UN2500 Analysis and Optimization or GU4061
ECON GU4412 Advanced Econometrics	ECON UN3211 Intermediate Microeconomics
ECON GU4213 Advanced Macroeconomics	ECON UN3213 Intermediate Macroeconomics
ECON GU4413 Econometrics of Time Series and Forecasting	ECON UN3412 Introduction To Econometrics MATH UN2010 Linear Algebra

ECON UN3025 Financial Economics	ECON UN3211 Intermediate Microeconomics	ECPH GU4950 Economics and Philosophy Seminar	ECON UN3211 Intermediate Microeconomics
ECON GU4020 Economics of Uncertainty and Information	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4230 Economics of New York City	STAT UN1201 Calculus-Based Introduction to Statistics		ECON UN3412 Introduction To Econometrics
ECON GU4260 Market Design		Barnard electives	See Barnard bulletin
ECON GU4280 Corporate Finance			
ECON GU4370 Political Economy			
ECON GU4700 Financial Crises			
ECON GU4710 Finance and the Real Economy			
ECON GU4850 Cognitive Mechanisms and Economic Behavior			
ECON GU4860 Behavioral Finance	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
All other ECON 3000- and 4000-level electives	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
ECON UN3901 Economics of Education	ECON UN3211 Intermediate Microeconomics		
ECON UN3952 Seminar in Macroeconomics and Formation of Expectations	ECON UN3213 Intermediate Macroeconomics		
ECON UN3981 Applied Econometrics	ECON UN3412 Introduction To Econometrics		
ECON GU4911 Seminar In Microeconomics			
ECON GU4913 Seminar In Macroeconomics			
ECON GU4918 Seminar In Econometrics			
ECPS GU4921 Seminar In Political Economy	ECON UN3211 Intermediate Microeconomics		
	ECON UN3213 Intermediate Macroeconomics		
	ECON UN3412 Introduction To Econometrics		
	ECON GU4370 Political Economy		

It is **strongly recommended** that students take ECON UN3412 Introduction To Econometrics in the semester **immediately** following the completion of the statistics course.

Grading

No course with a grade of D or lower, including calculus and statistics courses, can count toward the major, concentration, or interdepartmental majors. Economics core courses with a grade of D or F must be retaken and completed with a grade of C- or better.

Students who receive a grade of D or F in a core course are permitted to take a higher-level elective course that has that core course as a prerequisite, so long as it is taken concurrently with the retaking of that core course. For example, if a student fails ECON UN3211 Intermediate Microeconomics, the student must retake it and, in the same semester, may enroll in an elective course for which it is a prerequisite, provided that all other prerequisites for the elective have been completed. The same rule applies to the required math and statistics courses. For example, if a student fails *MATH UN1201 Calculus III*, the student may retake calculus III concurrently with *Intermediate Microeconomics*. Students who must retake any core economics or math course may not retake it concurrently with a senior seminar; the economics core courses *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, and *ECON UN3412 Introduction To Econometrics* must be successfully completed before a student may enroll in a seminar.

A grade of W is not equivalent to a grade of D or F; it does not qualify a student to retake the course concurrently with a higher level course that lists the course as a prerequisite. Students who receive a grade of W in a core course must complete the course with a grade of C- or better before taking a course that lists it as a prerequisite.

Only ECON UN1105 Principles of Economics may be taken for a grade of Pass/D/Fail, and the student must receive a grade of P for it to count towards the requirements for the major, concentration, or interdepartmental majors.

Economics Electives

Only those courses identified in the Economics Department listings in this Bulletin may be taken for elective credit. All 3000-level or higher electives offered by the Economics Department have ECON UN3211 Intermediate Microeconomics and ECON UN3213 Intermediate

Macroeconomics as prerequisites. However, some electives have additional prerequisites and students should ensure that all prerequisites have been completed (see the table of prerequisites printed above). *Seminars do not count as electives.*

Seminars

Seminars can be taken only after all of the required core courses in economics have been successfully completed. Students may not take or re-take ECON UN3211 Intermediate Microeconomics, ECON UN3213 Intermediate Macroeconomics, or ECON UN3412 Introduction To Econometrics concurrently with any senior seminar. *Seminars do not count as electives.* Each seminar is limited to sixteen students, with priority given to seniors. For ECPS GU4921 Seminar In Political Economy and ECPH GU4950 Economics and Philosophy Seminar, priority is given to economics–political science and economics–philosophy majors, respectively.

For seminar registration details, read the information posted on the department's *Senior Seminar Registration* page: <http://econ.columbia.edu/senior-seminars-registration> (<http://econ.columbia.edu/senior-seminars-registration/>).

Mathematics

Students must consult with the Mathematics Department for the appropriate placement in the calculus sequence. Students must complete one of the following sequences:

Select one of the following sequences:

MATH UN1101 - MATH UN1201	Calculus I and Calculus III
MATH UN1101 - MATH UN1205	Calculus I and Accelerated Multivariable Calculus
MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B

In addition:

1. Students who receive a grade of D or F in MATH UN1201 Calculus III or MATH UN1205 must retake the course, but may enroll in ECON UN3211 Intermediate Microeconomics.
2. Students who receive a grade of D or F in MATH UN1207 Honors Mathematics A may either retake the course, or take MATH UN1201 Calculus III or MATH UN1205, and enroll in ECON UN3211 Intermediate Microeconomics concurrently.

Statistics

Unless otherwise specified below, all students must take STAT UN1201 Calculus-Based Introduction to Statistics, or a higher level course, such as STAT GU4204 Statistical Inference, or STAT GU4001.

Barnard Courses

A limited number of Barnard economics electives may count toward the major, concentration, and interdepartmental majors. Students should pay careful attention to the limit of Barnard electives indicated in their program requirements. Please see the *Transfer Credit* section below for information on the number of Barnard electives that may be taken to fulfill major requirements. In addition, students may receive credit for the major, concentration, and interdepartmental majors only for those Barnard economics courses listed in this Bulletin. However, students may not receive credit for two courses whose content overlaps. Barnard and Columbia economics electives with overlapping content include but are not limited to:

ECON BC3029 - ECON GU4321	Empirical Development Economics and Economic Development
ECON BC3038 - ECON GU4505	International Money and Finance and International Macroeconomics
ECON BC3019 - ECON GU4400	Labor Economics and Labor Economics
ECON BC3047 - ECON GU4500	International Trade and International Trade
ECON BC3039 - ECON GU4625	Environmental and Natural Resource Economics and Economics of the Environment
ECON BC3041 - ECON GU4235	Theoretical Foundations of Political Economy and HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4400	Labor Economics
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes

Students should always first consult with *econ-advising* to confirm that the Barnard elective they wish to take does not overlap with a Columbia elective that they have already taken or plan to take. Students may *not* take the Barnard core economics, math, statistics, or seminar courses for credit towards the completion of major requirements.

School of Professional Studies Courses

The Department of Economics does not accept *any* of the courses offered through the School of Professional Studies for credit towards the economics major, concentration, or interdepartmental majors with the exception of the courses offered by the Economics Department during the summer session at Columbia.

Other Department and School Courses

Please note that with the exception of the above Barnard courses and the specific courses listed below for the financial

economics major, no other courses offered through the different departments and schools at Columbia count toward the economics majors or concentration.

Transfer Credits

Students are required to take a minimum number of courses in the Columbia Economics Department. For all majors and interdepartmental majors, students must complete a minimum of *five* lecture courses in the Columbia department. Students may fulfill their remaining requirements for economics lecture courses through AP (or IB or GCE) credits, Barnard electives, transfer courses, and study abroad courses (the latter two are subject to the approval of the Economics Department). The following table summarizes the new rules:

Program	Number of required economics lecture courses	Minimum number which must be taken in the department	Maximum number of outside allowed
Economics major	9	5	4
Financial economics	8	5	3
Economics-mathematics	7	5	2
Economics-political science	7	5	2
Economics-statistics	7	5	2
Economics-philosophy	7	5	2
Economics concentration	7	4	3

- Lecture courses** do not include seminars, which must be taken in the Columbia Economics Department. The lecture course counts are counts of economics courses only and do **not** include math, statistics, or courses in other departments;
- At least two of the three *3000*-level economics core courses must be taken in the department and no corresponding Barnard courses are accepted. ECON UN3025 Financial Economics and ECON UN3265 The Economics of Money and Banking are counted as departmental courses regardless of the instructor;
- Outside courses** include AP (or IB or GCE) credits, transfer credits, Barnard *2000*- and *3000*-level elective courses and transfer credits from other universities. In the case where two or more courses taken outside of Columbia are used as the equivalent of ECON UN1105 Principles of Economics, those courses are counted as one transfer course.

Approval of transfer credits to fulfill economics requirements must be obtained in writing from the Department of Economics (see the departmental website (<http://www.columbia.edu/cu/economics/>) or speak with your advising dean for information regarding applications for transfer credit). Approval is granted only for courses that are considered to be comparable to those offered at Columbia.

Summer courses taken at other institutions must be approved in writing by the department's transfer credit adviser before the course is taken. The department does not accept transfer credits for any *3000* level core courses taken during a summer session outside of Columbia University. Summer courses taken from the department of economics at Columbia University do not need approval.

Guidelines and instructions on how to request transfer credit approval can be found in the *Transfer Credit Information* page of the departmental website (<http://www.columbia.edu/cu/economics/>).

MAJOR IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 195) above.

The economics major requires a minimum of 35 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 44 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least five electives, of which no more than one may be taken at the *2000*-level (including Barnard courses)

Economics Seminar

Select one economics seminar course

CONCENTRATION IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 195) above.

The economics concentration requires a minimum of 25 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 34 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least three electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

MAJOR IN FINANCIAL ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 195) above.

The Department of Economics offers the major in financial economics, which provides an academic framework to explore the role of financial markets and intermediaries in the allocation (and misallocation) of capital. Among the topics studied in financial economics are financial markets, banks and other financial intermediaries, asset valuation, portfolio allocation, regulation and corporate governance.

The financial economics major requires 26 points in economics, 6 points in mathematics, 3 points in statistics, 3 points in business, and 12 points from a list of selected courses for a total minimum of 50 points as follows:

Economics Core Courses

All economics core courses

Finance Core Courses*

ECON UN3025	Financial Economics
ECON GU4280	Corporate Finance
BUSI UN3013	Financial Accounting

*NOTE: The department considers BUSI UN3013 and IEOR E2261 as overlapping courses. Students who take both courses shall be credited with one course only. Financial economics majors who are also in the Business Management concentration program (CNBUMG) must take an additional elective from either the financial economics prescribed elective list (below) or from the CNBUMB prescribed list.

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Electives

Select four of the following, of which two must be from the Columbia or Barnard economics departments, or equivalent economics transfer credits:

ECON BC3014	Entrepreneurship
ECON BC3017	Economics of Business Organization
ECON UN3265	The Economics of Money and Banking
ECON UN3952	Seminar in Macroeconomics and Formation of Expectations
ECON GU4020	Economics of Uncertainty and Information

ECON GU4213	Advanced Macroeconomics
ECON GU4251	Industrial Organization
ECON GU4260	Market Design
ECON GU4412	Advanced Econometrics
ECON GU4415	Game Theory
ECON GU4465	Public Economics
ECON GU4500	International Trade
ECON GU4505	International Macroeconomics
or ECON BC3038	International Money and Finance
ECON G4526	Transition Reforms, Globalization and Financial Crisis
ECON GU4700	Financial Crises
ECON GU4710	Finance and the Real Economy
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON GU4860	Behavioral Finance
BIOT GU4180	Entrepreneurship in Biotechnology
BUSI UN3021	Marketing Management
BUSI UN3701	Strategy Formulation
BUSI UN3702	Venturing to Change the World
BUSI UN3703	Leadership in Organizations
BUSI UN3704	Making History Through Venturing
COMS W1002	Computing in Context
HIST W2904	History of Finance
IEOR E3106	Stochastic Systems and Applications
IEOR E4700	Introduction to Financial Engineering
MATH UN3050	Discrete Time Models in Finance
POLS UN3630	Politics of International Economic Relations
STAT W3201	Math Finance in Continuous Time
STAT GU4261	Statistical Methods in Finance
STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance

Seminar

The seminar must be chosen from a list of seminars eligible for the financial economics major. The department indicates which seminars are eligible for the major on the Senior Seminars page of the departmental website.

Students must have completed at least one of ECON UN3025 or ECON GU4280 prior to taking their senior seminar.

* Students must complete the finance core no later than fall of their senior year.

MAJOR IN ECONOMICS-MATHEMATICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 195) above.

The major in economics and mathematics provides students with a grounding in economic theory comparable to that provided by the general economics major and exposes students to rigorous and extensive training in mathematics. The program is recommended for any student planning to do graduate work in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Mathematics has an assigned adviser with whom students may consult on mathematics requirements. The economics adviser can only advise on economics requirements; the mathematics adviser can only advise on mathematics requirements.

The economics-mathematics major requires a total of 52 or 56 points (depending on mathematics sequence) : 29 points in economics and 23-27 points in mathematics and statistics as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	Calculus and Linear Algebra

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Note: Students who take MATH UN1205 may not receive credit for both MATH UN1201 and MATH UN1202.

Analysis requirement:

MATH UN2500	Analysis and Optimization
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Select three of the following:

MATH UN1202	Calculus IV
MATH UN2030	Ordinary Differential Equations

Any mathematics course at the 3000-level or above

Note: Students who take MATH UN1205 will not receive credit for MATH UN1202.

Statistics

Select one of the following sequences:

STAT GU4001	Introduction to Probability and Statistics
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STAT GU4203 - STAT GU4204	PROBABILITY THEORY and Statistical Inference
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Economics Seminar

Select an economics seminar

NOTE:

1. Students who fulfill the statistics requirement with STAT GU4203 and STAT GU4204, may count STAT GU4203 or STAT GU4204 as one of the three required mathematics electives.
2. Students who choose the one year sequence (STAT GU4203/ STAT GU4204), must complete the year long sequence *prior* to taking ECON UN3412. Students receive elective credit for the probability course.

MAJOR IN ECONOMICS-PHILOSOPHY

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 195) above.

Economics-philosophy is an interdisciplinary major that introduces students to basic methodologies of economics and philosophy and stresses areas of particular concern to both, e.g. rationality and decision making, justice and efficiency, freedom and collective choice, logic of empirical theories and testing. Many issues are dealt with historically. Classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Philosophy has an assigned adviser with whom students may consult on philosophy requirements. The economics adviser can only advise on economics requirements; the philosophy adviser can only advise on philosophy requirements.

The economics-philosophy major requires a total minimum of 54 points: 25 points in economics, 16 points in philosophy, 6 points in mathematics, 3 points in statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105	Principles of Economics
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ECON UN3211	Intermediate Microeconomics
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ECON UN3213	Intermediate Macroeconomics
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ECON UN3412	Introduction To Econometrics
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Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three Electives are required; two must be selected from the below list, and the remaining elective may be any economics elective at the 3000-level or above.

ECON GU4020	Economics of Uncertainty and Information
ECON GU4211	Advanced Microeconomics
ECON GU4213	Advanced Macroeconomics
ECON GU4228	Urban Economics
ECON GU4230	Economics of New York City
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4301	Economic Growth and Development
ECON GU4370	Political Economy
ECON GU4400	Labor Economics
ECON GU4415	Game Theory
ECON GU4438	Economics of Race in the U.S.
ECON GU4465	Public Economics
ECON GU4480	Gender and Applied Economics
ECON GU4500	International Trade
ECON W4615	Law and Economics
ECON GU4625 or ECON BC3039	Economics of the Environment Environmental and Natural Resource Economics
ECON GU4750	Globalization and Its Risks
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON BC3011	Inequality and Poverty
Philosophy Courses	
PHIL UN1010	Methods and Problems of Philosophical Thought
PHIL UN3411	Symbolic Logic
PHIL UN3701	Ethics
PHIL UN3551 or PHIL UN3960	Philosophy of Science Epistemology
PHIL GU4561	Probability and Decision Theory
Seminar	
ECPH GU4950	Economics and Philosophy Seminar

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN ECONOMICS–POLITICAL SCIENCE

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 195) above.

Political economy is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Political Science has an assigned adviser with whom students may consult on political science requirements. The economics adviser can only advise on economics requirements; the political science adviser can only advise on political science requirements.

The economics–political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows.

The political science courses are grouped into four areas, i.e. subfields: (1) American Politics, (2) Comparative Politics, (3) International Relations, and (4) Political Theory. For the political science part of the major, students are required to select one area as a major subfield and one as a minor subfield. The corresponding introductory courses in both subfields must be taken, plus two electives in the major subfield, and one in the minor subfield.

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON GU4370	Political Economy

Mathematics

Select a mathematics sequence

Statistical Methods

STAT UN1201	Calculus-Based Introduction to Statistics
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Select one of the following:

ECON UN3412	Introduction To Econometrics
POLS GU4712	PRINC OF QUANT POL RESEARCH 2

Economics Electives

Select two electives (6 points) at the 3000-level or above

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921 Seminar In Political Economy
and a Political Science Department seminar, in the student's
Primary Subfield. Please select one of the following: *

- POLS UN3911 Seminar in Political Theory
or POLS UN3912 Seminar in Political Theory
- POLS UN3921 Seminar in American Politics
or POLS UN3922 Seminar in American Politics
- POLS UN3951 Seminar in Comparative Politics
or POLS UN3952 Seminar in Comparative Politics
- POLS UN3961 International Politics Seminar
or POLS UN3962 INTERNATIONAL POLITICS
SEMINAR

- Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN ECONOMICS- STATISTICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 195) above.

The major in economics-statistics provides students with a grounding in economic theory comparable to that provided by the general economics major, but also exposes students to a significantly more rigorous and extensive statistics training than is provided by the general major. This program is recommended for students with strong quantitative skills and for those contemplating graduate studies in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Statistics has an assigned adviser with whom students may consult on statistics requirements. The economics adviser can only advise on economics requirements; the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, 3 points in computer science as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Calculus III
- MATH UN1201 and Linear Algebra

MATH UN1101 Calculus I
and Calculus II
- MATH UN1102 and Accelerated Multivariable
- MATH UN1205 Calculus
- MATH UN2010 and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Statistics

STAT UN1201 Calculus-Based Introduction to
Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

One elective in statistics from among courses numbered
STAT GU 4206 through GU 4266.

Computer Science

Select one of the following:

COMS W1004 Introduction to Computer Science
and Programming in Java

COMS W1005 Introduction to Computer Science
and Programming in MATLAB

COMS W1007 Honors Introduction to Computer
Science

ENGI E1006 Introduction to Computing for
Engineers and Applied Scientists

STAT UN2102 Applied Statistical Computing

Economics Seminar

ECON GU4918 Seminar In Econometrics

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

EDUCATION*

***Education is offered exclusively as a concentration.**

335-336 Milbank Hall
212-854-7072

Department Assistant: Patricia Argueta

The Barnard Education Program is committed to strengthening public education and addressing issues of equity and social justice, particularly in urban schools. We offer three tracks in Education: Urban Teaching-Elementary/Childhood Education, Urban Teaching-Secondary/Adolescent Education, and Education Studies. In these tracks, students develop a critical lens for looking at the issues facing public schooling and consider ways to promote fair and inclusive policies and practices for all children in our public system. The program

is open to all undergraduates at Columbia (BC, SEAS, GS, CC) who are interested in becoming certified teachers, working with young people in human service agencies, or preparing for careers related to education.

Urban Teaching Minors/Special Concentrations: Our goal is to prepare students to become skilled and reflective teachers who can effectively respond to the learning needs of diverse learners, and create supportive and intellectually stimulating classroom communities. Students learn to create innovative curriculum; gain experience observing, tutoring, and teaching a diverse range of children and young people; develop confidence in their role as teachers who can promote fair and inclusive school practices; and graduate with certification to teach in New York. (Note: we are part of an interstate agreement for reciprocal certification with many other states.)

This program is registered by the New York State Department of Education and accredited by the Association for Advancing Quality in Educator Preparation (AAQEP). These tracks prepare students to obtain a teaching position as a certified teacher upon graduation and/or to pursue graduate studies in education, public policy, sociology, youth studies, and other related fields.

Education Studies Minor/Special Concentration: This track prepares students to pursue graduate studies or positions in public policy, sociology, history, youth studies, philosophy, psychology, and other areas where K-12 education is frequently a focus of coursework and scholarship. Students learn to think deeply and knowledgeably about the manner in which schools socialize as well as educate citizens, and examine how the interests of different stakeholders are privileged or neglected. The courses are linked by a focus on educational inequality and youth studies. This track does not lead to certification.

All three tracks are minors (BC) or special concentrations (CC, GS, SEAS) and are intended to complement a major's disciplinary specialization and methodological training. In addition to the requirements of the minor/special concentration, students must complete a major.

Student Learning Outcomes

1. Knowledge of Self: Students investigate how educational experiences in and out of school affect their vision for teaching and learning, use that knowledge to reflect upon and critique their practice, and set goals for continuing growth as equitable, multicultural educators.
2. Knowledge of Students: Students understand the importance of getting to know the children and youth in their classrooms; develop specific strategies that aid in understanding students' needs, capacities, interests, funds of knowledge, and social identities; and construct learning experiences that are responsive and relevant to their students.
3. Knowledge of Content: Students develop knowledge and skills to critique the social, political, cultural, and historical

forces that construct traditional content knowledge and design academic content that is dynamic, inquiry-based, and encompasses multiple literacies, and cultural perspectives.

4. Knowledge of Pedagogy: Students experience, practice, evaluate, and reflect on a range of constructivist, inclusive, critical, collaborative, and authentic methods for engaging students in learning and in assessing learning outcomes
5. Knowledge of Context: Students investigate the complex ways in which social, political, cultural, and historical forces shape school contexts, including students' opportunities in schools, teacher empowerment, effective leadership, roles of parents and the community, and patterns of similarity and difference across schools.

The Education Program is accredited by Teacher Education Accreditation Council (TEAC) to recommend students who complete the program for Initial Certification in either Childhood Education (Grades 1-6) or Adolescent Education (Grades 7-12). Graduates of the program are also eligible for membership in the Interstate Certification Agreement, a reciprocal certification among forty-one states. We provide ongoing support to those who teach in the New York City area through our New Teacher Network.

To apply, visit our website (<https://education.barnard.edu/applytotheprogram/>). Students are encouraged to apply for admission by March of the sophomore year but no later than the first Tuesday in September of the junior year. Those who plan to study abroad during junior year should apply by the spring of the freshman year, but no later than the first Tuesday in September of the sophomore year and take the Inclusive Approaches and Multicultural Pedagogy courses in the fall and spring of sophomore year. Admission criteria include good academic standing; evidence of commitment to the field of education; interest in issues of social justice issues as they affect education, particularly in urban schools; and capacity for growth as an intellectually resourceful and reflective teacher. Enrollment is limited.

Professors

Thea Abu El-Haj (Program Director/Chair)
Maria Rivera Maulucci

Senior Lecturer and Certification Officer

Lisa Edstrom

Term Assistant Professors

Erika Kitzmiller
Rachel Throop

Education Advisory Committee

Peter Balsam, Professor of Psychology and Samuel R. Milbank Chair
Lesley Sharp, Barbara Chamberlain & Helen Chamberlain
Josefsberg Professor of Anthropology
Herbert Sloan, Professor Emeritus of History

Kathryn Yatrakis, Professor of Urban Studies and Former Dean of Academic Affairs (Columbia College)

REQUIREMENTS FOR THE URBAN TEACHING MINORS/SPECIAL CONCENTRATIONS

Elementary/Childhood Education (To Teach Grades 1-6)

This program leads to New York State Initial Certification in Childhood Education (Grades 1-6). In addition to the liberal arts major, students must complete a total of 26-28 credits as follows:

Requirement A - Educational Foundations For students who have already taken EDUC BC3032, PHIL UN2100, SOCI UN3225, or ECON BC3012 to fulfill Requirement A prior to Fall 2018 do not need to enroll in EDUC BC1510 to fulfill the requirement.

EDUC BC1510	Educational Foundations	4
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Requirement B - Psychology

Select one of the following:		3-4.5
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PSYC BC1115	Cognitive Psychology	
PSYC BC1129	Developmental Psychology	
PSYC BC2134	Educational Psychology	
PSYC UN1420	RESEARCH METHODS - HUMAN BEHAVIOR *	

Requirement C - Pedagogical Elective

Select one of the following:		
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EDUC BC3050	Science in the City	
EDUC BC3052	Math and the City	
EDUC BC3055	Arts and Humanities in the City: Critical Literacy and Digital Storytelling	
EDUC BC3058	Science in the City II: Preparing Future Scientists Now	

Requirement D - Pedagogical Core

EDUC BC3025	Inclusive Approaches to Teaching Literacy: Theory and Practice	4
EDUC BC3053	Multicultural Elementary Pedagogy	4
EDUC BC3063	Elementary Student Teaching in Urban Schools	6
EDUC BC3064	Critical Inquiry in Urban Teaching	4
EDUC BC3061	Performance Assessment of Teaching	3

Requirement E - Liberal Arts and Sciences

Visit <https://education.barnard.edu/urban-teaching/liberal-arts-and-sciences-requirements-certification> (<https://education.barnard.edu/urban-teaching/liberal-arts-and-sciences-requirements-certification/>) for more information.

Requirement F - Clinical Experiences

Visit <https://education.barnard.edu/clinicalexperiences> (<https://education.barnard.edu/clinicalexperiences/>) for more information.

* Courses offered at Columbia

Note: Senior year student teaching may conflict with other opportunities at Barnard (e.g., PSYC BC3465 Field Work and Research Seminar: The Barnard Toddler Center, PSYC BC3466 Field Work and Research Seminar: The Barnard Toddler Center). Students with these interests should arrange their schedules accordingly.

Secondary/Adolescent Education (To Teach Grades 7-12)

This program leads to the New York State Initial Certification in Adolescent Education (Grades 7-12) in the fields of English, Foreign and Ancient Languages, Mathematics, the Sciences, and Social Studies. Students must complete a total of 23-26 credits from the following course of study:

Requirement A - Educational Foundations For students who have already taken EDUC BC3032, PHIL UN2100, SOCI UN3225, or ECON BC3012 to fulfill Requirement A prior to Fall 2018 do not need to enroll in EDUC BC1510 to fulfill the requirement.

EDUC BC1510	Educational Foundations	4
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Requirement B - Psychology

Select one of the following:		3-4.5
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PSYC BC1107	Psychology of Learning	
PSYC BC1115	Cognitive Psychology	
PSYC BC1129	Developmental Psychology	
PSYC BC2134	Educational Psychology	
PSYC BC3382	Adolescent Psychology	
PSYC UN1420	RESEARCH METHODS - HUMAN BEHAVIOR *	

Requirement C - Pedagogical Elective

Select one of the following:		
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EDUC BC3050	Science in the City	
EDUC BC3052	Math and the City	
EDUC BC3055	Arts and Humanities in the City: Critical Literacy and Digital Storytelling	
EDUC BC3058	Science in the City II: Preparing Future Scientists Now	

Requirement D - Pedagogical Core

EDUC BC3025	Inclusive Approaches to Teaching Literacy: Theory and Practice	4
EDUC BC3054	Multicultural Secondary Pedagogy	4
EDUC BC3065	Secondary Student Teaching in Urban Schools	6
EDUC BC3064	Critical Inquiry in Urban Teaching	4
EDUC BC3061	Performance Assessment of Teaching	3

Requirement E - Liberal Arts and Sciences

Visit <https://education.barnard.edu/urban-teaching/liberal-arts-and-sciences-requirements-certification> (<https://education.barnard.edu/urban-teaching/liberal-arts-and-sciences-requirements-certification/>) for more information.

Requirement F - Clinical Experiences

Visit <https://education.barnard.edu/clinicalexperiences> (<https://education.barnard.edu/clinicalexperiences/>) for more information.

Additional Urban Teaching Certification Requirements: Adolescent/Secondary

Students seeking certification in Adolescent Education must also complete 36 credits in the content area for which they seek certification. Typically, students major in the subject area for which they are seeking certification. Students must earn a grade of C or better for each course taken in the content core.

English:

A total of 36 credits of English.

Foreign Languages:

A total of 36 credits in French, German, Greek, Italian, Latin, or Spanish.

Mathematics:

A total of 36 credits of Mathematics.

Science:

A total of 36 credits in sciences including a minimum of 18 credits of collegiate-level study in the science or each of the sciences for which certification is sought: Biology, Chemistry, Physics, or Earth Science. Please note that psychology does not count as a science for NYS Teacher Certification. **

Social Studies:

A total of 36 credits, including 6 credits of American History; 6 credits of European or World History; 3 credits of non-Western study; and any other distribution to make 36 credits, chosen from credits in History, Political Science, Anthropology, Sociology, and Economics.

* Courses offered at Columbia

** Please note that some applied science courses will not be accepted.

Certification Requirements

The Urban Teaching program is accredited by AAQEP and approved by the New York State Education Department to recommend students who complete the program for Initial Certification in either Childhood Education (grades 1-6) or Adolescent Education (grades 7-12). New York State has reciprocity with most other states, allowing graduates of the program the ability to apply for certification in another state through our membership in the Interstate Certification Agreement.

Certification is based on demonstrated competency in both academic and field settings. Students are required to complete a minimum of 360 hours of educational based field experiences. 260+ hours must be supervised field based experiences. Students must pass the New York State Teacher Certification Examinations and the edTPA performance assessment. Also required are workshops in Child Abuse Identification; School Violence Intervention and Prevention; and the Dignity for All Students Act (DASA), offered at Teachers College.

REQUIREMENTS FOR THE EDUCATION STUDIES MINOR/SPECIAL CONCENTRATION

To complete the Minor (BC) or Special Concentration (CC/GS) in Education Studies, students must complete 20-24 points of course work, listed below.

The Education Studies track requires a minimum of six courses:

Requirement A - Educational Foundations

EDUC BC1510	Educational Foundations	4
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Requirement B - Educational Foundations Electives

Select two of the following:

EDUC BC3032	Contemporary Issues in Education
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EDUC BC3040	Migration, Globalization, and Education
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EDUC BC3042	Gender, Sexuality, and Schooling
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EDUC BC3044	Education and Social Change in Comparative Global Contexts
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EDUC BC3045	Complicating Class: Education and the Limits of Equity
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PHIL UN2100	Philosophy of Education
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SOCI UN3225	Sociology of Education
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SOCI UN3974	Sociology of Schools, Teaching and Learning *
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ECON BC3012	Economics of Education
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PSYC BC2134	Educational Psychology
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Requirement C - Interdisciplinary Elective (formerly Educational Elective) **

Select one course with advanced approval from Education adviser. For a full list of courses that satisfy the Interdisciplinary Elective requirement, see https://education.barnard.edu/education_studies (https://education.barnard.edu/education_studies/). Advanced approval required for courses not listed on the website.

Requirement D - Pedagogical Elective

Select one of the following:

EDUC BC3050	Science in the City
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EDUC BC3052	Math and the City
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EDUC BC3055	Arts and Humanities in the City: Critical Literacy and Digital Storytelling
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EDUC BC3058	Science in the City II: Preparing Future Scientists Now
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Requirement E - Pedagogical Core

EDUC BC3051	Seminar in Urban Education	4
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* Courses offered at Columbia

** Your final project or paper for the Educational Elective course should focus on educational issues and a copy of the project or paper must be submitted to the Education Program office for inclusion in your student file.

REQUIREMENTS FOR THE URBAN TEACHING SPECIALIZATION

Urban Studies majors who wish to pursue certification should apply to the Education Program by the spring of their freshman year. We encourage students to plan carefully if they wish to pursue this option.

Urban Studies majors who have selected Urban Teaching as their area of specialization within the major should complete the following:

Requirement A - Educational Foundations

EDUC BC1510	Educational Foundations	4
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Requirement B - Psychology

Select one of the following:

PSYC BC1107	Psychology of Learning	
PSYC BC1115	Cognitive Psychology	
PSYC BC1129	Developmental Psychology	
PSYC BC2134	Educational Psychology	
PSYC BC3382	Adolescent Psychology	
PSYC UN1420	RESEARCH METHODS - HUMAN BEHAVIOR *	

Requirement C - Field Studies

Select one of the following:

EDUC BC3050	Science in the City	
EDUC BC3052	Math and the City	
EDUC BC3055	Arts and Humanities in the City: Critical Literacy and Digital Storytelling	
EDUC BC3058	Science in the City II: Preparing Future Scientists Now	
SOCI UN3974	Sociology of Schools, Teaching and Learning *	

Requirement D - Pedagogical Core

EDUC BC3025	Inclusive Approaches to Teaching Literacy: Theory and Practice	4
EDUC BC3053	Multicultural Elementary Pedagogy	4
or EDUC BC3054	Multicultural Secondary Pedagogy	

* Courses offered at Columbia

REQUIREMENTS FOR THE URBAN EDUCATION SPECIALIZATION

Urban Studies majors who have selected Urban Education as their area of specialization within the major should complete the following:

Requirement A - Educational Foundations

EDUC BC1510	Educational Foundations	3
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Requirement B - Educational Electives

Select two of the following:

EDUC BC3032	Contemporary Issues in Education	
EDUC BC3040	Migration, Globalization, and Education	

EDUC BC3042	Gender, Sexuality, and Schooling	
EDUC BC3044	Education and Social Change in Comparative Global Contexts	
EDUC BC3045	Complicating Class: Education and the Limits of Equity	
PHIL UN2100	Philosophy of Education	
SOCI UN3225	Sociology of Education	
ECON BC3012	Economics of Education	

Requirement C - Field Studies

Select one of the following:

EDUC BC3050	Science in the City	
EDUC BC3052	Math and the City	
EDUC BC3055	Arts and Humanities in the City: Critical Literacy and Digital Storytelling	
EDUC BC3058	Science in the City II: Preparing Future Scientists Now	
SOCI UN3974	Sociology of Schools, Teaching and Learning *	

Requirement D - Capstone

EDUC BC3051	Seminar in Urban Education	4
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* Courses offered at Columbia

ENGLISH

Departmental Office: 602 Philosophy; 212-854-3215
<http://www.english.columbia.edu>

Director of Undergraduate Studies: Prof. Molly Murray, 406 Philosophy; 212-854-4016; mpm7@columbia.edu

Departmental Adviser:

Prof. Molly Murray, 406 Philosophy; mpm7@columbia.edu

The program in English fosters the ability to read critically and imaginatively, to appreciate the power of language to shape thought and represent the world, and to be sensitive to the ways in which literature is created and achieves its effects. It has several points of departure, grounding the teaching of critical reading in focused attention to the most significant works of English literature, in the study of the historical and social conditions surrounding literary production and reception, and in theoretical reflection on the process of writing and reading and the nature of the literary work./p>

The courses the department offers draw on a broad range of methodologies and theoretical approaches, from the formalist to the political to the psychoanalytical (to mention just a few). Ranging from the medieval period to the 21st century, the department teaches major authors alongside popular culture, traditional literary genres alongside verbal forms that cut across media, and canonical British literature alongside postcolonial, global, and trans-Atlantic literatures.

At once recognizing traditional values in the discipline and reflecting its changing shape, the major points to three

organizing principles for the study of literature—history, genre, and geography. Requiring students not only to take a wide variety of courses but also to arrange their thinking about literature on these very different grids, the major gives them broad exposure to the study of the past, an understanding of the range of forms that can shape literary meaning, and an encounter with the various geographical landscapes against which literature in English has been produced.

ADVISING

Students are not assigned specific advisers, but rather each year the faculty members serving on the department's Committee on Undergraduate Education (CUE) are designated undergraduate advisers (see above). Upon declaring a major or concentration in English, students should meet with the director of undergraduate studies or a delegated faculty adviser to discuss the program, especially to ensure that students understand the requirements.

Students must fill out a Major Requirements Worksheet early in the semester preceding graduation. The worksheet must be reviewed by an adviser and submitted to 602 Philosophy before the registration period for the final semester. The worksheet is available in the English Department or on-line at <http://english.columbia.edu/undergraduate/major-requirements> (<http://english.columbia.edu/undergraduate/major-requirements/>). It is this worksheet—**not** the Degree Audit Report (DAR)—that determines eligibility for graduation as an English major or concentrator.

COURSE INFORMATION

Lectures

Generally, lectures are addressed to a broad audience and do not assume previous course work in the area, unless prerequisites are noted in the description. The size of some lectures is limited. Senior majors have preference unless otherwise noted, followed by junior majors, followed by senior and junior non-majors. Students are responsible for checking for any special registration procedures on-line at <http://english.columbia.edu/courses> (<http://english.columbia.edu/courses/>).

Seminars

The department regards seminars as opportunities for students to do advanced undergraduate work in fields in which they have already had some related course experience. With the exception of some *CLEN* classes (in which, as comparative courses, much material is read in translation), students' admission to a seminar presupposes their having taken ENGL UN3001 Literary Texts, Critical Methods. During the three weeks preceding the registration period, students should check <http://english.columbia.edu/courses> (<http://english.columbia.edu/courses/>) for application instructions for individual seminars. Applications to seminars are usually due by the end of the week preceding registration. Students should

always assume that the instructor's permission is necessary; those who register without having secured the instructor's permission are not guaranteed admission.

DEPARTMENTAL HONORS

Writing a senior essay is a precondition, though not a guarantee, for the possible granting of departmental honors. After essays are submitted, faculty sponsors deliver a written report on the essay to the department's Committee on Undergraduate Education (CUE), with a grade for the independent study and, if merited, a recommendation for honors. CUE considers all the essays, including sponsor recommendations, reviews students' fall semester grades, and determines which students are to receive departmental honors. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

THE DEGREE AUDIT REPORTING SYSTEM (DARS)

The DAR is a useful tool for students to monitor their progress toward degree requirements, but it is not an official document for the major or concentration, nor should it replace consultation with departmental advisers. The department's director of undergraduate studies is the final authority on whether requirements for the major have been met. Furthermore, the DAR may be inaccurate or incomplete for any number of reasons—for example, courses taken elsewhere and approved for credit do not show up on the DAR report as fulfilling a specific requirement.

ONLINE INFORMATION

Other departmental information—faculty office hours, registration instructions, late changes, etc.—is available on the departmental website (<http://www.english.columbia.edu>).

PROFESSORS

James Eli Adams
 Rachel Adams
 Branka Arsic
 Christopher Baswell (Barnard)
 Sarah Cole
 Julie Crawford
 Nicholas Dames
 Jenny Davidson
 Andrew Delbanco
 Kathy Eden
 Brent Edwards
 Stathis Gourgouris
 Farah Jasmine Griffin
 Jack Halberstam
 Saidiya Hartman
 Marianne Hirsch
 Jean E. Howard
 Sharon Marcus
 Edward Mendelson

Frances Negrón-Muntaner
 Robert O’Meally
 Julie Peters
 Ross Posnock
 Austin E. Quigley
 Bruce Robbins
 James Shapiro
 Gayatri Chakravorty Spivak (University Professor)
 Alan Stewart
 Colm Toibin
 Gauri Viswanathan
 William Worthen (Barnard)
 David M. Yerkes

ASSOCIATE PROFESSORS

Denise Cruz
 Patricia Dailey
 T. Austin Graham
 Erik Gray
 Matt Hart
 Eleanor Johnson
 Molly Murray
 Joseph Slaughter
 Dennis Tenen
 Jennifer Wenzel

ASSISTANT PROFESSORS

Joseph Alvarez
 Lauren Robertson
 Dustin Stewart
 Hannah Weaver

LECTURERS

Paul Grimstad
 Sue Mendelsohn
 Aaron Ritzenberg
 Maura Spiegel
 Nicole B. Wallack

GUIDELINES FOR ALL ENGLISH AND COMPARATIVE LITERATURE MAJORS AND CONCENTRATORS

Declaring a Major in English

Upon declaring a major in English, students should meet with either the director of undergraduate studies or a departmental adviser to discuss the program. Students declaring a major should obtain a Major Requirements Worksheet from 602 Philosophy or on-line (http://english.columbia.edu/files/english/content/ENGLISH%20MAJOR%20WKSHEET_0.pdf), which outlines the requirements.

Additional information, including events and deadlines of particular relevance to undergraduates, is provided at <http://english.columbia.edu/undergraduate> (<http://>

english.columbia.edu/undergraduate/), the department’s undergraduate homepage. The sidebar on this page provides links to pages with details about undergraduate advising, major and concentration requirements, course options and restrictions, registration procedures, the senior essay, and writing prizes, as well as links to downloadable worksheets for the major and concentration and to course distribution requirement lists, past and present. For detailed information about registration procedures, students should consult <http://english.columbia.edu/courses> (<http://english.columbia.edu/courses/>), which explains the requirements and enables students to monitor their own progress.

Newly declared majors should contact the undergraduate assistant in 602 Philosophy Hall and request that their names be added to the department’s electronic mailing list for English majors and concentrators. Because important information now routinely is disseminated through e-mail, it is crucial that students be on this list.

Literary Texts, Critical Methods

The introductory course ENGL UN3001 Literary Texts, Critical Methods, together with its companion seminar, ENGL UN3011 Literary Texts, Critical Methods seminar, is required for the English major and concentration. It should be taken by the end of the sophomore year. Fulfillment of this requirement is a factor in admission to seminars and to some lectures. This once-a-week faculty lecture, accompanied by a seminar led by an advanced graduate student in the department, is intended to introduce students to the study of literature. Students read works from the three major literary modes (lyric, drama, and narrative), drawn from premodern to contemporary literature, and learn interpretative techniques required by these various modes or genres. This course does not fulfill any distribution requirements.

Senior Essay

The senior essay program is an opportunity for students to explore in depth some literary topic of special interest to them, involving extensive background reading and resulting in an essay (8,000–15,000 words) that constitutes a substantial and original critical or scholarly argument. Students submit proposals in September of their senior year, with acceptance contingent upon the quality of the proposal and the student’s record in the major. Students who are accepted are assigned a faculty sponsor to supervise the project, from its development during the fall semester to its completion in the spring. It is for the spring semester, not the fall, that students officially register for the course, designated as ENGL UN3999 Senior Essay. Senior essays are due in early April.

Course Options and Restrictions

1. No course at the 1000-level may be counted toward the major.
2. Speech courses may not be counted toward the major.

3. Two writing courses or two upper-level literature courses taught in a foreign language, or one of each, may count toward the major, though neither type of course fulfills any distribution requirement. Writing courses that may be applied toward the major include those offered through Columbia's undergraduate Creative Writing Program and through Barnard College.
4. Comparative literature courses sponsored by the department (designated as **CLEN**) may count toward the major. **Those sponsored by other departments** (e.g. *CLFR* - Comp Lit French, *CPLS* - Comp Lit and Society) **are not counted toward the major without permission of the director of undergraduate studies**. Literature courses taught in English in language departments do not count toward the major.
5. No more than two courses taken during the summer session may be counted toward the major.
6. Courses offered through the Barnard English Department may count toward the major or concentration. Before taking Barnard courses, students should verify with the director of undergraduate studies whether and how such courses may count toward the major.
7. For courses taken abroad or at other American institutions to count toward the major, students must obtain approval of the director of undergraduate studies.
8. To register for more than 42 points (including advanced standing credit) in English and comparative literature, a student majoring in English must obtain permission of the director of undergraduate studies.
9. No more than five courses taken elsewhere may be applied to the major, four to the concentration.
10. One independent study (for at least 3 points) may count toward the major but cannot satisfy any distribution requirements; likewise, the *Senior Essay* may count toward the major but fulfills no requirements. Students **may not count both** an *Independent Study* and the *Senior Essay* toward the major.
11. Courses assigned a grade of D may not be counted toward the major.
12. Only the first course taken to count toward the major can be taken Pass/D/Fail.

MAJOR IN ENGLISH

Please read *Guidelines for all English and Comparative Literature Majors and Concentrators* above.

Ten departmental courses (for a minimum of 30 points) and, in the process, fulfillment of the following requirements.

See course information above for details on fulfilling the distribution requirements.

1. ENGL UN3001 Literary Texts, Critical Methods and ENGL UN3011 Literary Texts, Critical Methods seminar
2. **Period distribution:** Three courses primarily dealing with periods before 1800, only one of which may be a course in Shakespeare
3. **Genre distribution:** One course in each of the following three generic categories:
 - Poetry
 - Prose fiction/narrative
 - Drama/film/new media
4. **Geography distribution:** One course in each of the following three geographical categories:
 - British
 - American
 - Comparative/global (comparative literature, postcolonial, global English, trans-Atlantic, diaspora)

Course Distribution Lists are available in the department and on-line at <http://english.columbia.edu/course-distribution-lists> (<http://english.columbia.edu/course-distribution-lists/>) to help students determine which courses fulfill which requirements.

A single course can satisfy more than one distribution requirement. For example, a Shakespeare lecture satisfies three requirements at once: not only does it count as one of the three required pre-1800 courses it also, at the same time, fulfills both a genre and a geography distribution requirement (drama and British, respectively). Courses not on the distribution list may count toward the major requirements **only** with the permission of the director of undergraduate studies. Two writing courses or upper-level literature courses taught in a foreign language, or one of each, may count toward the ten required courses.

CONCENTRATION IN ENGLISH

Please read *Guidelines for all English and Comparative Literature Majors and Concentrators* above.

Eight departmental courses and, in the process, fulfillment of the following requirements. See course information above for details on fulfilling the distribution requirements.

1. ENGL UN3001 Literary Texts, Critical Methods and ENGL UN3011 Literary Texts, Critical Methods seminar
2. **Period distribution:** Two courses dealing with periods before 1800, only one of which may be a course in Shakespeare
3. **Genre distribution:** Two courses, each chosen from a different genre category (see above)
4. **Geography distribution:** Two courses, each chosen from a different geography category (see above)

See the Course Distribution Lists, available in the department or on-line at <http://english.columbia.edu/course-distribution->

lists (<http://english.columbia.edu/course-distribution-lists/>), to determine which courses fulfill which requirements. All of the restrictions outlined for the English major also apply for the concentration in English.

COMPARATIVE LITERATURE PROGRAM

ENVIRONMENTAL BIOLOGY

Departmental Office: Schermerhorn Extension, 10th floor; 212-854-9987
<http://e3b.columbia.edu/>

Director of Undergraduate Studies: Dr. Matthew Palmer, 1010 Schermerhorn; 212-854-4767; mp2434@columbia.edu

Evolutionary Biology of the Human Species Adviser: Dr. Jill Shapiro, 1011 Schermerhorn Extension; 212-854-5819; jss19@columbia.edu

Director, Administration and Finance: Kyle Bukhari, 1014B Schermerhorn Extension; 212-854-8665; kb2337@columbia.edu (lg2019@columbia.edu)

The Department of Ecology, Evolution & Environmental Biology (E3B) at Columbia University was established in 2001. Although we are a relatively new department, we have grown rapidly in the past decade. We now have an internationally diverse student body and a broad network of supporters at Columbia and throughout New York City. Our affiliated faculty members come from departments at Columbia as well as from the American Museum of Natural History (<http://www.amnh.org/>), the New York Botanical Garden (<http://www.nybg.org/>), the Wildlife Conservation Society (<http://www.wcs.org/>), and the EcoHealth Alliance (<http://www.ecohealthalliance.org/>). Together, we provide an unparalleled breadth and depth of research opportunities for our students.

In creating E3B, Columbia University recognized that the fields of ecology, evolutionary biology, and environmental biology constitute a distinct subdivision of the biological sciences with its own set of intellectual foci, theoretical foundations, scales of analysis, and methodologies.

E3B's mission is to educate a new generation of scientists and practitioners in the theory and methods of ecology, evolution, and environmental biology. Our educational programs emphasize a multi-disciplinary perspective to understand life on Earth from the level of organisms to global processes that sustain humanity and all life.

To achieve this multi-disciplinary perspective, the department maintains close ties to over 70 faculty members beyond its

central core. Thus, many faculty members who teach, advise, and train students in research are based in other departments on the Columbia campus or at the partner institutions. Through this collaboration, the department is able to tap into a broad array of scientific and intellectual resources in the greater New York City area. The academic staff covers the areas of plant and animal systematics; evolutionary and population genetics; ecosystem science; demography and population biology; behavioral and community ecology; and related fields of epidemiology, ethnobiology, public health, and environmental policy. Harnessing the expertise of this diverse faculty and the institutions of which they are a part, E3B covers a vast area of inquiry into the evolutionary, genetic, and ecological relationships among all living things.

FACILITIES AND COLLABORATIVE INSTITUTIONS

The Department of Ecology, Evolution, and Environmental Biology (E3B)

In addition to the off-campus facilities detailed below, the Columbia community offers academic excellence in a range of natural and social science disciplines that are directly related to biodiversity conservation including: evolution, systematics, genetics, behavioral ecology, public health, business, economics, political science, anthropology, and public and international policy. These disciplines are embodied in world-class departments, schools, and facilities at Columbia. The divisions that bring their resources to bear on issues most relevant to E3B's mission are: the Lamont-Doherty Earth Observatory, the School of International and Public Affairs, the Goddard Institute for Space Studies, the International Research Institute for Climate Prediction, the Black Rock Forest Reserve in New York State, the Rosenthal Center for Alternative/Complementary Medicine, the Division of Environmental Health Sciences at the School of Public Health, and the Center for International Earth Science Information Network (CIESIN). Several of these units of the University are networked through the Earth Institute at Columbia, a division of the University that acts as an intramural network of environmental programs and supplies logistical support for constituent programs, through planning, research, seminars, and conferences. All of the above schools, centers, and institutes contribute to finding solutions for the world's environmental challenges.

The Earth Institute Center for Environmental Sustainability (EICES)

The Earth Institute Center for Environmental Sustainability (EICES), formerly known as the Center for Environmental Research and Conservation (CERC), is actively involved in protecting biodiversity and ecosystems. The Earth Institute Center for Environmental Sustainability is dedicated to the development of a rich, robust, and vibrant world within which we can secure a sustainable future. Through a diverse array

of strategic partners in science, education, and outreach, the center builds unique programs that promote human well-being through the preservation, restoration, and management of biodiversity, and the services our ecosystems provide.

The Center for Environmental Research and Conservation (CERC), a leading provider of cutting-edge environmental research, education, and training, since its inception in 1994, has grown into two institutions—an Earth institute center and a Secretariat for a major environmental consortium. The center's new name is the Earth Institute Center for Environmental Sustainability (EICES, pronounced “i-sees”). EICES also continues, however, as the Secretariat for the Consortium for Environmental Research and Conservation, continuing 15 years of collaborations between the Earth Institute, the American Museum of Natural History, the New York Botanical Garden, The Wildlife Conservation Society, and EcoHealth Alliance on biodiversity conservation.

American Museum of Natural History

The American Museum of Natural History is one of the world's preeminent scientific, educational, and cultural institutions. Since its founding in 1869, the Museum has advanced its global mission to discover, interpret, and disseminate information about human cultures, the natural world, and the universe through a wide-reaching program of scientific research, education, and exhibitions. The institution comprises 45 permanent exhibition halls, state-of-the-art research laboratories, one of the largest natural history libraries in the Western Hemisphere, and a permanent collection of 32 million specimens and cultural artifacts. With a scientific staff of more than 200, the Museum supports research divisions in anthropology, paleontology, invertebrate and vertebrate zoology, and the physical sciences. The Museum's scientific staff pursues a broad agenda of advanced scientific research, investigating the origins and evolution of life on Earth, the world's myriad species, the rich variety of human culture, and the complex processes that have formed and continue to shape planet Earth and the universe beyond.

The Museum's Center for Biodiversity and Conservation (CBC) was created in June 1993 to advance the use of scientific data to mitigate threats to biodiversity. CBC programs integrate research, education, and outreach so that people, a key force in the rapid loss of biodiversity, will become participants in its conservation. The CBC works with partners throughout the world to build professional and institutional capacities for biodiversity conservation and heightens public understanding and stewardship of biodiversity. CBC projects are under way in the Bahamas, Bolivia, Madagascar, Mexico, Vietnam, and the Metropolitan New York region.

The Museum's scientific facilities include: two molecular systematics laboratories equipped with modern high-throughput technology; the interdepartmental laboratories, which include a state-of-the-art imaging facility that provides analytical microscopy, energy dispersive spectrometry, science

visualization, and image analysis to support the Museum's scientific activities; a powerful parallel-computing facility, including a cluster of the world's fastest computers, positioned to make significant contributions to bioinformatics; and a frozen tissue facility with the capacity to store one million DNA samples.

New York Botanical Garden

The New York Botanical Garden (NYBG), with its 7 million specimen herbarium, the largest in the Western Hemisphere, and its LuEsther T. Mertz Library, the largest botanical and horticultural reference collection on a single site in the Americas, comprises one of the very best locations in the world to study plant science. NYBG's systematic botanists discover, decipher, and describe the world's plant and fungal diversity; and its economic botanists study the varied links between plants and people. The Enid A. Haupt Conservatory, the largest Victorian glasshouse in the United States, features some 6,000 species in a newly installed “Plants of the World” exhibit. The new International Plant Science Center stores the Garden collection under state-of-the-art environmental conditions and has nine study rooms for visiting scholars. All specimens are available for on-site study or loan.

In recent years, NYBG has endeavored to grow and expand its research efforts, supporting international field projects in some two dozen different countries, ranging from Brazil to Indonesia. In 1994, AMNH and NYBG established the Lewis and Dorothy Cullman Program for Molecular Systematics Studies to promote the use of molecular techniques in phylogenetic studies of plant groups. This program offers many opportunities for research in conservation genetics. NYBG operates both the Institute for Economic Botany (IEB) and the Institute of Systematic Botany (ISB). The ISB builds on the Garden's long tradition of intensive and distinguished research in systematic botany—the study of the kinds and diversity of plants and their relationships—to develop the knowledge and means for responding effectively to the biodiversity crisis.

The Garden has also established a molecular and anatomical laboratory program, which includes light and electron microscopes, and has made enormous advances in digitizing its collection. There is currently a searchable on-line library catalog and specimen database collection with some half million unique records. Field sites around the world provide numerous opportunities for work in important ecosystems of unique biodiversity.

Wildlife Conservation Society

The Wildlife Conservation Society (WCS), founded in 1895 as the New York Zoological Society, works to save wildlife and wild lands throughout the world. In addition to supporting the nation's largest system of zoological facilities—the Bronx Zoo; the New York Aquarium; the Wildlife Centers in Central Park, Prospect Park, and Flushing Meadow Park; and the Wildlife Survival Center on St. Catherine's Island, Georgia—WCS maintains a commitment to field-based conservation

science. With 60 staff scientists and more than 100 research fellows, WCS has the largest professional field staff of any U.S.-based international conservation organization. Currently, WCS conducts nearly 300 field projects throughout the Americas, Asia, and Africa. The field program is supported by a staff of conservation scientists based in New York who also conduct their own research.

WCS's field-based programs complement the organization's expertise in veterinary medicine, captive breeding, animal care, genetics, and landscape ecology, most of which are based at the Bronx Zoo headquarters. WCS's Conservation Genetics program places an emphasis on a rigorous, logical foundation for the scientific paradigms used in conservation biology and is linked to a joint Conservation Genetics program with the American Museum of Natural History. The Wildlife Health Sciences division is responsible for the health care of more than 17,000 wild animals in the five New York parks and wildlife centers. The departments of Clinical Care, Pathology, Nutrition, and Field Veterinary Programs provide the highest quality of care to wildlife.

EcoHealth Alliance

EcoHealth Alliance is an international organization of scientists dedicated to the conservation of biodiversity. For more than 40 years, EcoHealth Alliance has focused its efforts on conservation. Today, they are known for innovative research on the intricate relationships between wildlife, ecosystems, and human health.

EcoHealth Alliance's work spans the U.S. and more than 20 countries in Central and South America, the Caribbean, Africa, and Asia to research ways for people and wildlife to share bioscapes for their mutual survival. Their strength is built on innovations in research, education, and training and accessibility to international conservation partners.

Internationally, EHA programs support conservationists in over a dozen countries at the local level to save endangered species and their habitats, and to protect delicate ecosystems for the benefit of wildlife and humans.

ACADEMIC PROGRAMS

The Department of Ecology, Evolution, and Environmental Biology runs two undergraduate majors/concentrations. The primary major is in environmental biology and the second is evolutionary biology of the human species. The foci and requirements vary substantially and are intended for students with different academic interests.

The environmental biology major emphasizes those areas of biology and other disciplines essential for students who intend to pursue careers in the conservation of Earth's living resources. It is designed to prepare students for graduate study in ecology and evolutionary biology, conservation biology, environmental policy and related areas, or for direct entry into conservation-related or science teaching careers.

Interdisciplinary knowledge is paramount to solving environmental biology issues, and a wide breadth of courses is thus essential, as is exposure to current work. Conservation internships are available through partner institutions and serve as research experience leading to the development of the required senior thesis.

Declaration of the environmental biology major must be approved by the director of undergraduate studies and filed in the departmental office located on the 10th floor of Schermerhorn Extension.

The major in evolutionary biology of the human species provides students with a foundation in the interrelated spheres of behavior, ecology, genetics, evolution, morphology, patterns of growth, adaptation, and forensics. Using the framework of evolution and with attention to the interplay between biology and culture, research in these areas is applied to our own species and to our closest relatives to understand who we are and where we came from. This integrated biological study is also known as biological anthropology. As an interdisciplinary major, students are also encouraged to draw on courses in related fields including biology, anthropology, geology, and psychology as part of their studies.

PROFESSORS

Nicholas Christie-Blick
 Joel E. Cohen
 Peter B. de Menocal
 Hugh Ducklow
 Sonya Dyhrman
 Peter Eisenberger
 Göran Ekström
 Arlene M. Fiore
 Steven L. Goldstein
 Arnold L. Gordon
 Kevin L. Griffin
 Alex Halliday
 Sidney R. Hemming (Chair)
 Bärbel Hönlisch
 Peter B. Kelemen
 Galen McKinley
 Jerry F. McManus (Associate Chair)
 William H. Menke
 John C. Mutter
 Meredith Nettles
 Paul E. Olsen
 Terry A. Plank
 Lorenzo M. Polvani
 G. Michael Purdy
 Peter Schlosser
 Christopher H. Scholz
 Adam H. Sobel
 Sean C. Solomon
 Marc Spiegelman
 Martin Stute (Barnard)

Maria Tolstoy
Renata Wentzcovich

ASSOCIATE PROFESSORS

Ryan Abernathey
Kerry Key
Heather Savage

ASSISTANT PROFESSORS

Jacqueline Austermann
Roisin Commene
Jonathan Kingslake
Yves Moussallam

ADJUNCT PROFESSORS

Robert F. Anderson
W. Roger Buck IV
Denton Ebel
John J. Flynn
James Gaherty
Lisa M. Goddard
Arthur Lerner-Lam
Alberto Malinverno
Douglas G. Martinson
Ronald L. Miller
Mark A. Norell
Dorothy M. Peteet
Maureen Raymo
Andrew Robertson
Joerg M. Schaefer
Christopher Small
Minfang Ting
Felix Waldhauser
Spahr C. Webb
Gisela Winckler

ADJUNCT ASSOCIATE PROFESSORS

Alessandra Giannini
Andrew Juhl

LECTURERS

Pietro Ceccato
Cornelia Class
Andreas Turnherr
Kevin Uno
Christopher Zappa

ASSOCIATES

Erin Coughlin
Brian Kahn
Andrew Kruczkiewicz
Catherine Vaughan

EMERITUS

Mark Cane
James Hays
Paul Richards
Lynn Sykes
David Walker

GUIDELINES FOR ALL ECOLOGY, EVOLUTION, AND ENVIRONMENTAL BIOLOGY MAJORS AND CONCENTRATORS

The grade of D is not accepted for any course offered in fulfillment of the requirements toward the majors or concentrations.

MAJOR IN ENVIRONMENTAL BIOLOGY

The major in environmental biology requires 50 points, distributed as follows:

Lower Division Courses

Two terms of introductory or environmental biology such as the following:

EEEB UN2001 - EEEB UN2002	Environmental Biology I: Elements to Organisms and Environmental Biology II: Organisms to the Biosphere
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Two terms of environmental science such as the following:

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System

Two terms of chemistry such as the following:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
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One term of physics such as the following:

PHYS UN1201	General Physics I
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One term of statistics such as the following:

EEEB UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
BIOL BC2286	Statistics and Research Design
STAT UN1101	Introduction to Statistics
STAT UN1201	Calculus-Based Introduction to Statistics

One term of calculus such as the following:

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN1202	Calculus IV

Upper Division Courses

Students must complete five advanced elective courses (generally 3000-level or above) satisfying the following distribution. At least one of these courses must include a laboratory component. For more information and a list of appropriate courses, contact the director of undergraduate studies.

1. Ecology, behavior, or conservation biology;
2. Evolution or genetics;
3. Morphology, physiology, or diversity;
4. Policy or economics;
5. One additional course from the preceding four groups.

Students must also complete a senior thesis, which involves completing a research internship (generally in the summer before the senior year) and completing at least one semester of the thesis research seminar, EEEB UN3991- EEEB UN3992 Senior Seminar. Enrollment in both semesters of the seminar, starting in the spring of the junior year, is recommended.

Students planning on continuing into graduate studies in environmental biology or related fields are encouraged to take organic chemistry and genetics.

ECOLOGY AND EVOLUTION TRACK WITHIN THE ENVIRONMENTAL BIOLOGY MAJOR

The ecology and evolution track within the environmental biology major requires 50 points, distributed as follows:

Lower Division Courses

Two terms of introductory or environmental biology such as the following:

EEEEB UN2001 - EEEB UN2002	Environmental Biology I: Elements to Organisms and Environmental Biology II: Organisms to the Biosphere
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Two terms of chemistry such as the following:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
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Chemistry laboratory such as the following:

CHEM UN1500	General Chemistry Laboratory
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Two terms of physics such as the following:

PHYS UN1201 - PHYS UN1202	General Physics I and General Physics II
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One term of statistics such as the following:

EEEEB UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
BIOL BC2286	Statistics and Research Design
STAT UN1101	Introduction to Statistics

STAT UN1201	Calculus-Based Introduction to Statistics
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Two terms of calculus, or one term of calculus and second advanced course in math or statistics such as the following:

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN1202	Calculus IV

Upper Division Courses

Students must complete five advanced elective courses (generally 3000-level or above) satisfying the following distribution. At least one of these courses must include a laboratory component. For more information and a list of appropriate courses, contact the director of undergraduate studies.

1. Three courses in ecology, evolution, conservation biology, or behavior;
2. One course in genetics. BIOL UN3031 Genetics or BIOL BC2100 Molecular and Mendelian Genetics is recommended;
3. One course in morphology, physiology, or diversity.

Students must also complete a senior thesis, which involves completing a research internship (generally in the summer before the senior year) and completing at least one semester of the thesis research seminar, EEEB UN3991-EEEEB UN3992 Senior Seminar. Enrollment in both semesters of the seminar, starting in the spring of the junior year, is recommended.

Students planning on continuing into graduate studies in ecology or evolutionary biology are encouraged to take organic chemistry.

MAJOR IN EVOLUTIONARY BIOLOGY OF THE HUMAN SPECIES

The major in evolutionary biology of the human species requires 36 points, distributed as described below.

Students must take a minimum of 20 points from approved biological anthropology courses. The additional courses may be taken in other departments with adviser approval. These include up to 6 points of introductory biology/chemistry or calculus (in any combination). Please speak with the major adviser about the extended list of courses from related areas including Biology, Psychology, Archaeology, Anthropology, Earth and Environmental Science, and Statistics that count toward this program.

For example, students interested in focusing on paleoanthropology would complement the requirements with additional courses in human evolution and morphology, evolutionary biology and theory, archaeology, genetics, and statistics. Those interested in primate behavior would

supplement the requirements with classes in behavioral biology, ecology, and statistics.

Required Courses

EEEEB UN1010	Human Origins and Evolution
EEEEB UN1011	Behavioral Biology of the Living Primates

****Alternate options may be possible for all courses other than EEEB UN1010 Human Origins and Evolution and EEEB UN1011 Behavioral Biology of the Living Primates. These will be considered on an individual basis in consultation with the major/concentration adviser.**

Conservation Course

EEEEB UN3240	Challenges and Strategies of Primate Conservation (This is the recommended conservation course but this requirement can be fulfilled with other classes such as Conservation Biology, Zoo Conservation, Ecology, Behavior and Conservation of Mammals, SEE-U in Jordan or Brazil, or other relevant offerings.)
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Theoretical Foundation from Archaeology

Select one course of the following: Nearly all archaeology courses (save for Rise of Civilization) can fulfill this requirement. Check with the advisor.

Archaeology

ANTH UN1007	The Origins of Human Society
ANTH UN2028	Think Like an Archaeologist: Introduction to Method & Theory
ANTH UN3064	Death and the Body
ANTH UN3823	Archaeology Engaged: The Past in the Public Eye

Breadth Requirement

Select a minimum of one course from each of the three sections (may overlap seminar requirement for majors):

Genetics/Human Variation

BIOL BC2100	Molecular and Mendelian Genetics
BIOL UN3031	Genetics
BIOL GU4560	Evolution in the age of genomics
ANTH UN3970	Biological Basis of Human Variation
EEEEB GU4340	Human Adaptation
EEEEB GU4700	Race: The Tangled History of a Biological Concept

Primate Behavioral Biology and Ecology

EEEEB UN3940	Current Controversies in Primate Behavior and Ecology
BIOL BC2272	Ecology
BIOL BC2280	Animal Behavior
PSYC UN2420	Animal Behavior
PSYC BC1119	Systems and Behavioral Neuroscience
PSYC UN2450	Behavioral Neuroscience
PSYC BC3372	Comparative Cognition
PSYC UN3450	Evolution of Intelligence and Consciousness (Seminar)
PSYC UN3460	Evolution of Behavior (Seminar)
PSYC UN3470	Brain Evolution: Becoming Human (Seminar)
EEEEB GU4010	The Evolutionary Basis of Human Behavior
EEEEB GU4134	Behavioral Ecology
EEEEB GU4201	Ecology, Behavior, and Conservation of Mammals (can count for either breadth requirement or conservation requirement, but not both)

Human Evolution/Morphology

EEEEB UN3208	Explorations in Primate Anatomy
EEEEB UN3215	Forensic Osteology
EEEEB UN3220	The Evolution of Human Growth and Development
ANTH GU4147	Human Skeletal Biology I
ANTH GU4148	The Human Skeletal Biology II
EEEEB UN3204	Dynamics of Human Evolution
EEEEB UN3910	The Neandertals
ANTH GU4002	Controversial Topics in Human Evolution
ANTH GU4200	Fossil Evidence of Human Evolution
BIOL BC2278	Evolution
BIOL UN3208	Introduction to Evolutionary Biology
EEEEB UN3030	The Biology, Systematics, and Evolutionary History of the 'Apes'
BIOL BC2262	Vertebrate Biology
BIOL UN3006	Physiology
BIOL BC3360	Physiology
EEEEB GU4200	Natural History of the Mammals

Seminar

Selection at least one of the following seminars. May also count toward the breadth requirement.

EEEEB UN3204	Dynamics of Human Evolution
EEEEB UN3910	The Neandertals
EEEEB UN3940	Current Controversies in Primate Behavior and Ecology
ANTH UN3970	Biological Basis of Human Variation

EEEE UN3993 - EEEB UN3994	EBHS Senior Seminar and EBHS Senior Seminar
EEEE GU4321	Human Nature: DNA, Race & Identity
ANTH GU4002	Controversial Topics in Human Evolution (Fulfills the seminar requirement for the major)

Additional courses in the student's area of focus to complete the required 36 points overall including a minimum of 20 points of approved biological anthropology courses.

Students intending to pursue graduate study in this field should broaden their foundation by taking an introductory biology course (optimally either EEEB UN2001 Environmental Biology I: Elements to Organisms or EEEB UN2002 Environmental Biology II: Organisms to the Biosphere) or an advanced evolution course, a genetics course, and a statistics course. We recommend that those interested in either biological anthropology or bioarchaeology take a foundation cultural anthropology course such as ANTH UN1002 The Interpretation of Culture, ANTH UN2004 Introduction to Social and Cultural Theory, ANTH UN2005 Ethnographic Imagination, or ANTH UN3040 Anthropological Theory I. Students interested in forensic anthropology should take chemistry in lieu of biology (though the latter is recommended as a foundation course for all students). The adviser makes additional recommendations dependent on the student's area of focus.

Approved Biological Anthropology Courses

Paleoanthropology and Morphology

EEEE UN1010	Human Origins and Evolution
EEEE UN3204	Dynamics of Human Evolution
EEEE UN3208	Explorations in Primate Anatomy
EEEE UN3215	Forensic Osteology
EEEE UN3220	The Evolution of Human Growth and Development
EEEE UN3910	The Neandertals
ANTH GU4147 - ANTH GU4148	Human Skeletal Biology I and The Human Skeletal Biology II
ANTH GU4200	Fossil Evidence of Human Evolution <small>taught intermittently</small>

Primate Behavioral Ecology and Evolution

EEEE UN1011	Behavioral Biology of the Living Primates
EEEE UN3030	The Biology, Systematics, and Evolutionary History of the 'Apes'
EEEE UN3940	Current Controversies in Primate Behavior and Ecology
EEEE GU4010	The Evolutionary Basis of Human Behavior

Human Variation

ANTH UN3970	Biological Basis of Human Variation
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EEEE GU4340	Human Adaptation
EEEE GU4700	Race: The Tangled History of a Biological Concept

Additional Courses

EEEE UN3240	Challenges and Strategies of Primate Conservation
EEEE UN3993 - EEEB UN3994	EBHS Senior Seminar and EBHS Senior Seminar

CONCENTRATION IN ENVIRONMENTAL BIOLOGY

The concentration in environmental biology differs from the major in omitting calculus and physics from the lower division, requiring three advanced electives rather than five, and omitting the senior seminar with thesis project. It requires 36 points, distributed as follows:

Lower Division Courses

Two terms of introductory or environmental biology such as the following:

EEEE UN2001 - EEEB UN2002	Environmental Biology I: Elements to Organisms and Environmental Biology II: Organisms to the Biosphere (or equivalents)
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Two terms of environmental science such as the following:

EEESC UN2100	Earth's Environmental Systems: The Climate System
EEESC UN2200	Earth's Environmental Systems: The Solid Earth System

Two terms of chemistry such as the following:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
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One term of statistics. Select one of the following:

EEEE UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
BIOL BC2286	Statistics and Research Design
STAT UN1101	Introduction to Statistics
STAT UN1201	Calculus-Based Introduction to Statistics

Upper Division Courses

EEEE UN3087	Conservation Biology
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Two other 3000- or 4000- level courses from the advanced environmental biology courses listed for the major.

CONCENTRATION IN EVOLUTIONARY BIOLOGY OF THE HUMAN SPECIES

The concentration in evolutionary biology of the human species requires 20 points including the required introductory

courses EEEB UN1010 Human Origins and Evolution, EEEB UN1011 Behavioral Biology of the Living Primates, an approved conservation course (optimally Primate Conservation), and three courses for the breadth distribution requirements as described for the major. Students must take a minimum of 15 points from approved biological anthropology courses as described for the major (the two introductory classes count toward that total). The additional courses may be taken in other departments with adviser approval.

Concentrators do not have to complete the theoretical foundation course from archaeology or a seminar.

SPECIAL CONCENTRATION IN ENVIRONMENTAL SCIENCE FOR ENVIRONMENTAL BIOLOGY MAJORS

The special concentration in environmental science requires a minimum of 31.5 points, distributed as follows:

Introductory Environmental Science (13.5 points)

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System (equivalent to EEEB UN2002)

Introductory Science (6 points)

Two courses in chemistry, physics, mathematics, or environmental biology from the supporting mathematics and science list for the environmental science major.

Advanced Environmental Science (12 points)

Select four of the following:

EESC UN3015	The Earth's Carbon Cycle
EESC BC3017	Environmental Data Analysis
EESC BC3025	Hydrology
EESC GU4008	Introduction to Atmospheric Science
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
EESC GU4223	Sedimentary Geology
EESC GU4550	Plant Ecophysiology
EESC GU4835	Wetlands and Climate Change
EESC GU4885	The Chemistry of Continental Waters
EESC GU4917	Earth/Human Interactions

EESC GU4926	Principles of Chemical Oceanography
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Advanced courses used to fulfill requirements in the environmental biology major cannot count toward requirements for the special concentration.

SPECIAL CONCENTRATION IN ENVIRONMENTAL BIOLOGY FOR ENVIRONMENTAL SCIENCE MAJORS

The Department of Ecology, Evolution, and Environmental Biology sponsors a special concentration which must be done in conjunction with the environmental science major. Students should be aware that they must complete the environmental science major in order to receive credit for the special concentration.

The special concentration in environmental biology requires a minimum of 39 points, distributed as follows:

Introductory Environmental Biology and Environmental Science (17 points)

EEEB UN2001	Environmental Biology I: Elements to Organisms
EEEB UN2002	Environmental Biology II: Organisms to the Biosphere (equivalent to EESC UN2300)
EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System

Introductory Science (13 points)

Select one of the following chemistry sequences:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
CHEM UN1604 - CHEM UN2507	Intensive General Chemistry (Lecture) and Intensive General Chemistry Laboratory

One term of statistics such as the following:

EEEB UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
BIOL BC2286	Statistics and Research Design
STAT UN1101	Introduction to Statistics
STAT UN1201	Calculus-Based Introduction to Statistics
EEEB UN3087	Conservation Biology

Advanced Environmental Biology (9 points)

Three additional advanced environmental biology courses (3000-level and above), each chosen from a different curricular area (evolution/genetics, ecology/behavior/conservation, anatomy/physiology/diversity, biology laboratory courses).

ENVIRONMENTAL CHEMISTRY

Undergraduate Office: 340 Havemeyer; 212-854-2163

Departmental Office: 344 Havemeyer; 212-854-2202
<http://www.columbia.edu/cu/chemistry/>

Director of Undergraduate Studies: Prof. Karen Phillips, 422 Havemeyer; 212-851-7534; kep12@columbia.edu (kep12@chem.columbia.edu)

Program Manager for Undergraduate Studies: Dr. Vesna Gasperov, 211A Havemeyer; 212-854-2017; vg2231@columbia.edu

Biochemistry Advisers:

Biology: Prof. Brent Stockwell, 1208 Northwest Corner Building; 212-854-2919; stockwell@biology.columbia.edu

Chemistry, the study of molecules, is a central science interesting for its own sake but also necessary as an intellectual link to the other sciences of biology, physics, and environmental science. Faculty find the various disciplines of chemistry fascinating because they establish intellectual bridges between the macroscopic or human-scale world that we see, smell, and touch, and the microscopic world that affects every aspect of our lives. The study of chemistry begins on the microscopic scale and extends to engage a variety of different macroscopic contexts.

Chemistry is currently making its largest impact on society at the nexus between chemistry and biology and the nexus between chemistry and engineering, particularly where new materials are being developed. A typical chemistry laboratory now has more computers than test tubes and no longer smells of rotten eggs.

The chemistry department majors are designed to help students focus on these new developments and to understand the factors influencing the nature of the discipline. Because the science is constantly changing, courses change as well, and while organic and physical chemistry remain the bedrock courses, they too differ greatly from the same courses 40 years ago. Many consider biochemistry to be a foundation course as well. Although different paths within the chemistry major take different trajectories, there is a core that provides the essential foundation students need regardless of the path they choose. Students should consider majoring in chemistry if they share or can develop a fascination with the explanatory power that

comes with an advanced understanding of the nature and influence of the microscopic world of molecules.

Students who choose to major in chemistry may elect to continue graduate study in this field and obtain a Ph.D. which is a solid basis for a career in research, either in the industry or in a university. A major in chemistry also provides students with an astonishing range of career choices such as working in the chemical or pharmaceutical industries or in many other businesses where a technical background is highly desirable. Other options include becoming a financial analyst for a technical company, a science writer, a high school chemistry teacher, a patent attorney, an environmental consultant, or a hospital laboratory manager, among others. The choices are both numerous and various as well as intellectually exciting and personally fulfilling.

ADVANCED PLACEMENT

The department grants advanced placement (AP) credit for a score of 4 or 5 or the equivalent. The amount of credit granted is based on the results of the department placement exam and completion of the requisite course. Students who are placed into CHEM UN1604 Intensive General Chemistry (Lecture) are granted 3 points of credit; students who are placed into CHEM UN2045 Intensive Organic Chemistry I (Lecture)-CHEM UN2046 Intensive Organic Chemistry II (Lecture) are granted 6 points of credit. In either case, credit is granted only upon completion of the course with a grade of C or better. Students must complete a department placement exam prior to registering for either of these courses.

PROGRAMS OF STUDY

The Department of Chemistry offers four distinct academic major programs for undergraduates interested in professional-level training and education in the chemical sciences: chemistry, chemical physics, biochemistry and environmental chemistry. For students interested in a program of less extensive study and coursework, the department offers a concentration in chemistry.

COURSE INFORMATION

The results of the placement exam are used to advise students which track to pursue. The Department of Chemistry offers three different tracks. Students who wish to take Track 2 or 3 classes must take the placement exam. Students who wish to pursue Track 1 classes do not need to take the placement exam.

TRACK INFORMATION

In the first year, Track 1 students with one year of high school chemistry take a one-year course in general chemistry, and the one-term laboratory course that accompanies it. In the second year, students study organic chemistry, and take organic chemistry laboratory.

Students who qualify by prior examination during orientation week can place into the advanced tracks. There are two options.

Track 2 students take, in the fall term, a special one-term intensive course in general chemistry in place of the one-year course. In the second year, students study organic chemistry and take organic chemistry laboratory. Track 3 students take a one-year course in organic chemistry for first-year students and the one-term intensive general chemistry laboratory course. In the second year, students enroll in physical chemistry and the organic chemistry laboratory course.

Additional information on the tracks can be found in the *Requirements* section.

ADDITIONAL COURSES

First-year students may also elect to take CHEM UN2408. This seminar focuses on topics in modern chemistry, and is offered to all students who have taken at least one semester of college chemistry and have an interest in chemical research.

Biochemistry (BIOC UN3501, BIOC UN3512) is recommended for students interested in the biomedical sciences.

Physical chemistry (CHEM UN3079-CHEM UN3080), a one-year program, requires prior preparation in mathematics and physics. The accompanying laboratory is CHEM UN3085-CHEM UN3086.

Also offered are a senior seminar (CHEM UN3920); advanced courses in biochemistry, inorganic, organic, and physical chemistry; and an introduction to research (CHEM UN3098).

SAMPLE PROGRAMS

Some *typical* programs are shown below. Programs are crafted by the student and the director of undergraduate studies to meet individual needs and interests.

Track 1

First Year

CHEM UN1403 General Chemistry I (Lecture)
 CHEM UN1404 General Chemistry II (Lecture)
 CHEM UN1500 General Chemistry Laboratory
 CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and physics as required.

Second Year

CHEM UN2443 Organic Chemistry I (Lecture)
 CHEM UN2444 Organic Chemistry II (Lecture)
 CHEM UN2493 Organic Chemistry Laboratory I (Techniques)
 CHEM UN2494 Organic Chemistry Laboratory II (Synthesis)

Calculus and physics as required.

Third Year

CHEM UN3079 Physical Chemistry I

CHEM UN3080 Physical Chemistry II
 BIOC UN3501 Biochemistry: Structure and Metabolism
 CHEM UN3546 Advanced Organic Chemistry Laboratory
 CHEM UN3098 Supervised Independent Research

Fourth Year

CHEM UN3085 Physical and Analytical Chemistry Laboratory I
 CHEM UN3086 Physical and Analytical Chemistry Laboratory II
 CHEM UN3920 Senior Seminar in Chemical Research
 CHEM GU4071 Inorganic Chemistry
 Advanced courses (4000-level or higher)

Track 2

First Year

CHEM UN1507 Intensive General Chemistry Laboratory
 CHEM UN1604 Intensive General Chemistry (Lecture)
 CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and physics as required.

Second Year

CHEM UN2443 Organic Chemistry I (Lecture)
 CHEM UN2444 Organic Chemistry II (Lecture)
 CHEM UN2493 Organic Chemistry Laboratory I (Techniques)
 CHEM UN2494 Organic Chemistry Laboratory II (Synthesis)

Calculus and physics as required.

Third Year

CHEM UN3079 Physical Chemistry I
 CHEM UN3080 Physical Chemistry II
 BIOC UN3501 Biochemistry: Structure and Metabolism
 CHEM UN3546 Advanced Organic Chemistry Laboratory

CHEM UN3098 Supervised Independent Research

Fourth Year

CHEM UN3085 Physical and Analytical Chemistry Laboratory I
 CHEM UN3086 Physical and Analytical Chemistry Laboratory II
 CHEM UN3920 Senior Seminar in Chemical Research
 CHEM GU4071 Inorganic Chemistry
 Advanced courses (4000-level or higher)

Track 3**First Year**

- CHEM UN1507 Intensive General Chemistry Laboratory
- CHEM UN2045 Intensive Organic Chemistry I (Lecture)
- CHEM UN2046 Intensive Organic Chemistry II (Lecture)
- CHEM UN2408 First-Year Seminar in Chemical Research

Calculus and Physics as required.

Second Year

- CHEM UN3079 Physical Chemistry I
- CHEM UN3080 Physical Chemistry II
- CHEM UN2545 Intensive Organic Chemistry Laboratory
- CHEM UN3546 Advanced Organic Chemistry Laboratory

Calculus and physics as required.

Third Year

- BIOC UN3501 Biochemistry: Structure and Metabolism
- CHEM UN3085 Physical and Analytical Chemistry Laboratory I
- CHEM UN3086 Physical and Analytical Chemistry Laboratory II
- CHEM UN3098 Supervised Independent Research
- CHEM GU4071 Inorganic Chemistry

Fourth Year

- CHEM UN3920 Senior Seminar in Chemical Research
- Advanced courses (4000-level or higher)

PROFESSORS

Bruce J. Berne
 Louis Brus
 Virginia W. Cornish
 Kenneth B. Eisenthal
 Richard A. Friesner
 Ruben Gonzalez
 Laura Kaufman
 James L. Leighton
 Ann E. McDermott
 Wei Min
 Jack R. Norton
 Colin Nuckolls
 Gerard Parkin
 David R. Reichman
 Tomislav Rovis
 Dalibor Sames
 Brent Stockwell
 James J. Valentini

Latha Venkataraman
 Xiaoyang Zhu

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 Luis Campos
 Jonathan Owen

ASSISTANT PROFESSORS

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LECTURERS

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 Charles E. Doubleday
 Sarah Hansen
 Ruben Savizky
 Talha Siddiqui

ASSOCIATES

Anna Ghurbanyan
 Joseph Ulichny

GUIDELINES FOR ALL CHEMISTRY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Students majoring in chemistry or in one of the interdepartmental majors in chemistry should go to the director of undergraduate studies or the undergraduate program manager in the Department of Chemistry to discuss their program of study. Chemistry majors and interdepartmental majors usually postpone part of the Core Curriculum beyond the sophomore year.

Chemistry Tracks

All students who wish to start with Track 2 or 3 courses must take a placement exam. The results of the placement exam are used to advise students which track to pursue. Unless otherwise specified below, all students must complete one of the following tracks:

Track 1

CHEM UN1403	General Chemistry I (Lecture)
CHEM UN1404	General Chemistry II (Lecture)

CHEM UN1500	General Chemistry Laboratory
CHEM UN2443	Organic Chemistry I (Lecture)
CHEM UN2444	Organic Chemistry II (Lecture)
CHEM UN2493	Organic Chemistry Laboratory I (Techniques)
CHEM UN2494	Organic Chemistry Laboratory II (Synthesis)

Track 2

CHEM UN1500 or CHEM UN1507	General Chemistry Laboratory Intensive General Chemistry Laboratory
CHEM UN1604	Intensive General Chemistry (Lecture)
CHEM UN2443	Organic Chemistry I (Lecture)
CHEM UN2444	Organic Chemistry II (Lecture)
CHEM UN2493	Organic Chemistry Laboratory I (Techniques)
CHEM UN2494	Organic Chemistry Laboratory II (Synthesis)

Track 3

CHEM UN1507	Intensive General Chemistry Laboratory
CHEM UN2045	Intensive Organic Chemistry I (Lecture)
CHEM UN2046	Intensive Organic Chemistry II (Lecture)
CHEM UN2545	Intensive Organic Chemistry Laboratory

Physics Sequences

Unless otherwise specified below, all students must complete one of the following sequences:

Sequence A

For students with limited background in high school physics:

PHYS UN1401	Introduction To Mechanics and Thermodynamics
PHYS UN1402	Introduction To Electricity, Magnetism, and Optics
PHYS UN1403	Introduction to Classical and Quantum Waves

For chemistry majors, the following laboratory courses are recommended, NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN1494	Introduction to Experimental Physics
PHYS UN2699	Experiments in Classical and Modern Physics
PHYS UN3081	Intermediate Laboratory Work

Sequence B

PHYS UN1601	Physics, I: Mechanics and Relativity
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PHYS UN1602	Physics, II: Thermodynamics, Electricity, and Magnetism
PHYS UN2601	Physics, III: Classical and Quantum Waves
or PHYS UN3081	Intermediate Laboratory Work

For chemistry majors, the following laboratory courses are recommended NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN2699	Experiments in Classical and Modern Physics
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Sequence C

For students with advanced preparation in physics and mathematics:

PHYS UN2801	Accelerated Physics I
- PHYS UN2802	and Accelerated Physics II

For chemistry majors, the following laboratory courses are recommended NOT required. For chemical physics majors, the following laboratory courses are required:

PHYS UN2699	Experiments in Classical and Modern Physics
or PHYS UN3081	Intermediate Laboratory Work

MAJOR IN CHEMISTRY

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN2408	First-Year Seminar in Chemical Research (Recommended NOT required)
CHEM UN3079	Physical Chemistry I
CHEM UN3080	Physical Chemistry II
CHEM UN3085	Physical and Analytical Chemistry Laboratory I
CHEM UN3086	Physical and Analytical Chemistry Laboratory II
CHEM UN3546	Advanced Organic Chemistry Laboratory
CHEM UN3920	Senior Seminar in Chemical Research
CHEM GU4071	Inorganic Chemistry

Select one course from the following:

CHEM UN3098	Supervised Independent Research
OR	Chemistry courses numbered CHEM GU4000 or above

Physics

Select one of the physics sequences outlined above in the Guidelines section.

Mathematics

Select one of the following sequences:

Four semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

MAJOR IN BIOCHEMISTRY

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN2408	First-Year Seminar in Chemical Research (Recommended NOT required)
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CHEM UN3079	Physical Chemistry I
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CHEM UN3080	Physical Chemistry II
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Biology

BIOL UN1908	First-Year Seminar in Modern Biology (Recommended NOT required)
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BIOL UN2005	Introductory Biology I: Biochemistry, Genetics & Molecular Biology
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BIOL UN2006	Introductory Biology II: Cell Biology, Development & Physiology
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BIOC UN3501	Biochemistry: Structure and Metabolism
-------------	--

BIOC UN3512	Molecular Biology
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Physics

Select one of the following physics sequences:

Sequence A:

PHYS UN1201	General Physics I
- PHYS UN1202	and General Physics II

Sequence B:

PHYS UN1401	Introduction To Mechanics and Thermodynamics and Introduction To Electricity, Magnetism, and Optics and Introduction to Classical and Quantum Waves (PHYS UN1403 is recommended NOT required)
- PHYS UN1402	
- PHYS UN1403	

Sequence C:

PHYS UN1601	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves (PHYS UN2601 is recommended but not required)
- PHYS UN1602	
- PHYS UN2601	

Sequence D:

PHYS UN2801	Accelerated Physics I
- PHYS UN2802	and Accelerated Physics II

Mathematics

Select one of the following sequences:

Two semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

AP credit and one term of calculus (Calculus II or higher)

Additional Courses

Select two of the following upper level laboratory courses (one should be a Biology lab):

BIOL UN3040	Lab in Molecular Biology and Contemporary Biology Laboratory
- BIOL UN2501	

BIOL UN3050	Project Laboratory In Protein Biochemistry
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BIOL UN3052	Project Laboratory in Molecular Genetics
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BIOL UN3500	Independent Biological Research
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CHEM UN3085	Physical and Analytical Chemistry Laboratory I
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CHEM UN3086	Physical and Analytical Chemistry Laboratory II
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CHEM UN3098	Supervised Independent Research
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CHEM UN3546	Advanced Organic Chemistry Laboratory
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Select any three courses from the following:

CHEM GU4071	Inorganic Chemistry
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CHEM GU4102	Chemistry for the Brain
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CHEM GU4147	Advanced Organic Chemistry
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BIOC GU4323	Biophysical Chemistry I
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BIOC GU4324	Biophysical Chemistry II
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MATH UN3027	Ordinary Differential Equations
or MATH UN2030	Ordinary Differential Equations

One additional semester of calculus

One additional semester of honors math:

MATH UN1207	Honors Mathematics A
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or MATH UN1208 Honors Mathematics B

Any biology course at the 3000/4000 level for 3 or more points. The following are recommended:

BIOL UN3004	Neurobiology I: Cellular and Molecular Neurobiology
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or BIOL UN3005 Neurobiology II: Development & Systems

BIOL UN3008	The Cellular Physiology of Disease
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BIOL UN3022	Developmental Biology
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BIOL UN3034	Biotechnology
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BIOL UN3041	Cell Biology
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BIOL UN3073	Cellular and Molecular Immunology
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BIOL GU4065	Molecular Biology of Disease
BIOL GU4300	Drugs and Disease

MAJOR IN CHEMICAL PHYSICS

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above.

CHEM UN3079	Physical Chemistry I
CHEM UN3080	Physical Chemistry II
CHEM UN3085	Physical and Analytical Chemistry Laboratory I
CHEM UN3086	Physical and Analytical Chemistry Laboratory II
CHEM UN3098	Supervised Independent Research
CHEM UN3920	Senior Seminar in Chemical Research
CHEM GU4221	Quantum Chemistry
or PHYS GU4021	Quantum Mechanics I

Physics

Select one of the physics sequences outlined above in *Guidelines for all Chemistry Majors, Concentrators and Interdepartmental Majors*. For the chemical physics major, one lab **MUST** be completed for the sequence chosen.

Complete the following lectures:

PHYS UN3003	Mechanics
PHYS UN3007	Electricity and Magnetism
PHYS UN3008	Electromagnetic Waves and Optics

Mathematics

Select one of the following sequences:

Four semesters of calculus:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV

Two semesters of honors mathematics:

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B
- MATH UN3027	and Ordinary Differential Equations

Two semesters of advanced calculus:

MATH UN1202	Calculus IV
- MATH UN3027	and Ordinary Differential Equations

MAJOR IN ENVIRONMENTAL CHEMISTRY

The requirements for this program were modified on February 1, 2016. Students who declared this program before this date should

contact the director of undergraduate studies for the department in order to confirm their correct course of study.

Select one of the tracks outlined above in *Guidelines for all Chemistry Majors, Concentrators, and Interdepartmental Majors* and complete the following lectures and labs.

Chemistry

Select one of the chemistry tracks outlined above. A second semester of Organic Chemistry lecture is recommended NOT required.

CHEM UN3079	Physical Chemistry I
CHEM GU4071	Inorganic Chemistry

The following courses are recommended NOT required:

CHEM UN2408	First-Year Seminar in Chemical Research
CHEM UN3920	Senior Seminar in Chemical Research

Earth and Environmental Science

Select two of the following three courses:

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System

Additional course required:

EESC UN3101	Geochemistry for a Habitable Planet
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Select one of the following labs:

EESC BC3016	Environmental Measurements
CHEM UN3085	Physical and Analytical Chemistry Laboratory I

Select one option for Independent Research in Environmental Chemistry:

EESC BC3800	Senior Research Seminar
- EESC BC3801	and Senior Research Seminar
CHEM UN3098	Supervised Independent Research (It is strongly recommended to take CHEM UN3920 if taking CHEM UN3098)

Physics

Select one of the following physics sequences:

Sequence A:

PHYS UN1201	General Physics I
- PHYS UN1202	and General Physics II

Sequence B:

PHYS UN1401	Introduction To Mechanics and Thermodynamics
- PHYS UN1402	and Introduction To Electricity, Magnetism, and Optics
- PHYS UN1403	and Introduction to Classical and Quantum Waves (Recommended NOT required)

Sequence C:

PHYS UN1601 - PHYS UN1602 - PHYS UN2601	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves (Recommended, not required)
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Sequence D:

PHYS UN2801 - PHYS UN2802	Accelerated Physics I and Accelerated Physics II
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Mathematics

Two semesters of calculus:

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN1202	Calculus IV

Additional Courses

Select any two of the following:

Chemistry:

CHEM UN3080	Physical Chemistry II
CHEM GU4103	Organometallic Chemistry
CHEM GU4147	Advanced Organic Chemistry

Earth and Environmental Science:

EESC BC3017	Environmental Data Analysis
EESC BC3025	Hydrology
EESC GU4008	Introduction to Atmospheric Science
EESC GU4009	Chemical Geology
EESC GU4040	Climate Thermodynamics and Energy Transfer
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
EESC GU4600	Earth Resources and Sustainable Development
EESC GU4835	Wetlands and Climate Change
EESC GU4885	The Chemistry of Continental Waters
EESC GU4888	Stable Isotope Geochemistry
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4925	Principles of Physical Oceanography
EESC GU4926	Principles of Chemical Oceanography

Earth and Environmental Engineering:

EAAE E4001	Industrial ecology of earth resources
EAAE E4003	Aquatic chemistry

Mathematics:

One additional semester of calculus

CONCENTRATION IN CHEMISTRY

No more than four points of CHEM UN3098 Supervised Independent Research may be counted toward the concentration.

Select one of the three chemistry tracks listed below.

PHYS UN1201 - PHYS UN1202	General Physics I and General Physics II
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Two semesters of calculus

Chemistry Tracks

Track 1

CHEM UN1403	General Chemistry I (Lecture)
CHEM UN1404	General Chemistry II (Lecture)
CHEM UN1500	General Chemistry Laboratory

Select 22 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

Track 2

CHEM UN1500 or CHEM UN1507	General Chemistry Laboratory Intensive General Chemistry Laboratory
CHEM UN1604	Intensive General Chemistry (Lecture)

Select 22 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

Track 3

CHEM UN1507	Intensive General Chemistry Laboratory
CHEM UN2045	Intensive Organic Chemistry I (Lecture)
CHEM UN2046	Intensive Organic Chemistry II (Lecture)

Select 18 points of chemistry at the 2000-level or higher (excluding CHEM UN2408).

ENVIRONMENTAL SCIENCE

Departmental Offices:

556-7 Schermerhorn Hall Extension | 212-854-4525
106 Geoscience, Lamont-Doherty Earth Observatory |
845-365-8550
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Chair of Department:

Prof. Sidney Hemming, sidney@ldeo.columbia.edu

Director of Undergraduate Studies:

Prof. Kerry Key

305C Oceanography, Lamont-Doherty Earth Observatory |
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Undergraduate Program Manager:

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The undergraduate major in Earth and environmental sciences provides an understanding of the natural functioning of our planet and considers the consequences of human interactions with it. Our program for majors aims to convey an understanding of how the complex Earth system works at a level that encourages students to think creatively about the Earth system processes and how to address multidisciplinary environmental problems. The breadth of material covered provides an excellent background for those planning to enter the professions of law, business, diplomacy, public policy, teaching, journalism, etc. At the same time, the program provides sufficient depth so that our graduates are prepared for graduate school in one of the Earth sciences. The program can be adjusted to accommodate students with particular career goals in mind.

The department's close affiliations with the Lamont-Doherty Earth Observatory, the American Museum of Natural History (AMNH), NASA's Goddard Institute for Space Studies (GISS), the Earth Institute at Columbia (EI), and several departments within the Fu Foundation School of Engineering and Applied Sciences afford opportunities for student participation in a wide variety of current research programs. Summer employment, research, and additional educational opportunities are available at Lamont and GISS. The department encourages majors to become involved in a research project by their junior year.

All majors and concentrators, when planning their programs of study, should regularly consult the directors of undergraduate studies and make themselves aware of the requirements for their particular program.

PROGRAMS OF STUDY

Environmental Science Major

The environmental science major curriculum provides an introduction to a variety of fields of study relevant to the environment. Environmental science majors are required to take three semesters of introductory courses and to

develop a grounding in basic physics, chemistry, biology, and mathematics. Here, students may select courses depending on their interest. With this introduction to the Earth's environment and equipped with a knowledge of the basic sciences, students are prepared to choose a set of upper-level courses in consultation with an undergraduate adviser. All environmental science majors are required to complete a research project, providing a practical application of mastered course work. This research culminates in a senior thesis. The research and the thesis are usually done at Lamont-Doherty Earth Observatory with guidance from a faculty member or a research scientist. However, other options are also possible.

Environmental science majors have an option to complete the special concentration in environmental biology for environmental science majors.

Earth Science Major

The major in Earth science follows a similar rationale but is designed to allow students to pursue particular fields of the Earth sciences in greater depth. Compared with the environmental science major, one fewer introductory course is required, while one additional advanced course should be part of the plan of study. The Earth science major also offers the possibility of in-depth field experience through a six- to eight-week geology summer field course, arrangements for which are made through another university. The research and senior thesis capstone requirements are the same as for the environmental science major. The geology summer field course may be used as an alternative means of fulfilling the capstone requirement in the Earth science major.

Concentrations

The program for concentrators serves students who want more exposure to Earth and environmental science than is provided by introductory-level courses. The program aims to provide concentrators with experience in data analysis and a thorough introduction to the Earth's systems.

The concentrations in environmental science and in Earth science are designed to give students an understanding of how the Earth works and an introduction to the methods used to investigate Earth processes, including their capabilities and limitations. Concentrators often join the social professions (e.g., business, law, medicine, etc.) and take with them a strong scientific background. They take the same introductory courses as the majors, but fewer basic science and upper-level courses are required.

In addition to the environmental science and Earth science concentrations, the department sponsors a special concentration which must be done in conjunction with the environmental biology major. Students should be aware that they must complete the environmental biology major in order to receive credit for the special concentration. There is also a special concentration in environmental biology for

environmental science majors sponsored by the Department of Ecology, Evolution, and Environmental Biology.

DEPARTMENTAL HONORS

The Department of Earth and Environmental Science awards departmental honors to the major or majors in Earth science or environmental science judged to have the best overall academic record. The award is accorded to no more than 10% of the graduating class, or one student in the case of a class smaller than 10. A grade point average of at least 3.6 in the major and a senior thesis or equivalent research of high quality are required. Students who wish to be considered should contact the director of undergraduate studies early in their senior year.

PROFESSORS

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 Joel E. Cohen
 Peter B. de Menocal
 Hugh Ducklow
 Sonya Dyhrman
 Peter Eisenberger
 Göran Ekström
 Arlene M. Fiore
 Steven L. Goldstein
 Arnold L. Gordon
 Kevin L. Griffin
 Alex Halliday
 Sidney R. Hemming (Chair)
 Bärbel Hönisch
 Peter B. Kelemen
 Galen McKinley
 Jerry F. McManus (Associate Chair)
 William H. Menke
 John C. Mutter
 Meredith Nettles
 Paul E. Olsen
 Terry A. Plank
 Lorenzo M. Polvani
 G. Michael Purdy
 Peter Schlosser
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 Sean C. Solomon
 Marc Spiegelman
 Martin Stute (Barnard)
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ASSOCIATES

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 Brian Kahn
 Andrew Kruczkiewicz
 Catherine Vaughan

EMERITUS

Mark Cane
 James Hays
 Paul Richards
 Lynn Sykes
 David Walker

GUIDELINES FOR ALL EARTH AND ENVIRONMENTAL SCIENCES MAJORS, CONCENTRATORS, AND SPECIAL CONCENTRATORS

Advising

All majors and concentrators, when planning their programs of study, should regularly consult the directors of undergraduate studies, who can be contacted through the department office on the fifth floor of Schermerhorn. The requirements are different for each major and concentration and must be met in conjunction with the general requirements for the bachelor's degree. Declaration of the major must be approved by the department and filed in the departmental office.

Substitutions and Exceptions

- Higher-level courses may be used to satisfy supporting mathematics and science requirements for students with Advanced Placement preparation with the permission of the major adviser.
- In addition to the courses listed for the depth, and breadth and related courses requirements, several graduate-level courses offered in the department as well as several advanced courses offered at Barnard may be substituted with the permission of the major adviser.
- 1000-level courses in the Earth and Environmental Sciences Department can not be used toward meeting the requirements of any of the majors, concentrations, or special concentrations.
- The following course is not suitable for undergraduates and can not be used toward meeting any of the requirements for the majors, concentrations, or special concentrations: EESC GU4930 Earth's Oceans and Atmosphere.

Grading

A grade of C- or better must be obtained for a course to count toward the majors, concentrations, or special concentrations. The grade of P is not acceptable, but a course taken Pass/D/Fail may be counted if and only if the P is uncovered by the Registrar's deadline.

MAJOR IN EARTH SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The major in Earth science requires a minimum of 45.5 points, distributed as follows:

Foundation Courses

EESC UN2100	Earth's Environmental Systems: The Climate System
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EESC UN2200	Earth's Environmental Systems: The Solid Earth System
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Students who wish to take both EESC UN2100 Earth's Environmental Systems: The Climate System and EESC UN2300 Earth's Environmental Systems: The Life System can include one of these under breadth and related fields below.

Supporting Mathematics and Science Courses

One semester of Calculus at the level of Calculus I or higher (3 credits)

MATH UN1101	Calculus I
-------------	------------

Select one of the following three-course sequences:

CHEM UN1403 - CHEM UN1404 - PHYS UN1201	General Chemistry I (Lecture) and General Chemistry II (Lecture) and General Physics I
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CHEM UN1403 - PHYS UN1201 - PHYS UN1202	General Chemistry I (Lecture) and General Physics I and General Physics II
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Capstone Experience

Select one of the following:

EESC BC3800 - EESC UN3901	Senior Research Seminar and Environmental Science Senior Seminar
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EESC BC3801 - EESC UN3901	Senior Research Seminar and Environmental Science Senior Seminar
------------------------------	--

A six to eight week summer geology field course

Breadth and Related Fields Requirement

A minimum of 6 points (two courses) chosen with the major adviser are required.

Breadth and related field courses are science courses relevant for an Earth science major that do not require an Earth science background. Several such courses are offered at the 2000-, 3000- and 4000-level in the department and at Barnard. Examples include:

EESC UN2100	Earth's Environmental Systems: The Climate System
-------------	--

EESC UN2300	Earth's Environmental Systems: The Life System
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EESC UN3010	Field Geology
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EESC BC3017	Environmental Data Analysis
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EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
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EESC GU4600	Earth Resources and Sustainable Development
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EESC GU4917	Earth/Human Interactions
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EAAE E2002	Alternative energy resources
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Also included among breadth and related fields courses are science, mathematics, statistics, and engineering courses offered by other departments that count toward fulfilling degree requirements in those departments.

Depth Requirement

A minimum of 12 points (four courses) chosen with the major adviser to provide depth in the field of Earth science.

These courses build on the foundation and supporting courses listed above and provide a coherent focus in some area of Earth science. Students should include at least one of the following in their course of study:

EESC UN3101	Geochemistry for a Habitable Planet
or EESC UN3201	Solid Earth Dynamics

Areas of focus include one of the courses listed above and three or more additional courses. Students are not required to specialize in a focus area, but examples are given below for those who choose to do so.

Geological Science

EESC GU4090	Introduction to Geochronology and Thermochronology
EESC GU4113	Introduction to Mineralogy
EESC GU4223	Sedimentary Geology
EESC GU4230	Crustal Deformation
EESC GU4701	Introduction to Igneous Petrology
EESC GU4887	Isotope Geology I
EESC GU4947	Plate Tectonics

It is strongly recommended that students focusing in geological science take the summer geology field course as their capstone experience.

Geochemistry

EESC UN3015	The Earth's Carbon Cycle
EESC BC3016	Environmental Measurements
EESC BC3200	Ecotoxicology
EESC GU4090	Introduction to Geochronology and Thermochronology
EESC GU4113	Introduction to Mineralogy
EESC GU4701	Introduction to Igneous Petrology
EESC GU4885	The Chemistry of Continental Waters
EESC GU4887	Isotope Geology I
EESC GU4926	Principles of Chemical Oceanography

It is recommended that students focusing in geochemistry take CHEM UN1403-CHEM UN1404 General Chemistry I and II, and PHYS UN1201 General Physics I as their supporting science sequence.

Atmosphere and Ocean Science

EESC GU4008	Introduction to Atmospheric Science
EESC GU4920	Paleoceanography

EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4925	Principles of Physical Oceanography
EESC GU4926	Principles of Chemical Oceanography

It is recommended that students focusing on atmosphere and ocean science also take a course in fluid dynamics and a course in differential equations.

Solid Earth Geophysics

EESC GU4230	Crustal Deformation
EESC GU4300	The Earth's Deep Interior
EESC GU4937	Cenozoic Paleoceanography
EESC GU4947	Plate Tectonics
EESC GU4949	Introduction to Seismology

It is recommended that students focusing in solid Earth geophysics take PHYS UN1201-PHYS UN1202 General Physics I and II, and CHEM UN1403 General Chemistry I as their supporting science sequence and also take MATH UN1201 Calculus II.

Climate

EESC UN3015	The Earth's Carbon Cycle
EESC BC3025	Hydrology
EESC GU4008	Introduction to Atmospheric Science
EESC GU4330	Introduction to Terrestrial Paleoclimate
EESC GU4835	Wetlands and Climate Change
EESC GU4920	Paleoceanography
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4925	Principles of Physical Oceanography
EESC GU4937	Cenozoic Paleoceanography

Paleontology

EESC GU4223	Sedimentary Geology
EESC GU4550	Plant Ecophysiology
EESC GU4920	Paleoceanography
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4937	Cenozoic Paleoceanography

It is recommended that students focusing in paleontology take EESC UN2300 Earth's Environmental Systems: The Life System, as one of their foundation courses.

MAJOR IN ENVIRONMENTAL SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The major in environmental science requires a minimum of 47 points, distributed as follows:

Foundation Courses

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System

Supporting Mathematics and Science Courses

One semester of Calculus at the level of Calculus I or higher (3 credits)

MATH UN1101	Calculus I
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Select one of the following three-course sequences:

CHEM UN1403 - CHEM UN1404 - PHYS UN1201	General Chemistry I (Lecture) and General Chemistry II (Lecture) and General Physics I
CHEM UN1403 - PHYS UN1201 - PHYS UN1202	General Chemistry I (Lecture) and General Physics I and General Physics II
CHEM UN1403 - EEEB UN2001 - PHYS UN1201	General Chemistry I (Lecture) and Environmental Biology I: Elements to Organisms and General Physics I

Capstone Experience

EESC BC3800 or EESC BC3801	Senior Research Seminar Senior Research Seminar
EESC UN3901	Environmental Science Senior Seminar

Breadth and Related Fields Requirement

A minimum of 6 points (two courses) chosen with the major adviser are required.

Breadth and related field courses are science courses relevant for an environmental science major that do not require an environmental science background. Several such courses are offered at the 2000-, 3000- and 4000-level in the department and at Barnard. Examples include:

EESC BC3017	Environmental Data Analysis
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
EESC GU4600	Earth Resources and Sustainable Development
EESC GU4917	Earth/Human Interactions
EESC UN3010	Field Geology

Also included among breadth and related fields courses are science, mathematics, statistics, and engineering courses offered by other departments that count toward fulfilling degree requirements in those departments.

Depth Requirement

A minimum of 9 points (three courses) chosen with the major adviser to provide depth in the field of environmental science.

These courses build on the foundation and supporting courses listed above and provide a coherent focus in some area of environmental science. Students should include at least one of the following in their course of study:

EESC UN3101	Geochemistry for a Habitable Planet
or EESC UN3201	Solid Earth Dynamics

Areas of focus include one of the courses listed above and two or more additional courses. Students are not required to specialize in a focus area, but examples are given below for those who choose to do so.

Environmental Geology

EESC GU4076	Geologic Mapping
EESC GU4480	Paleobiology and Earth System History
EAEE E3221	Environmental geophysics

It is recommended that students focusing in environmental geology also take EESC W4050 Remote Sensing.

Environmental Geochemistry

EESC UN3015	The Earth's Carbon Cycle
EESC GU4885	The Chemistry of Continental Waters
EESC GU4887	Isotope Geology I
EESC GU4924	Introduction to Atmospheric Chemistry
EESC GU4888	Stable Isotope Geochemistry
EESC GU4926	Principles of Chemical Oceanography

Hydrology

EESC GU4076	Geologic Mapping
EESC GU4835	Wetlands and Climate Change
EESC GU4885	The Chemistry of Continental Waters
EESC BC3025	Hydrology
EAEE E3221	Environmental geophysics

Climate Change

EESC UN3015	The Earth's Carbon Cycle
EESC GU4008	Introduction to Atmospheric Science
EESC GU4330	Introduction to Terrestrial Paleoclimate
EESC GU4480	Paleobiology and Earth System History
EESC GU4835	Wetlands and Climate Change
EESC GU4920	Paleoceanography

It is recommended that students focusing in environmental geology also take EESC GU4050 Remote Sensing.

Energy and Resources

EESC GU4076	Geologic Mapping
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EESC GU4701	Introduction to Igneous Petrology
EAAE E2002	Alternative energy resources

CONCENTRATION IN EARTH SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The concentration in Earth science requires a minimum of 25 points, distributed as follows:

Foundation Courses

EESC UN2100	Earth's Environmental Systems: The Climate System
or EESC UN2300	Earth's Environmental Systems: The Life System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System

Supporting Mathematics and Science Courses

Two science or mathematics courses (6-7 points) selected from among those listed for the Earth science major above.

Depth and Breadth and Related Fields Requirements

A minimum of 10 points (typically three courses) is required as follows:

EESC UN3101	Geochemistry for a Habitable Planet
or EESC UN3201	Solid Earth Dynamics

One additional course chosen from those listed under Depth Requirement for the earth science major above.

The third course selected from those listed under either Depth Requirement or Breadth and Related Fields Requirement for the earth science major above.

CONCENTRATION IN ENVIRONMENTAL SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The concentration in environmental science requires a minimum of 25.5 points, distributed as follows:

Foundation Courses

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System

EESC UN2300	Earth's Environmental Systems: The Life System
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Supporting Mathematics and Science Courses

Two science or mathematics courses (6-7 points) selected from among those listed for the environmental science major above.

Depth and Breadth and Related Fields Requirements

A minimum of 6 points (two courses) is required as follows:

EESC UN3101	Geochemistry for a Habitable Planet
or EESC UN3201	Solid Earth Dynamics

One additional course selected from those listed under either Depth Requirement or Breadth and Related Fields Requirement for the environmental science major above.

SPECIAL CONCENTRATION IN ENVIRONMENTAL SCIENCE FOR MAJORS IN ENVIRONMENTAL BIOLOGY

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The Department of Earth and Environmental Sciences sponsors a special concentration which must be done in conjunction with the environmental biology major. Students should be aware that they must complete the environmental biology major in order to receive credit for the special concentration.

The special concentration in environmental science requires a minimum of 31.5 points, distributed as follows:

Introductory Environmental Science (13.5 points)

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System

Introductory Science (6 points)

Two courses in chemistry, physics, mathematics, or environmental biology from the supporting mathematics and science list for the environmental science major above.

Advanced Environmental Science (12 points)

Four courses at the 3000-level or above chosen from those recommended for the environmental science major above.

Advanced courses used to fulfill requirements in the environmental biology major cannot count toward requirements for the special concentration.

SPECIAL CONCENTRATION IN ENVIRONMENTAL BIOLOGY FOR MAJORS IN ENVIRONMENTAL SCIENCE

Please read *Guidelines for all Earth and Environmental Sciences Majors, Concentrators, and Special Concentrators* above.

The Department of Ecology, Evolution, and Environmental Biology sponsors a special concentration which must be done in conjunction with the environmental science major. Students should be aware that they must complete the environmental science major in order to receive credit for the special concentration.

The special concentration in environmental biology requires a minimum of 39 points, distributed as follows:

Introductory Environmental Biology and Environmental Science (17 points)

EEEB UN2001	Environmental Biology I: Elements to Organisms
EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EEEB UN2002	Environmental Biology II: Organisms to the Biosphere

Introductory Science (13 points)

Select one of the following chemistry sequences:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
CHEM UN1604 - CHEM UN2507	Intensive General Chemistry (Lecture) and Intensive General Chemistry Laboratory

One term of statistics such as the following:

STAT UN1101	Introduction to Statistics
STAT UN1201	Calculus-Based Introduction to Statistics
BIOL BC2286	Statistics and Research Design

EEEB UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
EEEB UN3087	Conservation Biology

Advanced Environmental Biology (9 points)

Three additional advanced EEEB courses (3000-level and above), each chosen from a different curricular area (evolution/genetics, ecology/behavior/conservation, anatomy/physiology/diversity, biology laboratory courses).

Advanced courses used to fulfill requirements in the environmental science major cannot count toward requirements for the special concentration.

Sustainable Development

Students interested in sustainable development should refer to the *Sustainable Development* section in this Bulletin.

ETHNICITY AND RACE STUDIES

Center for the Study of Ethnicity and Race (<http://www.columbia.edu/cu/cser/>): 420 Hamilton; 212-854-0507

Program Co-Directors: Professors Mae Ngai (mn53@columbia.edu) and Karl Jacoby (kj2305@columbia.edu) | 425 Hamilton | 212-854-2564

Director of Undergraduate Studies: Prof. Deborah Paredez (<https://www.cser.columbia.edu/deborah-paredez/>), 425 Hamilton | 212-854-2564 | Office Hours: 1-3pm | Online Appointment Scheduling (<https://www.cser.columbia.edu/dus-appointment/>) | d.paredez@columbia.edu

Assistant Director: Josephine Caputo | 424 Hamilton Hall | 212-854-0510 | jc2768@columbia.edu

Founded in 1999, the Center for the Study of Ethnicity and Race (CSER) is an interdisciplinary intellectual space whose mission is to advance the most innovative teaching, research, and public discussion about race and ethnicity. To promote its mission, the Center organizes conferences, seminars, exhibits, film screenings, and lectures that bring together faculty, undergraduates, and graduate students with diverse interests and backgrounds. Moreover, CSER partners with departments, centers, and institutes at Columbia, as well as with colleagues and organizations on and off campus, in order to reach new audiences and facilitate an exchange of knowledge.

PROGRAMS OF STUDY

Ethnicity and Race Studies major and concentration encompass a variety of fields and interdisciplinary approaches to the critical study of ethnicity and race. What makes CSER unique is its attention to the comparative study of racial and ethnic categories in the production of social identities, power relations,

and forms of knowledge in a multiplicity of contexts including the arts, social sciences, natural sciences, and humanities. In addition to the major, CSER also offers a concentration in ethnicity and race studies.

In both the major and concentration, students have the opportunity to select from the following areas of specialization:

- Asian American studies
- Comparative ethnic studies
- Latino/a studies
- Native American/Indigenous studies
- Individualized courses of study

Faculty and students find this field exciting and important because it opens up new ways of thinking about two fundamental aspects of human social existence: race and ethnicity. Although various traditional disciplines such as history, sociology, anthropology, and literature, among others, offer valuable knowledge on race and ethnicity, ethnicity and race studies provides a flexible interdisciplinary and comparative space to bring the insights of various conceptual frameworks and disciplines together in critical dialogue.

Overall, this program introduces students to the study of ethnicity and race, and the deep implications of the subject matter for thinking about human bodies, identity, culture, social hierarchy, and the formation of political communities. The major encourages students to consider the repercussions of racial and ethnic identifications to local and global politics, and how race and ethnicity relates to gender, sexuality, and social class, among other forms of hierarchical difference.

Students majoring in ethnicity and race studies may focus their work on specific groups, such as Asian Americans, Latino/a, or Native Americans/Indigenous; or a comparative study of how race and ethnicity are formed and how conceptions of race and ethnicity transform and change over time and place. Students also have the option of designing an individualized course of study, which may encompass a wide variety of themes. Among the most studied are those involving the relationship between race, ethnicity and law; health; human rights; urban spaces; cultural production; visual culture; and the environment.

Due to its rigorous curriculum, which trains students in theory, history, and a wide range of modes of inquiry, the major enables students to follow multiple directions after graduation. According to our internal surveys, nearly half of CSER students continue to Ph.D. programs in history, anthropology, and ethnic studies, among other areas. A second significant number of students continue on to professions most notably related to law, public policy, medicine, human rights, community organizing, journalism, and the environment.

STUDY ABROAD

Students are encouraged to participate in study abroad programs, as they represent an exciting opportunity to learn

new languages and live in countries that are germane to their areas of study. In addition, traveling abroad can enrich every student's intellectual experience by providing an opportunity to learn about other perspectives on ethnicity and race.

In summer 2017 CSER, together with Columbia's Office of Global Programs (OGP) launched a pilot summer program in Mexico City in collaboration with the Centro de Investigación y Docencia Económicas--CIDE, a leading institution of higher education with a focus in the social sciences. The program consists of an intensive 5-week CSER core course, "Colonization-Decolonization," visits to various historical colonial sites and a field trip to Oaxaca. Professors Claudio Lomnitz and Manan Ahmed jointly taught the class. Eleven Columbia students participated in this exchange. For more information about the CSER 2018 Global Program in Mexico, please contact cser@columbia.edu

In the past, students have also participated in study abroad programs in Australia, Dominican Republic, Mexico, and South Africa. To ensure that study abroad complements the major and integrates effectively with the requirements of the major, students are encouraged to consult with CSER's undergraduate adviser as early in their academic program as possible. The director of undergraduate studies can advise students on what may be exciting programs for their areas.

DEPARTMENTAL HONORS

CSER majors may choose to write and/or produce an honors project. The senior thesis gives undergraduate majors the opportunity to engage in rigorous, independent, and original research on a specific topic of their choosing. If a monograph, the honors thesis is expected to be 35-50 pages in length. Honors projects can also take other forms, such as video or websites. These projects also require a written component, but of a shorter length than the traditional thesis. During their senior year, honors students perform research as part of CSER UN3990 (<http://bulletin.columbia.edu/search/?P=CSER%20UN3990/>) Senior Project Seminar. Senior projects are due in early April. The Honors Thesis is an excellent option for any student interested in pursuing a Master's degree or Ph.D. Students should consult with their director of undergraduate studies (<http://www.college.columbia.edu/academics/dus/>) no later than the beginning of the first term of their senior year if they wish to be considered for departmental honors. Students who are awarded departmental honors are notified by their department in mid-May.

In order to qualify for departmental honors, students must satisfy all the requirements for the major, maintain a GPA of at least 3.6 in the major, and complete a high quality honors project. In addition, each student is expected to meet periodically with his or her supervising project adviser and preceptor. Although the senior thesis is a prerequisite for consideration for departmental honors, all Ethnicity and Race studies majors are strongly encouraged to consider undertaking

thesis work even if they do not wish to be considered for departmental honors.

CORE FACULTY AND EXECUTIVE COMMITTEE

Sayantani DasGupta (CSER, Professional Studies)

Jennifer Lee (Sociology)

Catherine Fennel (Anthropology)

Kevin Fellezs (Ethnomusicology and IRAAS)

Karl Jacoby CSER Co-Director (History)

Claudio Lomnitz (Anthropology)

Frances Negrón-Muntaner (English and Comparative Literature)

Mae Ngai CSER Co-Director (History)

Ana Maria Ochoa (Ethnomusicology)

Deborah Paredez (CSER and Professional Practice)

Audra Simpson (Anthropology)

Neferti Tadiar (Barnard, Women's Studies)

AFFILIATED FACULTY

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Jill Hill

Assistant Professor of Psychology and Education, Department of Counseling & Clinical Psychology, Teachers College

View Profile (<http://www.tc.columbia.edu/faculty/jh2937/>)

Marianne Hirsch

Professor, Department of English and Comparative Literature

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Jean Howard

George Delacorte Professor in the Humanities, Department of English and Comparative Literature

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Theodore Hughes

Professor of Korean Studies

Elizabeth Hutchinson

Associate Professor of Art History, Barnard

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Leila Hadley Luce Associate Professor of Modern Tibetan Studies

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MAJOR IN ETHNICITY AND RACE STUDIES

The requirements for this program were modified on September 28, 2018. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The major in ethnicity and race studies consists of a minimum of 27 points. All majors are required to take three core courses as listed below:

Core Courses	Points
1.	
CSER UN1010 Introduction to Comparative Ethnic Studies (or)	4
OR	
CSER UN1040 Critical Approaches to the Study of Ethnicity and Race	0
2.	
CSER UN3928 Colonization/Decolonization	4
OR	
CSER UN3942 Race and Racisms	4
3.	
CSER UN3919 Modes of Inquiry	4

Specialization

All majors will select one of the areas of specialization listed below from which to complete their remaining coursework:

- Asian American studies
- Comparative ethnic studies
- Latino/a studies
- Native American/Indigenous studies
- Individualized courses of study

Majors who elect NOT to follow the Honors track must complete at least five CSER elective courses, in consultation with their major adviser, within their area of specialization. At least one of these electives must be a writing-intensive seminar (3000 or above level courses must be chosen within the department). Majors who elect to follow the Honors track must complete at least four CSER elective courses, in consultation with their major adviser, within their area of specialization.

Honors

In lieu of a fifth elective, Honors majors are required to enroll in the following course in the spring semester of their senior year, during which they are required to write a thesis:

CSER UN3990	Senior Project Seminar	4
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Honors majors are required to present their senior essays at the annual undergraduate symposium in April. Students may fulfill this option in one of the following two ways:

1. By matriculating in the Senior Thesis course and writing the thesis under the supervision of the course faculty.
2. By taking an additional 4-point seminar where a major paper is required and further developing the paper into a thesis length work (minimum of 30 pages) under the supervision of a CSER faculty member.

Language Courses

- One of the following is highly recommended, although not required for the major:

- One course beyond the intermediate-level in language pertinent to the student's focus
- An introductory course in a language other than that used to fulfill the degree requirements, but that is pertinent to the student's focus
- A linguistics or other course that critically engages language
- An outside language and study abroad programs that include an emphasis on language acquisition

CONCENTRATION IN ETHNICITY AND RACE STUDIES

The requirements for this program were modified on September 28, 2018. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The concentration in ethnicity and race studies requires a minimum of 19 points. Students take two core courses (may choose between CSER UN1010 and CSER UN1040) and four elective courses, one of which must be a seminar:

Core Courses	Points
The concentration in ethnicity and race studies requires a minimum of 19 points. All students who choose a concentration are required to take two core course as listed below:	
1.	

The concentration in ethnicity and race studies requires a minimum of 19 points. All students who choose a concentration are required to take two core course as listed below:

- 1.

CSER UN1010	Introduction to Comparative Ethnic Studies (or)	4
OR		
CSER UN1040	Critical Approaches to the Study of Ethnicity and Race	3
2.		
CSER UN3928	Colonization/Decolonization	4
OR		
CSER UN3942	Race and Racisms	4

Specialization

Students must complete at least four courses, in consultation with their major adviser, in one of the following areas of specialization. At least one of the elective courses must be a seminar.

Asian American studies

Comparative ethnic studies

Latino/a studies

Native American/Indigenous studies

Individualized courses of study

EVOLUTIONARY BIOLOGY OF THE HUMAN SPECIES

Departmental Office: Schermerhorn Extension, 10th floor; 212-854-9987
<http://e3b.columbia.edu/>

Director of Undergraduate Studies: Dr. Matthew Palmer, 1010 Schermerhorn; 212-854-4767; mp2434@columbia.edu

Evolutionary Biology of the Human Species Adviser: Dr. Jill Shapiro, 1011 Schermerhorn Extension; 212-854-5819; jss19@columbia.edu

Director, Administration and Finance: Kyle Bukhari, 1014B Schermerhorn Extension; 212-854-8665; kb2337@columbia.edu (lg2019@columbia.edu)

The Department of Ecology, Evolution & Environmental Biology (E3B) at Columbia University was established in 2001. Although we are a relatively new department, we have grown rapidly in the past decade. We now have an internationally diverse student body and a broad network of supporters at Columbia and throughout New York City. Our affiliated faculty members come from departments at Columbia as well as from the American Museum of Natural History (<http://www.amnh.org/>), the New York Botanical Garden (<http://www.nybg.org/>), the Wildlife Conservation Society (<http://www.wcs.org/>), and the EcoHealth Alliance (<http://www.ecohealthalliance.org/>). Together, we provide an unparalleled breadth and depth of research opportunities for our students.

In creating E3B, Columbia University recognized that the fields of ecology, evolutionary biology, and environmental biology constitute a distinct subdivision of the biological sciences with its own set of intellectual foci, theoretical foundations, scales of analysis, and methodologies.

E3B's mission is to educate a new generation of scientists and practitioners in the theory and methods of ecology, evolution, and environmental biology. Our educational programs emphasize a multi-disciplinary perspective to understand life on Earth from the level of organisms to global processes that sustain humanity and all life.

To achieve this multi-disciplinary perspective, the department maintains close ties to over 70 faculty members beyond its central core. Thus, many faculty members who teach, advise, and train students in research are based in other departments on the Columbia campus or at the partner institutions. Through this collaboration, the department is able to tap into a broad array of scientific and intellectual resources in the greater New York City area. The academic staff covers the areas of plant and animal systematics; evolutionary and population genetics; ecosystem science; demography and population biology; behavioral and community ecology; and related fields of epidemiology, ethnobiology, public health, and environmental policy. Harnessing the expertise of this diverse faculty and the institutions of which they are a part, E3B covers a vast area of inquiry into the evolutionary, genetic, and ecological relationships among all living things.

FACILITIES AND COLLABORATIVE INSTITUTIONS

The Department of Ecology, Evolution, and Environmental Biology (E3B)

In addition to the off-campus facilities detailed below, the Columbia community offers academic excellence in a range of natural and social science disciplines that are directly related to biodiversity conservation including: evolution, systematics, genetics, behavioral ecology, public health, business, economics, political science, anthropology, and public and international policy. These disciplines are embodied in world-class departments, schools, and facilities at Columbia. The divisions that bring their resources to bear on issues most relevant to E3B's mission are: the Lamont-Doherty Earth Observatory, the School of International and Public Affairs, the Goddard Institute for Space Studies, the International Research Institute for Climate Prediction, the Black Rock Forest Reserve in New York State, the Rosenthal Center for Alternative/Complementary Medicine, the Division of Environmental Health Sciences at the School of Public Health, and the Center for International Earth Science Information Network (CIESIN). Several of these units of the University are networked through the Earth Institute at Columbia, a division of the University that acts as an intramural network of environmental programs and supplies logistical support for constituent programs, through planning, research, seminars,

and conferences. All of the above schools, centers, and institutes contribute to finding solutions for the world's environmental challenges.

The Earth Institute Center for Environmental Sustainability (EICES)

The Earth Institute Center for Environmental Sustainability (EICES), formerly known as the Center for Environmental Research and Conservation (CERC), is actively involved in protecting biodiversity and ecosystems. The Earth Institute Center for Environmental Sustainability is dedicated to the development of a rich, robust, and vibrant world within which we can secure a sustainable future. Through a diverse array of strategic partners in science, education, and outreach, the center builds unique programs that promote human well-being through the preservation, restoration, and management of biodiversity, and the services our ecosystems provide.

The Center for Environmental Research and Conservation (CERC), a leading provider of cutting-edge environmental research, education, and training, since its inception in 1994, has grown into two institutions—an Earth institute center and a Secretariat for a major environmental consortium. The center's new name is the Earth Institute Center for Environmental Sustainability (EICES, pronounced “i-sees”). EICES also continues, however, as the Secretariat for the Consortium for Environmental Research and Conservation, continuing 15 years of collaborations between the Earth Institute, the American Museum of Natural History, the New York Botanical Garden, The Wildlife Conservation Society, and EcoHealth Alliance on biodiversity conservation.

American Museum of Natural History

The American Museum of Natural History is one of the world's preeminent scientific, educational, and cultural institutions. Since its founding in 1869, the Museum has advanced its global mission to discover, interpret, and disseminate information about human cultures, the natural world, and the universe through a wide-reaching program of scientific research, education, and exhibitions. The institution comprises 45 permanent exhibition halls, state-of-the-art research laboratories, one of the largest natural history libraries in the Western Hemisphere, and a permanent collection of 32 million specimens and cultural artifacts. With a scientific staff of more than 200, the Museum supports research divisions in anthropology, paleontology, invertebrate and vertebrate zoology, and the physical sciences. The Museum's scientific staff pursues a broad agenda of advanced scientific research, investigating the origins and evolution of life on Earth, the world's myriad species, the rich variety of human culture, and the complex processes that have formed and continue to shape planet Earth and the universe beyond.

The Museum's Center for Biodiversity and Conservation (CBC) was created in June 1993 to advance the use of scientific data to mitigate threats to biodiversity. CBC programs integrate

research, education, and outreach so that people, a key force in the rapid loss of biodiversity, will become participants in its conservation. The CBC works with partners throughout the world to build professional and institutional capacities for biodiversity conservation and heightens public understanding and stewardship of biodiversity. CBC projects are under way in the Bahamas, Bolivia, Madagascar, Mexico, Vietnam, and the Metropolitan New York region.

The Museum's scientific facilities include: two molecular systematics laboratories equipped with modern high-throughput technology; the interdepartmental laboratories, which include a state-of-the-art imaging facility that provides analytical microscopy, energy dispersive spectrometry, science visualization, and image analysis to support the Museum's scientific activities; a powerful parallel-computing facility, including a cluster of the world's fastest computers, positioned to make significant contributions to bioinformatics; and a frozen tissue facility with the capacity to store one million DNA samples.

New York Botanical Garden

The New York Botanical Garden (NYBG), with its 7 million specimen herbarium, the largest in the Western Hemisphere, and its LuEsther T. Mertz Library, the largest botanical and horticultural reference collection on a single site in the Americas, comprises one of the very best locations in the world to study plant science. NYBG's systematic botanists discover, decipher, and describe the world's plant and fungal diversity; and its economic botanists study the varied links between plants and people. The Enid A. Haupt Conservatory, the largest Victorian glasshouse in the United States, features some 6,000 species in a newly installed “Plants of the World” exhibit. The new International Plant Science Center stores the Garden collection under state-of-the-art environmental conditions and has nine study rooms for visiting scholars. All specimens are available for on-site study or loan.

In recent years, NYBG has endeavored to grow and expand its research efforts, supporting international field projects in some two dozen different countries, ranging from Brazil to Indonesia. In 1994, AMNH and NYBG established the Lewis and Dorothy Cullman Program for Molecular Systematics Studies to promote the use of molecular techniques in phylogenetic studies of plant groups. This program offers many opportunities for research in conservation genetics. NYBG operates both the Institute for Economic Botany (IEB) and the Institute of Systematic Botany (ISB). The ISB builds on the Garden's long tradition of intensive and distinguished research in systematic botany—the study of the kinds and diversity of plants and their relationships—to develop the knowledge and means for responding effectively to the biodiversity crisis.

The Garden has also established a molecular and anatomical laboratory program, which includes light and electron microscopes, and has made enormous advances in digitizing its collection. There is currently a searchable on-line library catalog

and specimen database collection with some half million unique records. Field sites around the world provide numerous opportunities for work in important ecosystems of unique biodiversity.

Wildlife Conservation Society

The Wildlife Conservation Society (WCS), founded in 1895 as the New York Zoological Society, works to save wildlife and wild lands throughout the world. In addition to supporting the nation's largest system of zoological facilities—the Bronx Zoo; the New York Aquarium; the Wildlife Centers in Central Park, Prospect Park, and Flushing Meadow Park; and the Wildlife Survival Center on St. Catherine's Island, Georgia—WCS maintains a commitment to field-based conservation science. With 60 staff scientists and more than 100 research fellows, WCS has the largest professional field staff of any U.S.-based international conservation organization. Currently, WCS conducts nearly 300 field projects throughout the Americas, Asia, and Africa. The field program is supported by a staff of conservation scientists based in New York who also conduct their own research.

WCS's field-based programs complement the organization's expertise in veterinary medicine, captive breeding, animal care, genetics, and landscape ecology, most of which are based at the Bronx Zoo headquarters. WCS's Conservation Genetics program places an emphasis on a rigorous, logical foundation for the scientific paradigms used in conservation biology and is linked to a joint Conservation Genetics program with the American Museum of Natural History. The Wildlife Health Sciences division is responsible for the health care of more than 17,000 wild animals in the five New York parks and wildlife centers. The departments of Clinical Care, Pathology, Nutrition, and Field Veterinary Programs provide the highest quality of care to wildlife.

EcoHealth Alliance

EcoHealth Alliance is an international organization of scientists dedicated to the conservation of biodiversity. For more than 40 years, EcoHealth Alliance has focused its efforts on conservation. Today, they are known for innovative research on the intricate relationships between wildlife, ecosystems, and human health.

EcoHealth Alliance's work spans the U.S. and more than 20 countries in Central and South America, the Caribbean, Africa, and Asia to research ways for people and wildlife to share bioscapes for their mutual survival. Their strength is built on innovations in research, education, and training and accessibility to international conservation partners.

Internationally, EHA programs support conservationists in over a dozen countries at the local level to save endangered species and their habitats, and to protect delicate ecosystems for the benefit of wildlife and humans.

ACADEMIC PROGRAMS

The Department of Ecology, Evolution, and Environmental Biology runs two undergraduate majors/concentrations. The primary major is in environmental biology and the second is evolutionary biology of the human species. The foci and requirements vary substantially and are intended for students with different academic interests.

The environmental biology major emphasizes those areas of biology and other disciplines essential for students who intend to pursue careers in the conservation of Earth's living resources. It is designed to prepare students for graduate study in ecology and evolutionary biology, conservation biology, environmental policy and related areas, or for direct entry into conservation-related or science teaching careers.

Interdisciplinary knowledge is paramount to solving environmental biology issues, and a wide breadth of courses is thus essential, as is exposure to current work. Conservation internships are available through partner institutions and serve as research experience leading to the development of the required senior thesis.

Declaration of the environmental biology major must be approved by the director of undergraduate studies and filed in the departmental office located on the 10th floor of Schermerhorn Extension.

The major in evolutionary biology of the human species provides students with a foundation in the interrelated spheres of behavior, ecology, genetics, evolution, morphology, patterns of growth, adaptation, and forensics. Using the framework of evolution and with attention to the interplay between biology and culture, research in these areas is applied to our own species and to our closest relatives to understand who we are and where we came from. This integrated biological study is also known as biological anthropology. As an interdisciplinary major, students are also encouraged to draw on courses in related fields including biology, anthropology, geology, and psychology as part of their studies.

PROFESSORS

Steve Cohen (International and Public Affairs)
 Marina Cords (also Anthropology)
 Ruth DeFries
 Kevin Griffin (also Earth and Environmental Sciences)
 Paul Hertz (Barnard)
 Ralph Holloway (Anthropology)
 Darcy Kelley (Biological Sciences)
 Don Melnick (also Anthropology and Biological Sciences)
 Brian Morton (Barnard)
 Shahid Naeem
 Paul Olsen (Earth and Environmental Sciences)
 Robert Pollack (Biological Sciences)
 Maria Uriarte

Paige West

ASSOCIATE PROFESSORS

Hilary Callahan (Barnard)
 Maria Diuk-Wasser
 Duncan Menge
 Dustin Rubenstein
 Duncan Menge

ASSISTANT PROFESSORS

Andres Bendesky
 Deren Eaton

LECTURERS

Sara Kross
 Matthew Palmer
 Jill Shapiro

ADJUNCT FACULTY/RESEARCH SCIENTISTS

Columbia University

Simon Anthony (CUMC)
 Hilary Callahan (Barnard Biology)
 Steven Cohen (SIPA)
 Steven Davis
 Adela Gondek (SIPA)
 Paul Hertz (Barnard)
 Ralph Holloway
 Darcy Kelley
 Brian Morton (Barnard)
 Robert Pollack
 Marya Pollack
 Paige West
 Natalie Boelman (Lamont-Doherty)

American Museum of Natural History

George Amato
 Mary Blair
 Frank Burbrink
 Joel Cracraft
 Steven David
 Dave Grimaldi
 Christopher Raxworthy
 Robert Rockwell
 Nancy Simmons
 Brian Smith
 Eleanor Sterling

The New York Botanical Garden

Michael Balick
 Dennis Stevenson

Wildlife Conservation Society

Howard Rosenbaum
 Scott Silver
 Patrick R. Thomas

Ecohealth Alliance

Peter Daszak
 Kevin Olival
 Melinda Rostal

Cary Institute of Ecosystem Studies

Joshua Ginsberg

NYC Audubon

Susan Elbin

Woods Hole

Michael T. Coe

GUIDELINES FOR ALL ECOLOGY, EVOLUTION, AND ENVIRONMENTAL BIOLOGY MAJORS AND CONCENTRATORS

The grade of D is not accepted for any course offered in fulfillment of the requirements toward the majors or concentrations.

MAJOR IN ENVIRONMENTAL BIOLOGY

The major in environmental biology requires 50 points, distributed as follows:

Lower Division Courses

Two terms of introductory or environmental biology such as the following:

EEEB UN2001 - EEEB UN2002	Environmental Biology I: Elements to Organisms and Environmental Biology II: Organisms to the Biosphere
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Two terms of environmental science such as the following:

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System

Two terms of chemistry such as the following:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
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One term of physics such as the following:

PHYS UN1201	General Physics I
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One term of statistics such as the following:

EEEE UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
BIOL BC2286	Statistics and Research Design
STAT UN1101	Introduction to Statistics
STAT UN1201	Calculus-Based Introduction to Statistics
One term of calculus such as the following:	
MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN1202	Calculus IV

Upper Division Courses

Students must complete five advanced elective courses (generally 3000-level or above) satisfying the following distribution. At least one of these courses must include a laboratory component. For more information and a list of appropriate courses, contact the director of undergraduate studies.

1. Ecology, behavior, or conservation biology;
2. Evolution or genetics;
3. Morphology, physiology, or diversity;
4. Policy or economics;
5. One additional course from the preceding four groups.

Students must also complete a senior thesis, which involves completing a research internship (generally in the summer before the senior year) and completing at least one semester of the thesis research seminar, EEEB UN3991- EEEB UN3992 Senior Seminar. Enrollment in both semesters of the seminar, starting in the spring of the junior year, is recommended.

Students planning on continuing into graduate studies in environmental biology or related fields are encouraged to take organic chemistry and genetics.

ECOLOGY AND EVOLUTION TRACK WITHIN THE ENVIRONMENTAL BIOLOGY MAJOR

The ecology and evolution track within the environmental biology major requires 50 points, distributed as follows:

Lower Division Courses

Two terms of introductory or environmental biology such as the following:

EEEE UN2001 - EEEB UN2002	Environmental Biology I: Elements to Organisms and Environmental Biology II: Organisms to the Biosphere
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Two terms of chemistry such as the following:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
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Chemistry laboratory such as the following:

CHEM UN1500	General Chemistry Laboratory
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Two terms of physics such as the following:

PHYS UN1201 - PHYS UN1202	General Physics I and General Physics II
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One term of statistics such as the following:

EEEE UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
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BIOL BC2286	Statistics and Research Design
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STAT UN1101	Introduction to Statistics
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STAT UN1201	Calculus-Based Introduction to Statistics
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Two terms of calculus, or one term of calculus and second advanced course in math or statistics such as the following:

MATH UN1101	Calculus I
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MATH UN1102	Calculus II
-------------	-------------

MATH UN1201	Calculus III
-------------	--------------

MATH UN1202	Calculus IV
-------------	-------------

Upper Division Courses

Students must complete five advanced elective courses (generally 3000-level or above) satisfying the following distribution. At least one of these courses must include a laboratory component. For more information and a list of appropriate courses, contact the director of undergraduate studies.

1. Three courses in ecology, evolution, conservation biology, or behavior;
2. One course in genetics. BIOL UN3031 Genetics or BIOL BC2100 Molecular and Mendelian Genetics is recommended;
3. One course in morphology, physiology, or diversity.

Students must also complete a senior thesis, which involves completing a research internship (generally in the summer before the senior year) and completing at least one semester of the thesis research seminar, EEEB UN3991-EEEE UN3992 Senior Seminar. Enrollment in both semesters of the seminar, starting in the spring of the junior year, is recommended.

Students planning on continuing into graduate studies in ecology or evolutionary biology are encouraged to take organic chemistry.

MAJOR IN EVOLUTIONARY BIOLOGY OF THE HUMAN SPECIES

The major in evolutionary biology of the human species requires 36 points, distributed as described below.

Students must take a minimum of 20 points from approved biological anthropology courses. The additional

courses may be taken in other departments with adviser approval. These include up to 6 points of introductory biology/chemistry or calculus (in any combination). Please speak with the major adviser about the extended list of courses from related areas including Biology, Psychology, Archaeology, Anthropology, Earth and Environmental Science, and Statistics that count toward this program.

For example, students interested in focusing on paleoanthropology would complement the requirements with additional courses in human evolution and morphology, evolutionary biology and theory, archaeology, genetics, and statistics. Those interested in primate behavior would supplement the requirements with classes in behavioral biology, ecology, and statistics.

Required Courses

EEEB UN1010	Human Origins and Evolution
EEEB UN1011	Behavioral Biology of the Living Primates

****Alternate options may be possible for all courses other than EEEB UN1010 Human Origins and Evolution and EEEB UN1011 Behavioral Biology of the Living Primates. These will be considered on an individual basis in consultation with the major/concentration adviser.**

Conservation Course

EEEB UN3240	Challenges and Strategies of Primate Conservation (This is the recommended conservation course but this requirement can be fulfilled with other classes such as Conservation Biology, Zoo Conservation, Ecology, Behavior and Conservation of Mammals, SEE-U in Jordan or Brazil, or other relevant offerings.)
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Theoretical Foundation from Archaeology

Select one course of the following: Nearly all archaeology courses (save for Rise of Civilization) can fulfill this requirement. Check with the advisor.

Archaeology

ANTH UN1007	The Origins of Human Society
ANTH UN2028	Think Like an Archaeologist: Introduction to Method & Theory
ANTH UN3064	Death and the Body
ANTH UN3823	Archaeology Engaged: The Past in the Public Eye

Breadth Requirement

Select a minimum of one course from each of the three sections (may overlap seminar requirement for majors):

Genetics/Human Variation

BIOL BC2100	Molecular and Mendelian Genetics
BIOL UN3031	Genetics
BIOL GU4560	Evolution in the age of genomics
ANTH UN3970	Biological Basis of Human Variation
EEEB GU4340	Human Adaptation
EEEB GU4700	Race: The Tangled History of a Biological Concept

Primate Behavioral Biology and Ecology

EEEB UN3940	Current Controversies in Primate Behavior and Ecology
BIOL BC2272	Ecology
BIOL BC2280	Animal Behavior
PSYC UN2420	Animal Behavior
PSYC BC1119	Systems and Behavioral Neuroscience
PSYC UN2450	Behavioral Neuroscience
PSYC BC3372	Comparative Cognition
PSYC UN3450	Evolution of Intelligence and Consciousness (Seminar)
PSYC UN3460	Evolution of Behavior (Seminar)
PSYC UN3470	Brain Evolution: Becoming Human (Seminar)
EEEB GU4010	The Evolutionary Basis of Human Behavior
EEEB GU4134	Behavioral Ecology
EEEB GU4201	Ecology, Behavior, and Conservation of Mammals (can count for either breadth requirement or conservation requirement, but not both)

Human Evolution/Morphology

EEEB UN3208	Explorations in Primate Anatomy
EEEB UN3215	Forensic Osteology
EEEB UN3220	The Evolution of Human Growth and Development
ANTH GU4147	Human Skeletal Biology I
ANTH GU4148	The Human Skeletal Biology II
EEEB UN3204	Dynamics of Human Evolution
EEEB UN3910	The Neandertals
ANTH GU4002	Controversial Topics in Human Evolution
ANTH GU4200	Fossil Evidence of Human Evolution
BIOL BC2278	Evolution
BIOL UN3208	Introduction to Evolutionary Biology
EEEB UN3030	The Biology, Systematics, and Evolutionary History of the 'Apes'

BIOL BC2262	Vertebrate Biology
BIOL UN3006	Physiology
BIOL BC3360	Physiology
EEEB GU4200	Natural History of the Mammals

Seminar

Selection at least one of the following seminars. May also count toward the breadth requirement.

EEEB UN3204	Dynamics of Human Evolution
EEEB UN3910	The Neandertals
EEEB UN3940	Current Controversies in Primate Behavior and Ecology
ANTH UN3970	Biological Basis of Human Variation
EEEB UN3993 - EEEB UN3994	EBHS Senior Seminar and EBHS Senior Seminar
EEEB GU4321	Human Nature: DNA, Race & Identity
ANTH GU4002	Controversial Topics in Human Evolution (Fulfills the seminar requirement for the major)

Additional courses in the student's area of focus to complete the required 36 points overall including a minimum of 20 points of approved biological anthropology courses.

Students intending to pursue graduate study in this field should broaden their foundation by taking an introductory biology course (optimally either EEEB UN2001 Environmental Biology I: Elements to Organisms or EEEB UN2002 Environmental Biology II: Organisms to the Biosphere) or an advanced evolution course, a genetics course, and a statistics course. We recommend that those interested in either biological anthropology or bioarchaeology take a foundation cultural anthropology course such as ANTH UN1002 The Interpretation of Culture, ANTH UN2004 Introduction to Social and Cultural Theory, ANTH UN2005 Ethnographic Imagination, or ANTH UN3040 Anthropological Theory I. Students interested in forensic anthropology should take chemistry in lieu of of biology (though the latter is recommended as a foundation course for all students). The adviser makes additional recommendations dependent on the student's area of focus.

Approved Biological Anthropology Courses

Paleoanthropology and Morphology

EEEB UN1010	Human Origins and Evolution
EEEB UN3204	Dynamics of Human Evolution
EEEB UN3208	Explorations in Primate Anatomy
EEEB UN3215	Forensic Osteology
EEEB UN3220	The Evolution of Human Growth and Development
EEEB UN3910	The Neandertals

ANTH GU4147 - ANTH GU4148	Human Skeletal Biology I and The Human Skeletal Biology II
ANTH GU4200	Fossil Evidence of Human Evolution <small>taught intermittently</small>

Primate Behavioral Ecology and Evolution

EEEB UN1011	Behavioral Biology of the Living Primates
EEEB UN3030	The Biology, Systematics, and Evolutionary History of the 'Apes'
EEEB UN3940	Current Controversies in Primate Behavior and Ecology
EEEB GU4010	The Evolutionary Basis of Human Behavior

Human Variation

ANTH UN3970	Biological Basis of Human Variation
EEEB GU4340	Human Adaptation
EEEB GU4700	Race: The Tangled History of a Biological Concept

Additional Courses

EEEB UN3240	Challenges and Strategies of Primate Conservation
EEEB UN3993 - EEEB UN3994	EBHS Senior Seminar and EBHS Senior Seminar

CONCENTRATION IN ENVIRONMENTAL BIOLOGY

The concentration in environmental biology differs from the major in omitting calculus and physics from the lower division, requiring three advanced electives rather than five, and omitting the senior seminar with thesis project. It requires 36 points, distributed as follows:

Lower Division Courses

Two terms of introductory or environmental biology such as the following:

EEEB UN2001 - EEEB UN2002	Environmental Biology I: Elements to Organisms and Environmental Biology II: Organisms to the Biosphere (or equivalents)
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Two terms of environmental science such as the following:

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System

Two terms of chemistry such as the following:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
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One term of statistics. Select one of the following:

EEEB UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
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BIOL BC2286	Statistics and Research Design
STAT UN1101	Introduction to Statistics
STAT UN1201	Calculus-Based Introduction to Statistics

Upper Division Courses

EEOB UN3087	Conservation Biology
Two other 3000- or 4000- level courses from the advanced environmental biology courses listed for the major.	

CONCENTRATION IN EVOLUTIONARY BIOLOGY OF THE HUMAN SPECIES

The concentration in evolutionary biology of the human species requires 20 points including the required introductory courses EEOB UN1010 Human Origins and Evolution, EEOB UN1011 Behavioral Biology of the Living Primates, an approved conservation course (optimally Primate Conservation), and three courses for the breadth distribution requirements as described for the major. Students must take a minimum of 15 points from approved biological anthropology courses as described for the major (the two introductory classes count toward that total). The additional courses may be taken in other departments with adviser approval.

Concentrators do not have to complete the theoretical foundation course from archaeology or a seminar.

SPECIAL CONCENTRATION IN ENVIRONMENTAL SCIENCE FOR ENVIRONMENTAL BIOLOGY MAJORS

The special concentration in environmental science requires a minimum of 31.5 points, distributed as follows:

Introductory Environmental Science (13.5 points)

EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System
EESC UN2300	Earth's Environmental Systems: The Life System (equivalent to EEOB UN2002)

Introductory Science (6 points)

Two courses in chemistry, physics, mathematics, or environmental biology from the supporting mathematics and science list for the environmental science major.

Advanced Environmental Science (12 points)

Select four of the following:

EESC UN3015	The Earth's Carbon Cycle
EESC BC3017	Environmental Data Analysis
EESC BC3025	Hydrology
EESC GU4008	Introduction to Atmospheric Science
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
EESC GU4223	Sedimentary Geology
EESC GU4550	Plant Ecophysiology
EESC GU4835	Wetlands and Climate Change
EESC GU4885	The Chemistry of Continental Waters
EESC GU4917	Earth/Human Interactions
EESC GU4926	Principles of Chemical Oceanography

Advanced courses used to fulfill requirements in the environmental biology major cannot count toward requirements for the special concentration.

SPECIAL CONCENTRATION IN ENVIRONMENTAL BIOLOGY FOR ENVIRONMENTAL SCIENCE MAJORS

The Department of Ecology, Evolution, and Environmental Biology sponsors a special concentration which must be done in conjunction with the environmental science major. Students should be aware that they must complete the environmental science major in order to receive credit for the special concentration.

The special concentration in environmental biology requires a minimum of 39 points, distributed as follows:

Introductory Environmental Biology and Environmental Science (17 points)

EEOB UN2001	Environmental Biology I: Elements to Organisms
EEOB UN2002	Environmental Biology II: Organisms to the Biosphere (equivalent to EESC UN2300)
EESC UN2100	Earth's Environmental Systems: The Climate System
EESC UN2200	Earth's Environmental Systems: The Solid Earth System

Introductory Science (13 points)

Select one of the following chemistry sequences:

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
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CHEM UN1604 - CHEM UN2507	Intensive General Chemistry (Lecture) and Intensive General Chemistry Laboratory
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One term of statistics such as the following:

EEEB UN3005	Introduction to Statistics for Ecology and Evolutionary Biology
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BIOL BC2286	Statistics and Research Design
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STAT UN1101	Introduction to Statistics
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STAT UN1201	Calculus-Based Introduction to Statistics
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EEEB UN3087	Conservation Biology
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Advanced Environmental Biology (9 points)

Three additional advanced environmental biology courses (3000-level and above), each chosen from a different curricular area (evolution/genetics, ecology/behavior/conservation, anatomy/physiology/diversity, biology laboratory courses).

FILM STUDIES

Departmental Office: 513 Dodge; 212-854-2815
<http://arts.columbia.edu/film> (<http://arts.columbia.edu/film/>)

Director of Undergraduate Studies: Prof. Robert King, 509C Dodge Hall; 212-854-2815; rk2704@columbia.edu. Office hours: Wednesdays, 2–5 p.m.

The major in film studies is scholarly, international in scope, and writing-intensive. Students choose to major in film if they want to learn more about the art form, from technology to cultural significance; want to work in the film industry; or are interested in a major that combines arts and humanities.

Students usually declare the major toward the end of the second year by meeting with the departmental adviser; together, they create a program of twelve required courses within the major, often supplemented by courses outside the department. In the lecture classes and seminars, there tends to be a mixed population of undergraduate majors and graduate film students.

Students have the opportunity to gain additional experience by taking advantage of internship opportunities with film companies, working on graduate student films, and participating in the Columbia Undergraduate Film Productions (CUFP), an active, student-run organization that provides film-making experience to Columbia undergraduate producers and directors. In addition to careers in screenwriting, directing, and producing, alumni have gone on to work in film distribution,

publicity, archives, and festivals, and to attend graduate school to become teachers and scholars.

The trajectory of the major is from introductory-level courses (three are required), to intermediate and advanced-level courses (two are required, plus seven electives). While film studies majors take workshops in screenwriting and film-making, the course of study is rooted in film history, theory, and culture.

The prerequisite for all classes is *Introduction to Film and Media Studies (FILM UN1000)* offered each term at Columbia as well as at Barnard, and open to first-year students. Subsequently, majors take a combination of history survey courses; workshops ("Labs"); and advanced classes in theory, genre study, national cinemas, auteur study, and screenwriting.

The educational goal is to provide film majors with a solid grounding in the history and theory of film; its relation to other forms of art; and its synthesis of visual storytelling, technology, economics, and sociopolitical context, as well as the means to begin writing a script and making a short film.

Students who wish to graduate with honors must take the Senior Seminar in Film Studies (FILM UN3900), writing a thesis that reflects mastery of cinematic criticism. The essay is submitted after the winter break. Students decide upon the topic with the professor and develop the essay during the fall semester.

Since film courses tend to be popular, it is imperative that students attend the first class. Registration priority is usually given to film majors and seniors.

DEPARTMENTAL HONORS

In order to qualify for departmental honors, students must take FILM UN3900 Senior Seminar in Film Studies, have a GPA of at least 3.75 in the major and distinction in their overall achievements in film study. The department submits recommendations to the undergraduate honors committees for confirmation. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

FACULTY

Vito Adriaensens
Nico Baumbach
Loren-Paul Caplin
Jane Gaines
Jerome Game
Ronald Gregg
Annette Insdorf
Caryn James
Robert King
Richard Peña
James Schamus
Edward Turk

MAJOR IN FILM STUDIES

The major in film studies requires a minimum of 36 points distributed as follows:

Introductory Courses

FILM UN1000	Introduction to Film and Media Studies
FILM GU4000	Film and Media Theory

History Courses

Select two of the following courses, one of which must either be FILM UN2010 or FILM UN2020:

FILM UN2010	Cinema History 1: Beginning-1930
FILM UN2020	Cinema History 2: 1930-60
FILM UN2030	Cinema History 3: 1960-90
FILM UN2040	Cinema History 4: after 1990

Laboratories

Select one of the following courses:

FILM UN2410	Laboratory in Writing Film Criticism
FILM UN2510	Laboratory in Fiction Filmmaking
FILM UN2420	Laboratory in Screenwriting
FILM UN2520	Laboratory In Nonfiction Filmmaking

Electives

Select seven of the following electives, one of which must be an international course:

FILM UN1010	Genre Study
FILM UN2310	The Documentary Tradition
FILM UN2190	Topics in American Cinema
FILM UN3020	Interdisciplinary Studies
FILM UN3900	Senior Seminar in Film Studies
FILM UN3910	Senior Seminar in Filmmaking
FILM UN3920	Senior Seminar in Screenwriting
FILM UN3925	Narrative Strategies in Screenwriting
FILM UN3930	Seminar in International Film
FILM UN3950	Seminar in Media: Seriality
FILM UN2400	Script Analysis
FILM UN3010	Auteur Study
FILM UN2290	Topics in World Cinema: Arab and Africa
FILM GU4310	Experimental Film and Media
FILM GU4320	New Directions in Film and Philosophy
FILM GU4910	Seeing Narrative

FINANCIAL ECONOMICS

Departmental Office: 1022 International Affairs Building; 212-854-3680

<http://www.columbia.edu/cu/economics/>

Director of Undergraduate Studies: Dr. Susan Elmes, 1006 International Affairs Building; 212-854-9124; se5@columbia.edu

Director of Departmental Honors Program: Dr. Susan Elmes, 1006 International Affairs Building; 212-854-9124; se5@columbia.edu

Economics is the study of the ways in which society allocates its scarce resources among alternative uses and the consequences of these decisions. The areas of inquiry deal with a varied range of topics such as international trade, domestic and international financial systems, labor market analysis, and the study of less developed economies. Broadly speaking, the goal of an economics major is to train students to think analytically about social issues and, as such, provide a solid foundation for not only further study and careers in economics, but also for careers in law, public service, business, and related fields.

The Economics Department offers a general economics major in addition to five interdisciplinary majors structured to suit the interests and professional goals of a heterogeneous student body. All of these programs have different specific requirements but share the common structure of core theoretical courses that provide the foundation for higher-level elective courses culminating in a senior seminar. Students are urged to carefully look through the details of each of these programs and to contact an appropriate departmental adviser to discuss their particular interests.

ADVANCED PLACEMENT

Tests must be taken in **both** microeconomics and macroeconomics, with a score of 5 on one test and at least a 4 on the other. Provided that this is achieved, the department grants 4 credits for a score of 4 and 5 on the AP Economics exam along with exemption from *ECON UN1105 Principles of Economics*.

ADVISING

The Department of Economics offers a variety of advising resources to provide prospective and current undergraduate majors and concentrators with the information and support needed to successfully navigate through the program. These resources are described below.

Frequently Asked Questions

Please see: <http://econ.columbia.edu/frequently-asked-questions-0> (<http://econ.columbia.edu/frequently-asked-questions-0/>)

As a first step, students are encouraged to visit the department's FAQ page, which provides comprehensive information and answers to the most frequently asked questions about the departmental majors and requirements. This page also

includes a section that answers specific questions of first-years, sophomores, and non-majors.

Graduate Student Advisers

For answers to the most common questions that students have about the majors, the department has graduate student advisers, who are available by e-mail at econ-advising@columbia.edu, or during weekly office hours to meet with students.

Students should direct all questions and concerns about their major to the graduate student advisers either in person or via e-mail. The graduate student advisers can discuss major requirements, scheduling, and major course selection, as well as review student checklists and discuss progress in the major. Occasionally, graduate student advisers may refer a student to someone else in the department (such as the director of undergraduate studies) or in the student's school for additional advising.

Contact information and office hours for the graduate student advisers are posted on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) in the week prior to the beginning of the semester. Students considering one of the interdepartmental majors should speak to both a graduate student adviser from the Economics Department and the adviser from the other department early in the sophomore year.

Faculty Advisers

Faculty advisers are available to discuss students' academic and career goals, both in terms of the undergraduate career and post-graduate degrees and research. Students wishing to discuss these types of substantive topics may request a faculty adviser by completing the form available on the *Advisers* page of the departmental website (<http://www.columbia.edu/cu/economics/>) and depositing it in the mailbox of the director of undergraduate studies in the department's main office, 1022 International Affairs Building.

The department does its best to match students with faculty members that share similar academic interests. While faculty advisers do not discuss major requirements—that is the role of the graduate student advisers—they do provide guidance in course selection as it relates to meeting a student's intellectual goals and interests, as well as advise on career and research options. It is recommended that students who plan on attending a Ph.D. program in economics or are interested in pursuing economics research after graduation request a faculty adviser.

ON-LINE INFORMATION

Students can access useful information on-line, including: a comprehensive FAQ page; requirement changes to the major and concentration; sample programs and checklists; faculty office hours, contact information and fields of specialization; adviser information; teaching assistant information; research

assistant opportunities; list of tutors; and Columbia-Barnard Economics Society information.

DEPARTMENTAL HONORS

Economics majors and economics joint majors who wish to be considered for departmental honors in economics must:

1. Have at least a 3.7 GPA in their major courses;
2. Take ECON GU4999 Senior Honors Thesis (a one-year course);
3. Receive at least a grade of A- in ECON GU4999 Senior Honors Thesis.

Students must consult and obtain the approval of the departmental undergraduate director in order to be admitted to the workshop. Please note that ECON GU4999 Senior Honors Thesis may be taken to fulfill the **seminar requirement** for the economics major and all economics joint majors. Students who wish to write a senior thesis (ECON GU4999 Senior Honors Thesis) must have completed the core major requirements. Normally no more than 10% of graduating majors receive departmental honors in a given academic year. Please see the *Honors Prizes* page on the department's website for more information.

UNDERGRADUATE PRIZES

All prize recipients are announced at the end of the spring semester each academic year.

The Dean's Prize in Economics

Awarded to General Studies students for excellence in the study of Economics.

Romine Prize

Established in 1997, this prize is awarded annually to two students (Columbia College or General Studies) majoring in economics: one for the best honors thesis paper, and the other for the best economics seminar paper.

Parker Prize for Summer Research

PROFESSORS

Douglas Almond (also School of International and Public Affairs)

Jushan Bai

Jagdish N. Bhagwati

Sandra Black

Patrick Bolton (also Business School)

André Burgstaller (Barnard)

Alessandra Casella (also Political Science Department)

Yeon-Koo Che

Pierre-André Chiappori

Graciela Chichilnisky

Richard Clarida (also School of International and Public Affairs)

Donald Davis
 Padma Desai (*emerita*)
 Prajit Dutta
 Harrison Hong
 R. Glenn Hubbard (also Business School)
 Navin Kartik
 Wojciech Kopczuk (also School of International and Public Affairs)
 Sokbae (Simon) Lee
 W. Bentley McLeod (also School of International and Public Affairs)
 Perry Mehrling (Barnard)
 Robert Mundell (*emeritus*)
 Suresh Naidu (also School of International and Public Affairs)
 Serena Ng
 Brendan O'Flaherty
 Edmund S. Phelps
 Andrea Prat (also Business School)
 Michael Riordan
 Jeffrey Sachs (also Earth Institute)
 Xavier Sala-i-Martin
 Bernard Salanié (Chair)
 José A. Scheinkman
 Stephanie Schmitt-Grohé
 Rajiv Sethi (Barnard)
 Joseph Stiglitz (also Business School)
 Martín Uribe
 Miguel Urquiola (also School of International and Public Affairs)
 Eric Verhoogen (also School of International and Public Affairs)
 David Weiman (Barnard)
 David Weinstein
 Michael Woodford

ASSOCIATE PROFESSORS

Mark Dean
 Lena Edlund
 Jennifer La'O
 Qingmin Liu

ASSISTANT PROFESSORS

Hassan Afrouzi
 Michael Best
 Andres Drenik
 Matthieu Gomez
 Reka Juhasz
 Elliot Lipnowski
 Jose Luis Montiel Olea
 Xiaosheng Mu
 Evan Sadler
 Jack Willis

LECTURERS

Irasema Alonso
 Tri Vi Dang

Susan Elmes
 Seyhan Erden
 Tamrat Gashaw
 Sunil Gulati
 Ronald Miller
 Wouter Vergote

ADJUNCT FACULTY

Tim Goodspeed
 Claudia Halbac
 Ed Lincoln
 Neal Masia
 Caterina Musatti
 Waseem Noor
 Ingmar Nyman
 Maxim Pinkovskiy

ON LEAVE

Profs. Clarida, Drenik, Hubbard, Kopczuk, Liu, Riordan (2019-2020)
 Profs. Best, Salanie, Scheinkman (Fall 2019)
 Profs. Lee, Montiel Olea, Weinstein (Spring 2020)

GUIDELINES FOR ALL ECONOMICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Checklists and Requirement

Checklists and Requirement information are available on the Department website (<https://econ.columbia.edu/undergraduate/requirements-and-forms/>).

Course List

Economics Core Courses

All of the core courses must be completed **no later than the spring semester** of the student's **junior year** and must be taken at Columbia. *Students who take any core course during the fall semester of their senior year must obtain written permission from the department's director of undergraduate studies.* Unless otherwise specified below, all students must complete the following core courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Prerequisites

Course prerequisites are strictly enforced. Prerequisites must be taken before the course, not after or concurrently.

Economics courses taken before the completion of any of its prerequisites, even with instructor approval, are **not** counted toward the major, concentration, or interdepartmental

majors. Exemptions from a prerequisite requirement may only be made, in writing, by the department's director of undergraduate studies. Credits from a course taken *prior* to the completion of its prerequisites are **not** counted towards the major requirements. As a consequence, students are required to complete **additional**, specific courses in economics at the direction of the director of undergraduate studies.

The prerequisites for required courses are as follows:

Course	Prerequisites		
ECON UN1105 Principles of Economics	None	ECON UN3025 Financial Economics	ECON UN3211 Intermediate Microeconomics
MATH UN1101 Calculus I		ECON GU4020 Economics of Uncertainty and Information	ECON UN3213 Intermediate Macroeconomics
STAT UN1201 Calculus-Based Introduction to Statistics	MATH UN1101 Calculus I	ECON GU4230 Economics of New York City	STAT UN1201 Calculus-Based Introduction to Statistics
ECON UN3211 Intermediate Microeconomics	ECON UN1105 Principles of Economics MATH UN1201 Calculus III or UN1205	ECON GU4260 Market Design	
ECON UN3213 Intermediate Macroeconomics	ECON UN1105 Principles of Economics MATH UN1101 Calculus I Co-requisite: MATH UN1201 Calculus III or UN1205	ECON GU4280 Corporate Finance	
ECON UN3412 Introduction To Econometrics	MATH UN1201 Calculus III or UN1205 ECON UN3211 Intermediate Microeconomics or UN3213 STAT UN1201 Calculus-Based Introduction to Statistics	ECON GU4370 Political Economy	
ECON 2000-level electives	ECON UN1105 Principles of Economics	ECON GU4700 Financial Crises	
ECON GU4211 Advanced Microeconomics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics MATH UN2010 Linear Algebra Corequisites: MATH UN2500 Analysis and Optimization or GU4061	ECON GU4710 Finance and the Real Economy	
ECON GU4412 Advanced Econometrics	ECON UN3211 Intermediate Microeconomics	ECON GU4850 Cognitive Mechanisms and Economic Behavior	
ECON GU4213 Advanced Macroeconomics	ECON UN3213 Intermediate Macroeconomics	ECON GU4860 Behavioral Finance	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics ECON UN3412 Introduction To Econometrics
ECON GU4413 Econometrics of Time Series and Forecasting	ECON UN3412 Introduction To Econometrics MATH UN2010 Linear Algebra	All other ECON 3000- and 4000-level electives	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics
		ECON UN3901 Economics of Education	ECON UN3211 Intermediate Microeconomics
		ECON UN3952 Seminar in Macroeconomics and Formation of Expectations	ECON UN3213 Intermediate Macroeconomics
		ECON UN3981 Applied Econometrics	ECON UN3412 Introduction To Econometrics
		ECON GU4911 Seminar In Microeconomics	
		ECON GU4913 Seminar In Macroeconomics	
		ECON GU4918 Seminar In Econometrics	
		ECPS GU4921 Seminar In Political Economy	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics ECON UN3412 Introduction To Econometrics ECON GU4370 Political Economy

ECPH GU4950 Economics and Philosophy Seminar	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics ECON UN3412 Introduction To Econometrics
Barnard electives	See Barnard bulletin

It is **strongly recommended** that students take ECON UN3412 Introduction To Econometrics in the semester **immediately** following the completion of the statistics course.

Grading

No course with a grade of D or lower, including calculus and statistics courses, can count toward the major, concentration, or interdepartmental majors. Economics core courses with a grade of D or F must be retaken and completed with a grade of C- or better.

Students who receive a grade of D or F in a core course are permitted to take a higher-level elective course that has that core course as a prerequisite, so long as it is taken concurrently with the retaking of that core course. For example, if a student fails ECON UN3211 Intermediate Microeconomics, the student must retake it and, in the same semester, may enroll in an elective course for which it is a prerequisite, provided that all other prerequisites for the elective have been completed. The same rule applies to the required math and statistics courses. For example, if a student fails *MATH UN1201 Calculus III*, the student may retake calculus III concurrently with *Intermediate Microeconomics*. Students who must retake any core economics or math course may not retake it concurrently with a senior seminar; the economics core courses *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, and *ECON UN3412 Introduction To Econometrics* must be successfully completed before a student may enroll in a seminar.

A grade of W is not equivalent to a grade of D or F; it does not qualify a student to retake the course concurrently with a higher level course that lists the course as a prerequisite. Students who receive a grade of W in a core course must complete the course with a grade of C- or better before taking a course that lists it as a prerequisite.

Only ECON UN1105 Principles of Economics may be taken for a grade of Pass/D/Fail, and the student must receive a grade of P for it to count towards the requirements for the major, concentration, or interdepartmental majors.

Economics Electives

Only those courses identified in the Economics Department listings in this Bulletin may be taken for elective credit. All 3000-level or higher electives offered by the Economics Department have ECON UN3211 Intermediate Microeconomics and ECON UN3213 Intermediate

Macroeconomics as prerequisites. However, some electives have additional prerequisites and students should ensure that all prerequisites have been completed (see the table of prerequisites printed above). *Seminars do not count as electives.*

Seminars

Seminars can be taken only after all of the required core courses in economics have been successfully completed. Students may not take or re-take ECON UN3211 Intermediate Microeconomics, ECON UN3213 Intermediate Macroeconomics, or ECON UN3412 Introduction To Econometrics concurrently with any senior seminar. *Seminars do not count as electives.* Each seminar is limited to sixteen students, with priority given to seniors. For ECPS GU4921 Seminar In Political Economy and ECPH GU4950 Economics and Philosophy Seminar, priority is given to economics–political science and economics–philosophy majors, respectively.

For seminar registration details, read the information posted on the department's *Senior Seminar Registration* page: <http://econ.columbia.edu/senior-seminars-registration> (<http://econ.columbia.edu/senior-seminars-registration/>).

Mathematics

Students must consult with the Mathematics Department for the appropriate placement in the calculus sequence. Students must complete one of the following sequences:

Select one of the following sequences:

MATH UN1101 - MATH UN1201	Calculus I and Calculus III
MATH UN1101 - MATH UN1205	Calculus I and Accelerated Multivariable Calculus
MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B

In addition:

1. Students who receive a grade of D or F in MATH UN1201 Calculus III or MATH UN1205 must retake the course, but may enroll in ECON UN3211 Intermediate Microeconomics.
2. Students who receive a grade of D or F in MATH UN1207 Honors Mathematics A may either retake the course, or take MATH UN1201 Calculus III or MATH UN1205, and enroll in ECON UN3211 Intermediate Microeconomics concurrently.

Statistics

Unless otherwise specified below, all students must take STAT UN1201 Calculus-Based Introduction to Statistics, or a higher level course, such as STAT GU4204 Statistical Inference, or STAT GU4001.

Barnard Courses

A limited number of Barnard economics electives may count toward the major, concentration, and interdepartmental majors. Students should pay careful attention to the limit of Barnard electives indicated in their program requirements. Please see the *Transfer Credit* section below for information on the number of Barnard electives that may be taken to fulfill major requirements. In addition, students may receive credit for the major, concentration, and interdepartmental majors only for those Barnard economics courses listed in this Bulletin. However, students may not receive credit for two courses whose content overlaps. Barnard and Columbia economics electives with overlapping content include but are not limited to:

ECON BC3029 - ECON GU4321	Empirical Development Economics and Economic Development
ECON BC3038 - ECON GU4505	International Money and Finance and International Macroeconomics
ECON BC3019 - ECON GU4400	Labor Economics and Labor Economics
ECON BC3047 - ECON GU4500	International Trade and International Trade
ECON BC3039 - ECON GU4625	Environmental and Natural Resource Economics and Economics of the Environment
ECON BC3041 - ECON GU4235	Theoretical Foundations of Political Economy and HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4400	Labor Economics
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes

Students should always first consult with *econ-advising* to confirm that the Barnard elective they wish to take does not overlap with a Columbia elective that they have already taken or plan to take. Students may *not* take the Barnard core economics, math, statistics, or seminar courses for credit towards the completion of major requirements.

School of Professional Studies Courses

The Department of Economics does not accept *any* of the courses offered through the School of Professional Studies for credit towards the economics major, concentration, or interdepartmental majors with the exception of the courses offered by the Economics Department during the summer session at Columbia.

Other Department and School Courses

Please note that with the exception of the above Barnard courses and the specific courses listed below for the financial

economics major, no other courses offered through the different departments and schools at Columbia count toward the economics majors or concentration.

Transfer Credits

Students are required to take a minimum number of courses in the Columbia Economics Department. For all majors and interdepartmental majors, students must complete a minimum of *five* lecture courses in the Columbia department. Students may fulfill their remaining requirements for economics lecture courses through AP (or IB or GCE) credits, Barnard electives, transfer courses, and study abroad courses (the latter two are subject to the approval of the Economics Department). The following table summarizes the new rules:

Program	Number of required economics lecture courses	Minimum number which must be taken in the department	Maximum number of outside allowed
Economics major	9	5	4
Financial economics	8	5	3
Economics-mathematics	7	5	2
Economics-political science	7	5	2
Economics-statistics	7	5	2
Economics-philosophy	7	5	2
Economics concentration	7	4	3

- Lecture courses** do not include seminars, which must be taken in the Columbia Economics Department. The lecture course counts are counts of economics courses only and do **not** include math, statistics, or courses in other departments;
- At least two of the three *3000*-level economics core courses must be taken in the department and no corresponding Barnard courses are accepted. ECON UN3025 Financial Economics and ECON UN3265 The Economics of Money and Banking are counted as departmental courses regardless of the instructor;
- Outside courses** include AP (or IB or GCE) credits, transfer credits, Barnard *2000*- and *3000*-level elective courses and transfer credits from other universities. In the case where two or more courses taken outside of Columbia are used as the equivalent of ECON UN1105 Principles of Economics, those courses are counted as one transfer course.

Approval of transfer credits to fulfill economics requirements must be obtained in writing from the Department of Economics (see the departmental website (<http://www.columbia.edu/cu/economics/>) or speak with your advising dean for information regarding applications for transfer credit). Approval is granted only for courses that are considered to be comparable to those offered at Columbia.

Summer courses taken at other institutions must be approved in writing by the department's transfer credit adviser before the course is taken. The department does not accept transfer credits for any 3000 level core courses taken during a summer session outside of Columbia University. Summer courses taken from the department of economics at Columbia University do not need approval.

Guidelines and instructions on how to request transfer credit approval can be found in the *Transfer Credit Information* page of the departmental website (<http://www.columbia.edu/cu/economics/>).

MAJOR IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 246) above.

The economics major requires a minimum of 35 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 44 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least five electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

Economics Seminar

Select one economics seminar course

CONCENTRATION IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 246) above.

The economics concentration requires a minimum of 25 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 34 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least three electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

MAJOR IN FINANCIAL ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 246) above.

The Department of Economics offers the major in financial economics, which provides an academic framework to explore the role of financial markets and intermediaries in the allocation (and misallocation) of capital. Among the topics studied in financial economics are financial markets, banks and other financial intermediaries, asset valuation, portfolio allocation, regulation and corporate governance.

The financial economics major requires 26 points in economics, 6 points in mathematics, 3 points in statistics, 3 points in business, and 12 points from a list of selected courses for a total minimum of 50 points as follows:

Economics Core Courses

All economics core courses

Finance Core Courses *

ECON UN3025 Financial Economics

ECON GU4280 Corporate Finance

BUSI UN3013 Financial Accounting

*NOTE: The department considers BUSI UN3013 and IEOR E2261 as overlapping courses. Students who take both courses shall be credited with one course only. Financial economics majors who are also in the Business Management concentration program (CNBUMG) must take an additional elective from either the financial economics prescribed elective list (below) or from the CNBUMB prescribed list.

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Electives

Select four of the following, of which two must be from the Columbia or Barnard economics departments, or equivalent economics transfer credits:

ECON BC3014 Entrepreneurship

ECON BC3017 Economics of Business Organization

ECON UN3265 The Economics of Money and Banking

ECON UN3952 Seminar in Macroeconomics and Formation of Expectations

ECON GU4020 Economics of Uncertainty and Information

ECON GU4213	Advanced Macroeconomics
ECON GU4251	Industrial Organization
ECON GU4260	Market Design
ECON GU4412	Advanced Econometrics
ECON GU4415	Game Theory
ECON GU4465	Public Economics
ECON GU4500	International Trade
ECON GU4505	International Macroeconomics
or ECON BC3038	International Money and Finance
ECON G4526	Transition Reforms, Globalization and Financial Crisis
ECON GU4700	Financial Crises
ECON GU4710	Finance and the Real Economy
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON GU4860	Behavioral Finance
BIOT GU4180	Entrepreneurship in Biotechnology
BUSI UN3021	Marketing Management
BUSI UN3701	Strategy Formulation
BUSI UN3702	Venturing to Change the World
BUSI UN3703	Leadership in Organizations
BUSI UN3704	Making History Through Venturing
COMS W1002	Computing in Context
HIST W2904	History of Finance
IEOR E3106	Stochastic Systems and Applications
IEOR E4700	Introduction to Financial Engineering
MATH UN3050	Discrete Time Models in Finance
POLS UN3630	Politics of International Economic Relations
STAT W3201	Math Finance in Continuous Time
STAT GU4261	Statistical Methods in Finance
STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance

Seminar

The seminar must be chosen from a list of seminars eligible for the financial economics major. The department indicates which seminars are eligible for the major on the Senior Seminars page of the departmental website.

Students must have completed at least one of ECON UN3025 or ECON GU4280 prior to taking their senior seminar.

* Students must complete the finance core no later than fall of their senior year.

MAJOR IN ECONOMICS-MATHEMATICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 246) above.

The major in economics and mathematics provides students with a grounding in economic theory comparable to that provided by the general economics major and exposes students to rigorous and extensive training in mathematics. The program is recommended for any student planning to do graduate work in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Mathematics has an assigned adviser with whom students may consult on mathematics requirements. The economics adviser can only advise on economics requirements; the mathematics adviser can only advise on mathematics requirements.

The economics-mathematics major requires a total of 52 or 56 points (depending on mathematics sequence) : 29 points in economics and 23-27 points in mathematics and statistics as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
- MATH UN1102 and Calculus II
- MATH UN1201 and Calculus III
- MATH UN2010 and Linear Algebra

MATH UN1101 Calculus I
- MATH UN1102 and Calculus II
- MATH UN1205 and Accelerated Multivariable
- MATH UN2010 Calculus
and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Note: Students who take MATH UN1205 may not receive credit for both MATH UN1201 and MATH UN1202.

Analysis requirement:

MATH UN2500 Analysis and Optimization

Select three of the following:

MATH UN1202 Calculus IV
MATH UN2030 Ordinary Differential Equations
Any mathematics course at the 3000-level or above

Note: Students who take MATH UN1205 will not receive credit for MATH UN1202.

Statistics

Select one of the following sequences:

STAT GU4001	Introduction to Probability and Statistics
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STAT GU4203 - STAT GU4204	PROBABILITY THEORY and Statistical Inference
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Economics Seminar

Select an economics seminar

NOTE:

1. Students who fulfill the statistics requirement with STAT GU4203 and STAT GU4204, may count STAT GU4203 or STAT GU4204 as one of the three required mathematics electives.
2. Students who choose the one year sequence (STAT GU4203/ STAT GU4204), must complete the year long sequence *prior* to taking ECON UN3412. Students receive elective credit for the probability course.

MAJOR IN ECONOMICS- PHILOSOPHY

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 246) above.

Economics-philosophy is an interdisciplinary major that introduces students to basic methodologies of economics and philosophy and stresses areas of particular concern to both, e.g. rationality and decision making, justice and efficiency, freedom and collective choice, logic of empirical theories and testing. Many issues are dealt with historically. Classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Philosophy has an assigned adviser with whom students may consult on philosophy requirements. The economics adviser can only advise on economics requirements; the philosophy adviser can only advise on philosophy requirements.

The economics-philosophy major requires a total minimum of 54 points: 25 points in economics, 16 points in philosophy, 6 points in mathematics, 3 points in statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three Electives are required; two must be selected from the below list, and the remaining elective may be any economics elective at the 3000-level or above.

ECON GU4020	Economics of Uncertainty and Information
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ECON GU4211	Advanced Microeconomics
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ECON GU4213	Advanced Macroeconomics
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ECON GU4228	Urban Economics
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ECON GU4230	Economics of New York City
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ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
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ECON GU4301	Economic Growth and Development
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ECON GU4370	Political Economy
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ECON GU4400	Labor Economics
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ECON GU4415	Game Theory
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ECON GU4438	Economics of Race in the U.S.
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ECON GU4465	Public Economics
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ECON GU4480	Gender and Applied Economics
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ECON GU4500	International Trade
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ECON W4615	Law and Economics
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ECON GU4625	Economics of the Environment
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or ECON BC3039	Environmental and Natural Resource Economics
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ECON GU4750	Globalization and Its Risks
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ECON GU4840	Behavioral Economics
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ECON GU4850	Cognitive Mechanisms and Economic Behavior
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ECON BC3011	Inequality and Poverty
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Philosophy Courses

PHIL UN1010	Methods and Problems of Philosophical Thought
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PHIL UN3411	Symbolic Logic
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PHIL UN3701	Ethics
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PHIL UN3551	Philosophy of Science
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or PHIL UN3960	Epistemology
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PHIL GU4561	Probability and Decision Theory
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Seminar

ECPH GU4950	Economics and Philosophy Seminar
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Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN ECONOMICS- POLITICAL SCIENCE

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 246) above.

Political economy is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Political Science has an assigned adviser with whom students may consult on political science requirements. The economics adviser can only advise on economics requirements; the political science adviser can only advise on political science requirements.

The economics–political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows.

The political science courses are grouped into four areas, i.e. subfields: (1) American Politics, (2) Comparative Politics, (3) International Relations, and (4) Political Theory. For the political science part of the major, students are required to select one area as a major subfield and one as a minor subfield. The corresponding introductory courses in both subfields must be taken, plus two electives in the major subfield, and one in the minor subfield.

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON GU4370	Political Economy

Mathematics

Select a mathematics sequence

Statistical Methods

STAT UN1201	Calculus-Based Introduction to Statistics
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Select one of the following:

ECON UN3412	Introduction To Econometrics
POLS GU4712	PRINC OF QUANT POL RESEARCH 2

Economics Electives

Select two electives (6 points) at the 3000-level or above

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921	Seminar In Political Economy
and a Political Science Department seminar, in the student's Primary Subfield. Please select one of the following: *	
POLS UN3911	Seminar in Political Theory
or POLS UN3912	Seminar in Political Theory
POLS UN3921	Seminar in American Politics
or POLS UN3922	Seminar in American Politics
POLS UN3951	Seminar in Comparative Politics
or POLS UN3952	Seminar in Comparative Politics
POLS UN3961	International Politics Seminar
or POLS UN3962	INTERNATIONAL POLITICS SEMINAR

- Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN ECONOMICS-STATISTICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 246) above.

The major in economics-statistics provides students with a grounding in economic theory comparable to that provided by the general economics major, but also exposes students to a significantly more rigorous and extensive statistics training than is provided by the general major. This program is recommended for students with strong quantitative skills and for those contemplating graduate studies in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Statistics has an assigned adviser with whom students may consult on statistics requirements. The economics adviser can only advise on economics requirements; the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, 3 points in computer science as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 - MATH UN1102 - MATH UN1201 - MATH UN2010	Calculus I and Calculus II and Calculus III and Linear Algebra
MATH UN1101 - MATH UN1102 - MATH UN1205 - MATH UN2010	Calculus I and Calculus II and Accelerated Multivariable Calculus and Linear Algebra
MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B
Statistics	
STAT UN1201	Calculus-Based Introduction to Statistics
STAT GU4203	PROBABILITY THEORY
STAT GU4204	Statistical Inference
STAT GU4205	Linear Regression Models
One elective in statistics from among courses numbered STAT GU 4206 through GU 4266.	
Computer Science	
Select one of the following:	
COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1005	Introduction to Computer Science and Programming in MATLAB
COMS W1007	Honors Introduction to Computer Science
ENGI E1006	Introduction to Computing for Engineers and Applied Scientists
STAT UN2102	Applied Statistical Computing
Economics Seminar	
ECON GU4918	Seminar In Econometrics

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

FRENCH

Departmental Office: 515 Philosophy; 212-854-2500 or 212-854-3208
<http://www.columbia.edu/cu/french/>

Director of Undergraduate Studies: Prof. Thomas Dodman, 505 Philosophy; 212-854-3715; td2551@columbia.edu

Director of the Language Program: Dr. Pascale Hubert-Leibler, 519 Philosophy; 212-854-4819; ph2028@columbia.edu

Academic Department Administrator: Isabelle Chagnon, 515 Philosophy; 212-854-7978; ic7@columbia.edu

The Department of French and Romance Philology offers a major and concentration in French, as well as a major and

concentration in French and Francophone studies. Students who are primarily interested in French literature should consider the major in French. Students who are interested in French history and civilization, and in the literature and culture of the Francophone world, should consider the major in French and Francophone studies.

Major in French

The major in French gives students an in-depth familiarity with the language, culture, and literature of France and the French-speaking world. After completing the four-semester language requirement, students take courses in advanced grammar, and composition to refine their skills in reading, speaking, and writing French. In a required two-semester survey course (FREN UN3333-FREN UN3334), they receive a comprehensive overview of the development of French literature from the Middle Ages to the present day. After completing these core courses, French majors are encouraged to pursue individual interests; a wide range of language, literature, and cultural studies courses is available. Small classes and seminars allow for individual attention and enable students to work closely with faculty members. Advanced elective courses on French literature, history, philosophy, and cinema allow students to explore intellectual interests, perfect critical reading skills, and master close reading techniques.

The capstone course is the senior seminar, in which students study a range of texts and critical approaches and are encouraged to synthesize their learning in previous courses. The optional senior essay, written under the direction of a faculty member, introduces students to scholarly research. To be considered for departmental honors, students must complete the senior essay.

Major in French and Francophone Studies

The major in French and Francophone studies provides an interdisciplinary framework for the study of the history, literature, and culture of France and parts of the world in which French is an important medium of culture. Students explore the history and contemporary applications of concepts such as citizenship, national unity, secularism, and human rights, and explore central issues including universalism/relativism, tradition/modernity, and religion/state as they have developed in France and its colonies/former colonies since the 18th century.

Students take a series of required courses that includes:

- French grammar and composition/stylistics, essential to achieving proficiency in French language;
- FREN UN3420 Introduction To French and Francophone Studies I-FREN UN3421 Introduction To French and Francophone Studies II;
- FREN UN3995 Senior Seminar.

Having completed these courses, students take courses in related departments and programs, e.g., history, anthropology,

political science, women's studies, human rights, art history, to fulfill the interdisciplinary portion of the major. To ensure methodological focus, three of these courses should be taken within a single field (e.g., history, music, anthropology, or political science), or in relation to a single issue or world region, e.g., West Africa.

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT

Students beginning the study of French at Columbia must take four terms of the following two-year sequence:

Entering students are placed, or exempted, on the basis of their College Board Achievement or Advanced Placement scores, or their scores on the placement test administered by the Center for Student Advising, 403 Lerner. An SAT score of 780 or a score of 4 on the AP exam satisfies the language requirement.

The Barnard course, FREN BC1204 Intermediate II does **not** fulfill the undergraduate language requirement.

Language Proficiency Courses

Elementary and intermediate French courses help students develop an active command of the language. In FREN UN1101 Elementary French I and FREN UN1102 Elementary French II, the communicative approach is the main instructional method. In addition to practicing all four language skills—listening, speaking, reading, and writing—students are introduced to the cultural features of diverse French-speaking communities.

In intermediate courses FREN UN2101 INTERMEDIATE FRENCH I and FREN UN2102 Intermediate Course II, students develop linguistic competence through the study of short stories, films, novels, and plays. After completing the four-semester language sequence, students can discuss and write in fairly proficient French on complex topics.

At the third-year level, attention is focused on more sophisticated use of language, in grammar and composition courses, and on literary, historical, and philosophical questions.

Conversation Courses

Students looking for intensive French oral practice may take one of the 2-point conversation courses offered at intermediate and advanced levels. Conversation courses generally may not be counted toward the major. The exception is the special 3-point advanced conversation course, FREN UN3498 French Cultural Workshop, offered in the fall, designed to meet the needs of students planning to study abroad at Reid Hall.

ADVANCED PLACEMENT

- AP score of 4: The department grants 0 credits for a score of 4 on the AP French Language exam, but the foreign language requirement is satisfied.

- AP score of 5 or DELF: The department grants 3 credits for a score of 5 on the AP French Language exam, or for the completion of DELF (Diplôme d'Etudes en Langue Française). Students are awarded this credit after they take a 3000-level French course (taught in French, for at least 3 points) and obtain a grade of B or above in that course.
- DALF C1 level or IB HL score of 6 or 7: The department grants 6 credits for the C1 level of DALF (Diplôme Approfondi de Langue Française), or for a score of 6 or 7 on the International Baccalaureate (IB) Higher Level (HL) exam. Students have no obligation to take higher-level French courses in order to receive these 6 credits, but restrictions apply on the use of these credits toward the French major.

LANGUAGE LABORATORY AND ON-LINE MATERIALS

Language laboratories located in the International Affairs Building provide opportunities for intensive practice in French pronunciation and aural comprehension. French courses typically make extensive use of on-line interactive materials that students can access from their own computer terminals.

MAISON FRANÇAISE

Students interested in French should acquaint themselves with the Maison Française, which houses a reading room of French newspapers, periodicals, books, and videos, and sponsors lectures/discussions by distinguished French visitors to New York City. With its weekly French film series, book club, café-conversation and other events, the Maison Française offers an excellent opportunity for students to perfect their language skills and enhance their knowledge of French and Francophone culture.

STUDY ABROAD

Because a direct experience of contemporary French society is an essential part of the program, majors and concentrators are strongly encouraged to spend either a semester or a year at Reid Hall-Columbia University in Paris, or at another French or Francophone university. During their time abroad, students take courses credited toward the major and, in some cases, also toward other majors (e.g. history, art history, political science).

For information on study abroad, visit the OGP website at www.ogp.columbia.edu (<http://www.ogp.columbia.edu/>), call 212-854-2559, or e-mail studyabroad@columbia.edu. For a list of approved study abroad programs, visit <http://www.ogp.columbia.edu/index.cfm?FuseAction=Programs.ListAll> (<http://www.ogp.columbia.edu/index.cfm?FuseAction=Programs.ListAll/>).

Reid Hall, Paris

Located at 4 rue de Chevreuse, Paris, Reid Hall is administered by Columbia University. It offers semester and year-long programs of study, as well as summer courses.

Most students who study at Reid Hall take courses in the French university system (e.g., at the Sorbonne) and core courses offered at Reid Hall. In their first semester, students take a course in academic writing in French, enabling them to succeed at a high level in French university courses. Special opportunities include small topical seminars of Reid Hall students and French students.

For information on study abroad at Reid Hall, visit www.ogp.columbia.edu (<http://www.ogp.columbia.edu/>).

GRADING

Students who wish to use toward the major or concentration a course in which a grade of D has been received must consult with the director of undergraduate studies.

DEPARTMENTAL HONORS

Majors who wish to be considered for departmental honors should consult with the director of undergraduate studies. To be eligible, students must have a grade point average of at least 3.7 in major courses and have completed an approved senior thesis under the guidance of a faculty member at Columbia or Reid Hall. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

UNDERGRADUATE PRIZES

The Department of French and Romance Philology awards the following prizes to students enrolled in courses in the department:

1. Prize for Excellence in French Studies: awarded to a highly promising student in an intermediate or advanced French course;
2. Senior French Prize: awarded to an outstanding graduating major.

Professors

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- Emmanuelle Saada
- Joanna Stalnaker

Associate Professors

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- Pascale Hubert-Leibler
- Sophie Queuniet

Lecturers

- Alexandra Borer
- Pascale Crépon
- Samuel Skippon
- Eric Matheis

MAJOR IN FRENCH

The program of study should be planned before the end of the sophomore year with the director of undergraduate studies.

The major in French requires a minimum of 33 points beyond completion of the language requirement (FREN UN2102 Intermediate Course II), distributed as follows:

FREN UN3405 Third Year Grammar and Composition

FREN UN3333 - FREN UN3334 Introduction to Literary Study I and Introduction to Literary Studies II

FREN UN3600 France, Past and Present. An Introduction to French Civilization.

FREN UN3995 Senior Seminar

Select one upper-level course on literature before 1800.

Select one course in area of Francophone literature or culture, i.e., bearing on practices of French outside of France or on internal cultural diversity of France.

The remaining four courses (12 points) are to be chosen from 3000-level offerings in French literature, linguistics, or civilization.

One of the following advanced language classes can be counted as an elective: French for Diplomats; French Culture, Language and Society through...; Advanced Translation Workshop; and The Cultural Workshop.

Note the following:

- FREN BC3006 Composition and Conversation is not applicable to either the French major or the concentration.

Other Barnard French courses may be taken with the approval of the director of undergraduate studies;

- Heritage speakers are exempted from FREN UN3405 Third Year Grammar and Composition, but must replace the course by taking an advanced elective.

The following Columbia French courses are **not applicable** to the French major or concentration:

FREN UN1101	Elementary French I
FREN UN1102	Elementary French II
FREN UN1105	Accelerated Elementary French
FREN UN2101	INTERMEDIATE FRENCH I
FREN UN2102	Intermediate Course II
FREN UN2106	RAPID READING AND TRANSLATION
FREN UN2121	INTERMED CONVERSATN FRENCH I
FREN UN2122	INTERMED CONVERSATN FRENCH II
FREN UN3131	Third-Year Conversation I
FREN UN3132	Third-Year Conversation II

CONCENTRATION IN FRENCH

The requirements for this program were modified on March 1, 2016. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The concentration in French requires a minimum of 24 points beyond completion of the language requirement (FREN UN2102 Intermediate Course II), distributed as follows:

FREN UN3405	Third Year Grammar and Composition
FREN UN3333 - FREN UN3334	Introduction to Literary Study I and Introduction to Literary Studies II
FREN UN3600	France, Past and Present. An Introduction to French Civilization.

The remaining four courses (12 points) are to be chosen from 3000-level offerings in French literature, linguistics, or civilization.

One of the following advanced language classes can be counted as an elective: French for Diplomats; French Culture, Language and Society through...; Advanced Translation Workshop; and The Cultural Workshop.

MAJOR IN FRENCH AND FRANCOPHONE STUDIES

The requirements for this program were modified on February 14, 2014. Students who declared this program before this date should

contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The program of study should be planned before the end of the sophomore year with the director of undergraduate studies.

The major in French and Francophone studies requires a minimum of 33 points beyond completion of the language requirement (FREN UN2102 Intermediate Course II), distributed as follows:

FREN UN3405	Third Year Grammar and Composition
FREN UN3420	Introduction To French and Francophone Studies I
FREN UN3421	Introduction To French and Francophone Studies II
FREN UN3995	Senior Seminar

Select one course on Francophone/postcolonial French literature.

The remaining six courses (18 points) are to be chosen from upper-level offerings in French and other disciplines. Nine (9) of these points must be taken in a discipline other than French literature. To ensure focus, these interdisciplinary electives must fall within a single discipline of subject area. Courses must be pre-approved by the director of undergraduate studies. One of the advanced electives may be a senior essay written under the direction of a faculty member affiliated with the French and Francophone studies committee or teaching at Reid Hall. Majors who choose to write a senior essay at Columbia should register for the senior tutorial course in their adviser's home department.

Note the following:

- FREN BC3006 Composition and Conversation is not applicable to either the French and Francophone studies major or concentration. Other Barnard College French courses may be taken with the approval of the director of undergraduate studies;
- Heritage speakers can be exempted from FREN UN3405 Third Year Grammar and Composition, but must replace the course by taking an advanced elective.

The following Columbia French courses are not applicable to the French and Francophone studies major or concentration:

FREN UN1101	Elementary French I
FREN UN1102	Elementary French II
FREN UN1105	Accelerated Elementary French
FREN UN2101	INTERMEDIATE FRENCH I
FREN UN2102	Intermediate Course II
FREN UN2106	RAPID READING AND TRANSLATION
FREN UN2121	INTERMED CONVERSATN FRENCH I
FREN UN2122	INTERMED CONVERSATN FRENCH II

FREN UN3131	Third-Year Conversation I
FREN UN3132	Third-Year Conversation II

CONCENTRATION IN FRENCH AND FRANCOPHONE STUDIES

The requirements for this program were modified on March 1, 2016. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The concentration in French and Francophone studies requires a minimum of 24 points beyond completion of the language requirement (FREN UN2102 Intermediate Course II), distributed as follows:

FREN UN3405	Third Year Grammar and Composition
FREN UN3420	Introduction To French and Francophone Studies I
FREN UN3421	Introduction To French and Francophone Studies II

One course on Francophone/postcolonial French literature.

The remaining four courses (12 points) are to be chosen from upper-level offerings in French and other disciplines. Six (6) of these points must be taken in a discipline other than French literature. To ensure focus, these interdisciplinary elective courses must fall within a single discipline or subject area. Courses must be pre-approved by the director of undergraduate studies.

FRENCH AND FRANCOPHONE STUDIES

Departmental Office: 515 Philosophy; 212-854-2500 or 212-854-3208
<http://www.columbia.edu/cu/french/>

Director of Undergraduate Studies: Prof. Thomas Dodman, 505 Philosophy; 212-854-3715; td2551@columbia.edu

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Academic Department Administrator: Isabelle Chagnon, 515 Philosophy; 212-854-7978; ic7@columbia.edu

The Department of French and Romance Philology offers a major and concentration in French, as well as a major and concentration in French and Francophone studies. Students who are primarily interested in French literature should consider the major in French. Students who are interested in French history and civilization, and in the literature and culture

of the Francophone world, should consider the major in French and Francophone studies.

Major in French

The major in French gives students an in-depth familiarity with the language, culture, and literature of France and the French-speaking world. After completing the four-semester language requirement, students take courses in advanced grammar, and composition to refine their skills in reading, speaking, and writing French. In a required two-semester survey course (FREN UN3333-FREN UN3334), they receive a comprehensive overview of the development of French literature from the Middle Ages to the present day. After completing these core courses, French majors are encouraged to pursue individual interests; a wide range of language, literature, and cultural studies courses is available. Small classes and seminars allow for individual attention and enable students to work closely with faculty members. Advanced elective courses on French literature, history, philosophy, and cinema allow students to explore intellectual interests, perfect critical reading skills, and master close reading techniques.

The capstone course is the senior seminar, in which students study a range of texts and critical approaches and are encouraged to synthesize their learning in previous courses. The optional senior essay, written under the direction of a faculty member, introduces students to scholarly research. To be considered for departmental honors, students must complete the senior essay.

Major in French and Francophone Studies

The major in French and Francophone studies provides an interdisciplinary framework for the study of the history, literature, and culture of France and parts of the world in which French is an important medium of culture. Students explore the history and contemporary applications of concepts such as citizenship, national unity, secularism, and human rights, and explore central issues including universalism/relativism, tradition/modernity, and religion/state as they have developed in France and its colonies/former colonies since the 18th century.

Students take a series of required courses that includes:

- French grammar and composition/stylistics, essential to achieving proficiency in French language;
- FREN UN3420 Introduction To French and Francophone Studies I-FREN UN3421 Introduction To French and Francophone Studies II;
- FREN UN3995 Senior Seminar.

Having completed these courses, students take courses in related departments and programs, e.g., history, anthropology, political science, women's studies, human rights, art history, to fulfill the interdisciplinary portion of the major. To ensure methodological focus, three of these courses should be taken within a single field (e.g., history, music, anthropology, or

political science), or in relation to a single issue or world region, e.g., West Africa.

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT

Students beginning the study of French at Columbia must take four terms of the following two-year sequence:

Entering students are placed, or exempted, on the basis of their College Board Achievement or Advanced Placement scores, or their scores on the placement test administered by the Center for Student Advising, 403 Lerner. An SAT score of 780 or a score of 4 on the AP exam satisfies the language requirement.

The Barnard course, FREN BC1204 Intermediate II does **not** fulfill the undergraduate language requirement.

Language Proficiency Courses

Elementary and intermediate French courses help students develop an active command of the language. In FREN UN1101 Elementary French I and FREN UN1102 Elementary French II, the communicative approach is the main instructional method. In addition to practicing all four language skills—listening, speaking, reading, and writing—students are introduced to the cultural features of diverse French-speaking communities.

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Conversation Courses

Students looking for intensive French oral practice may take one of the 2-point conversation courses offered at intermediate and advanced levels. Conversation courses generally may not be counted toward the major. The exception is the special 3-point advanced conversation course, FREN UN3498 French Cultural Workshop, offered in the fall, designed to meet the needs of students planning to study abroad at Reid Hall.

ADVANCED PLACEMENT

- AP score of 4: The department grants 0 credits for a score of 4 on the AP French Language exam, but the foreign language requirement is satisfied.
- AP score of 5 or DELF: The department grants 3 credits for a score of 5 on the AP French Language exam, or for the completion of DELF (Diplôme d'Etudes en Langue Française). Students are awarded this credit after they take

a 3000-level French course (taught in French, for at least 3 points) and obtain a grade of B or above in that course.

- DALF C1 level or IB HL score of 6 or 7: The department grants 6 credits for the C1 level of DALF (Diplôme Approfondi de Langue Française), or for a score of 6 or 7 on the International Baccalaureate (IB) Higher Level (HL) exam. Students have no obligation to take higher-level French courses in order to receive these 6 credits, but restrictions apply on the use of these credits toward the French major.

LANGUAGE LABORATORY AND ON-LINE MATERIALS

Language laboratories located in the International Affairs Building provide opportunities for intensive practice in French pronunciation and aural comprehension. French courses typically make extensive use of on-line interactive materials that students can access from their own computer terminals.

MAISON FRANÇAISE

Students interested in French should acquaint themselves with the Maison Française, which houses a reading room of French newspapers, periodicals, books, and videos, and sponsors lectures/discussions by distinguished French visitors to New York City. With its weekly French film series, book club, café-conversation and other events, the Maison Française offers an excellent opportunity for students to perfect their language skills and enhance their knowledge of French and Francophone culture.

STUDY ABROAD

Because a direct experience of contemporary French society is an essential part of the program, majors and concentrators are strongly encouraged to spend either a semester or a year at Reid Hall-Columbia University in Paris, or at another French or Francophone university. During their time abroad, students take courses credited toward the major and, in some cases, also toward other majors (e.g. history, art history, political science).

For information on study abroad, visit the OGP website at www.ogp.columbia.edu (<http://www.ogp.columbia.edu/>), call 212-854-2559, or e-mail studyabroad@columbia.edu. For a list of approved study abroad programs, visit <http://www.ogp.columbia.edu/index.cfm?FuseAction=Programs.ListAll> (<http://www.ogp.columbia.edu/index.cfm?FuseAction=Programs.ListAll/>).

Reid Hall, Paris

Located at 4 rue de Chevreuse, Paris, Reid Hall is administered by Columbia University. It offers semester and year-long programs of study, as well as summer courses.

Most students who study at Reid Hall take courses in the French university system (e.g., at the Sorbonne) and core courses offered at Reid Hall. In their first semester, students take a course in academic writing in French, enabling them

to succeed at a high level in French university courses. Special opportunities include small topical seminars of Reid Hall students and French students.

For information on study abroad at Reid Hall, visit www.ogp.columbia.edu (<http://www.ogp.columbia.edu/>).

GRADING

Students who wish to use toward the major or concentration a course in which a grade of D has been received must consult with the director of undergraduate studies.

DEPARTMENTAL HONORS

Majors who wish to be considered for departmental honors should consult with the director of undergraduate studies. To be eligible, students must have a grade point average of at least 3.7 in major courses and have completed an approved senior thesis under the guidance of a faculty member at Columbia or Reid Hall. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

UNDERGRADUATE PRIZES

The Department of French and Romance Philology awards the following prizes to students enrolled in courses in the department:

1. Prize for Excellence in French Studies: awarded to a highly promising student in an intermediate or advanced French course;
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- Pascale Hubert-Leibler
- Sophie Queuniet

Lecturers

- Alexandra Borer
- Pascale Crépon
- Samuel Skippon
- Eric Matheis

MAJOR IN FRENCH

The program of study should be planned before the end of the sophomore year with the director of undergraduate studies.

The major in French requires a minimum of 33 points beyond completion of the language requirement (FREN UN2102 Intermediate Course II), distributed as follows:

FREN UN3405	Third Year Grammar and Composition
FREN UN3333 - FREN UN3334	Introduction to Literary Study I and Introduction to Literary Studies II
FREN UN3600	France, Past and Present. An Introduction to French Civilization.
FREN UN3995	Senior Seminar

Select one upper-level course on literature before 1800.

Select one course in area of Francophone literature or culture, i.e., bearing on practices of French outside of France or on internal cultural diversity of France.

The remaining four courses (12 points) are to be chosen from 3000-level offerings in French literature, linguistics, or civilization.

One of the following advanced language classes can be counted as an elective: French for Diplomats; French Culture, Language and Society through...; Advanced Translation Workshop; and The Cultural Workshop.

Note the following:

- FREN BC3006 Composition and Conversation is not applicable to either the French major or the concentration. Other Barnard French courses may be taken with the approval of the director of undergraduate studies;

- Heritage speakers are exempted from FREN UN3405 Third Year Grammar and Composition, but must replace the course by taking an advanced elective.

The following Columbia French courses are **not applicable** to the French major or concentration:

FREN UN1101	Elementary French I
FREN UN1102	Elementary French II
FREN UN1105	Accelerated Elementary French
FREN UN2101	INTERMEDIATE FRENCH I
FREN UN2102	Intermediate Course II
FREN UN2106	RAPID READING AND TRANSLATION
FREN UN2121	INTERMED CONVERSATN FRENCH I
FREN UN2122	INTERMED CONVERSATN FRENCH II
FREN UN3131	Third-Year Conversation I
FREN UN3132	Third-Year Conversation II

CONCENTRATION IN FRENCH

The requirements for this program were modified on March 1, 2016. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The concentration in French requires a minimum of 24 points beyond completion of the language requirement (FREN UN2102 Intermediate Course II), distributed as follows:

FREN UN3405	Third Year Grammar and Composition
FREN UN3333 - FREN UN3334	Introduction to Literary Study I and Introduction to Literary Studies II
FREN UN3600	France, Past and Present. An Introduction to French Civilization.

The remaining four courses (12 points) are to be chosen from 3000-level offerings in French literature, linguistics, or civilization.

One of the following advanced language classes can be counted as an elective: French for Diplomats; French Culture, Language and Society through...; Advanced Translation Workshop; and The Cultural Workshop.

MAJOR IN FRENCH AND FRANCOPHONE STUDIES

The requirements for this program were modified on February 14, 2014. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The program of study should be planned before the end of the sophomore year with the director of undergraduate studies.

The major in French and Francophone studies requires a minimum of 33 points beyond completion of the language requirement (FREN UN2102 Intermediate Course II), distributed as follows:

FREN UN3405	Third Year Grammar and Composition
FREN UN3420	Introduction To French and Francophone Studies I
FREN UN3421	Introduction To French and Francophone Studies II
FREN UN3995	Senior Seminar

Select one course on Francophone/postcolonial French literature.

The remaining six courses (18 points) are to be chosen from upper-level offerings in French and other disciplines. Nine (9) of these points must be taken in a discipline other than French literature. To ensure focus, these interdisciplinary electives must fall within a single discipline of subject area. Courses must be pre-approved by the director of undergraduate studies. One of the advanced electives may be a senior essay written under the direction of a faculty member affiliated with the French and Francophone studies committee or teaching at Reid Hall. Majors who choose to write a senior essay at Columbia should register for the senior tutorial course in their adviser's home department.

Note the following:

- FREN BC3006 Composition and Conversation is not applicable to either the French and Francophone studies major or concentration. Other Barnard College French courses may be taken with the approval of the director of undergraduate studies;
- Heritage speakers can be exempted from FREN UN3405 Third Year Grammar and Composition, but must replace the course by taking an advanced elective.

The following Columbia French courses are not applicable to the French and Francophone studies major or concentration:

FREN UN1101	Elementary French I
FREN UN1102	Elementary French II
FREN UN1105	Accelerated Elementary French
FREN UN2101	INTERMEDIATE FRENCH I
FREN UN2102	Intermediate Course II
FREN UN2106	RAPID READING AND TRANSLATION
FREN UN2121	INTERMED CONVERSATN FRENCH I
FREN UN2122	INTERMED CONVERSATN FRENCH II
FREN UN3131	Third-Year Conversation I
FREN UN3132	Third-Year Conversation II

CONCENTRATION IN FRENCH AND FRANCOPHONE STUDIES

The requirements for this program were modified on March 1, 2016. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The concentration in French and Francophone studies requires a minimum of 24 points beyond completion of the language requirement (FREN UN2102 Intermediate Course II), distributed as follows:

FREN UN3405	Third Year Grammar and Composition
FREN UN3420	Introduction To French and Francophone Studies I
FREN UN3421	Introduction To French and Francophone Studies II

One course on Francophone/postcolonial French literature.

The remaining four courses (12 points) are to be chosen from upper-level offerings in French and other disciplines. Six (6) of these points must be taken in a discipline other than French literature. To ensure focus, these interdisciplinary elective courses must fall within a single discipline or subject area. Courses must be pre-approved by the director of undergraduate studies.

GERMAN LITERATURE AND CULTURAL HISTORY

Departmental Office: 414 Hamilton; 212-854-3202
<https://germanic.columbia.edu/>

Director of Undergraduate Studies: Prof. Dorothea von Mücke, 410 Hamilton; 212-854-1891; dev1@columbia.edu
tw2284@columbia.edu

Language Instruction: Jutta Schmiers-Heller, 403A Hamilton; 212-854-4824; js2331@columbia.edu (rak23@columbia.edu)

The Department of Germanic Languages and Literatures is considered one of the very best in the country. Many of the faculty specialize in the study of German literature and culture from 1700 to the present. German majors acquire proficiency in examining literary, philosophical, and historical texts in the original, as well as critical understanding of modern German culture and society. Particular attention is given to German-speaking traditions within larger European and global contexts. Courses taught in translation build on Columbia's Core Curriculum, thereby allowing students to enroll in upper-level seminars before completing the language requirement.

All classes are taught as part of a living culture. Students have ample opportunities to study abroad, to work with visiting

scholars, and to take part in the cultural programs at Deutsches Haus. In addition, the department encourages internships with German firms, museums, and government offices. This hands-on experience immerses students in both language and culture, preparing them for graduate study and professional careers.

Upon graduation, German majors compete successfully for Fulbright or DAAD scholarships for research in Germany or Austria beyond the B.A. degree. Our graduating seniors are highly qualified to pursue graduate studies in the humanities and social sciences, as well as professional careers. Former majors and concentrators have gone on to careers in teaching, law, journalism, banking and consulting, international affairs, and communications.

German literature and culture courses are taught as seminars integrating philosophical and social questions. Topics include romanticism, revolution, and national identity; German intellectual history; minority literatures; Weimar cinema; German-Jewish culture and modernity; the Holocaust and memory; and the history and culture of Berlin. Classes are small, with enrollment ranging from 5 to 15 students.

The department regularly offers courses in German literature and culture in English for students who do not study the German language. The department also participates in Columbia's excellent program in comparative literature and society.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 5 on the AP German Language exam, which satisfies the foreign language requirement. Credit is awarded upon successful completion of a 3000-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in German. Courses taught in English may not be used for language AP credit. The department grants 0 credits for a score of 4 on the AP German Language exam, but the foreign language requirement is satisfied.

THE YIDDISH STUDIES PROGRAM

The Yiddish Studies Program at Columbia University, the global leader in Yiddish scholarship and teaching, focuses on the experiences and cultural efflorescence of Ashkenazic Jewry over a thousand years and five continents. It is a perfect exemplar of Columbia's interests in global and transnational study, weaving together language, literature, and culture in a way that echoes the best of Columbia's justly famed humanities programs.

The program in Yiddish studies offers both the undergraduate Major and Concentration, in addition to graduate studies leading to the Ph.D. In both the undergraduate and graduate program, emphasis is placed not merely on acquiring linguistic proficiency and textual study, but also viewing Yiddish literature in a larger cultural and interdisciplinary context. The graduate program, the only degree-granting Yiddish Studies Program in the United States, is considered one of the world's

most important, with its graduates holding many of the major university positions in the field.

Students of Yiddish have ample opportunities to enhance their studies through a number of fellowships. The Naomi Fellowship (<https://www.ijs.columbia.edu/naomi-fellowship/>), a fully-subsidized Yiddish Study Abroad program allows students to explore Yiddish culture and history in Israel and Poland. The Irene Kronhill Pletka YIVO Fellowship (<https://germanic.columbia.edu/programs/yiddish/fellowships/>) enables students to expand on their archival research skills in New York. Upon graduation, our majors compete successfully for Fulbright and other prestigious scholarships, and are highly qualified to pursue careers in humanities, social sciences, as well as artistic and professional careers.

Students work with faculty in Germanic languages, Jewish studies, history, and Slavic studies to broaden their understanding of the literature, language, and culture of Eastern European Jewry. The Yiddish Studies Program is also closely affiliated with the Institute for Israel and Jewish Studies (p.), which offers diverse programming and other fellowship opportunities. Classes are small, and instruction is individualized and carefully directed to ensure that students gain both a thorough general grounding and are able to pursue their own particular interests in a wide-spanning field. The program also offers classes taught in translation for students who do not study Yiddish. The Yiddish programming, such as lectures, monthly conversation hours, Meet a Yiddish Celebrity series, as well as the activities of the Yiddish Club of Columbia's Barnard/Hillel allows students to explore Yiddish culture outside the classroom.

THE GERMAN LANGUAGE PROGRAM

First- and second-year German language courses emphasize spoken and written communication, and provide a basic introduction to German culture. Goals include mastery of the structure of the language and enough cultural understanding to interact comfortably with native speakers.

After successfully completing the elementary German sequence, GERM UN1101 Elementary German Language Course, I-GERM UN1102 Elementary German Language Course, II, students are able to provide information about themselves, their interests, and daily activities. They can participate in simple conversations, read edited texts, and understand the main ideas of authentic texts. By the end of GERM UN1102 Elementary German Language Course, II, students are able to write descriptions, comparisons, and creative stories, and to discuss general information about the German-speaking countries.

The intermediate German sequence, GERM UN2101 Intermediate German I-GERM UN2102 Intermediate German II, increases the emphasis on reading and written

communication skills, expands grammatical mastery, and focuses on German culture and literary texts. Students read short stories, a German drama, and increasingly complex texts. Regular exposure to video, recordings, the World Wide Web, and art exhibits heightens the cultural dimensions of the third and fourth semesters. Students create portfolios comprised of written and spoken work.

Upon completion of the second-year sequence, students are prepared to enter advanced courses in German language, culture, and literature at Columbia and/or at the Berlin Consortium for German Studies in Berlin. Advanced-level courses focus on more sophisticated use of the language structure and composition (GERM UN3001 Advanced German, I-GERM UN3002 *Advanced German II: Vienna*); on specific cultural areas; and on literary, historical, and philosophical areas in literature-oriented courses (GERM UN3333 Introduction To German Literature [In German]).

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT IN GERMAN

Students beginning the study of German at Columbia must take four terms of the following two-year sequence:

GERM UN1101	Elementary German Language Course, I
GERM UN1102	Elementary German Language Course, II
GERM UN2101	Intermediate German I
GERM UN2102	Intermediate German II

Entering students are placed, or exempted, on the basis of their College Board Achievement or Advanced Placement scores, or their scores on the placement test administered by the departmental language director. Students who need to take GERM UN1101 Elementary German Language Course, I-GERM UN1102 Elementary German Language Course, II may take GERM UN1125 Accelerated Elementary German I & II as preparation for GERM UN2101 Intermediate German I.

UNIVERSITY STUDY IN BERLIN DEUTSCHES HAUS

Deutsches Haus, 420 West 116th Street, provides a center for German cultural activities on the Columbia campus. It sponsors lectures, film series, and informal gatherings that enrich the academic programs of the department. Frequent events throughout the fall and spring terms offer students opportunities to practice their language skills.

GRADING

Courses in which a grade of D has been received do not count toward the major or concentration requirements.

DEPARTMENTAL HONORS

Normally no more than 10% of graduating majors receive departmental honors in a given academic year. For the requirements for departmental honors, see the director of undergraduate studies.

PROFESSORS

Mark Anderson
 Stefan Andriopoulos
 Claudia Breger
 Jeremy Dauber
 Andreas Huyssen (emeritus)
 Harro Müller (emeritus)
 Dorothea von Mücke
 Oliver Simons (Chair)

SENIOR LECTURERS

Wijnie de Groot (Dutch)
 Jutta Schmiers-Heller

LECTURERS

Agnieszka Legutko (Yiddish)
 Silja Weber

MAJOR IN GERMAN LITERATURE AND CULTURAL HISTORY

The goal of the major is to provide students with reasonable proficiency in reading a variety of literary, philosophical, and historical texts in the original and, through this training, to facilitate a critical understanding of modern German-speaking cultures and societies. Students should plan their program of study with the director of undergraduate studies as early as possible. Competence in a second foreign language is strongly recommended, especially for those students planning to attend graduate school.

The major in German literature and cultural history requires a minimum of 30 points, distributed as follows:

GERM UN3001	Advanced German, I (can be waived and replaced by another 3000 level class upon consultation with the DUS)
or GERM UN3002	Advanced German II: Vienna
GERM UN3333	Introduction To German Literature [In German]

Select two of the following survey courses in German literature and culture (at least one of these must focus on pre-20th-century cultural history):

GERM UN3442	Survey of 18th Century German Lit: Enlightenment, Sturm und Drang [In German]
GERM UN3443	Romanticism, Revolution, Realism [In German]

GERM UN3444	SURVEY OF GERMAN LIT:20C
GERM UN3445	German Literature After 1945 [In German]

One course in German intellectual history

GERM UN3991	Senior Seminar
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The remaining courses to be chosen from the 3000- or 4000-level offerings in German and Comparative Literature—German in consultation with the Director of Undergraduate Studies.

Senior Thesis

A senior thesis is not required for the major. Students interested in a senior thesis or research project may do so through independent study with a faculty member over one or two semesters.

MAJOR IN YIDDISH STUDIES

The program is designed as a combination of language and content courses. First- and second-year Yiddish language courses emphasize spoken and written communication, and provide a basic introduction to Eastern European Jewish culture. Goals include mastery of the structure of the language and enough cultural understanding to interact comfortably with native speakers.

After second-year Yiddish language courses are completed, students should feel sufficiently comfortable to begin to work with Yiddish literature in the original. Upper-level undergraduate/graduate courses are designed to accommodate students with a range of Yiddish language experience, and intensive language summer study abroad, such as the Naomi Praver Kadar International Yiddish Summer Program (the Yiddish Studies program at Columbia offers the fully-subsidized Naomi Fellowship (<http://www.ijs.columbia.edu/naomi-fellowship/>) for students of Yiddish), or other academic summer programs, is also encouraged for improvement in language acquisition and comprehension.

The goal is to provide students with reasonable proficiency in reading a variety of literary, philosophical, and historical texts in the original and, through this training, to provide them with a critical understanding of Yiddish-speaking culture and society.

The second pillar of the Yiddish program is an intimate exposure to the literature and culture of the Yiddish-speaking Jewry. That exposure is achieved through several courses in Yiddish literature, which, although they may cover a variety of subjects or proceed from a number of methodological and disciplinary orientations, share a rigorous commitment to analyzing and experiencing that literature within an overarching historical and cultural framework.

These courses in Yiddish literature, culture and Jewish history will provide students with a solid interdisciplinary foundation in Yiddish studies. Inevitably and necessarily, these courses, whether taught in Yiddish, English, or in a combination of

the Yiddish text and English language instruction – cover the sweep of Yiddish literary history from the early modern period to today.

Students should plan their program of study with the director of undergraduate studies as early as possible. There is a prerequisite of two years of Yiddish, or equivalent to be demonstrated through testing.

The Major in Yiddish Studies requires a minimum of 30 points, distributed as follows:

1. **Two courses of advanced language study** (6 points); YIDD UN3101, YIDD UN3102
2. **Three courses in Yiddish literature** (9 points); e.g. YIDD UN3500, YIDD GU4420
3. **At least one course related to a senior thesis** (3 points);
4. **Four related courses, at least one of which is in medieval or modern Jewish history** (12 points); e.g. HIST UN4604, YIDD GU4113.

A senior thesis **is required** for the Major in Yiddish Studies. Students interested in a senior thesis or research project may do so through independent study with a faculty member over one or two semesters. Students must conduct original research, some of which must take place in the Yiddish language, and are required to submit a culminating paper, of no less than 35 pages.

Elective courses: Elective courses can be taken at Columbia as well as at affiliated institutions such as the Jewish Theological Seminary, Barnard College, New York University, etc. Columbia's arrangements with the joint degree appointing program at JTS, i.e. JTS and GS Joint program with List College, offers students exposure to a wide variety of courses on Yiddish and Yiddish-related topics taught by experts in the field of Yiddish and comparative Jewish literature such as Profs. David Roskies and Barbara Mann.

Thanks to the consortial arrangements with other universities in the New York area (Barnard, NYU, Yale, Penn, etc.) students both in Columbia College and General Studies, can take courses at these institutions for degree credit, which allows for student exposure to experts in twentieth-century Soviet Yiddish literature, Yiddish women's writing, Yiddish literature in Israel, and much more (Profs. Gennady Estraiikh, Kathryn Hellerstein, and Hannan Hever). These arrangements allow students to have, if they so choose, an even broader intellectual experience than the already broad interdisciplinary opportunities available to them via the courses offered by the faculty on the Interdisciplinary Committee on Yiddish at Columbia.

Language courses need to be taken at Columbia.

Honors options: Departmental Honors in Yiddish Studies can be granted to a total of 10% of the students graduating

with the Major in Yiddish Studies in a given year across both Columbia College and General Studies.

CONCENTRATION IN GERMAN LITERATURE AND CULTURAL HISTORY

The concentration in German literature and cultural history requires a minimum of 21 points in German courses.

GERM UN3333 Introduction To German Literature [In German]

At least one of the period survey courses in German literature and culture

GERM UN3442 Survey of 18th Century German Lit: Enlightenment, Sturm und Drang [In German]

GERM UN3443 Romanticism, Revolution, Realism [In German]

GERM UN3444 SURVEY OF GERMAN LIT:20C

GERM UN3445 German Literature After 1945 [In German]

GERM UN3991 Senior Seminar

The remaining courses to be chosen from the 3000- or 4000-level offerings in German and Comparative Literature-german in consultation with the Director of Undergraduate Studies

CONCENTRATION IN YIDDISH STUDIES

The concentration in Yiddish studies requires a minimum of 21 points, distributed as follows:

1. **Two courses of advanced language study** (6 points); YIDD UN3101, YIDD UN3102
2. **Two courses in Yiddish literature** (6 points); e.g. YIDD UN3500, YIDD GU4420
3. **Three related courses, at least one of which is in medieval or modern Jewish history** (9 points); e.g. HIST UN4604, YIDD GU4113.

SPECIAL CONCENTRATION IN GERMAN FOR COLUMBIA COLLEGE AND SCHOOL OF GENERAL STUDIES STUDENTS IN STEM FIELDS

The special concentration in German requires a minimum of 15 points.

GERM UN3333 Introduction To German Literature [In German]

At least one of the period survey courses in German Literature and Culture

GERM UN3442 Survey of 18th Century German Lit: Enlightenment, Sturm und Drang [In German]

GERM UN3443 Romanticism, Revolution, Realism [In German]

GERM UN3444 SURVEY OF GERMAN LIT:20C

GERM UN3445 German Literature After 1945 [In German]

GERM UN3991 Senior Seminar

Two courses to be chosen from the 3000- or 4000-level (taught in German or English) offerings in German and Comparative Literature German in consultation with the Director of Undergraduate Studies

HISPANIC STUDIES

Departmental Office:

101 Casa Hispánica | 612 W. 116th Street | (212) 854-4187
<http://www.laic.columbia.edu/>

Director of Undergraduate Studies:

Prof. Seth Kimmel | 408 Casa Hispánica | (212) 854-6238 |
srk29@columbia.edu

Director of Graduate Studies:

Prof. Alessandra Russo | 405 Casa Hispánica | (212) 854-4187 |
ar2701@columbia.edu

Director of the Spanish Language Program:

Dr. Lee B. Abraham | 402 Casa Hispánica | (212) 854-3764 |
lba2133@columbia.edu

Director of the Portuguese Language Program:

José Antonio Castellanos-Pazos | 501 Casa Hispánica | (212) 854-0277 |
jc846@columbia.edu |
lba2133@columbia.edu

The Department of Latin American and Iberian Cultures (LAIC) at Columbia, located in the Casa Hispánica, has long enjoyed an international reputation as a center for Hispanic and Lusophone studies. The department provides linguistic preparation in Spanish, Portuguese, and Catalan, and offers a flexible program to study manifestations of the Hispanic and Lusophone worlds in all historical periods—from the medieval to the globalized present—and in a variety of cultural contexts: the Iberian Peninsula, Latin America, the former colonies of Portugal, and the United States.

Students can enter the program at any level of linguistic and cultural preparedness. The department offers a placement exam to determine the level at which students may either begin or

continue study. Majors and concentrators in Hispanic studies and Portuguese studies are typically double majors who bring insights and methods from fields such as history, political science, women's studies, anthropology, economics, Latino studies, Latin American studies, etc., which fosters engaging discussions.

ACADEMIC PROGRAMS

The department offers two majors. The major in Hispanic studies gives students a well-rounded preparation in the history and culture of the Hispanic world. The second option, a major in Hispanic studies with specialization, allows students to study the Hispanic world through a number of fields, among them Latin American studies, gender studies, political science, economics, history, and sociology. The department also offers two concentrations: Hispanic studies and Portuguese studies.

The language and major programs have also been designed in close consultation and cooperation with Barnard's Department of Spanish and Latin American Cultures. All courses taken in one program may be used to fulfill the requirements of the other. Hence, Columbia and Barnard students may move freely between departments of both institutions for courses that best fit their intellectual interests and schedules.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 5 on the AP Spanish Language exam, which satisfies the foreign language requirement. Credit is awarded upon successful completion of a 3300-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in Spanish. Courses taught in English may not be used for language AP credit.

The department grants 0 credits for a score of 4 on the AP Spanish Language exam, but the foreign language requirement is satisfied.

The department grants 3 credits for a score of 5 on the AP Spanish Literature exam, which satisfies the foreign language requirement. Credit is awarded upon successful completion of a 3300-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in Spanish. Courses taught in English may not be used for language AP credit.

The department grants 0 credits for a score of 4 on the AP Spanish Literature exam, but the foreign language requirement is satisfied.

STUDY ABROAD

The department strongly recommends that all Hispanic and Portuguese studies majors/concentrators study abroad. Most courses taken abroad can be used to fulfill the requirements for the major and concentration, and with adequate planning, even some of the requirements for a second major or concentration. A maximum of four (4) courses taken abroad may be applied to

the major, and a maximum of three (3) to the concentration in Hispanic or Portuguese studies.

All students are strongly advised to take either SPAN UN3349 Hispanic Cultures I: Islamic Spain through the Colonial Period or SPAN UN3350 Hispanic Cultures II: Enlightenment to the Present before studying abroad. Actual or potential majors and concentrators in Hispanic or Portuguese studies should seek tentative approval of their programs from the director of undergraduate studies before their departure.

INTERSHIPS

The department maintains an updated list of internship resources and volunteer opportunities in New York City, the United States, and abroad. No academic credit is given for internships.

THE HISPANIC INSTITUTE

The department hosts the Hispanic Institute at Columbia. Founded in 1920 as the Instituto de las Españas, the Institute sponsors and disseminates research on Hispanic and Luso-Brazilian culture. Since 1934, the Institute has published the *Revista Hispánica Moderna*, a distinguished journal in Hispanic criticism and theory.

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT

For students with no knowledge of Spanish, Portuguese, or Catalan, at least four terms of the language are required: *UN1101-UN1102* (or *UN1120*) and *UN2101-UN2102* (or *UN2120*). **All courses must be taken for a letter grade to fulfill the language requirement.**

Students with prior knowledge of Spanish who plan to continue studying Spanish are required to take the department's on-line placement examination (<http://laic.columbia.edu/programs/placement-examination/>) before registering for courses. Students with prior knowledge of Portuguese or Catalan should speak with the director of language programs.

Students may be exempted from the language requirement in one of four ways:

1. Present a score of 4 or 5 on the AP Spanish Language or Spanish Literature Exams. Students who receive a score of 5 in either exam are awarded 3 AP credits upon successful completion of a 3300-level (or above) course with a grade of B or higher. AP credit is not granted for a score of 4.
2. Present a score of 780 or above on the SAT Subject Test. Students with a score lower than 780 should take the department's on-line placement exam and follow the placement advice received.
3. Present a score of a 7, 6, or 5 on the International Baccalaureate Higher Level Exam in Spanish.
4. Obtain a score of 625 or higher in the department's on-line placement exam (<http://laic.columbia.edu/programs/>

placement-examination/). If the score in the on-line test qualifies a student for exemption from the language requirement, they are required to take a written version of the placement exam during orientation (for entering students) or during the semester (for continuing students). This written exam is offered every year on the Thursday before the beginning of classes in the fall semester from 10:00 a.m.- 2:00 p.m. in Room 352 of the International Affairs Building (the Language Resource Center Computer Lab). Students do not need to make an appointment to take the exam.

DEPARTMENTAL HONORS

Beginning in Spring 2015, the department put in place a new timeline and training program for juniors, to assist students with planning and completing the Honors Thesis during their senior year. The Honors Thesis is an excellent option for any student interested in pursuing a Master's degree or Ph.D.; but, above all, it is a highly formative research and writing experience—one that can bear unexpected fruits toward any path the student decides to take in the future.

All students pursuing a major through the department may apply to write an Honors Thesis. The department envisions the thesis as an intellectually challenging and rewarding experience that crowns four years of undergraduate studies with an original contribution in the field chosen by the student.

The department supports students in shaping their research topic and provides frequent advising throughout the research and writing process. The timeline is as follows:

- During the junior year, students take into consideration the possibility of writing an Honors Thesis in the following year. The topic of the Honors Thesis may likely originate in an advanced course taken during the junior year; students may also choose to develop ideas discussed or papers written in courses taken in previous years. Juniors schedule a meeting (or, if the student is studying abroad, a Skype conversation) with the director of undergraduate studies to discuss their proposed topic and faculty adviser.
- By May 15, juniors who have decided to write an Honors Thesis in their senior year send a formal proposal to the director of undergraduate studies, which includes:
 - A title and a one-page abstract;
 - The name of the proposed faculty adviser;
 - An application for departmental partial funding support (for those who would like to pursue research during the summer).
- By May 30, the Honors Thesis committee reviews the proposals and informs the students of its decision.
- In the fall of the senior year:
 - Seniors selected to write the Honors Thesis enroll in SPAN UN3998 Supervised Individual Research (Spring) with their faculty adviser and write the Honors Thesis during the entire senior year under the direction

of their adviser. For the purposes of the major, this independent study counts as a 3-point course towards elective courses.

- Faculty advisers organize Honors Thesis Workshops to discuss students' ongoing projects and provide advising on research tools, methodological and theoretical frames, and overall writing process.
- In either the fall or spring of the senior year, students enroll in a Senior Seminar.
- By April 15 of the senior year, students complete and present their Honors Thesis for consideration towards departmental honors and prizes. Students submit their thesis in hard copy, following the formatting specifications provided on the LAIC website (<http://laic.columbia.edu/programs/formatting-specifications-for-the-senior-thesis/>).
- By May 1, the Honors Thesis committee informs the students of its decision. Departmental honors and prizes are assigned. The committee provides publishing options to students whose work has resulted in a highly original scholarship piece.

In order to facilitate the transition to this new schedule, the department will organize an *Honors Thesis Introductory Session* during the last week of April 2015. All undergraduate students are welcome; students in the junior year will have the opportunity to discuss possible research themes and thesis topics.

To be considered for departmental honors, a student must write an Honors Thesis and maintain a GPA of at least 3.6 in major courses. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

UNDERGRADUATE PRIZES

The faculty awards an undergraduate prize every year:

Dr. Antonio G. Mier Prize

Awarded for excellence in Hispanic Studies to a major degree candidate in the School of General Studies at Columbia University.

PROFESSORS

Carlos J. Alonso
Bruno Bosteels
Patricia E. Grieve
Alberto Medina
Graciela R. Montaldo
Gustavo Pérez-Firmat
Alessandra Russo
Jesús R. Velasco

ASSOCIATE PROFESSORS

Seth Kimmel

ASSISTANT PROFESSORS

Karen Benezra
Ana M. Fernández-Cebrián
Ana Paulina Lee

SENIOR LECTURER

Guadalupe Ruiz-Fajardo
José Antonio Castellanos-Pazos
Angelina Craig-Flórez
Reyes Llopis-García
Francisco Rosales-Varo
José Plácido Ruiz-Campillo

LECTURERS

Lee B. Abraham
Francisca Aguiló Mora
Leyre Alejaldre Biel
Irene Alonso-Aparicio
Dolores Barbazán Capeáns
Lorena García Barroso
Ana Paula Huback
Juan Pablo Jiménez-Caicedo
Francisco Meizoso
João Nemi Neto
Diana P. Romero
Elsa Úbeda

MAJOR IN HISPANIC STUDIES

Students who declared this program before March 2016 (when requirements changed) should contact the Director of Undergraduate Studies to confirm their correct course of study.

Students may only register once in each of the Core Courses (SPAN UN3300, SPAN UN3349 and SPAN UN3350).

The major in Hispanic studies requires 11 courses (minimum of 33 points) as follows:

Core Courses

SPAN UN3300	Advanced Language through Content [in Spanish]
SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present

Elective Courses

Select seven elective courses (21 points): a minimum of three 3000- or 4000-level electives must be chosen within the department and up to three electives related to Hispanic Studies may be taken outside the department.

Senior Seminar

SPAN UN3991	Senior Seminar
or SPAN UN3992	Senior Seminar: Modern Cities and Global Cities

MAJOR IN HISPANIC STUDIES WITH SPECIALIZATION

Students who declared this program before March 2016 (when requirements changed) should contact the Director of Undergraduate Studies to confirm their correct course of study.

Students may only register once in each of the Core Courses (SPAN UN3300, SPAN UN3349 and SPAN UN3350).

The major in Hispanic studies with specialization requires 14 courses (minimum of 42 points) as follows. Students should consult the director of undergraduate studies to plan their program and refer to the Hispanic Studies Major Worksheet.

Core Courses

SPAN UN3300	Advanced Language through Content [in Spanish]
SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present

Elective Courses

Select ten elective courses (30 points): four of which must be chosen within the department and six of which must be in the field of specialization. Approved courses taken abroad may be counted as inside or outside the department for the specialization. A maximum of four courses taken abroad may be counted toward the major.

Senior Seminar *

SPAN UN3991	Senior Seminar
or SPAN UN3992	Senior Seminar: Modern Cities and Global Cities

* In exceptional cases and with the director of undergraduate studies' approval, students may take a senior seminar in their area of specialization as a seventh course outside the department, if they have completed enough foundational courses to manage the demands of an advanced seminar. In such cases, the director of undergraduate studies must receive a letter or e-mail from the seminar instructor indicating approval of a student's membership in the course; the seminar project must be on a Hispanic topic; and a copy of the project must be turned in to the director of undergraduate studies for the student's file upon completion of the course. Students who complete the senior seminar in another department may also count it as the third elective course on a Hispanic topic outside the department, in which case they may take a fourth 3000- or 4000-level course in the department.

CONCENTRATION IN HISPANIC STUDIES

Students who declared this program before March 2016 (when requirements changed) should contact the Director of Undergraduate Studies to confirm their correct course of study.

Students may only register once in each of the Core Courses (SPAN UN3300, SPAN UN3349 and SPAN UN3350).

The concentration in Hispanic studies requires eight courses (minimum of 24 points) as follows:

Core Courses

SPAN UN3300	Advanced Language through Content [in Spanish]
SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present

Elective Courses

Select five elective courses (15 points): a minimum of four 3000- or 4000-level courses must be chosen within the department and up to one elective related to Hispanic Studies may be taken outside the department. A maximum of three courses taken abroad may be counted toward the concentration.

CONCENTRATION IN PORTUGUESE STUDIES

The concentration in Portuguese studies requires eight courses (minimum 24 points) as follows:

Core Courses

PORT UN3101	Conversation about the Lusophone World
PORT UN3300	Advanced Language through Content
PORT UN3330	Introduction to Portuguese Studies
PORT UN3350	Lusophone Africa and Afro Brazilian Culture

Elective Courses

Select four elective courses (12 points): at least two must have a PORT designation and be chosen from the department's 3000-level offerings. Electives taken outside of the department must have the director of undergraduate studies' approval and be related to Portuguese studies. A maximum of two courses taught in English may be counted toward the concentration overall. Refer to the Portuguese Concentration Worksheet.

HISTORY

Departmental Office: 413 Fayerweather; 212-854-4646

<http://www.history.columbia.edu>

Director of Undergraduate Studies: Prof. Neslihan Şenocak ,
324 Fayerweather; nsenocak@columbia.edu

Undergraduate Administrator: Kimberly Solomon;
kms2307@columbia.edu

The history curriculum covers most areas of the world and most periods of history. It encourages students to develop historical understanding in the widest sense of the word: a thorough empirical grasp along with the kind of analytical skills that come with a genuinely historical sensibility. This is done through two types of courses: lectures and seminars. Lectures range from broad surveys of the history of a place or period to more thematically oriented courses. Seminars offer students the opportunity to work more closely with historical sources in smaller groups and to do more sophisticated written work. Because history courses usually have no prerequisites, there are no preordained sequences to follow. It is advisable, however, that students take a relevant lecture course in preparation for a seminar. Majors wishing to follow a more intensive program are advised to enroll in a historiography course and to undertake a senior thesis project. Historically, majors have pursued careers in a very wide range of areas including medicine, law, mass media, Wall Street, and academia.

ADVANCED PLACEMENT

Students may receive 3 credits toward the overall degree requirements for a score of 5 on the AP European History exam or the AP United States History exam. No points count toward or fulfill any requirements of the history major or concentration.

ADVISING

During their junior and senior years, majors and concentrators are advised by the faculty members of the Undergraduate Education Committee (UNDED). UNDED advisers also review and sign Plan of Study (POS) forms for majors and concentrators at least once per year. POS forms track students' progress toward completing all major and concentration requirements. New history majors and concentrators may see any member of UNDED. For the most up-to-date information on UNDED members, please see the undergraduate advising page of the departmental website (<http://www.history.columbia.edu>).

Majors and concentrators can also receive pure academic interest advising (non-requirement advising) from any faculty member and affiliated faculty member of the department.

First-years and sophomores considering a history major or concentration can seek advising from UNDED or any other faculty member.

For questions about requirements, courses, or the general program, majors and concentrators can also contact the undergraduate administrator.

DEPARTMENTAL HONORS

To be eligible for departmental honors, the student must have a GPA of at least 3.6 in courses for the major, an ambitious curriculum, and an outstanding senior thesis. Honors are awarded on the basis of a truly outstanding senior thesis. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

COURSE NUMBERING

Courses are numbered by *type*:

UN 1xxx - Introductory Survey Lectures

UN 2xxx - Undergraduate Lectures

UN 3xxx - Undergraduate Seminars

GU 4xxx - Joint Undergraduate/Graduate Seminars

and *field* (with some exceptions):

x000-x059: Ancient

x060-x099: Medieval

x100-x199: Early modern Europe

x200-x299: East Central Europe

x300-x399: Modern Western Europe

x400-x599: United States

x600-x659: Jewish

x660-x699: Latin America

x700-x759: Middle East

x760-x799: Africa

x800-x859: South Asia

x860-x899: East Asia

x900-x999: Research, historiography, and transnational

SEMINARS

Seminars are integral to the undergraduate major in history. In these courses, students develop research and writing skills under the close supervision of a faculty member. Enrollment is normally limited to approximately 15 students. In order to maintain the small size of the courses, admission to most seminars is by instructor's permission or application.

In conjunction with the Barnard History Department and other departments in the University (particularly East Asian Languages and Cultures), the History Department offers about 25 seminars each semester that majors may use to meet their seminar requirements. While there are sufficient seminars offered to meet the needs of majors seeking to fulfill the two-seminar requirement, given the enrollment limits, students may not always be able to enroll in a particular seminar. Students should discuss with UNDED their various options for completing the seminar requirement.

The History Department has developed an on-line application system for some seminars. The department regularly provides declared majors and concentrators with information on upcoming application periods, which typically occur midway

through the preceding semester. Students majoring in other fields, or students who have not yet declared a major, must inform themselves of the application procedures and deadlines by checking the undergraduate seminar page of the departmental website (<http://www.history.columbia.edu>).

PROFESSORS

Charles Armstrong
 Volker Berghahn (*emeritus*)
 Richard Billows
 Elizabeth Blackmar
 Casey Blake
 Christopher Brown
 Richard Bulliet (*emeritus*)
 Elisheva Carlebach
 Mark Carnes (Barnard)
 Zeynep Çelik
 George Chauncey
 John Coatsworth (Provost)
 Matthew Connelly
 Victoria de Grazia
 Mamadou Diouf (Middle Eastern, South Asian, and African Studies)
 Catherine Evtuhov
 Barbara Fields
 Eric Foner (*emeritus*)
 Carol Gluck
 Martha Howell
 Robert Hymes (East Asian Language and Cultures)
 Kenneth Jackson
 Karl Jacoby
 Matthew Jones
 Ira Katznelson (Political Science)
 Joel Kaye (Barnard)
 Alice Kessler-Harris (*emerita*)
 Rashid Khalidi
 Dorothy Ko (Barnard)
 Adam Kosto
 William Leach (*emeritus*)
 Gregory Mann
 Mark Mazower
 Robert McCaughey (Barnard)
 Stephanie McCurry
 Jose Moya (Barnard)
 Mae Ngai
 Susan Pedersen
 Pablo Piccato
 Rosalind Rosenberg (Barnard)
 David Rosner (Mailman School of Public Health)
 David Rothman (Physicians and Surgeons)
 Simon Schama (University Professor)
 Seth Schwartz
 Herbert Sloan (Barnard, *emeritus*)
 Pamela Smith
 Robert Somerville (Religion)
 Michael Stanislawski

Anders Stephanson
 Lisa Tiersten (Barnard)
 Adam Tooze
 Deborah Valenze (Barnard)
 Marc Van de Mieroop
 Richard Wortman (*emeritus*)
 Madeleine Zelin (East Asian Languages and Cultures)

ASSOCIATE PROFESSORS

Gergely Baics (Barnard)
 Lisbeth Kim Brandt (East Asian Languages and Cultures)
 Paul Chamberlin
 Amy Chazkel
 Charly Coleman
 Marwa Elshakry
 Frank Guridy
 Hilary Hallett
 Natasha Lightfoot
 Malgorzata Mazurek
 Nara Milanich
 Lien-Hang Nguyen
 Gregory Pflugfelder (East Asian Languages and Cultures)
 Caterina Pizzigoni
 Anupama Rao (Barnard)
 Camille Robcis
 Samuel Roberts
 Neslihan Senocak
 Rhiannon Stephens
 Gray Tuttle (East Asian Languages and Cultures)
 Carl Wennerlind (Barnard)

ASSISTANT PROFESSORS

Hannah Farber
 Andrew Lipman (Barnard)
 Gulnar Kendirbai (Visiting)
 A. Tunç Şen
 Alma Steingart
 Sailakshmi Ramgopal

LECTURERS IN DISCIPLINE

Victoria Phillips

ON LEAVE

Fall 2019: Armstrong, Carnes (Barnard), de Grazia, Howell, Piccato, Schwartz, Smith, Stephanson, Stephens, Tooze

Spring 2020: Armstrong, Baics, Gluck, Jackson, Piccato, Pizzigoni, Schwartz, Smith, Stephanson, Stephens, Tooze, Valenze

GUIDELINES FOR ALL HISTORY MAJORS AND CONCENTRATORS

For detailed information about the history major or concentration, as well as the policies and procedures of the department, please refer to the *History at Columbia Undergraduate Handbook*, available for download on the departmental website (<http://www.history.columbia.edu/undergraduate/handbook/>).

MAJOR IN HISTORY

Students must complete a minimum of *nine* courses in the department, of which *four* or more must be in an area of specialization chosen by the student and approved by a member of UNDED. Students must also fulfill a breadth requirement by taking three courses outside of their specialization. Two of the courses taken in the major must be seminars (including one seminar in the chosen specialization).

The requirements of the undergraduate program encourage students to do two things:

1. Develop a deeper knowledge of the history of a particular time and/or place. Students are required to complete a specialization by taking a number of courses in a single field of history of their own choosing. The field should be defined, in consultation with a member of UNDED, according to geographical, chronological, and/or thematic criteria. For example, a student might choose to specialize in 20th C. U.S. History, Medieval European History, Ancient Greek and Roman History, or Modern East Asian History. The specialization does not appear on the student's transcript, but provides an organizing principle for the program the student assembles in consultation with UNDED.
2. Gain a sense of the full scope of history as a discipline by taking a broad range of courses. Students must fulfill a breadth requirement by taking courses outside their own specialization -- at least one course removed in time and two removed in space.
 - a. Time: majors and concentrators must take at least one course removed in time from their specialization:
 - Students specializing in the modern period must take at least one course in the pre-modern period; students specializing in the pre-modern period must take at least one course in the modern period.
 - If the course proposed is in the same regional field as a student's specialization, special care must be taken to ensure that it is as far removed as possible; please consult with UNDED to make sure a given course counts for the chronological breadth requirement.
 - b. Space: majors must take at least two additional courses in regional fields not their own:

- These two "removed in space" courses must also cover **two different** regions.
- For example, students specializing in some part of Europe must take two courses in Africa, East or South Asia, Latin America/Caribbean, Middle East, and/or the U.S.
- Some courses cover multiple geographic regions. If a course includes one of the regions within a student's specialization, that course cannot count towards the breadth requirement unless it is specifically approved by the Director of Undergraduate Studies. For example, if a student is specializing in 20th C. U.S. history and takes the class *World War II in Global Perspective*, the class is too close to the specialization and may not count as a regional breadth course.

All courses in the Barnard History Department as well as select courses in East Asian Languages and Cultures; Middle Eastern, South Asian, and African Studies; and other departments count toward the major. Eligible inter-departmental courses may include:

- African Civilizations (AFCV UN1020) (when taught by Professor Gregory Mann, Professor Rhiannon Stephens, or PhD students in the Columbia University Department of History; the course does NOT count for History when taught by anyone else)
- Primary Texts of Latin American Civilization (LACV UN1020) (when taught by Professor Pablo Piccato, Professor Caterina Pizzigoni, or PhD students in the Columbia University Department of History; the course does NOT count for History when taught by anyone else)
- Introduction to East Asian Civilizations: China (ASCE UN1359), Introduction to East Asian Civilizations: Japan (ASCE UN1361), Introduction to East Asian Civilizations: Korea (ASCE UN1363) or other ASCE UN1xxx courses (when taught by Professors Charles Armstrong, Carol Gluck, Robert Hymes, Dorothy Ko, Eugenia Lean, Feng Li, David Lurie, Jungwon Kim, Paul Kreitman, Gregory Pflugfelder, Gray Tuttle, or Madeleine Zelin, and NOT when they are taught by anyone else)
- Please see the Courses section on the departmental website (<http://www.history.columbia.edu/>) to see which of these might count in a given semester. Any courses not listed or linked on the departmental website, however historical in approach or content, do not count toward the history major or concentration, except with explicit written approval of the UNDED chair.
- If you suspect a History course has escaped being listed at the above link and want to confirm whether or not it counts for History students, please contact the Undergraduate Administrator.

Thematic Specializations

Suitably focused thematic and cross-regional specializations are permitted and the breadth requirements for students

interested in these topics are set in consultation with a member of UNDED. Classes are offered in fields including, but not limited to:

- Ancient history
- Medieval history
- Early modern European history
- Modern European history
- United States history
- Latin American and Caribbean history
- Middle Eastern history
- East Asian history
- South Asian history

Additionally, classes are offered in thematic and cross-regional fields which include, but are not limited to:

- Intellectual history
- Jewish history
- Women's history
- International history
- History of science

These fields are only examples. Students should work with a member of UNDED to craft a suitably focused specialization on the theme or field that interests them.

Thesis Requirements

Majors may elect to write a senior thesis, though this is not a graduation requirement. Only senior thesis writers are eligible to be considered for departmental honors. The senior thesis option is not available to concentrators.

The yearlong HIST UN3838-HIST UN3839 Senior Thesis Seminar carries 8 points, 4 of which typically count as a seminar in the specialization. For the most up-to-date information on the field designations for history courses, please see the Courses section of the departmental website (<http://www.history.columbia.edu/>).

CONCENTRATION IN HISTORY

Effective February 2018, students must complete a minimum of *six* courses in history. At least *three* of the six courses must be in an area of specialization, *one* far removed in time, and *one* on a geographic region far removed in space. There is no seminar requirement for the concentration.

HUMAN RIGHTS

Program Office: Institute for the Study of Human Rights; 475 Riverside Drive (Interchurch Center), 3rd floor; 646-745-8577; uhrp@columbia.edu

Departmental Website: <http://humanrightscolumbia.org/education/undergraduate> (<http://humanrightscolumbia.org/education/undergraduate/>)

Director of Undergraduate Studies: Prof. Inga Winkler, 475 Riverside Drive (Interchurch Center), 308C; 646-745-8524. Office hours: Tuesday: 10:00am - 12:00pm and by appointment.

Human rights are central to contemporary understandings of justice and equality and have crucial bearing on the ability to assess and respond to emerging technological, economic, social, cultural, and political issues.

The Undergraduate Human Rights Program at the Institute for the Study of Human Rights engages students in this dynamic and evolving field and enhances their knowledge, skills, and commitment to human rights. The program offers a major and a concentration in human rights, provides students the opportunity to deepen their knowledge and explore their interests in human rights outside the classroom, and works to strengthen and support the undergraduate human rights community on campus. More information on academic and extracurricular events, opportunities, and resources for undergraduate human rights students is available on the program's website. For an advising appointment, please e-mail [humanrightsed \(humanrightsed@columbia.edu\)](mailto:humanrightsed@cumcolumbia.edu)@columbia.edu ([humanrightsed@columbia.edu](mailto:humanrightsed@cumcolumbia.edu)).

DEPARTMENTAL HONORS

To be eligible for departmental honors, a student must satisfy all the requirements for the major, maintain a 3.6 GPA in the major, maintain an overall GPA of 3.6, and complete a thesis of sufficiently high quality to merit honors. A thesis is required for all students who wish to be considered for honors, but does not guarantee honors. Students who graduate in October, February, or May of a given academic year are eligible for honors consideration in May. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

Students interested in writing a thesis for honors consideration complete a two semester course sequence during their final year of study. In the fall, students take HRTS UN3994 Human Rights Senior Seminar: Research Methods, which introduces students to various research methods and guides them through the proposal development process. In the spring, students take HRTS UN3996 Human Rights Thesis Seminar. This course will consist of group sessions, where students will present their work and participate in discussions, as well as individual meetings with their thesis supervisor, who is also the course instructor.

Students are encouraged to write a thesis, but they should not do so solely to be eligible for honors consideration. Rather, students should consider enrolling in the thesis seminar in order to demonstrate their capacity to produce a work of

original research and develop more specialized knowledge of a human rights issue.

GUIDELINES FOR ALL HUMAN RIGHTS MAJORS, CONCENTRATORS, AND SPECIAL CONCENTRATORS

Student should also consult the general academic policies of their school.

Planning Forms

Major and concentration planning forms are available on the ISHR undergraduate program website. Prior to each semester, students should submit an online course advising form (<http://www.humanrightscolumbia.org/education/courseadvising/>). Students may also e-mail uhrp@columbia.edu to set up an advising appointment.

Grades

No course with a grade of D or lower is credited towards the major or concentration.

One course, with the exception of the three core courses required for the major, can be taken for Pass/D/Fail. The student must receive a grade of P for the course to count towards the requirements of the major. All other courses must be taken for a letter grade.

All seminar courses must be taken for a letter grade.

Transfer Credit/Study Abroad Credit

Human rights majors may transfer a maximum of three courses from other institutions. Human rights concentrators may transfer a maximum of two courses from other institutions. This includes study abroad credit. No more than one Advanced Placement course can be counted for the major or concentration. The application of transferred courses to the major or concentration must be approved by the Director of Undergraduate Studies or the undergraduate adviser.

Students wishing to count transfer courses toward the major or concentration should email uhrp@columbia.edu (<http://bulletin.columbia.edu/general-studies/majors-concentrations/human-rights/uhrp@columbia.edu>) with their Transfer Credit Report, the syllabi of the courses they want to count toward departmental requirements, and a statement of how they want to apply the transfer credits to the requirements.

Double-Counting

Students may double count major or concentration courses toward the fulfillment of degree requirements in accordance with the academic policies of their school.

Normally, courses for one program of study (i.e. major, concentration, special concentration, etc.) may not be used to satisfy the course requirements for another program of study.

Students should consult the academic policies of their school for specific information.

MAJOR IN HUMAN RIGHTS

The major in human rights requires 10 courses for a minimum of 31 points as follows. One of the distributional or specialization courses must be a seminar.

Core Courses

HRTS UN3001	Introduction to Human Rights
HRTS UN3190	International Human Rights Law
HRTS UN3995	Human Rights Senior Seminar

Distributional Requirement *

Students take one course in three of these four categories (three courses), for a minimum of 9 credit points.

Politics and history

Culture and representation

Political theory and philosophy

Social and economic processes

Specialization Requirement **

Students fulfill the specialization requirement by focusing on a particular discipline, taking four courses for a minimum of 12 credit points offered by a single department or institute.

* Please see the ISHR undergraduate course list (<http://www.humanrightscolumbia.org/education/undergraduate/undergraduate-courses/>) for the current list of courses that fulfill the distributional requirement of the major.

** The goal of the specialization requirement is to equip students with the tools of a specific discipline. Students should inform the human rights program of their intended specialization before taking courses to fulfill this requirement. As a general rule, fields of study listed as academic programs (<http://www.college.columbia.edu/academics/programs/>) on the bulletin are approved for the specialization requirement if a free-standing major is offered. Courses approved for that major are generally approved for the human rights specialization. However, language acquisition and studio courses may not be taken to fulfill the specialization requirement. Students are encouraged to take any core and/or methodology courses required by a program when fulfilling their specialization requirement. Students are also encouraged to take courses within their chosen specialization that focus on human rights issues, but the specialization requirement can be fulfilled by taking any four courses within the same discipline. For example, if a student's specialization is Political Science, he or she can fulfill the specialization requirement by taking any four POLS courses.

CONCENTRATION IN HUMAN RIGHTS

The concentration in human rights requires 8 courses for a minimum of 24 points as follows:

HRTS UN3001 Introduction to Human Rights

Seven additional human rights courses, one of which must be a seminar.

Please see the ISHR undergraduate course list (<http://www.humanrightscolumbia.org/education/undergraduate/undergraduate-courses/>) for the current list of courses that fulfill the concentration requirements.

INFORMATION SCIENCE

Departmental Office: 450 Computer Science Building;
212-939-7000
<http://www.cs.columbia.edu/>

Director of Undergraduate Studies: Dr. Jae Woo Lee, 715
CEPSR; 212-939-7066; jae@cs.columbia.edu

Departmental Advisers:

For updated adviser information, see <http://www.cs.columbia.edu/education/undergrad/advisors> (<http://www.cs.columbia.edu/education/undergrad/advisors/>).

For administrative advising issues please contact:
advising@cs.columbia.edu.

The majors in the Department of Computer Science provide students with the appropriate computer science background necessary for graduate study or a professional career. Computers impact nearly all areas of human endeavor. Therefore, the department also offers courses for students who do not plan a computer science major or concentration. The computer science majors offer maximum flexibility by providing students with a range of options for program specialization. The department offers four majors: computer science; information science; data science; and computer science-mathematics, offered jointly with the Mathematics Department.

COMPUTER SCIENCE MAJOR

Students study a common core of fundamental topics, supplemented by a track that identifies specific areas for deeper study. The foundations track prepares students for advanced work in fundamental, theoretical, and mathematical aspects of computing, including analysis of algorithms, scientific computing, and security. The systems track prepares students for immediate employment in the computer industry as well as advanced study in software engineering, operating systems, computer-aided digital design, computer architecture, programming languages, and user interfaces. The intelligent systems track provides specialization for the student interested in natural language processing and systems capable of

exhibiting “human-like” intelligence. The applications track is for students interested in the implementation of interactive multimedia content for the Internet and wireless applications. The vision, graphics, interaction, and robotics track exposes students to computer vision, graphics, human-computer interaction, and robotics.

A combination track is available to students who wish to pursue an interdisciplinary course of study combining computer science and another field in the arts, humanities, mathematics, natural sciences, or social sciences. A student planning a combination track should be aware that one additional course is required to complete this option.

INFORMATION SCIENCE MAJOR

Information science is an interdisciplinary major designed to provide a student with an understanding of how information is organized, accessed, stored, distributed, and processed in strategic segments of today’s society. Recent years have seen an explosive growth of on-line information, with people of all ages and all walks of life making use of the World Wide Web and other information in digital form.

This major puts students at the forefront of the information revolution, studying how on-line access touches on all disciplines and changing the very way people communicate. Organizations have large stores of in-house information that are crucial to their daily operation. Today’s systems must enable quick access to relevant information, must ensure that confidential information is secure, and must enable new forms of communication among people and their access to information.

The information science major can choose a scientific focus on algorithms and systems for organizing, accessing, and processing information, or an interdisciplinary focus in order to develop an understanding of, and tools for, information modeling and use within an important sector of modern society such as economics or health.

ADVANCED PLACEMENT

The department grants 3 points for a score of 4 or 5 on the AP Computer Science exam along with exemption from COMS W1004 Introduction to Computer Science and Programming in Java. However, we still recommend that you take COMS W1004 or W1007 even if you have credits from the CS AP exam. COMS W1007 Honors Introduction to Computer Science is recommended if you scored 5 on the AP exam, and COMS W1004 is recommended if you scored 4.

PRE-INTRODUCTORY COURSES

COMS W1004 is the first course in the Computer Science major curriculum, and it does not require any previous computing experience. Before taking COMS W1004, however, students have an option to start with one of the pre-introductory courses: ENGI E1006 or COMS W1002.

ENGI E1006 Introduction to Computing for Engineers and Applied Scientist is a general introduction to computing for STEM students. ENGI E1006 is in fact a required course for all engineering students. COMS W1002 Computing In Context is a course primarily intended for humanities majors, but it also serves as a pre-introductory course for CS majors.

ENGI E1006 and COMS W1002 do not count towards Computer Science major.

LABORATORY FACILITIES

The department has well-equipped lab areas for research in computer graphics, computer-aided digital design, computer vision, databases and digital libraries, data mining and knowledge discovery, distributed systems, mobile and wearable computing, natural language processing, networking, operating systems, programming systems, robotics, user interfaces, and real-time multimedia.

Research labs contain several large Linux and Solaris clusters; Puma 500 and IBM robotic arms; a UTAH-MIT dexterous hand; an Adept-1 robot; three mobile research robots; a real-time defocus range sensor; interactive 3-D graphics workstations with 3-D position and orientation trackers; prototype wearable computers, wall-sized stereo projection systems; see-through head-mounted displays; a networking testbed with three Cisco 7500 backbone routers, traffic generators; an IDS testbed with secured LAN, Cisco routers, EMC storage, and Linux servers; and a simulation testbed with several Sun servers and Cisco Catalyst routers. The department uses a SIP IP phone system. The protocol was developed in the department.

The department's computers are connected via a switched 1Gb/s Ethernet network, which has direct connectivity to the campus OC-3 Internet and internet 2 gateways. The campus has 802.11b/g wireless LAN coverage.

The research facility is supported by a full-time staff of professional system administrators and programmers.

PROFESSORS

Alfred V. Aho
 Peter K. Allen
 Peter Belhumeur
 Steven M. Bellovin
 David Blei
 Luca Carloni
 Michael J. Collins
 Steven K. Feiner
 Luis Gravano
 Julia Hirschberg
 Gail E. Kaiser
 John R. Kender
 Kathleen R. McKeown
 Vishal Misra
 Shree K. Nayar
 Jason Nieh

Steven M. Nowick
 Christos Papadimitriou
 Kenneth A. Ross
 Henning G. Schulzrinne
 Rocco A. Servedio
 Salvatore J. Stolfo
 Jeannette Wing
 Mihalis Yannakakis

ASSOCIATE PROFESSORS

Alexandr Andoni
 Augustin Chaintreau
 Xi Chen
 Stephen A. Edwards
 Yaniv Erlich
 Roxana Geambasu
 Eitan Grinspun
 Daniel Hsu
 Tony Jebara
 Martha Allen Kim
 Tal Malkin
 Itsik Pe'er
 Daniel S. Rubenstein
 Simha Sethumadhavan
 Junfeng Yang
 Changxi Zheng

ASSISTANT PROFESSORS

Lydia Chilton
 Ronghui Gu
 Suman Jana
 Baishakhi Ray
 Carl Vondrick
 Omri Weinstein
 Eugene Wu

SENIOR LECTURER IN DISCIPLINE

Paul Blaer
 Adam Cannon
 Jae Woo Lee

LECTURER IN DISCIPLINE

Daniel Bauer
 Tony Dear
 Ansaf Salleb-Aouissi
 Nakul Verma

ASSOCIATED FACULTY JOINT

Shih-Fu Chang
 Clifford Stein

ASSOCIATED FACULTY

Matei Ciocarlie
 Edward G. Coffman Jr. (*emeritus*)
 Eleni Drinea

Jonathan Gross (*emeritus*)
 Andreas Mueller
 Steven H. Unger (*emeritus*)
 Vladimir Vapnik
 Yechiam Yemini (*emeritus*)

SENIOR RESEARCH SCIENTISTS

Moti Yung

RESEARCH SCIENTISTS

Smaranda Muresan*

ASSOCIATED RESEARCH SCIENTISTS

Allison Breton Bishop
 Giuseppe DiGuglielmo
 Paolo Mantovani
 Hiroshi Sasaki
 Eran Tromer

PROFESSOR OF PRACTICE

Donald F. Ferguson

GUIDELINES FOR ALL COMPUTER SCIENCE MAJORS AND CONCENTRATORS

Courses

Students may receive credit for only one of the following two courses:

- COMS W1004 Introduction to Computer Science and Programming in Java
- COMS W1005 Introduction to Computer Science and Programming in MATLAB.

Students may receive credit for only one of the following three courses:

- COMS W3134 Data Structures in Java
- COMS W3136 Data Structures with C/C++
- COMS W3137 Honors Data Structures and Algorithms

However, COMS W1005 and COMS W3136 cannot be counted towards the Computer Science major, minor, and concentration.

Transfer Credit

As a rule, no more than 12 transfer credits are accepted toward the major.

Grading

A maximum of one course worth no more than 4 points passed with a grade of D may be counted toward the major or concentration.

MAJOR IN COMPUTER SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

All majors should confer with their program adviser each term to plan their programs of study. Students considering a major in computer science are encouraged to talk to a program adviser during their first or second year. A typical program of study is as follows:

Program of Study

Computer Science Core (22-24 points)

For students who declare in Spring 2014 and beyond:

ENGI E1006	Introduction to Computing for Engineers and Applied Scientists (recommended but not required)
First Year	
COMS W1004	Introduction to Computer Science and Programming in Java
or COMS W1007	Honors Introduction to Computer Science
Sophomore Year	
COMS W3134	Data Structures in Java
or COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
Junior and Senior Year	
Select the remaining required core courses:	
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems
Select one of the following courses:	
MATH UN2010	Linear Algebra
APMA E2101	Introduction to Applied Mathematics
APMA E3101	Linear Algebra
STAT GU4001	Introduction to Probability and Statistics

For students who declared prior to Spring 2014:

First Year	
COMS W1004	Introduction to Computer Science and Programming in Java
Sophomore Year	

COMS W1007	Honors Introduction to Computer Science
COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
Junior and Senior Year	
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems

In addition to the CS Core (22-24 points), all CS majors must complete the Calculus Requirement (3 points) and a Track Requirement (15 or 18 points). The CS major therefore requires 40-45 points total.

Mathematics (3 points)

Calculus II or Calculus III.

Note that Calculus III does NOT depend on Calculus II. You can take either Calculus II or III, but we recommend Calculus III, which covers topics that are a bit more relevant for upper-level Computer Science courses.

If you have received equivalent credits for Calculus I & II already (through a 4 or 5 on the AP Calculus exam for example), you are not required to take any more Calculus courses. But we recommend taking one more semester of Calculus, either Math UN1201 Calculus III or APAM E2000 Multivariate Calculus for Engineers and Scientists. APAM E2000 covers relevant topics from Calculus III and IV.

Track Requirement (15 or 18 points)

Students must select one of the following six upper-level tracks. Each track, except the combination track, requires five courses consisting of required, elective breadth, and elective track courses. The combination track requires a selection of six advanced courses: three 3000- or 4000-level computer science courses and three 3000- or 4000-level courses from another field. The elective breadth requirement in each track can be fulfilled with any 3-point computer science 3000-level or higher course that is not a computer science core course or a technical elective course in that track. In addition to the breadth elective, the track requirements are as follows:

Foundations Track (15 points)

For students interested in algorithms, computational complexity, and other areas of theoretical Computer Science.

Note: Students who declared their Computer Science major prior to Fall 2016 may also count COMS 4241, COMS 4205, COMS 4281, COMS 4444, COMS 4771, and COMS 4772 as track elective courses.

Required Courses

CSOR W4231	Analysis of Algorithms I
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COMS W4236	Introduction to Computational Complexity
Track Electives	
Select 2 from:	
MATH UN3020	Number Theory and Cryptography
MATH UN3025	Making, Breaking Codes
COMS W4203	Graph Theory
MATH GU4032	Fourier Analysis
MATH GU4041	Introduction to Modern Algebra I
MATH GU4042	Introduction to Modern Algebra II
MATH GU4061	Introduction To Modern Analysis I
MATH GU4155	Probability Theory
COMS W4252	Introduction to Computational Learning Theory
COMS W4261	Introduction to Cryptography
APMA E4300	Computational Math: Introduction to Numerical Methods
IEOR E4407	Game Theoretic Models of Operations
CSPH G4802	Math Logic II: Incompleteness
COMS E6232	Analysis of Algorithms, II
MATH G6238	Enumerative Combinatorics
COMS E6253	Advanced Topics in Computational Learning Theory
COMS E6261	Advanced Cryptography
EEOR E6616	Convex optimization
IEOR E6613	Optimization, I
IEOR E6614	Optimization, II
IEOR E6711	Stochastic models, I
IEOR E6712	Stochastic models, II
ELEN E6717	Information theory
ELEN E6718	Error Correcting Codes: Classical and Modern

Adviser Approved:	
COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I
COMS E6998	Topics in Computer Science

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Software Systems Track (15 points)

For students interested in networks, programming languages, operating systems, software engineering, databases, security, and distributed systems.

Required Courses

COMS W4115	Programming Languages and Translators
COMS W4118	Operating Systems I
CSEE W4119	Computer Networks

Track Electives

Select 1 from:

Any COMS W41xx course

COMS W4444	Programming and Problem Solving
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Any COMS W48xx course

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I
COMS W4996	Special topics in computer science, II

Any COMS E68XX course

Any COMS E61XX course

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Intelligent Systems Track (15 points)

For students interested in machine learning, robotics, and systems capable of exhibiting “human-like” intelligence.

Required Courses

Select two of the following courses:

COMS W4701	Artificial Intelligence
COMS W4705	Natural Language Processing
COMS W4706	Spoken Language Processing
COMS W4731	Computer Vision
COMS W4733	Computational Aspects of Robotics
COMS W4771	Machine Learning

Track Electives

Select 2 from:

COMS W4252	Introduction to Computational Learning Theory
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Any COMS W47xx course

Any COMS E67XX course

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I
COMS E6998	Topics in Computer Science

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Applications Track (15 points)

For students interested in the implementation of interactive multimedia applications for the internet and wireless networks.

Required Courses

COMS W4115	Programming Languages and Translators
COMS W4170	User Interface Design

Track Electives

Select 2 from:

Any COMS W41xx course

Any COMS W47xx course

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I

Any COMS E69XX course

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Vision, Graphics, Interaction, and Robotics Track (15 points)

For students in the vision, interaction, graphics, and robotics track. It focuses on visual information with topics in vision, graphics, human-computer interaction, robotics, modeling, and learning. Students learn about fundamental ways in which visual information is captured, manipulated, and experienced.

Required Courses

Select two of the following courses:

COMS W4160	Computer Graphics
COMS W4167	Computer Animation
COMS W4731	Computer Vision

Track Electives

Select 2 from:

COMS W4162	Advanced Computer Graphics
COMS W4170	User Interface Design
COMS W4172	3D User Interfaces and Augmented Reality
COMS W4701	Artificial Intelligence
COMS W4733	Computational Aspects of Robotics
COMS W4735	Visual Interfaces to Computers
COMS W4771	Machine Learning

Adviser Approved:

COMS W3902	Undergraduate Thesis
COMS W3998	Undergraduate Projects in Computer Science
COMS W4901	Projects in Computer Science
COMS W4995	Special topics in computer science, I
Any COMS E69XX course	

One Breadth Course

Any 3-point COMS 3000- or 4000-level course except those courses in the CS core or in the required or elective courses for this track

Combination Track (18 points)

For students who wish to combine computer science with another discipline in the arts, humanities, social or natural sciences. A coherent selection of six upper-level courses is required: three from computer science and three from another discipline.

The courses should be planned with and approved by the student's CS faculty advisor by the first semester of the junior year. The six courses are typically 4000-level elective courses that would count towards the individual majors. Moreover, the six courses should have a common theme. The combination track is not intended for those students who pursue double majors.

MAJOR IN COMPUTER SCIENCE—MATHEMATICS

For a description of the joint major in computer science—mathematics, see the *Mathematics* section in this bulletin.

MAJOR IN INFORMATION SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

The major in information science requires a minimum of 33 points including a core requirement of five courses.

The elective courses must be chosen with a faculty adviser to focus on the modeling and use of information within the context of a disciplinary theme. After discussing potential selections students prepare a proposal of study that must be approved by the faculty adviser. In all cases the six courses must be at the 3000-level or above with at least three courses chosen from computer science. Following are some example programs. For more examples or templates for the program proposal, see a faculty adviser.

Note: In most cases additional courses will be necessary as prerequisites in order to take some of the elective courses. This will depend on the student's proposed program of study.

Core Requirement

COMS W1001	Introduction to Information Science
or COMS W1002 Computing in Context	
COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1007	Honors Introduction to Computer Science
COMS W3134	Data Structures in Java
STAT GU4001	Introduction to Probability and Statistics

Following are some suggested programs of instruction:

Information Science and Contemporary Society

Students may focus on how humans use technology and how technology has changed society.

The requirements include:

COMS W4111	Introduction to Databases
COMS W4170	User Interface Design
COMS W4701	Artificial Intelligence
COMS W3410	Computers and Society
SOCI UN3010	Methods for Social Research
SOCI UN3960	Law, Science, and Society

Information Science and the Economy

Students may focus on understanding information modeling together with existing and emerging needs in economics and finance as well as algorithms and systems to address those needs.

The requirements include:

COMS W4111	Introduction to Databases
COMS W4701	Artificial Intelligence
COMS W4771	Machine Learning
ECON UN3412	Introduction To Econometrics
ECON UN3025	Financial Economics
ECON UN3265	The Economics of Money and Banking

Information Science and Health Sciences

Students may focus on understanding information modeling together with existing and emerging needs in health sciences, as well as algorithms and systems to address those needs.

The requirements include:

COMS W4111	Introduction to Databases
COMS W4170	User Interface Design
COMS W4701	Artificial Intelligence
BINF G4001	
BIOL W4037	Bioinformatics of Gene Expression

ECBM E3060/E4060	Introduction to genomic information science and technology
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MAJOR IN DATA SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

In response to the ever growing importance of "big data" in scientific and policy endeavors, the last few years have seen an explosive growth in theory, methods, and applications at the interface between computer science and statistics. The statistics and computer science departments have responded with a joint-major that emphasizes the interface between the disciplines.

Prerequisites (15 points)

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN2010	Linear Algebra
This introductory Statistics course:	
STAT UN1201	Calculus-Based Introduction to Statistics

Statistics (12 points)

STAT GU4203	PROBABILITY THEORY
STAT GU4204	Statistical Inference
STAT GU4205	Linear Regression Models
STAT GU4241	Statistical Machine Learning
or COMS W4771 Machine Learning	

Computer Science (12 points)

Select one of the following courses:

COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1005	Introduction to Computer Science and Programming in MATLAB
COMS W1007	Honors Introduction to Computer Science
ENGI E1006	Introduction to Computing for Engineers and Applied Scientists

Select one of the following courses:

COMS W3134	Data Structures in Java
COMS W3136	Data Structures with C/C++
COMS W3137	Honors Data Structures and Algorithms

Two required courses:

COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
CSOR W4231	Analysis of Algorithms I

Electives (15 points)

Select two of the following courses:

STAT UN3106	Applied Data Mining
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STAT GU4206	Statistical Computing and Introduction to Data Science
STAT GU4224	Bayesian Statistics
STAT GU4243	Applied Data Science
STAT Q4242	Advanced Machine Learning
Select three of the following courses:	
COMS W3261	Computer Science Theory
COMS W4111	Introduction to Databases
COMS W4130	Principles and Practice of Parallel Programming
COMS W4236	Introduction to Computational Complexity
COMS W4252	Introduction to Computational Learning Theory
Any COMS W47xx course EXCEPT W4771	

CONCENTRATION IN COMPUTER SCIENCE

Please read *Guidelines for all Computer Science Majors and Concentrators* above.

For students who declare in Spring 2014 and beyond:

The concentration in computer science requires a minimum of 22-24 points, as follows:

COMS W1004	Introduction to Computer Science and Programming in Java
or COMS W1007	Honors Introduction to Computer Science
COMS W3134	Data Structures in Java
or COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3203	Discrete Mathematics: Introduction to Combinatorics and Graph Theory
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems (or any 3 point 4000-level computer science course)

Select one of the following courses:

MATH UN2010	Linear Algebra
MATH V2020	Honors Linear Algebra
APMA E2101	Introduction to Applied Mathematics
APMA E3101	Linear Algebra
STAT GU4001	Introduction to Probability and Statistics
SIEO W3600	

For students who declared prior to Spring 2014:

The concentration requires a minimum of 23 points, as follows:

COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1007	Honors Introduction to Computer Science
COMS W3137	Honors Data Structures and Algorithms
COMS W3157	Advanced Programming
COMS W3261	Computer Science Theory
CSEE W3827	Fundamentals of Computer Systems (or any 3-point 4000-level computer science course)

ITALIAN

Departmental Office: 502 Hamilton; 212-854-2308
<http://italian.columbia.edu/>

Director of Undergraduate Studies: Assoc. Prof. Pier Mattia Tommasino, 513 Hamilton; 212-854-0747;
 pmt2114@columbia.edu

A major in Italian offers students the opportunity to study Italian literature and culture in an intimate, seminar setting with the close supervision of the department's faculty. In addition, the prerequisite and corequisite sequence of language courses is designed to give students a command of written and spoken Italian.

Majors must complete 30 points and concentrators must complete 24 points. All majors and concentrators are required to take two semesters of Advanced Italian (ITAL UN3335 Advanced Italian-ITAL UN3336 Advanced Italian II: Italian Language & Culture, ITAL UN3337 Advanced Italian Through Cinema, ITAL UN3338 Italiana. Introduction to Italian Culture, the High, the Low, and the In-between, ITAL UN3645 Grand Tour in Italy, or ITAL UN3232 Senza frontiere. *Lingua e cultura italiane dall'Ottocento ad oggi tra emigrazione ...*) as well as one of the following two sequences:

- *Introduction to Italian Literature I and II* (ITAL UN3333-ITAL UN3334) provides an overview of major authors and works in the Italian literary tradition from the Middle Ages to the present;
- *Italian Cultural Studies I and II* (ITAL GU4502-ITAL GU4503) is an interdisciplinary investigation into Italian culture and society from national unification in 1860 to the present.

In consultation with the director of undergraduate studies, majors select six additional courses (concentrators select four additional courses) from the department's 3000- or 4000-level offerings or from other humanities and social science departments with a focus on Italian culture. Students who have taken courses in Italian Literature, Italian History, and/or Italian Culture while abroad should consult with the Director

of Undergraduate Studies to determine if the courses may be applicable to the major.

Highly motivated students have the opportunity to pursue a senior thesis under the guidance of a faculty adviser in an area of Italian literature or culture of their choosing. The senior thesis tutorial, ITAL UN3993 Senior Thesis/Tutorial, will count for 3 points.

Departmental courses taught entirely in English do not have linguistic prerequisites and students from other departments who have interests related to Italian culture are especially welcome to enroll.

Italian language instruction employs a communicative approach that integrates speaking, reading, writing, and listening. Courses make use of materials that help students to learn languages not just as abstract systems of grammar and vocabulary but as living cultures with specific content. Across the levels from elementary to advanced, a wide range of literary, cultural and multimedia materials, including books, film, and opera, supplement the primary course text.

The sequence in elementary and intermediate Italian enables students to fulfill the College's foreign language requirement and thoroughly prepares them for advanced study of language and for literature courses taught in Italian. Specialized language courses allow students to develop their conversational skills.

For highly motivated students, the department offers intensive elementary and intensive intermediate Italian, both of which cover a full year of instruction in one semester. Courses in advanced Italian, although part of the requirements for a major or a concentration in Italian, are open to any qualified student whose main goal is to improve and perfect their competence in the language.

Outside the classroom, the Department of Italian organizes a weekly *Caffè e conversazione* where students at all levels can converse with fellow students and faculty members over Italian espresso and cookies. Students can also attend the *Serata al cinema*, Italian film viewings scheduled in the evening throughout the academic year, in which faculty and graduate students introduce each film and then conclude with a question and answer session. In addition, the student-run *Società Italiana* (culasocieta@gmail.com) organizes events such as pasta-making workshops, movie nights, and costume parties.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 5 on the AP Italian Language exam, which satisfies the foreign language requirement. Credit is awarded upon successful completion of a 3000-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in Italian. Courses taught in English may not be used for language AP credit. The department grants 0 credits for a score of 4 on the AP Italian Language exam, but the foreign language requirement is satisfied.

CASA ITALIANA

A wide range of cultural programs are sponsored by the Italian Academy for Advanced Studies in America (<http://www.italianacademy.columbia.edu/>), located in Casa Italiana. These programs, which include the activities of the *Columbia Seminar on Modern Italian Studies* and the *Italian Academy Film Festival*, enrich the learning experience of the student and offer opportunities to meet distinguished Italian and Italian-American visitors to the University. The Paterno book collection is housed in Butler Library and contains valuable resources on Italian literature and culture.

For inquiries into the department and its undergraduate and graduate degrees offered, please contact 212-854-2308 or italian@columbia.edu.

LANGUAGE RESOURCE CENTER

The Language Resource Center (LRC) provides resources for intensive practice in pronunciation, diction, and aural comprehension of some twenty-five modern languages. LRC exercises are closely coordinated with the classroom's work.

Coordinated tape programs and on-line audio are available and mandatory for students registered in elementary and intermediate Italian language courses. Taped exercises in pronunciation and intonation, as well as tapes of selected literary works, are also available to all students in Italian courses.

ELECTRONIC CLASSROOMS

Language instruction courses meet at least once a week in a multimedia-equipped electronic classroom in order to facilitate exposure to Italian arts such as music, opera, and film, and for other pedagogical uses.

DEPARTMENTAL HONORS

Majors in Italian literature or Italian cultural studies who wish to be considered for departmental honors in Italian must: (1) have at least a 3.6 GPA in their courses for the major; and (2) complete a senior thesis or tutorial and receive a grade of at least A- within the context of the course ITAL UN3993 Senior Thesis/Tutorial. Normally no more than one graduating senior receives departmental honors in a given academic year.

PROFESSORS

Teodolinda Barolini, (*on leave Spring '20*)
Jo Ann Cavallo, Chair
Elizabeth Leake

ASSOCIATE PROFESSOR

Nelson Moe (Barnard)
Pier Mattia Tommasino

ASSISTANT PROFESSOR

Konstantina Zanou (*on leave 2019-20*)

SENIOR LECTURERS

Felice Italo Beneduce
Federica Franze
Maria Luisa Gozzi
Patrizia Palumbo
Carol Rounds (Hungarian)
Barbara Spinelli

LECTURERS

Alessandra Saggin

GUIDELINES FOR ALL ITALIAN MAJORS AND CONCENTRATORS

The courses in the Department of Italian are designed to develop the student's proficiency in all the language skills and to present the literary and cultural traditions of Italy. The program of study is to be planned as early as possible with the director of undergraduate studies. Students are advised to meet with the director of undergraduate studies each semester in order to obtain program approval.

For students with no knowledge of Italian, the required language course sequence is:

ITAL UN1101	Elementary Italian I
- ITAL UN1102	and Elementary Italian II
ITAL UN2101	Intermediate Italian I
- ITAL UN2102	and Intermediate Italian II

For students planning to enroll in Intensive Italian courses, a minimum of three semesters of Italian language instruction is required, such as:

ITAL UN1121	Intensive Elementary Italian
- ITAL UN2101	and Intermediate Italian I
- ITAL UN2102	and Intermediate Italian II
ITAL UN1101	Elementary Italian I
- ITAL UN1102	and Elementary Italian II
- ITAL UN2121	and Intensive Intermediate Italian
ITAL UN1121	Intensive Elementary Italian
- ITAL UN2121	and Intensive Intermediate Italian

And one of the following courses:

ITAL UN3335	Advanced Italian
ITAL UN3336	Advanced Italian II: Italian Language & Culture
ITAL UN3337	Advanced Italian Through Cinema
ITAL UN3338	Italiana. Introduction to Italian Culture, the High, the Low, and the In-between
ITAL UN3339	Learning Italian in Class and Online: A Telecollaboration with Italy.

ITAL UN3232 Senza frontiere. Lingua e cultura italiane dall'Ottocento ad oggi tra emigrazione ...

ITAL UN3645 Grand Tour in Italy

Italian language proficiency equivalent to the elementary and intermediate sequence may be demonstrated by the departmental placement test, offered before the start of every semester; with a score of 4 or 5 on the Advanced Placement Examination; or with a score of 780 or higher on the SAT II Subject Test in Italian.

As noted above, courses given entirely in English do not have linguistic prerequisites; students planning a major in Italian may enroll in such courses before completing the language prerequisite for the major or concentration.

MAJOR IN ITALIAN

Please read *Guidelines for all Italian Majors and Concentrators* above.

Requirements

The major in Italian literature requires a minimum of 30 points in Italian courses numbered above the intermediate level, i.e., above ITAL UN2121, to include the following:

Two semesters of Advanced Italian

ITAL UN3335 Advanced Italian
- ITAL UN3336 and Advanced Italian II: Italian Language & Culture

Two semesters of Italian Literature

ITAL UN3333 Introduction To Italian Literature,
- ITAL UN3334 I
and Introduction To Italian Literature, II

- OR -

Two Semesters of Italian Culture

ITAL GU4502 Italian Cultural Studies I: From
- ITAL GU4503 Unification to World War I
and Italian Cultural Studies II:
From World War I to the Present

Additional Courses

Select at least two other courses from the department's GU4000-level courses.

In consultation with the director of undergraduate studies, the remaining courses may be selected from the department's 3000- or 4000-level offerings or from other humanities and social science departments with a focus on Italian literature or culture.

ITAL UN3993 Senior Thesis/Tutorial (or another course in Italian literature or culture)

Native speakers and students with superior proficiency (as demonstrated by a departmental exam) may replace the

Advanced Italian sequence with six points of Italian literature courses of their choice.

Period Distribution

At least two courses that cover material before 1700 and two courses that cover material after 1700.

CONCENTRATION IN ITALIAN

Please read *Guidelines for all Italian Majors and Concentrators* above.

Requirements

The concentration in Italian literature requires a minimum of 24 points in Italian courses numbered above the intermediate level, i.e., above ITAL UN2121, to include the following:

Two semesters of Advanced Italian

ITAL UN3335 Advanced Italian
- ITAL UN3336 and Advanced Italian II: Italian Language & Culture
or ITAL UN3337 Advanced Italian Through Cinema
or ITAL UN3338 Italiana. Introduction to Italian Culture, the High, the Low, and the In-between

Two semesters of Italian Literature

ITAL UN3333 Introduction To Italian Literature,
- ITAL UN3334 I
and Introduction To Italian Literature, II

- OR -

Two Semesters of Italian Culture

ITAL GU4502 Italian Cultural Studies I: From
- ITAL GU4503 Unification to World War I
and Italian Cultural Studies II:
From World War I to the Present

Additional Courses

Select at least two other courses from the department's GU4000-level courses.

In consultation with the director of undergraduate studies, the remaining courses may be selected from the department's 3000- or 4000-level offerings or from other humanities and social science departments with a focus on Italian literature or culture.

ITALIAN CULTURAL STUDIES

Departmental Office: 502 Hamilton; 212-854-2308
<http://italian.columbia.edu/>

Director of Undergraduate Studies: Assoc. Prof. Pier Mattia Tommasino, 513 Hamilton; 212-854-0747; pmt2114@columbia.edu

A major in Italian offers students the opportunity to study Italian literature and culture in an intimate, seminar setting with the close supervision of the department's faculty. In addition, the prerequisite and corequisite sequence of language courses is designed to give students a command of written and spoken Italian.

Majors must complete 30 points and concentrators must complete 24 points. All majors and concentrators are required to take two semesters of Advanced Italian (ITAL UN3335 Advanced Italian-ITAL UN3336 Advanced Italian II: Italian Language & Culture, ITAL UN3337 Advanced Italian Through Cinema, ITAL UN3338 Italiana. Introduction to Italian Culture, the High, the Low, and the In-between, ITAL UN3645 Grand Tour in Italy, or ITAL UN3232 Senza frontiere. Lingua e cultura italiane dall'Ottocento ad oggi tra emigrazione ...) as well as one of the following two sequences:

- *Introduction to Italian Literature I and II* (ITAL UN3333-ITAL UN3334) provides an overview of major authors and works in the Italian literary tradition from the Middle Ages to the present;
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cultural and multimedia materials, including books, film, and opera, supplement the primary course text.

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For highly motivated students, the department offers intensive elementary and intensive intermediate Italian, both of which cover a full year of instruction in one semester. Courses in advanced Italian, although part of the requirements for a major or a concentration in Italian, are open to any qualified student whose main goal is to improve and perfect their competence in the language.

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ADVANCED PLACEMENT

The department grants 3 credits for a score of 5 on the AP Italian Language exam, which satisfies the foreign language requirement. Credit is awarded upon successful completion of a 3000-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in Italian. Courses taught in English may not be used for language AP credit. The department grants 0 credits for a score of 4 on the AP Italian Language exam, but the foreign language requirement is satisfied.

CASA ITALIANA

A wide range of cultural programs are sponsored by the Italian Academy for Advanced Studies in America (<http://www.italianacademy.columbia.edu/>), located in Casa Italiana. These programs, which include the activities of the *Columbia Seminar on Modern Italian Studies* and the *Italian Academy Film Festival*, enrich the learning experience of the student and offer opportunities to meet distinguished Italian and Italian-American visitors to the University. The Paterno book collection is housed in Butler Library and contains valuable resources on Italian literature and culture.

For inquiries into the department and its undergraduate and graduate degrees offered, please contact 212-854-2308 or italian@columbia.edu.

LANGUAGE RESOURCE CENTER

The Language Resource Center (LRC) provides resources for intensive practice in pronunciation, diction, and aural comprehension of some twenty-five modern languages. LRC exercises are closely coordinated with the classroom's work.

Coordinated tape programs and on-line audio are available and mandatory for students registered in elementary and intermediate Italian language courses. Taped exercises in pronunciation and intonation, as well as tapes of selected literary works, are also available to all students in Italian courses.

ELECTRONIC CLASSROOMS

Language instruction courses meet at least once a week in a multimedia-equipped electronic classroom in order to facilitate exposure to Italian arts such as music, opera, and film, and for other pedagogical uses.

DEPARTMENTAL HONORS

Majors in Italian literature or Italian cultural studies who wish to be considered for departmental honors in Italian must: (1) have at least a 3.6 GPA in their courses for the major; and (2) complete a senior thesis or tutorial and receive a grade of at least A- within the context of the course ITAL UN3993 Senior Thesis/Tutorial. Normally no more than one graduating senior receives departmental honors in a given academic year.

PROFESSORS

Teodolinda Barolini, (*on leave Spring '20*)
Jo Ann Cavallo, Chair
Elizabeth Leake

ASSOCIATE PROFESSOR

Nelson Moe (Barnard)
Pier Mattia Tommasino

ASSISTANT PROFESSOR

Konstantina Zanou (*on leave 2019-20*)

SENIOR LECTURERS

Felice Italo Beneduce
Federica Franze
Maria Luisa Gozzi
Patrizia Palumbo
Carol Rounds (Hungarian)
Barbara Spinelli

LECTURERS

Alessandra Saggin

GUIDELINES FOR ALL ITALIAN MAJORS AND CONCENTRATORS

The courses in the Department of Italian are designed to develop the student's proficiency in all the language skills and to present the literary and cultural traditions of Italy. The program of study is to be planned as early as possible with the director of undergraduate studies. Students are advised to meet with the director of undergraduate studies each semester in order to obtain program approval.

For students with no knowledge of Italian, the required language course sequence is:

ITAL UN1101 - ITAL UN1102	Elementary Italian I and Elementary Italian II
ITAL UN2101 - ITAL UN2102	Intermediate Italian I and Intermediate Italian II

For students planning to enroll in Intensive Italian courses, a minimum of three semesters of Italian language instruction is required, such as:

ITAL UN1121 - ITAL UN2101 - ITAL UN2102	Intensive Elementary Italian and Intermediate Italian I and Intermediate Italian II
ITAL UN1101 - ITAL UN1102 - ITAL UN2121	Elementary Italian I and Elementary Italian II and Intensive Intermediate Italian
ITAL UN1121 - ITAL UN2121	Intensive Elementary Italian and Intensive Intermediate Italian

And one of the following courses:

ITAL UN3335	Advanced Italian
ITAL UN3336	Advanced Italian II: Italian Language & Culture
ITAL UN3337	Advanced Italian Through Cinema
ITAL UN3338	Italiana. Introduction to Italian Culture, the High, the Low, and the In-between
ITAL UN3339	Learning Italian in Class and Online: A Telecollaboration with Italy.
ITAL UN3232	Senza frontiere. Lingua e cultura italiane dall'Ottocento ad oggi tra emigrazione ...
ITAL UN3645	Grand Tour in Italy

Italian language proficiency equivalent to the elementary and intermediate sequence may be demonstrated by the departmental placement test, offered before the start of every semester; with a score of 4 or 5 on the Advanced Placement Examination; or with a score of 780 or higher on the SAT II Subject Test in Italian.

As noted above, courses given entirely in English do not have linguistic prerequisites; students planning a major in Italian may enroll in such courses before completing the language prerequisite for the major or concentration.

MAJOR IN ITALIAN

Please read *Guidelines for all Italian Majors and Concentrators* above.

Requirements

The major in Italian literature requires a minimum of 30 points in Italian courses numbered above the intermediate level, i.e., above ITAL UN2121, to include the following:

Two semesters of Advanced Italian

ITAL UN3335	Advanced Italian
- ITAL UN3336	and Advanced Italian II: Italian Language & Culture

Two semesters of Italian Literature

ITAL UN3333	Introduction To Italian Literature, I
- ITAL UN3334	and Introduction To Italian Literature, II

- OR -

Two Semesters of Italian Culture

ITAL GU4502	Italian Cultural Studies I: From Unification to World War I
- ITAL GU4503	and Italian Cultural Studies II: From World War I to the Present

Additional Courses

Select at least two other courses from the department's GU4000-level courses.

In consultation with the director of undergraduate studies, the remaining courses may be selected from the department's 3000- or 4000-level offerings or from other humanities and social science departments with a focus on Italian literature or culture.

ITAL UN3993	Senior Thesis/Tutorial (or another course in Italian literature or culture)
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Native speakers and students with superior proficiency (as demonstrated by a departmental exam) may replace the Advanced Italian sequence with six points of Italian literature courses of their choice.

Period Distribution

At least two courses that cover material before 1700 and two courses that cover material after 1700.

CONCENTRATION IN ITALIAN

Please read *Guidelines for all Italian Majors and Concentrators* above.

Requirements

The concentration in Italian literature requires a minimum of 24 points in Italian courses numbered above the intermediate level, i.e., above ITAL UN2121, to include the following:

Two semesters of Advanced Italian

ITAL UN3335	Advanced Italian
- ITAL UN3336	and Advanced Italian II: Italian Language & Culture
or ITAL UN3337	Advanced Italian Through Cinema
or ITAL UN3338	Italiana. Introduction to Italian Culture, the High, the Low, and the In-between

Two semesters of Italian Literature

ITAL UN3333	Introduction To Italian Literature, I
- ITAL UN3334	and Introduction To Italian Literature, II

- OR -

Two Semesters of Italian Culture

ITAL GU4502	Italian Cultural Studies I: From Unification to World War I
- ITAL GU4503	and Italian Cultural Studies II: From World War I to the Present

Additional Courses

Select at least two other courses from the department's GU4000-level courses.

In consultation with the director of undergraduate studies, the remaining courses may be selected from the department's 3000- or 4000-level offerings or from other humanities and social science departments with a focus on Italian literature or culture.

JAZZ STUDIES*

*Jazz Studies is offered exclusively as a concentration.

The Center for Jazz Studies: Prentis Hall, 4th floor (632 W. 125th Street); 212-851-9270
<http://www.columbia.edu/cu/cjs> (<http://www.columbia.edu/cu/cjs/>)

Jazz at Columbia:

<https://mpp.music.columbia.edu/louis-armstrong-jazz-performance-program> (<https://mpp.music.columbia.edu/louis-armstrong-jazz-performance-program/>)

Director: Prof. Robert G. O'Meally, 611 Philosophy; 212-851-9270; rgo1@columbia.edu

Director of Jazz Performance: Prof. Christopher Washburne, 619A Dodge; 212-854-9862; cjw5@columbia.edu

Program Administrator: Yulanda Mckenzie, 602 Philosophy; 212-851-9270; ym189@columbia.edu

The special concentration in jazz studies is an interdisciplinary liberal arts course of study that uses jazz music—and the jazz culture from which the music emanated—as a prism through which to study jazz culture during what might be termed the long jazz century, the Sprawling 20's. The curriculum in this new field guides students in developing a firm grounding in the traditions and aesthetic motives of jazz music, viewed through the perspectives of music history and ethnomusicology as well as literary theory and cultural studies.

The program also explores in depth the development of jazz-oriented art works in the music's sister arts—literature, dance, painting, photography, and film. While a U.S. focus is highly appropriate, considering the many ways in which jazz is a definitive music of this nation, students also explore jazz's geographical history beyond these shorelines, including complex, ongoing interactions with Africa, the Caribbean, Europe, and Asia.

The special concentration in jazz studies is designed for music majors as well as for those majoring in other fields. The main difference between music majors and non-music majors is that while music majors take advanced courses in arranging, composition, and transcription, non-music majors are required to take an introduction to music fundamentals.

While there are some fields where the fit with jazz studies is very obvious—music, American studies, African-American studies, English, comparative literature, and history—special concentrators can major in any field whatsoever. Is there a jazz or improvisatory philosophy? What might be its relation to studies of aesthetics or American pragmatism? And what are jazz's implications for the student of law? How does one protect the intellectual property rights of an improvised jazz solo? What about business? What economic and political forces have shaped jazz? Who buys jazz? What is its audience? What is a jazz painting? A jazz novel? What is jazz poetry? What is jazz dance? What is a jazz film? What are the sources and meanings of art? What work does the music do for the whole community?

Along with problems of musical history, form, and definition, our special courses explore jazz as a culture. Students not only study individual jazz artists but also explore the immeasurably variegated worlds through which such artists moved, and which they helped to shape. As cultural historians-in-training—focused on questions of nationality, race, sexuality, gender, economics, and politics—students explore the extraordinarily complicated terrains of the New Orleans of Bunk Johnson, for example, or the Baltimore of Billie Holiday (born in Philadelphia, reared in Baltimore). They explore such artists' other geographical travels. What did their images, including mistaken conceptions of who they were, tell us about the cultures that mythologized them?

How did these jazz musicians influence not only musicians but other artists of their era and milieu: the poets and novelists, painters and sculptors, photographers and filmmakers, dancers

and choreographers who regularly heard them play and often shared with them a sense of common project?

One thinks of Tito Puente, working with singers and dancers at the Palladium; Jackson Pollack dancing to the music as he spun drips of paints on canvasses placed on the studio floor; Langston Hughes writing detailed instructions to the musicians he hoped would accompany performance of his poetry; Romare Bearden's beautifully turned stage and costume designs for Alvin Ailey and Dianne McIntyre, whose improvisatory jazz dance workshop was called *Sound in Motion*; the drummer Jo Jones in an interview naming as key influences a series of tap dancers he admired; Stanley Crouch, stirring in his high-powered essays in a room where jazz drums stand at the center, the old dream-kit inspiration; Ralph Ellison, who kept in touch with his beginnings as a musician in Oklahoma City through hour-long conversations with his childhood friend, the singer Jimmy Rushing; Toni Morrison reading her magical prose to improvisations by Max Roach and the dancer Bill T. Jones; and the pianist Jason Moran playing at the Studio Museum in Harlem, where he introduced his group as including Beauford Delany, whose paintings hung on the wall near the bandstand—vigorous all and recall across the art forms.

Perhaps above all, the special concentration in jazz studies is designed to prepare students to be well-prepared and flexible improvisers in a universe of change and possibility.

INTERDEPARTMENTAL COMMITTEE ON JAZZ STUDIES

Ann Douglas (English and Comparative Literature)
Brent Hayes Edwards (English and Comparative Literature)
Aaron Fox (Music)
Farah Jasmine Griffin (English and Comparative Literature)
George Lewis (Music)
Robert G. O'Meally (English and Comparative Literature)
Christopher Washburne (Music)

ADJUNCT LECTURERS IN JAZZ PERFORMANCE

Paul Bollenbeck
Christine Correa
Krin Gabbard
David Gibson
Brad Jones
Victor Lin
Ole Mathiesen
Tony Moreno
Ugonna Okegwa
Adriano Santos
Don Sickler
Leo Traversa
Ben Waltzer

GUIDELINES FOR ALL JAZZ STUDIES SPECIAL CONCENTRATORS

Students interested in a special concentration in jazz studies should speak with the director no later than the fall semester of the sophomore year.

In addition to the requirements of the special concentration, students must complete a major. Students interested in declaring a special concentration in jazz studies will be assigned an adviser. The program of study is to be planned with the adviser as early as possible.

SPECIAL CONCENTRATION IN JAZZ STUDIES

Please read *Guidelines for all Jazz Studies Special Concentrators* above.

The special concentration in jazz studies requires a total of seven courses (22 points minimum), distributed as follows:

Requirements for Non-Music Majors/ Concentrators

ENGL GU4612	Jazz and American Culture
MUSI UN2016	Jazz
MUSI UN1002	Fundamentals of Music
Three interdisciplinary courses as approved by the director	
A senior independent study project	

Requirements for Music Majors/ Concentrators

ENGL GU4612	Jazz and American Culture
MUSI UN2016	Jazz
MUSI GU4505	Jazz Arranging and Composition
MUSI GU4500	Jazz Transcription and Analysis
MPP UN1541	Columbia University Jazz Ensemble
Private music lessons (strongly recommended but not required)	
Three interdisciplinary courses as approved by the director	
A senior independent study project	

JEWISH STUDIES*

***Jewish Studies is offered exclusively as a concentration.**

Program Office: Institute for Israel and Jewish Studies, 617 Kent Hall; 212-854-2581; <http://www.ijs.columbia.edu/>

Program Director: Prof. Elisheva Carlebach, 505 Fayerweather; 212-854-5294; ec607@columbia.edu

Assistant Director: Dana Kresel, 619 Kent Hall; 212-854-4006; drk2106@columbia.edu

The academic discipline of Jewish studies is an interdisciplinary field centered on the analysis and investigation of Jewish history, religion, language, and literature. The discipline ranges from the study of Jews and Judaism in antiquity to the present day. It explores Judaism not only as a religion, but as a civilization and culture.

A special concentration in Jewish studies is available for undergraduates and allows students to draw upon classes in a wide range of departments across the University, including History; Sociology; Middle Eastern, South Asian, and African Studies; Germanic Languages and Literature; and Religion. The requirements for the special concentration are designed to provide students with the interdisciplinary knowledge necessary to study Jewish civilization both broadly and deeply.

The roots of Judaism lie deeper than one region, gender, language, or culture; and by studying the interconnectedness of these areas, the depth of understanding across a range of spheres and disciplines greatly increases. The special concentration in Jewish studies enhances the current scholarly programs, adding to current Jewish studies courses' vitality as students come to each course with a deeper understanding and background based on their complementary coursework.

Students wishing to complete a special concentration in Jewish studies work with a program adviser to decide upon course selection and sequencing. The program office provides and keeps on record a planning form to track the fulfillment of requirements for the special concentration.

AFFILIATED FACULTY

Beth Berkowitz (Religion, Barnard)
Clemence Boulouque (Religion)
Elisheva Carlebach (History)
Yinon Cohen (Sociology)
Jeremy Dauber (Germanic Languages)
Rebecca Kobrin (History)
Agnieszka Legutko (Germanic Languages)
Seth Schwartz (History)
Michael Stanislawski (History)

SPECIAL CONCENTRATION IN JEWISH STUDIES

In addition to the requirements of the special concentration, students must complete a major.

For a special concentration in Jewish studies, students are required to complete a minimum of 21 points. Please note:

- At least one course must be taken from each of three of the focus areas listed below.

- Credits for language courses may constitute at most 10 points, and one year of Hebrew or Yiddish language is strongly recommended.
- A minimum of 18 points must be taken at Columbia or as part of an approved study abroad program (unless equivalent courses are not offered at Columbia, as determined by the faculty adviser).

The focus areas and courses listed below are examples and do not include all the potential courses which may count. Additionally, as new courses are introduced, new focus areas may develop. Some courses may fall under multiple headings. Determination of a course's focus area is at the discretion of the faculty adviser.

Focus Areas

Bible and Rabbinics/Ancient Judaism

RELI V3512	The Bible and Its Interpreters
RELI GU4637	Talmudic Narrative
RELI W4520	Patriarchal and Rabbinic Authority in Antiquity
RELI V3501	Introduction To the Hebrew Bible
RELI V3508	Origins of Judaism
RELI V3561	Classics fo Judaism: Ethics of the Fathers
RELI V2510	Jews and Judaism in Antiquity

Medieval Judaism

HIST UN2657	Medieval Jewish Cultures
HIST W3616	Jews and Christians in the Medieval World
RELI W4510	The Thought of Maimonides
RELI V3870	Inquisitions, New Christians, and Empire
RELI GU4515	Reincarnation and Technology
HIST UN3180	Conversion in Historical Perspective

Modern Judaism

HIST W3630	American Jewish History
RELI V3571	Judaism, Jewishness, and Modernity
MDES UN3542	Introduction to Israeli Literature

Israeli Society

MDES UN3541	Zionism: A Cultural Perspective
MDES UN3542	Introduction to Israeli Literature

Gender and Judaism

HIST W3640	Jewish Women and Family, 1000-1800
RELI V3570	Women and Judaism: Folklore or Religion?
RELI W4504	Reading the Patriarchal and Matriarchal Stories in Genesis

Jewish History and Culture

MUSI G4125	Jewish Music: Uniqueness and Diversity
RELI V3585	The Sephardic Experience

RELI W4503	Readings from the Sephardic Diaspora
RELI UN2306	Intro to Judaism
RELI W4511	Jewish Ethics
HIST UN2657	Medieval Jewish Cultures
HIST UN3645	Spinoza to Sabbatai: Jews in Early Modern Europe

Jewish Literature

CLYD UN3500	Readings In Jewish Literature: Humor In Jewish Literature [In English]
YIDD UN3800	Readings in Yiddish Literature: The Family Singer [In English]
RELI V3561	Classics fo Judaism: Ethics of the Fathers

LATIN AMERICAN AND CARIBBEAN STUDIES

The Institute of Latin American Studies: 8th Floor, International Affairs Building; 212-854-4643
<http://ilas.columbia.edu>

Program Director: Prof. M. Victoria Murillo, 832 International Affairs Building; mm2140@columbia.edu

Senior Manager of Business & Student Affairs: Eliza Kwon-Ahn, 827 International Affairs Building; ek2159@columbia.edu

The major in Latin American and Caribbean Studies stresses knowledge of a dynamic, historically deep and extensive region, but it also focuses on social, political, and cultural phenomena that transcend physical boundaries. The major thus reflects multidisciplinary dialogues that are transnational yet remain anchored in the common historical experience of Latin American societies. Thanks to the broad range of courses on Latin America offered in different departments of instruction and centers at Columbia, the major provides a multidisciplinary training on politics, history, culture, economy, and society.

The Institute of Latin American Studies coordinates the major and offers access to research support, study abroad options, and linkages and credits toward the M.A. program in Latin American and Caribbean studies.

GUIDELINES FOR ALL LATIN AMERICAN AND CARIBBEAN STUDIES MAJORS AND CONCENTRATORS

Declaring the Major or Concentration

For additional information on Latin American and Caribbean Studies, please visit the Institute's website (<http://ilas.columbia.edu>) or contact Eliza Kwon-Ahn, Senior Manager

of Business & Student Affairs, at ek2159@columbia.edu. Please note: major and concentration requirements were updated November, 2019.

MAJOR IN LATIN AMERICAN AND CARIBBEAN STUDIES

The major requires a minimum of 31 points as follows:

Select five of the following twelve courses:

HIST UN1786	History of the City in Latin America
HIST UN2618	The Modern Caribbean
HIST UN2660	Latin American Civilization I
HIST UN2661	LATIN AMERICAN CIVILIZATION II
HIST BC2664	Reproducing Inequalities: Families in Latin American History
HIST BC2676	Latin America: Migration, Race, and Ethnicity
HIST BC2681	Women and Gender in Latin America
LACV UN1020	Primary Texts of Latin American Civilization
POLS W3560	Politics of Urban Development in Latin America
POLS UN3565	Drugs and Politics in the Americas
POLS GU4461	Latin American Politics
SPAN UN3300	Advanced Language through Content [in Spanish]

***** The SPAN UN3300 section taken for the Major must focus on Latin America. Please contact the ILAS Student Affairs Coordinator for details.**

Language Requirement

Select one course on Spanish, Portuguese, or an indigenous language at the intermediate or advanced level; if students can demonstrate advance knowledge of one of these languages, they can replace this course with an area studies course.

Discipline of Choice

Select four courses in a discipline or theme of choice with substantive focus on Latin America. One of these courses must be a seminar. All students, however, need to take at least two courses in a discipline or theme outside of their specialization. The director of undergraduate studies advises students on areas of specialization and must approve courses with substantial Latin American or Caribbean contents not included in the list of eligible courses.

Up to 12 credits for Discipline of Choice requirement can be earned through study abroad. Students are encouraged to explore study abroad options before their junior year. Upon return, they should submit the syllabi and all coursework related to each course taken abroad for approval by the director of undergraduate studies.

CONCENTRATION IN LATIN AMERICAN AND CARIBBEAN STUDIES

The concentration requires a minimum of 18 points as follows:

Select three of the following twelve courses:

HIST UN1786	History of the City in Latin America
HIST UN2618	The Modern Caribbean
HIST UN2660	Latin American Civilization I
HIST UN2661	LATIN AMERICAN CIVILIZATION II
HIST BC2664	Reproducing Inequalities: Families in Latin American History
HIST BC2676	Latin America: Migration, Race, and Ethnicity
HIST BC2681	Women and Gender in Latin America
LACV UN1020	Primary Texts of Latin American Civilization
POLS W3560	Politics of Urban Development in Latin America
POLS UN3565	Drugs and Politics in the Americas
POLS GU4461	Latin American Politics
SPAN UN3300	Advanced Language through Content [in Spanish]

***** The SPAN UN3300 section taken for the Concentration must focus on Latin America. Please contact the ILAS Student Affairs Coordinator for details.**

Language Requirement

Select one course on Spanish, Portuguese, or an indigenous language at the intermediate or advanced level; if students can demonstrate advance knowledge of one of these languages, they can replace this course with an area studies course.

Discipline of Choice:

Select two courses in a discipline or theme of choice with substantive focus on Latin America. One of these courses must be a seminar. All students, however, need to take at least one course in a discipline or theme outside of their specialization. The director of undergraduate studies advises students on areas of specialization and must approve courses with substantial Latin American or Caribbean contents not included in the list of eligible courses.

Up to 6 credits for Discipline of Choice requirement can be earned through study abroad. Students are encouraged to explore study abroad options before their junior year. Upon return, they should submit the syllabi and all coursework related to each course taken abroad for approval by the director of undergraduate studies.

LATIN AMERICAN AND IBERIAN CULTURES

Departmental Office:

101 Casa Hispánica | 612 W. 116th Street | (212) 854-4187
<http://www.laic.columbia.edu/>

Director of Undergraduate Studies:

Prof. Seth Kimmel | 408 Casa Hispánica | (212) 854-6238 |
srk29@columbia.edu

Director of Graduate Studies:

Prof. Alessandra Russo | 405 Casa Hispánica | (212) 854-4187 |
ar2701@columbia.edu

Director of the Spanish Language Program:

Dr. Lee B. Abraham | 402 Casa Hispánica | (212) 854-3764 |
lba2133@columbia.edu

Director of the Portuguese Language Program:

José Antonio Castellanos-Pazos | 501 Casa Hispánica | (212) 854-0277 |
jc846@columbia.edu | lba2133@columbia.edu

The Department of Latin American and Iberian Cultures (LAIC) at Columbia, located in the Casa Hispánica, has long enjoyed an international reputation as a center for Hispanic and Lusophone studies. The department provides linguistic preparation in Spanish, Portuguese, and Catalan, and offers a flexible program to study manifestations of the Hispanic and Lusophone worlds in all historical periods—from the medieval to the globalized present—and in a variety of cultural contexts: the Iberian Peninsula, Latin America, the former colonies of Portugal, and the United States.

Students can enter the program at any level of linguistic and cultural preparedness. The department offers a placement exam to determine the level at which students may either begin or continue study. Majors and concentrators in Hispanic studies and Portuguese studies are typically double majors who bring insights and methods from fields such as history, political science, women's studies, anthropology, economics, Latino studies, Latin American studies, etc., which fosters engaging discussions.

ACADEMIC PROGRAMS

The department offers two majors. The major in Hispanic studies gives students a well-rounded preparation in the history and culture of the Hispanic world. The second option, a major in Hispanic studies with specialization, allows students to study the Hispanic world through a number of fields, among them Latin American studies, gender studies, political science,

economics, history, and sociology. The department also offers two concentrations: Hispanic studies and Portuguese studies.

The language and major programs have also been designed in close consultation and cooperation with Barnard's Department of Spanish and Latin American Cultures. All courses taken in one program may be used to fulfill the requirements of the other. Hence, Columbia and Barnard students may move freely between departments of both institutions for courses that best fit their intellectual interests and schedules.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 5 on the AP Spanish Language exam, which satisfies the foreign language requirement. Credit is awarded upon successful completion of a 3300-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in Spanish. Courses taught in English may not be used for language AP credit.

The department grants 0 credits for a score of 4 on the AP Spanish Language exam, but the foreign language requirement is satisfied.

The department grants 3 credits for a score of 5 on the AP Spanish Literature exam, which satisfies the foreign language requirement. Credit is awarded upon successful completion of a 3300-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in Spanish. Courses taught in English may not be used for language AP credit.

The department grants 0 credits for a score of 4 on the AP Spanish Literature exam, but the foreign language requirement is satisfied.

STUDY ABROAD

The department strongly recommends that all Hispanic and Portuguese studies majors/concentrators study abroad. Most courses taken abroad can be used to fulfill the requirements for the major and concentration, and with adequate planning, even some of the requirements for a second major or concentration. A maximum of four (4) courses taken abroad may be applied to the major, and a maximum of three (3) to the concentration in Hispanic or Portuguese studies.

All students are strongly advised to take either SPAN UN3349 Hispanic Cultures I: Islamic Spain through the Colonial Period or SPAN UN3350 Hispanic Cultures II: Enlightenment to the Present before studying abroad. Actual or potential majors and concentrators in Hispanic or Portuguese studies should seek tentative approval of their programs from the director of undergraduate studies before their departure.

INTERNSHIPS

The department maintains an updated list of internship resources and volunteer opportunities in New York City, the

United States, and abroad. No academic credit is given for internships.

THE HISPANIC INSTITUTE

The department hosts the Hispanic Institute at Columbia. Founded in 1920 as the Instituto de las Españas, the Institute sponsors and disseminates research on Hispanic and Luso-Brazilian culture. Since 1934, the Institute has published the *Revista Hispánica Moderna*, a distinguished journal in Hispanic criticism and theory.

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT

For students with no knowledge of Spanish, Portuguese, or Catalan, at least four terms of the language are required: *UN1101-UN1102* (or *UN1120*) and *UN2101-UN2102* (or *UN2120*). **All courses must be taken for a letter grade to fulfill the language requirement.**

Students with prior knowledge of Spanish who plan to continue studying Spanish are required to take the department's on-line placement examination (<http://laic.columbia.edu/programs/placement-examination/>) before registering for courses. Students with prior knowledge of Portuguese or Catalan should speak with the director of language programs.

Students may be exempted from the language requirement in one of four ways:

1. Present a score of 4 or 5 on the AP Spanish Language or Spanish Literature Exams. Students who receive a score of 5 in either exam are awarded 3 AP credits upon successful completion of a 3300-level (or above) course with a grade of B or higher. AP credit is not granted for a score of 4.
2. Present a score of 780 or above on the SAT Subject Test. Students with a score lower than 780 should take the department's on-line placement exam and follow the placement advice received.
3. Present a score of a 7, 6, or 5 on the International Baccalaureate Higher Level Exam in Spanish.
4. Obtain a score of 625 or higher in the department's on-line placement exam (<http://laic.columbia.edu/programs/placement-examination/>). If the score in the on-line test qualifies a student for exemption from the language requirement, they are required to take a written version of the placement exam during orientation (for entering students) or during the semester (for continuing students). This written exam is offered every year on the Thursday before the beginning of classes in the fall semester from 10:00 a.m.- 2:00 p.m. in Room 352 of the International Affairs Building (the Language Resource Center Computer Lab). Students do not need to make an appointment to take the exam.

DEPARTMENTAL HONORS

Beginning in Spring 2015, the department put in place a new timeline and training program for juniors, to assist students with planning and completing the Honors Thesis during their senior year. The Honors Thesis is an excellent option for any student interested in pursuing a Master's degree or Ph.D.; but, above all, it is a highly formative research and writing experience—one that can bear unexpected fruits toward any path the student decides to take in the future.

All students pursuing a major through the department may apply to write an Honors Thesis. The department envisions the thesis as an intellectually challenging and rewarding experience that crowns four years of undergraduate studies with an original contribution in the field chosen by the student.

The department supports students in shaping their research topic and provides frequent advising throughout the research and writing process. The timeline is as follows:

- During the junior year, students take into consideration the possibility of writing an Honors Thesis in the following year. The topic of the Honors Thesis may likely originate in an advanced course taken during the junior year; students may also choose to develop ideas discussed or papers written in courses taken in previous years. Juniors schedule a meeting (or, if the student is studying abroad, a Skype conversation) with the director of undergraduate studies to discuss their proposed topic and faculty adviser.
- By May 15, juniors who have decided to write an Honors Thesis in their senior year send a formal proposal to the director of undergraduate studies, which includes:
 - A title and a one-page abstract;
 - The name of the proposed faculty adviser;
 - An application for departmental partial funding support (for those who would like to pursue research during the summer).
- By May 30, the Honors Thesis committee reviews the proposals and informs the students of its decision.
- In the fall of the senior year:
 - Seniors selected to write the Honors Thesis enroll in SPAN UN3998 Supervised Individual Research (Spring) with their faculty adviser and write the Honors Thesis during the entire senior year under the direction of their adviser. For the purposes of the major, this independent study counts as a 3-point course towards elective courses.
 - Faculty advisers organize Honors Thesis Workshops to discuss students' ongoing projects and provide advising on research tools, methodological and theoretical frames, and overall writing process.
- In either the fall or spring of the senior year, students enroll in a Senior Seminar.
- By April 15 of the senior year, students complete and present their Honors Thesis for consideration towards departmental honors and prizes. Students submit their

thesis in hard copy, following the formatting specifications provided on the LAIC website (<http://laic.columbia.edu/programs/formatting-specifications-for-the-senior-thesis/>).

- By May 1, the Honors Thesis committee informs the students of its decision. Departmental honors and prizes are assigned. The committee provides publishing options to students whose work has resulted in a highly original scholarship piece.

In order to facilitate the transition to this new schedule, the department will organize an *Honors Thesis Introductory Session* during the last week of April 2015. All undergraduate students are welcome; students in the junior year will have the opportunity to discuss possible research themes and thesis topics.

To be considered for departmental honors, a student must write an Honors Thesis and maintain a GPA of at least 3.6 in major courses. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

UNDERGRADUATE PRIZES

The faculty awards an undergraduate prize every year:

Dr. Antonio G. Mier Prize

Awarded for excellence in Hispanic Studies to a major degree candidate in the School of General Studies at Columbia University.

PROFESSORS

Carlos J. Alonso
Bruno Bosteels
Patricia E. Grieve
Alberto Medina
Graciela R. Montaldo
Gustavo Pérez-Firmat
Alessandra Russo
Jesús R. Velasco

ASSOCIATE PROFESSORS

Seth Kimmel

ASSISTANT PROFESSORS

Karen Benezra
Ana M. Fernández-Cebrián
Ana Paulina Lee

SENIOR LECTURER

Guadalupe Ruiz-Fajardo
José Antonio Castellanos-Pazos
Angelina Craig-Flórez
Reyes Llopis-García
Francisco Rosales-Varo
José Plácido Ruiz-Campillo

LECTURERS

Lee B. Abraham
Francisca Aguiló Mora
Leyre Alejaldre Biel
Irene Alonso-Aparicio
Dolores Barbazán Capeáns
Lorena García Barroso
Ana Paula Huback
Juan Pablo Jiménez-Caicedo
Francisco Meizoso
João Nemi Neto
Diana P. Romero
Elsa Úbeda

MAJOR IN HISPANIC STUDIES

Students who declared this program before March 2016 (when requirements changed) should contact the Director of Undergraduate Studies to confirm their correct course of study.

Students may only register once in each of the Core Courses (SPAN UN3300, SPAN UN3349 and SPAN UN3350).

The major in Hispanic studies requires 11 courses (minimum of 33 points) as follows:

Core Courses

SPAN UN3300	Advanced Language through Content [in Spanish]
SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present

Elective Courses

Select seven elective courses (21 points): a minimum of three 3000- or 4000-level electives must be chosen within the department and up to three electives related to Hispanic Studies may be taken outside the department.

Senior Seminar

SPAN UN3991	Senior Seminar
or SPAN UN3992	Senior Seminar: Modern Cities and Global Cities

MAJOR IN HISPANIC STUDIES WITH SPECIALIZATION

Students who declared this program before March 2016 (when requirements changed) should contact the Director of Undergraduate Studies to confirm their correct course of study.

Students may only register once in each of the Core Courses (SPAN UN3300, SPAN UN3349 and SPAN UN3350).

The major in Hispanic studies with specialization requires 14 courses (minimum of 42 points) as follows. Students should consult the director of undergraduate studies to plan their program and refer to the Hispanic Studies Major Worksheet.

Core Courses

SPAN UN3300	Advanced Language through Content [in Spanish]
SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present

Elective Courses

Select ten elective courses (30 points): four of which must be chosen within the department and six of which must be in the field of specialization. Approved courses taken abroad may be counted as inside or outside the department for the specialization. A maximum of four courses taken abroad may be counted toward the major.

Senior Seminar *

SPAN UN3991	Senior Seminar
or SPAN UN3992	Senior Seminar: Modern Cities and Global Cities

* In exceptional cases and with the director of undergraduate studies' approval, students may take a senior seminar in their area of specialization as a seventh course outside the department, if they have completed enough foundational courses to manage the demands of an advanced seminar. In such cases, the director of undergraduate studies must receive a letter or e-mail from the seminar instructor indicating approval of a student's membership in the course; the seminar project must be on a Hispanic topic; and a copy of the project must be turned in to the director of undergraduate studies for the student's file upon completion of the course. Students who complete the senior seminar in another department may also count it as the third elective course on a Hispanic topic outside the department, in which case they may take a fourth 3000- or 4000-level course in the department.

CONCENTRATION IN HISPANIC STUDIES

Students who declared this program before March 2016 (when requirements changed) should contact the Director of Undergraduate Studies to confirm their correct course of study.

Students may only register once in each of the Core Courses (SPAN UN3300, SPAN UN3349 and SPAN UN3350).

The concentration in Hispanic studies requires eight courses (minimum of 24 points) as follows:

Core Courses

SPAN UN3300	Advanced Language through Content [in Spanish]
SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present

Elective Courses

Select five elective courses (15 points): a minimum of four 3000- or 4000-level courses must be chosen within the department and up to one elective related to Hispanic Studies may be taken outside the department. A maximum of three courses taken abroad may be counted toward the concentration.

CONCENTRATION IN PORTUGUESE STUDIES

The concentration in Portuguese studies requires eight courses (minimum 24 points) as follows:

Core Courses

PORT UN3101	Conversation about the Lusophone World
PORT UN3300	Advanced Language through Content
PORT UN3330	Introduction to Portuguese Studies
PORT UN3350	Lusophone Africa and Afro Brazilian Culture

Elective Courses

Select four elective courses (12 points): at least two must have a PORT designation and be chosen from the department's 3000-level offerings. Electives taken outside of the department must have the director of undergraduate studies' approval and be related to Portuguese studies. A maximum of two courses taught in English may be counted toward the concentration overall. Refer to the Portuguese Concentration Worksheet.

LINGUISTICS

Director of Undergraduate Studies: Prof. Meredith Landman, ml4263@columbia.edu

Program Director: Prof. John McWhorter, jm3156@columbia.edu

In any discussion of linguistics, in popular or academic contexts, the first question is always, what is linguistics, after all? This is remarkable. Language informs most of our mental and cultural activity, and linguistics is the just study of language.

Linguistics, especially since the 1960s, has become a highly multifarious, and even sprawling, field of inquiry. This requires that a major acquaint students with a number of subfields, all of which are crucial to understanding what modern linguistic analysis is about, and foster interdisciplinary inquiry as well. To wit, the person with a basic foundation in what constitutes linguistic study in our times (including realistic training for graduate study if desired) understands:

- the basics of grammatical analysis in terms of sounds and sentence structure
- how languages change over time

- c) the mechanics of how languages express meaning and implication
- d) the details and nuances of how language is used in social space
- e) the ways and extent to which the world's 7000 languages differ from one another
- f) the relationship between language and cognition writ large

STUDY ABROAD

Undergraduates have engaged in unique travel and research projects, including sign language in Nicaragua; language attitudes in Kyrgyzstan; colloquial Arabic in Cairo; summer internship at the Max Planck Institute for Evolutionary Biology; and study abroad in Spain, England, India, Hungary, and Ireland.

GRADUATE STUDY

Columbia's linguists have distinguished themselves with awards and plans after graduation, such as Fulbright Fellowships to France, Georgia, and Turkey; and graduate study of linguistics or psychology at Harvard, Stanford, UCSD, Northwestern, New York University, and SUNY Buffalo. Linguistics is also a natural background for the law, and our students have entered such law schools as Georgetown and Columbia.

There is no graduate program in linguistics at Columbia. Students interested in pursuing graduate study in linguistics in New York should investigate CUNY Graduate Center, New York University, or Teachers College (applied linguistics).

AFFILIATED FACULTY

May Ahmar (Arabic; MESAAS)
 Akeel Bilgrami (Philosophy)
 Aaron Fox (Music)
 Melissa Fusco (Philosophy)
 Haim Gaifman (Philosophy)
 Boris Gasparov (Slavic Languages)
 E. Mara Green, (Anthropology, Barnard)
 Tiina Haapakoski (Finnish, Germanic Languages)
 Julia Hirschberg (Computer Science)
 Ana Paula Huback (Latin American and Iberian Studies)
 Rina Kreitman (Hebrew; MESAAS)
 Meredith Landman (Slavic Languages)
 Karen Lewis (Philosophy, Barnard)
 Lening Liu (Chinese; East Asian Languages and Cultures)
 Reyes Llopis-Garcia (Latin American and Iberian Cultures)
 David Lurie (Japanese; East Asian Languages and Cultures)
 Kathleen McKeown (Computer Science)
 John McWhorter (American Studies)
 Yuan-Yuan Meng (Chinese; East Asian Languages and Cultures)
 Michele Miozzo (Psychology)
 Fumiko Nazikian (Japanese; East Asian Languages and Cultures)
 Youssef Nouhi (Arabic; MESAAS)
 Christopher Peacocke (Philosophy)

John Phan (East Asian Languages and Cultures)
 Owen Rambow (Center for Computational Learning Systems)
 Robert Remez (Psychology, Barnard)
 Francisco Rosales-Varo (Latin American and Iberian Studies)
 Carol Rounds (Hungarian; Italian)
 José Plácido Ruiz-Campillo (Latin American and Iberian Studies)
 Richard Sacks (English and Comparative Literature)
 Ann Senghas (Psychology, Barnard)
 Una Stojnic (Philosophy)
 Mariame Sy (Wolof; Pulaar; MESAAS)
 Herbert Terrace (Psychology)
 Alan Timberlake (Slavic Languages)
 Zhirong Wang (Chinese; East Asian Languages and Cultures)

MAJOR IN LINGUISTICS

The complete major requirement – totaling 38 points – is the following:

1. LING UN3101 Introduction to Linguistics
2. LING GU4376 Phonetics and Phonology
3. LING GU4903 Syntax
4. One course from four out of five themes (12 pts. total):
 - a) Language in time
 Content: Historical linguistics, as in how grammars transform over time (such as the development of Modern from Old English) in terms of sounds, structures, and meaning

 LING GU4108 Language History
 ENGL GU4901 History of the English Language
 CHNS GU4019 History of Chinese Language
 - b) Language in context
 Content: How language varies in structure and usage according to sociological factors such as gender, class, race, power and culture

 LING GU4800 Language and Society
 LING UN3102 Endangered Languages in the Global City: Lang, Culture, and Migration in Contemporary NYC
 ANTH UN1009 Introduction to Language and Culture
 ANTH GR6067 Language and Its Limits (graduate seminar open to undergraduates)
 AMST UN3931 Topics in American Studies
 AMST UN3931 Topics in American Studies
 SPAN GU4010 LANGUAGE CROSSING IN LATINX CARIBBEAN CULTURAL PRODUCTION
 SPAN BC3382 Languages in Contact: Sociolinguistic Aspects of U. S. Spanish (taught in Spanish)
 - c) Language diversity
 Content: How languages differ from one another and in which ways; especially valuable in this module are a) Field Methods, eliciting the vocabulary and structure of a lesser documented language by questioning a native speaker, in the fashion of

professional linguists, b) courses focusing on the structure of individual languages

LING GU4206 Advanced Grammar and Grammars
 LING GU4120 Language Documentation and Field Methods
 LING GU4171 Languages of Africa
 HNGR UN3343 Hungarian Descriptive Grammar

d) Language and meaning
 Content: semantics, philosophy of language, cognitive linguistics, natural language processing

LING GU4190 Discourse and Pragmatics
 PHIL UN2685 Introduction to Philosophy of Language
 SPAN GR5450 A COGNITIVE LINGUISTICS ACCOUNT OF LANGUAGE
 SPAN GU4030 Spanish Pragmatics (taught in Spanish)

e) Psychology and biology of language
 Content: psycholinguistics, neurolinguistics, language genesis. This is especially important given the burgeoning research on the actual structural representation of language in the brain, as well as increasingly influential proposals that ground language in larger thought processes (as opposed to the Chomskyan proposal that language is, to a considerable extent, generated via exclusive cognitive mechanisms).

PSYC BC3164 Perception and Language
 PSYC GU4232 Production and Perception of Language
 PSYC BC3369 Language Development
 PSYC GU4242 Evolution of Language (Seminar) (graduate seminar open to undergraduates)
 PSYC GU4272 Advanced Seminar in Language Development

4. One elective course (3 pts.) from either a) one of the themes, or b) a linguistics-related course from another department subject to approval from the program. This option will allow students to either sample more widely or specialize somewhat in a subarea of linguistics that has come to interest them.

5. Senior thesis (two semesters, 3 pts. per semester)

6. Two courses at the intermediate level (8 pts.), in addition to the general foreign language requirement.

SPECIAL CONCENTRATION IN LINGUISTICS

The special concentration in linguistics is not sufficient for graduation in and of itself. It must be taken in conjunction with a major or a full concentration in another discipline.

For the special concentration, students must take 23 points in the linguistics program as follows:

1. Three core courses in linguistics chosen from:

LING UN3101 Introduction to Linguistics
 LING UN3102 Endangered Languages in the Global City: Lang, Culture, and Migration in Contemporary NYC
 HNGR UN3343 Hungarian Descriptive Grammar

ANTH UN3906 Functional Linguistics and Language Typology
 LING GU4108 Language History
 LING GU4120 Language Documentation and Field Methods
 LING GU4171 Languages of Africa
 LING GU4190 Discourse and Pragmatics
 LING GU4202 Cognitive Linguistics
 LING GU4206 Advanced Grammar and Grammars
 LING GU4376 Phonetics and Phonology
 LING GU4800 Language and Society
 LING GU4903 Syntax

2. Two additional courses in either linguistics or in related fields chosen in consultation with the program director, in fields such as:

History or structure of individual languages; Chinese, Spanish, French, Russian etc.

Anthropology:

ANTH UN1009 Introduction to Language and Culture
 ANTH UN3044 Symbolic Anthropology
 ANTH GU4042 Agent, Person, Subject, Self
 ANTH GR6067 Language and Its Limits
 ANTH GR6125 Language, Culture, and Power

Chinese:

CHNS GU4018 Readings In Modern Chinese II (W) (Level 4)

Computer Science:

COMS UN3261 Computer Science Theory
 COMS GU4705 Natural Language Processing
 COMS GU4706 Spoken Language Processing
 COMS GR6998 Topics in Computer Science

Comparative Literature & Society:

CPLS GU4111 World Philology

French:

FREN BC3011 History of the French Language

Music:

MUSI GU4405 Music and Language
 MSPS GU4233 Language and Music (Seminar)

Philosophy:

PHIL UN2685 Introduction to Philosophy of Language
 PHIL UN3411 Symbolic Logic
 PHIL UN3685 Philosophy of Language
 PHIL GU4490 LANGUAGE AND MIND

Psychology:

PSYC UN2215 Cognition and the Brain
 PSYC UN2440: Language and the Brain
 PSYC UN2450 Behavioral Neuroscience
 PSYC BC3164 Perception and Language
 PSYC UN3265 Auditory Perception (Seminar)
 PSYC BC3369 Language Development
 PSYC GU4232 Production and Perception of Language
 PSYC GU4272 Advanced Seminar in Language Development

Spanish:

SPAN BC3382 Languages in Contact: Sociolinguistic Aspects of U. S. Spanish
 SPAN GU4010 LANGUAGE CROSSING IN LATINX CARIBBEAN CULTURAL PRODUCTION
 SPAN GU4030 Spanish Pragmatics
 SPAN GR5450 A COGNITIVE LINGUISTICS ACCOUNT OF LANGUAGE

Sociology:

SOCI GU4030 Sociology of Language

3. One language course at the intermediate level (third-semester), separate from the general language requirement.

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT FOR LINGUISTICS

The language taken in fulfillment of the linguistics requirement can be either an ancient or modern language, but should neither be the student's native (or semi-native) language nor belong to one of the major groups of modern European languages (Germanic, Romance). In addition to the regularly taught courses listed under the Foreign Language Requirement, the following is a list of languages that have been offered at Columbia. See the list of languages offered through the Language Resource Center and consult with the program director about other languages to determine if they are acceptable for the linguistics language requirement.

Ancient Egyptian
Anglo-Saxon
Aramaic
Bosnian/Croatian/Serbian
Cantonese
Chagatay
Czech
Finnish
Georgian
Hindi
Hungarian
Indonesian
Irish
Kannada
Kazakh
Korean
Nahuatl
Nepali
Old Church Slavonic
Quechua
Persian
Polish
Pulaar
Romanian
Sumerian Swahili
Syriac
Tajik
Tamil
Telugu
Ukrainian Uzbek
Urdu
Vietnamese
Wolof
Zulu

MATHEMATICS

Departmental Undergraduate Office: 410 Mathematics;
 212-854-2432
<http://www.math.columbia.edu/>

Director of Undergraduate Studies: Prof. Ovidiu Savin, 409 Mathematics; 212-854-8233; savin@math.columbia.edu

Calculus Director: Prof. Michael Woodbury; 525 Mathematics; 212-854-2849; woodbury@math.columbia.edu

Computer Science-Mathematics Adviser: Prof. Eric Urban, 608 Mathematics; 212-854-6362; urban@math.columbia.edu

Economics-Mathematics Advisers:

Mathematics: Prof. Julien Dubedat, 601 Mathematics; 212-854-8806; jd2653@columbia.edu

Economics: Dr. Susan Elmes, 1006 International Affairs Building; 212-854-9124; se5@columbia.edu

Mathematics-Statistics Advisers:

Mathematics: Prof. Julien Dubedat, 601 Mathematics; 212-854-8806; dubedat@math.columbia.edu

Statistics: Prof. Banu Baydil, 611 Watson; 212-851-2132; bb2717@columbia.edu

The major in mathematics is an introduction to some of the highlights of the development of theoretical mathematics over the past four hundred years from a modern perspective. This study is also applied to many problems, both internal to mathematics and arising in other disciplines such as physics, cryptography, and finance.

Majors begin by taking either Honors mathematics or the calculus sequence. Students who do not take MATH UN1207 Honors Mathematics A and MATH UN1208 Honors Mathematics B normally take MATH UN2010 Linear Algebra in the second year. Following this, majors begin to learn some aspects of the main branches of modern mathematics: algebra, analysis, and geometry; as well as some of their subdivisions and hybrids (e.g., number theory, differential geometry, and complex analysis). As the courses become more advanced, they also become more theoretical and proof-oriented and less computational.

Aside from the courses offered by the Mathematics Department, cognate courses in areas such as astronomy, chemistry, physics, probability, logic, economics, and computer science can be used toward the major. A cognate course must be a 2000-level (or higher) course and must be approved by the director of undergraduate studies. In general, a course not taught by the Mathematics Department is a cognate course for the mathematics major if either (a) it has at least two semesters of calculus as a stated prerequisite, or (b) the subject matter in the course is mathematics beyond an elementary level, such as PHIL UN3411 Symbolic Logic, in the Philosophy Department, or COMS W3203 Discrete Mathematics: Introduction to Combinatorics and Graph Theory, in the Computer Science Department.

Another requirement for majors is participation in an undergraduate seminar, usually in the junior or senior year. In these seminars, students gain experience in learning an advanced topic and lecturing on it. In order to be eligible for departmental honors, majors must write a senior thesis.

COURSES FOR FIRST-YEAR STUDENTS

The systematic study of mathematics begins with one of the following three alternative calculus and linear algebra sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV
- MATH UN2010	and Linear Algebra
MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	Calculus
	and Linear Algebra
MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1207	and Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Credit is allowed for only one calculus and linear algebra sequence.

Calculus I, II is a standard course in single-variable differential and integral calculus; *Calculus III, IV* is a standard course in multivariable differential and integral calculus; *Accelerated Multivariable Calculus* is an accelerated course in multivariable differential and integral calculus.

While *Calculus II* is no longer a prerequisite for *Calculus III*, students are strongly urged to take it before taking *Calculus III*. In particular, students thinking of majoring or concentrating in mathematics or one of the joint majors involving mathematics should take *Calculus II* before taking *Calculus III*. Note that *Calculus II* is a prerequisite for Accelerated Multivariable Calculus, and both *Calculus II* and *Calculus III* are prerequisites for *Calculus IV*.

The third sequence, *Honors Mathematics A- B*, is for exceptionally well-qualified students who have strong Advanced Placement scores. It covers multivariable calculus (MATH UN1201 Calculus III- MATH UN1202 Calculus IV) and linear algebra (MATH UN2010 Linear Algebra), with an emphasis on theory.

MATH UN1003 College Algebra and Analytic Geometry does not count toward the degree. Students who take this course do not receive college credit.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 4 or 5 on the AP Calculus AB exam provided students complete MATH UN1102 Calculus II or MATH UN1201 Calculus III with a grade of C or better. The department grants 3 credits for a score of 4 on the AP Calculus BC exam provided students complete MATH UN1102 Calculus II or MATH UN1201 Calculus III with a grade of C or better. The department

grants 6 credits for a score of 5 on the AP Calculus BC exam provided students complete MATH UN1201 Calculus III or MATH UN1205 Accelerated Multivariable Calculus MATH UN1207 Honors Mathematics A with a grade of C or better. Students can receive credit for only one calculus sequence.

PLACEMENT IN THE CALCULUS SEQUENCES

Calculus I

Students who have essentially mastered a precalculus course and those who have a score of 3 or less on an Advanced Placement (AP) exam (either AB or BC) should begin their study of calculus with MATH UN1101 Calculus I.

Calculus II and III

Students with a score of 4 or 5 on the AB exam, 4 on the BC exam, or those with no AP score but with a grade of A in a full year of high school calculus may begin with either MATH UN1102 Calculus II or *MATH UN1201 Calculus III*. Note that such students who decide to start with *Calculus III* may still need to take *Calculus II* since it is a requirement or prerequisite for other courses. In particular, they **MUST** take *Calculus II* before going on to MATH UN1202 Calculus IV. Students with a score of 5 on the BC exam may begin with *Calculus III* and do not need to take *Calculus II*.

Those with a score of 4 or 5 on the AB exam or 4 on the BC exam may receive 3 points of AP credit upon completion of *Calculus II* with a grade of C or higher. Those students with a score of 5 on the BC exam may receive 6 points of AP credit upon completion of *Calculus III* with a grade of C or higher.

Accelerated Multivariable Calculus

Students with a score of 5 on the AP BC exam or 7 on the IB HL exam may begin with MATH UN1205 Accelerated Multivariable Calculus. Upon completion of this course with a grade of C or higher, they may receive 6 points of AP credit.

Honors Mathematics A

Students who want a proof-oriented theoretical sequence and have a score of 5 on the BC exam may begin with MATH UN1207 Honors Mathematics A, which is especially designed for mathematics majors. Upon completion of this course with a grade of C or higher, they may receive 6 points of AP credit.

TRANSFERS INSIDE THE CALCULUS SEQUENCES

Students who wish to transfer from one calculus course to another are allowed to do so beyond the date specified on the Academic Calendar. They are considered to be adjusting their level, not changing their program. However, students must

obtain the approval of the new instructor and their advising dean prior to reporting to the Office of the Registrar.

GRADING

No course with a grade of D or lower can count toward the major, interdepartmental major, or concentration. Students who are doing a double major cannot double count courses for their majors.

DEPARTMENTAL HONORS

In order to be eligible for departmental honors, majors must write a senior thesis. To write a senior thesis, students must register for MATH UN3999 Senior Thesis in Mathematics in the fall semester of their senior year. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

PROFESSORS

- Mohammed Abouzaid
- David A. Bayer (Barnard)
- Simon Brendle
- Ivan Corwin
- Panagiota Daskalopoulos
- Aise Johan de Jong
- Robert Friedman
- Dorian Goldfeld
- Brian Greene
- Richard Hamilton
- Michael Harris
- Ioannis Karatzas
- Mikhail Khovanov
- Igor Krichever
- Chiu-Chu Liu
- Dusa McDuff (Barnard)
- Walter Neumann (Barnard)
- Andrei Okounkov
- D. H. Phong
- Henry Pinkham
- Ovidiu Savin
- Michael Thaddeus (Department Chair)
- Eric Urban
- Mu-Tao Wang

ASSOCIATE PROFESSORS

- Daniela De Silva (Barnard)
- Julien Dubedat

ASSISTANT PROFESSORS

- Chao Li
- Francesco Lin

- Giulia Sacca
- Will Sawin

J.F. RITT ASSISTANT PROFESSORS

- Konstantin Aleshkin
- Evgeni Dimitrov
- Nathan Dowlin
- Alexandra Florea
- Florian Johne
- Inbar Klang
- Shotaro Makisumi
- Konstantin Matetski
- S. Michael Miller
- Henri Roesch
- Nicholas Salter
- Gus Schrader
- Akash Sengupta
- Kyler Siegel
- Yi Sun
- Evan Warner
- Hui Yu
- Yihang Zhu

SENIOR LECTURERS IN DISCIPLINE

- Lars Nielsen
- Mikhail Smirnov
- Peter Voit

LECTURERS IN DISCIPLINE

- Michael Woodbury

ON LEAVE

- Profs. Florea, Krichever, Neumann, Roesch, Sacca, Salter, Sawin (*Fall 2019*)
- Profs. Abouzaid, Hamilton, Neumann, Roesch, Sacca, Salter, Sawin (*Spring 2020*)

GUIDELINES FOR ALL ECONOMICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Checklists and Requirement

Checklists and Requirement information are available on the Department website (<https://econ.columbia.edu/undergraduate/requirements-and-forms/>).

Course List

Economics Core Courses

All of the core courses must be completed **no later than the spring semester** of the student's **junior year** and must be taken at Columbia. *Students who take any core course during the fall semester of their senior year must obtain written permission from the department's director of undergraduate studies.* Unless otherwise specified below, all students must complete the following core courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Prerequisites

Course prerequisites are strictly enforced. Prerequisites must be taken before the course, not after or concurrently.

Economics courses taken before the completion of any of its prerequisites, even with instructor approval, are **not** counted toward the major, concentration, or interdepartmental majors. Exemptions from a prerequisite requirement may only be made, in writing, by the department's director of undergraduate studies. Credits from a course taken *prior* to the completion of its prerequisites are **not** counted towards the major requirements. As a consequence, students are required to complete **additional**, specific courses in economics at the direction of the director of undergraduate studies.

The prerequisites for required courses are as follows:

Course	Prerequisites
ECON UN1105 Principles of Economics	None
MATH UN1101 Calculus I	
STAT UN1201 Calculus-Based Introduction to Statistics	MATH UN1101 Calculus I
ECON UN3211 Intermediate Microeconomics	ECON UN1105 Principles of Economics MATH UN1201 Calculus III or UN1205
ECON UN3213 Intermediate Macroeconomics	ECON UN1105 Principles of Economics MATH UN1101 Calculus I Co-requisite: MATH UN1201 Calculus III or UN1205
ECON UN3412 Introduction To Econometrics	MATH UN1201 Calculus III or UN1205 ECON UN3211 Intermediate Microeconomics or UN3213 STAT UN1201 Calculus-Based Introduction to Statistics

ECON 2000-level electives	ECON UN1105 Principles of Economics	ECON UN3901 Economics of Education	ECON UN3211 Intermediate Microeconomics
ECON GU4211 Advanced Microeconomics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics MATH UN2010 Linear Algebra Corequisites: MATH UN2500 Analysis and Optimization or GU4061	ECON UN3952 Seminar in Macroeconomics and Formation of Expectations ECON UN3981 Applied Econometrics ECON GU4911 Seminar In Microeconomics ECON GU4913 Seminar In Macroeconomics ECON GU4918 Seminar In Econometrics	ECON UN3213 Intermediate Macroeconomics ECON UN3412 Introduction To Econometrics
ECON GU4412 Advanced Econometrics	ECON UN3211 Intermediate Microeconomics	ECPS GU4921 Seminar In Political Economy	ECON UN3211 Intermediate Microeconomics
ECON GU4213 Advanced Macroeconomics	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4413 Econometrics of Time Series and Forecasting	ECON UN3412 Introduction To Econometrics MATH UN2010 Linear Algebra		ECON UN3412 Introduction To Econometrics ECON GU4370 Political Economy
ECON UN3025 Financial Economics	ECON UN3211 Intermediate Microeconomics	ECPH GU4950 Economics and Philosophy Seminar	ECON UN3211 Intermediate Microeconomics
ECON GU4020 Economics of Uncertainty and Information	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4230 Economics of New York City	STAT UN1201 Calculus-Based Introduction to Statistics		ECON UN3412 Introduction To Econometrics
ECON GU4260 Market Design		Barnard electives	See Barnard bulletin
ECON GU4280 Corporate Finance			
ECON GU4370 Political Economy			
ECON GU4700 Financial Crises			
ECON GU4710 Finance and the Real Economy			
ECON GU4850 Cognitive Mechanisms and Economic Behavior			
ECON GU4860 Behavioral Finance	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics ECON UN3412 Introduction To Econometrics		
All other ECON 3000- and 4000-level electives	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics		

It is **strongly recommended** that students take ECON UN3412 Introduction To Econometrics in the semester **immediately** following the completion of the statistics course.

Grading

No course with a grade of D or lower, including calculus and statistics courses, can count toward the major, concentration, or interdepartmental majors. Economics core courses with a grade of D or F must be retaken and completed with a grade of C- or better.

Students who receive a grade of D or F in a core course are permitted to take a higher-level elective course that has that core course as a prerequisite, so long as it is taken concurrently with the retaking of that core course. For example, if a student fails ECON UN3211 Intermediate Microeconomics, the student must retake it and, in the same semester, may enroll in an elective course for which it is a prerequisite, provided that all other prerequisites for the elective have been completed. The same rule applies to the required math and statistics courses. For example, if a student fails *MATH UN1201 Calculus III*, the student may retake calculus III concurrently with *Intermediate Microeconomics*. Students who must retake any core economics or math course may not retake it concurrently with a senior seminar; the economics core courses *ECON UN3211 Intermediate*

Microeconomics, *ECON UN3213 Intermediate Macroeconomics*, and *ECON UN3412 Introduction To Econometrics* must be successfully completed before a student may enroll in a seminar.

A grade of W is not equivalent to a grade of D or F; it does not qualify a student to retake the course concurrently with a higher level course that lists the course as a prerequisite. Students who receive a grade of W in a core course must complete the course with a grade of C- or better before taking a course that lists it as a prerequisite.

Only *ECON UN1105 Principles of Economics* may be taken for a grade of Pass/D/Fail, and the student must receive a grade of P for it to count towards the requirements for the major, concentration, or interdepartmental majors.

Economics Electives

Only those courses identified in the Economics Department listings in this Bulletin may be taken for elective credit. All 3000-level or higher electives offered by the Economics Department have *ECON UN3211 Intermediate Microeconomics* and *ECON UN3213 Intermediate Macroeconomics* as prerequisites. However, some electives have additional prerequisites and students should ensure that all prerequisites have been completed (see the table of prerequisites printed above). *Seminars do not count as electives.*

Seminars

Seminars can be taken only after all of the required core courses in economics have been successfully completed. Students may not take or re-take *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, or *ECON UN3412 Introduction To Econometrics* concurrently with any senior seminar. *Seminars do not count as electives.* Each seminar is limited to sixteen students, with priority given to seniors. For *ECPS GU4921 Seminar In Political Economy* and *ECPH GU4950 Economics and Philosophy Seminar*, priority is given to economics-political science and economics-philosophy majors, respectively.

For seminar registration details, read the information posted on the department's *Senior Seminar Registration* page: <http://econ.columbia.edu/senior-seminars-registration> (<http://econ.columbia.edu/senior-seminars-registration/>).

Mathematics

Students must consult with the Mathematics Department for the appropriate placement in the calculus sequence. Students must complete one of the following sequences:

Select one of the following sequences:

MATH UN1101 - MATH UN1201	Calculus I and Calculus III
MATH UN1101 - MATH UN1205	Calculus I and Accelerated Multivariable Calculus

MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B
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In addition:

1. Students who receive a grade of D or F in *MATH UN1201 Calculus III* or *MATH UN1205* must retake the course, but may enroll in *ECON UN3211 Intermediate Microeconomics*.
2. Students who receive a grade of D or F in *MATH UN1207 Honors Mathematics A* may either retake the course, or take *MATH UN1201 Calculus III* or *MATH UN1205*, and enroll in *ECON UN3211 Intermediate Microeconomics* concurrently.

Statistics

Unless otherwise specified below, all students must take *STAT UN1201 Calculus-Based Introduction to Statistics*, or a higher level course, such as *STAT GU4204 Statistical Inference*, or *STAT GU4001*.

Barnard Courses

A limited number of Barnard economics electives may count toward the major, concentration, and interdepartmental majors. Students should pay careful attention to the limit of Barnard electives indicated in their program requirements. Please see the *Transfer Credit* section below for information on the number of Barnard electives that may be taken to fulfill major requirements. In addition, students may receive credit for the major, concentration, and interdepartmental majors only for those Barnard economics courses listed in this Bulletin. However, students may not receive credit for two courses whose content overlaps. Barnard and Columbia economics electives with overlapping content include but are not limited to:

<i>ECON BC3029</i> - <i>ECON GU4321</i>	Empirical Development Economics and Economic Development
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<i>ECON BC3038</i> - <i>ECON GU4505</i>	International Money and Finance and International Macroeconomics
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<i>ECON BC3019</i> - <i>ECON GU4400</i>	Labor Economics and Labor Economics
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<i>ECON BC3047</i> - <i>ECON GU4500</i>	International Trade and International Trade
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<i>ECON BC3039</i> - <i>ECON GU4625</i>	Environmental and Natural Resource Economics and Economics of the Environment
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<i>ECON BC3041</i> - <i>ECON GU4235</i>	Theoretical Foundations of Political Economy and HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
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<i>ECON GU4400</i>	Labor Economics
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ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
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Students should always first consult with *econ-advising* to confirm that the Barnard elective they wish to take does not overlap with a Columbia elective that they have already taken or plan to take. Students may *not* take the Barnard core economics, math, statistics, or seminar courses for credit towards the completion of major requirements.

School of Professional Studies Courses

The Department of Economics does not accept *any* of the courses offered through the School of Professional Studies for credit towards the economics major, concentration, or interdepartmental majors with the exception of the courses offered by the Economics Department during the summer session at Columbia.

Other Department and School Courses

Please note that with the exception of the above Barnard courses and the specific courses listed below for the financial economics major, no other courses offered through the different departments and schools at Columbia count toward the economics majors or concentration.

Transfer Credits

Students are required to take a minimum number of courses in the Columbia Economics Department. For all majors and interdepartmental majors, students must complete a minimum of *five* lecture courses in the Columbia department. Students may fulfill their remaining requirements for economics lecture courses through AP (or IB or GCE) credits, Barnard electives, transfer courses, and study abroad courses (the latter two are subject to the approval of the Economics Department). The following table summarizes the new rules:

Program	Number of required economics lecture courses	Minimum number which must be taken in the department	Maximum number of outside allowed
Economics major	9	5	4
Financial economics	8	5	3
Economics-mathematics	7	5	2
Economics-political science	7	5	2
Economics-statistics	7	5	2
Economics-philosophy	7	5	2

Economics concentration	7	4	3
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- Lecture courses** do not include seminars, which must be taken in the Columbia Economics Department. The lecture course counts are counts of economics courses only and do **not** include math, statistics, or courses in other departments;
- At least two of the three *3000*-level economics core courses must be taken in the department and no corresponding Barnard courses are accepted. ECON UN3025 Financial Economics and ECON UN3265 The Economics of Money and Banking are counted as departmental courses regardless of the instructor;
- Outside courses** include AP (or IB or GCE) credits, transfer credits, Barnard *2000*- and *3000*-level elective courses and transfer credits from other universities. In the case where two or more courses taken outside of Columbia are used as the equivalent of ECON UN1105 Principles of Economics, those courses are counted as one transfer course.

Approval of transfer credits to fulfill economics requirements must be obtained in writing from the Department of Economics (see the departmental website (<http://www.columbia.edu/cu/economics/>) or speak with your advising dean for information regarding applications for transfer credit). Approval is granted only for courses that are considered to be comparable to those offered at Columbia.

Summer courses taken at other institutions must be approved in writing by the department's transfer credit adviser before the course is taken. The department does not accept transfer credits for any 3000 level core courses taken during a summer session outside of Columbia University. Summer courses taken from the department of economics at Columbia University do not need approval.

Guidelines and instructions on how to request transfer credit approval can be found in the *Transfer Credit Information* page of the departmental website (<http://www.columbia.edu/cu/economics/>).

MAJOR IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 301) above.

The economics major requires a minimum of 35 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 44 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least five electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

Economics Seminar

Select one economics seminar course

CONCENTRATION IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 301) above.

The economics concentration requires a minimum of 25 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 34 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least three electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

MAJOR IN FINANCIAL ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 301) above.

The Department of Economics offers the major in financial economics, which provides an academic framework to explore the role of financial markets and intermediaries in the allocation (and misallocation) of capital. Among the topics studied in financial economics are financial markets, banks and other financial intermediaries, asset valuation, portfolio allocation, regulation and corporate governance.

The financial economics major requires 26 points in economics, 6 points in mathematics, 3 points in statistics, 3 points in business, and 12 points from a list of selected courses for a total minimum of 50 points as follows:

Economics Core Courses

All economics core courses

Finance Core Courses *

ECON UN3025 Financial Economics

ECON GU4280 Corporate Finance

BUSI UN3013 Financial Accounting

*NOTE: The department considers BUSI UN3013 and IEOR E2261 as overlapping courses. Students who take both courses shall be credited with one course only. Financial economics majors who are also in the Business Management concentration program (CNBUMG) must take an additional elective from either the financial economics prescribed elective list (below) or from the CNBUMB prescribed list.

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Electives

Select four of the following, of which two must be from the Columbia or Barnard economics departments, or equivalent economics transfer credits:

ECON BC3014	Entrepreneurship
ECON BC3017	Economics of Business Organization
ECON UN3265	The Economics of Money and Banking
ECON UN3952	Seminar in Macroeconomics and Formation of Expectations
ECON GU4020	Economics of Uncertainty and Information
ECON GU4213	Advanced Macroeconomics
ECON GU4251	Industrial Organization
ECON GU4260	Market Design
ECON GU4412	Advanced Econometrics
ECON GU4415	Game Theory
ECON GU4465	Public Economics
ECON GU4500	International Trade
ECON GU4505	International Macroeconomics
or ECON BC3038	International Money and Finance
ECON G4526	Transition Reforms, Globalization and Financial Crisis
ECON GU4700	Financial Crises
ECON GU4710	Finance and the Real Economy
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON GU4860	Behavioral Finance
BIOT GU4180	Entrepreneurship in Biotechnology
BUSI UN3021	Marketing Management
BUSI UN3701	Strategy Formulation
BUSI UN3702	Venturing to Change the World
BUSI UN3703	Leadership in Organizations
BUSI UN3704	Making History Through Venturing
COMS W1002	Computing in Context
HIST W2904	History of Finance
IEOR E3106	Stochastic Systems and Applications
IEOR E4700	Introduction to Financial Engineering

MATH UN3050	Discrete Time Models in Finance
POLS UN3630	Politics of International Economic Relations
STAT W3201	Math Finance in Continuous Time
STAT GU4261	Statistical Methods in Finance
STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance

Seminar

The seminar must be chosen from a list of seminars eligible for the financial economics major. The department indicates which seminars are eligible for the major on the Senior Seminars page of the departmental website.

Students must have completed at least one of ECON UN3025 or ECON GU4280 prior to taking their senior seminar.

* Students must complete the finance core no later than fall of their senior year.

MAJOR IN ECONOMICS-MATHEMATICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 301) above.

The major in economics and mathematics provides students with a grounding in economic theory comparable to that provided by the general economics major and exposes students to rigorous and extensive training in mathematics. The program is recommended for any student planning to do graduate work in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Mathematics has an assigned adviser with whom students may consult on mathematics requirements. The economics adviser can only advise on economics requirements; the mathematics adviser can only advise on mathematics requirements.

The economics-mathematics major requires a total of 52 or 56 points (depending on mathematics sequence) : 29 points in economics and 23-27 points in mathematics and statistics as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN2010	and Linear Algebra

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable Calculus
- MATH UN2010	and Linear Algebra

MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Note: Students who take MATH UN1205 may not receive credit for both MATH UN1201 and MATH UN1202.

Analysis requirement:

MATH UN2500	Analysis and Optimization
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Select three of the following:

MATH UN1202	Calculus IV
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MATH UN2030	Ordinary Differential Equations
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Any mathematics course at the 3000-level or above

Note: Students who take MATH UN1205 will not receive credit for MATH UN1202.

Statistics

Select one of the following sequences:

STAT GU4001	Introduction to Probability and Statistics
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STAT GU4203	PROBABILITY THEORY
- STAT GU4204	and Statistical Inference

Economics Seminar

Select an economics seminar

NOTE:

1. Students who fulfill the statistics requirement with STAT GU4203 and STAT GU4204, may count STAT GU4203 or STAT GU4204 as one of the three required mathematics electives.
2. Students who choose the one year sequence (STAT GU4203/ STAT GU4204), must complete the year long sequence *prior* to taking ECON UN3412. Students receive elective credit for the probability course.

MAJOR IN ECONOMICS-PHILOSOPHY

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 301) above.

Economics-philosophy is an interdisciplinary major that introduces students to basic methodologies of economics and philosophy and stresses areas of particular concern to both, e.g. rationality and decision making, justice and efficiency, freedom and collective choice, logic of empirical theories and testing. Many issues are dealt with historically. Classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Philosophy has an assigned adviser with whom students may consult on philosophy requirements. The

economics adviser can only advise on economics requirements; the philosophy adviser can only advise on philosophy requirements.

The economics-philosophy major requires a total minimum of 54 points: 25 points in economics, 16 points in philosophy, 6 points in mathematics, 3 points in statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three Electives are required; two must be selected from the below list, and the remaining elective may be any economics elective at the 3000-level or above.

ECON GU4020	Economics of Uncertainty and Information
ECON GU4211	Advanced Microeconomics
ECON GU4213	Advanced Macroeconomics
ECON GU4228	Urban Economics
ECON GU4230	Economics of New York City
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4301	Economic Growth and Development
ECON GU4370	Political Economy
ECON GU4400	Labor Economics
ECON GU4415	Game Theory
ECON GU4438	Economics of Race in the U.S.
ECON GU4465	Public Economics
ECON GU4480	Gender and Applied Economics
ECON GU4500	International Trade
ECON W4615	Law and Economics
ECON GU4625	Economics of the Environment
or ECON BC3039	Environmental and Natural Resource Economics
ECON GU4750	Globalization and Its Risks
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON BC3011	Inequality and Poverty

Philosophy Courses

PHIL UN1010	Methods and Problems of Philosophical Thought
PHIL UN3411	Symbolic Logic
PHIL UN3701	Ethics
PHIL UN3551	Philosophy of Science

or PHIL UN3960	Epistemology
PHIL GU4561	Probability and Decision Theory

Seminar

ECPH GU4950	Economics and Philosophy Seminar
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Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN ECONOMICS–POLITICAL SCIENCE

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 301) above.

Political economy is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Political Science has an assigned adviser with whom students may consult on political science requirements. The economics adviser can only advise on economics requirements; the political science adviser can only advise on political science requirements.

The economics–political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows.

The political science courses are grouped into four areas, i.e. subfields: (1) American Politics, (2) Comparative Politics, (3) International Relations, and (4) Political Theory. For the political science part of the major, students are required to select one area as a major subfield and one as a minor subfield. The corresponding introductory courses in both subfields must be taken, plus two electives in the major subfield, and one in the minor subfield.

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON GU4370	Political Economy

Mathematics

Select a mathematics sequence

Statistical Methods

STAT UN1201 Calculus-Based Introduction to Statistics

Select one of the following:

ECON UN3412 Introduction To Econometrics

POLS GU4712 PRINC OF QUANT POL RESEARCH 2

Economics Electives

Select two electives (6 points) at the 3000-level or above

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921 Seminar In Political Economy
and a Political Science Department seminar, in the student's Primary Subfield. Please select one of the following: *

POLS UN3911 Seminar in Political Theory

or POLS UN3912 Seminar in Political Theory

POLS UN3921 Seminar in American Politics

or POLS UN3922 Seminar in American Politics

POLS UN3951 Seminar in Comparative Politics

or POLS UN3952 Seminar in Comparative Politics

POLS UN3961 International Politics Seminar

or POLS UN3962 INTERNATIONAL POLITICS SEMINAR

- Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN ECONOMICS-STATISTICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 301) above.

The major in economics-statistics provides students with a grounding in economic theory comparable to that provided by the general economics major, but also exposes students to a significantly more rigorous and extensive statistics training than is provided by the general major. This program is recommended

for students with strong quantitative skills and for those contemplating graduate studies in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Statistics has an assigned adviser with whom students may consult on statistics requirements. The economics adviser can only advise on economics requirements; the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, 3 points in computer science as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
- MATH UN1102 and Calculus II
- MATH UN1201 and Calculus III
- MATH UN2010 and Linear Algebra

MATH UN1101 Calculus I
- MATH UN1102 and Calculus II
- MATH UN1205 and Accelerated Multivariable
- MATH UN2010 Calculus
and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Statistics

STAT UN1201 Calculus-Based Introduction to Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

One elective in statistics from among courses numbered STAT GU 4206 through GU 4266.

Computer Science

Select one of the following:

COMS W1004 Introduction to Computer Science and Programming in Java

COMS W1005 Introduction to Computer Science and Programming in MATLAB

COMS W1007 Honors Introduction to Computer Science

ENGI E1006 Introduction to Computing for Engineers and Applied Scientists

STAT UN2102 Applied Statistical Computing

Economics Seminar

ECON GU4918 Seminar In Econometrics

Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact

the director of undergraduate studies for the department in order to confirm their options for major requirements.

MATHEMATICS- STATISTICS

Departmental Undergraduate Office: 410 Mathematics;
212-854-2432
<http://www.math.columbia.edu/>

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Computer Science-Mathematics Adviser: Prof. Eric Urban,
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Economics-Mathematics Advisers:

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212-854-8806; dubedat@math.columbia.edu

Statistics: Prof. Banu Baydil, 611 Watson; 212-851-2132;
bb2717@columbia.edu

The major in mathematics is an introduction to some of the highlights of the development of theoretical mathematics over the past four hundred years from a modern perspective. This study is also applied to many problems, both internal to mathematics and arising in other disciplines such as physics, cryptography, and finance.

Majors begin by taking either Honors mathematics or the calculus sequence. Students who do not take MATH UN1207 Honors Mathematics A and MATH UN1208 Honors Mathematics B normally take MATH UN2010 Linear Algebra in the second year. Following this, majors begin to learn some aspects of the main branches of modern mathematics: algebra, analysis, and geometry; as well as some of their subdivisions and hybrids (e.g., number theory, differential geometry, and complex analysis). As the courses become more advanced, they also become more theoretical and proof-oriented and less computational.

Aside from the courses offered by the Mathematics Department, cognate courses in areas such as astronomy, chemistry, physics, probability, logic, economics, and computer science can be used toward the major. A cognate course must be a 2000-level (or higher) course and must be approved by the director of undergraduate studies. In general, a course not

taught by the Mathematics Department is a cognate course for the mathematics major if either (a) it has at least two semesters of calculus as a stated prerequisite, or (b) the subject matter in the course is mathematics beyond an elementary level, such as PHIL UN3411 Symbolic Logic, in the Philosophy Department, or COMS W3203 Discrete Mathematics: Introduction to Combinatorics and Graph Theory, in the Computer Science Department.

Another requirement for majors is participation in an undergraduate seminar, usually in the junior or senior year. In these seminars, students gain experience in learning an advanced topic and lecturing on it. In order to be eligible for departmental honors, majors must write a senior thesis.

COURSES FOR FIRST-YEAR STUDENTS

The systematic study of mathematics begins with one of the following three alternative calculus and linear algebra sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN1202	and Calculus IV
- MATH UN2010	and Linear Algebra
MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable
- MATH UN2010	Calculus
	and Linear Algebra
MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1207	and Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Credit is allowed for only one calculus and linear algebra sequence.

Calculus I, II is a standard course in single-variable differential and integral calculus; *Calculus III, IV* is a standard course in multivariable differential and integral calculus; *Accelerated Multivariable Calculus* is an accelerated course in multivariable differential and integral calculus.

While *Calculus II* is no longer a prerequisite for *Calculus III*, students are strongly urged to take it before taking *Calculus III*. In particular, students thinking of majoring or concentrating in mathematics or one of the joint majors involving mathematics should take *Calculus II* before taking *Calculus III*. Note that *Calculus II* is a prerequisite for Accelerated Multivariable Calculus, and both *Calculus II* and *Calculus III* are prerequisites for *Calculus IV*.

The third sequence, *Honors Mathematics A- B*, is for exceptionally well-qualified students who have strong Advanced Placement scores. It covers multivariable calculus (MATH UN1201 Calculus III- MATH UN1202 Calculus IV)

and linear algebra (MATH UN2010 Linear Algebra), with an emphasis on theory.

MATH UN1003 College Algebra and Analytic Geometry does not count toward the degree. Students who take this course do not receive college credit.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 4 or 5 on the AP Calculus AB exam provided students complete MATH UN1102 Calculus II or MATH UN1201 Calculus III with a grade of C or better. The department grants 3 credits for a score of 4 on the AP Calculus BC exam provided students complete MATH UN1102 Calculus II or MATH UN1201 Calculus III with a grade of C or better. The department grants 6 credits for a score of 5 on the AP Calculus BC exam provided students complete MATH UN1201 Calculus III or MATH UN1205 Accelerated Multivariable Calculus MATH UN1207 Honors Mathematics A with a grade of C or better. Students can receive credit for only one calculus sequence.

PLACEMENT IN THE CALCULUS SEQUENCES

Calculus I

Students who have essentially mastered a precalculus course and those who have a score of 3 or less on an Advanced Placement (AP) exam (either AB or BC) should begin their study of calculus with MATH UN1101 Calculus I.

Calculus II and III

Students with a score of 4 or 5 on the AB exam, 4 on the BC exam, or those with no AP score but with a grade of A in a full year of high school calculus may begin with either MATH UN1102 Calculus II or *MATH UN1201 Calculus III*. Note that such students who decide to start with *Calculus III* may still need to take *Calculus II* since it is a requirement or prerequisite for other courses. In particular, they **MUST** take *Calculus II* before going on to MATH UN1202 Calculus IV. Students with a score of 5 on the BC exam may begin with *Calculus III* and do not need to take *Calculus II*.

Those with a score of 4 or 5 on the AB exam or 4 on the BC exam may receive 3 points of AP credit upon completion of *Calculus II* with a grade of C or higher. Those students with a score of 5 on the BC exam may receive 6 points of AP credit upon completion of *Calculus III* with a grade of C or higher.

Accelerated Multivariable Calculus

Students with a score of 5 on the AP BC exam or 7 on the IB HL exam may begin with MATH UN1205 Accelerated Multivariable Calculus. Upon completion of this course with a grade of C or higher, they may receive 6 points of AP credit.

Honors Mathematics A

Students who want a proof-oriented theoretical sequence and have a score of 5 on the BC exam may begin with MATH UN1207 Honors Mathematics A, which is especially designed for mathematics majors. Upon completion of this course with a grade of C or higher, they may receive 6 points of AP credit.

TRANSFERS INSIDE THE CALCULUS SEQUENCES

Students who wish to transfer from one calculus course to another are allowed to do so beyond the date specified on the Academic Calendar. They are considered to be adjusting their level, not changing their program. However, students must obtain the approval of the new instructor and their advising dean prior to reporting to the Office of the Registrar.

GRADING

No course with a grade of D or lower can count toward the major, interdepartmental major, or concentration. Students who are doing a double major cannot double count courses for their majors.

DEPARTMENTAL HONORS

In order to be eligible for departmental honors, majors must write a senior thesis. To write a senior thesis, students must register for MATH UN3999 Senior Thesis in Mathematics in the fall semester of their senior year. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

PROFESSORS

- Mohammed Abouzaid
- David A. Bayer (Barnard)
- Simon Brendle
- Ivan Corwin
- Panagiota Daskalopoulos
- Aise Johan de Jong
- Robert Friedman
- Dorian Goldfeld
- Brian Greene
- Richard Hamilton
- Michael Harris
- Ioannis Karatzas
- Mikhail Khovanov
- Igor Krichever
- Chiu-Chu Liu
- Dusa McDuff (Barnard)
- Walter Neumann (Barnard)
- Andrei Okounkov
- D. H. Phong

- Henry Pinkham
- Ovidiu Savin
- Michael Thaddeus (Department Chair)
- Eric Urban
- Mu-Tao Wang

ASSOCIATE PROFESSORS

- Daniela De Silva (Barnard)
- Julien Dubedat

ASSISTANT PROFESSORS

- Chao Li
- Francesco Lin
- Giulia Sacca
- Will Sawin

J.F. RITT ASSISTANT PROFESSORS

- Konstantin Aleshkin
- Evgeni Dimitrov
- Nathan Dowlin
- Alexandra Florea
- Florian Johne
- Inbar Klang
- Shotaro Makisumi
- Konstantin Matetski
- S. Michael Miller
- Henri Roesch
- Nicholas Salter
- Gus Schrader
- Akash Sengupta
- Kyler Siegel
- Yi Sun
- Evan Warner
- Hui Yu
- Yihang Zhu

SENIOR LECTURERS IN DISCIPLINE

- Lars Nielsen
- Mikhail Smirnov
- Peter Voit

LECTURERS IN DISCIPLINE

- Michael Woodbury

ON LEAVE

- Profs. Florea, Krichever, Neumann, Roesch, Sacca, Salter, Sawin (*Fall 2019*)

- Profs. Abouzaid, Hamilton, Neumann, Roesch, Sacca, Salter, Sawin (*Spring 2020*)

GUIDELINES FOR ALL ECONOMICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Checklists and Requirement

Checklists and Requirement information are available on the Department website (<https://econ.columbia.edu/undergraduate/requirements-and-forms/>).

Course List

Economics Core Courses

All of the core courses must be completed **no later than the spring semester** of the student's **junior year** and must be taken at Columbia. *Students who take any core course during the fall semester of their senior year must obtain written permission from the department's director of undergraduate studies.* Unless otherwise specified below, all students must complete the following core courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Prerequisites

Course prerequisites are strictly enforced. Prerequisites must be taken before the course, not after or concurrently.

Economics courses taken before the completion of any of its prerequisites, even with instructor approval, are **not** counted toward the major, concentration, or interdepartmental majors. Exemptions from a prerequisite requirement may only be made, in writing, by the department's director of undergraduate studies. Credits from a course taken *prior* to the completion of its prerequisites are **not** counted towards the major requirements. As a consequence, students are required to complete **additional**, specific courses in economics at the direction of the director of undergraduate studies.

The prerequisites for required courses are as follows:

Course	Prerequisites
ECON UN1105 Principles of Economics	None
MATH UN1101 Calculus I	
STAT UN1201 Calculus-Based Introduction to Statistics	MATH UN1101 Calculus I
ECON UN3211 Intermediate Microeconomics	ECON UN1105 Principles of Economics MATH UN1201 Calculus III or UN1205

ECON UN3213 Intermediate Macroeconomics	ECON UN1105 Principles of Economics MATH UN1101 Calculus I Co-requisite: MATH UN1201 Calculus III or UN1205	ECON GU4860 Behavioral Finance	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics ECON UN3412 Introduction To Econometrics
ECON UN3412 Introduction To Econometrics	MATH UN1201 Calculus III or UN1205 ECON UN3211 Intermediate Microeconomics or UN3213 STAT UN1201 Calculus-Based Introduction to Statistics	All other ECON 3000- and 4000-level electives	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics
ECON 2000-level electives	ECON UN1105 Principles of Economics	ECON UN3901 Economics of Education ECON UN3952 Seminar in Macroeconomics and Formation of Expectations ECON UN3981 Applied Econometrics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics
ECON GU4211 Advanced Microeconomics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics MATH UN2010 Linear Algebra Corequisites: MATH UN2500 Analysis and Optimization or GU4061	ECON GU4911 Seminar In Microeconomics ECON GU4913 Seminar In Macroeconomics ECON GU4918 Seminar In Econometrics	ECON UN3211 Intermediate Microeconomics ECON UN3213 Intermediate Macroeconomics ECON UN3412 Introduction To Econometrics
ECON GU4412 Advanced Econometrics	ECON UN3211 Intermediate Microeconomics	ECPS GU4921 Seminar In Political Economy	ECON UN3211 Intermediate Microeconomics
ECON GU4213 Advanced Macroeconomics	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4413 Econometrics of Time Series and Forecasting	ECON UN3412 Introduction To Econometrics MATH UN2010 Linear Algebra		ECON UN3412 Introduction To Econometrics ECON GU4370 Political Economy
ECON UN3025 Financial Economics	ECON UN3211 Intermediate Microeconomics	ECPH GU4950 Economics and Philosophy Seminar	ECON UN3211 Intermediate Microeconomics
ECON GU4020 Economics of Uncertainty and Information	ECON UN3213 Intermediate Macroeconomics		ECON UN3213 Intermediate Macroeconomics
ECON GU4230 Economics of New York City	STAT UN1201 Calculus-Based Introduction to Statistics		ECON UN3412 Introduction To Econometrics
ECON GU4260 Market Design		Barnard electives	See Barnard bulletin
ECON GU4280 Corporate Finance			
ECON GU4370 Political Economy			
ECON GU4700 Financial Crises			
ECON GU4710 Finance and the Real Economy			
ECON GU4850 Cognitive Mechanisms and Economic Behavior			

It is **strongly recommended** that students take ECON UN3412 Introduction To Econometrics in the semester **immediately** following the completion of the statistics course.

Grading

No course with a grade of D or lower, including calculus and statistics courses, can count toward the major, concentration, or interdepartmental majors. Economics core courses with a grade of D or F must be retaken and completed with a grade of C- or better.

Students who receive a grade of D or F in a core course are permitted to take a higher-level elective course that has that core course as a prerequisite, so long as it is taken concurrently with the retaking of that core course. For example, if a student fails ECON UN3211 Intermediate

Microeconomics, the student must retake it and, in the same semester, may enroll in an elective course for which it is a prerequisite, provided that all other prerequisites for the elective have been completed. The same rule applies to the required math and statistics courses. For example, if a student fails *MATH UN1201 Calculus III*, the student may retake calculus III concurrently with *Intermediate Microeconomics*. Students who must retake any core economics or math course may not retake it concurrently with a senior seminar; the economics core courses *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, and *ECON UN3412 Introduction To Econometrics* must be successfully completed before a student may enroll in a seminar.

A grade of W is not equivalent to a grade of D or F; it does not qualify a student to retake the course concurrently with a higher level course that lists the course as a prerequisite. Students who receive a grade of W in a core course must complete the course with a grade of C- or better before taking a course that lists it as a prerequisite.

Only *ECON UN1105 Principles of Economics* may be taken for a grade of Pass/D/Fail, and the student must receive a grade of P for it to count towards the requirements for the major, concentration, or interdepartmental majors.

Economics Electives

Only those courses identified in the Economics Department listings in this Bulletin may be taken for elective credit. All 3000-level or higher electives offered by the Economics Department have *ECON UN3211 Intermediate Microeconomics* and *ECON UN3213 Intermediate Macroeconomics* as prerequisites. However, some electives have additional prerequisites and students should ensure that all prerequisites have been completed (see the table of prerequisites printed above). *Seminars do not count as electives*.

Seminars

Seminars can be taken only after all of the required core courses in economics have been successfully completed. Students may not take or re-take *ECON UN3211 Intermediate Microeconomics*, *ECON UN3213 Intermediate Macroeconomics*, or *ECON UN3412 Introduction To Econometrics* concurrently with any senior seminar. *Seminars do not count as electives*. Each seminar is limited to sixteen students, with priority given to seniors. For *ECPS GU4921 Seminar In Political Economy* and *ECPH GU4950 Economics and Philosophy Seminar*, priority is given to economics-political science and economics-philosophy majors, respectively.

For seminar registration details, read the information posted on the department's *Senior Seminar Registration* page: <http://econ.columbia.edu/senior-seminars-registration> (<http://econ.columbia.edu/senior-seminars-registration/>).

Mathematics

Students must consult with the Mathematics Department for the appropriate placement in the calculus sequence. Students must complete one of the following sequences:

Select one of the following sequences:

MATH UN1101 - MATH UN1201	Calculus I and Calculus III
MATH UN1101 - MATH UN1205	Calculus I and Accelerated Multivariable Calculus
MATH UN1207 - MATH UN1208	Honors Mathematics A and Honors Mathematics B

In addition:

1. Students who receive a grade of D or F in *MATH UN1201 Calculus III* or *MATH UN1205* must retake the course, but may enroll in *ECON UN3211 Intermediate Microeconomics*.
2. Students who receive a grade of D or F in *MATH UN1207 Honors Mathematics A* may either retake the course, or take *MATH UN1201 Calculus III* or *MATH UN1205*, and enroll in *ECON UN3211 Intermediate Microeconomics* concurrently.

Statistics

Unless otherwise specified below, all students must take *STAT UN1201 Calculus-Based Introduction to Statistics*, or a higher level course, such as *STAT GU4204 Statistical Inference*, or *STAT GU4001*.

Barnard Courses

A limited number of Barnard economics electives may count toward the major, concentration, and interdepartmental majors. Students should pay careful attention to the limit of Barnard electives indicated in their program requirements. Please see the *Transfer Credit* section below for information on the number of Barnard electives that may be taken to fulfill major requirements. In addition, students may receive credit for the major, concentration, and interdepartmental majors only for those Barnard economics courses listed in this Bulletin. However, students may not receive credit for two courses whose content overlaps. Barnard and Columbia economics electives with overlapping content include but are not limited to:

<i>ECON BC3029</i> - <i>ECON GU4321</i>	Empirical Development Economics and Economic Development
<i>ECON BC3038</i> - <i>ECON GU4505</i>	International Money and Finance and International Macroeconomics
<i>ECON BC3019</i> - <i>ECON GU4400</i>	Labor Economics and Labor Economics
<i>ECON BC3047</i> - <i>ECON GU4500</i>	International Trade and International Trade

ECON BC3039 - ECON GU4625	Environmental and Natural Resource Economics and Economics of the Environment
ECON BC3041 - ECON GU4235	Theoretical Foundations of Political Economy and HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4400	Labor Economics
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes

Financial economics	8	5	3
Economics-mathematics	7	5	2
Economics-political science	7	5	2
Economics-statistics	7	5	2
Economics-philosophy	7	5	2
Economics concentration	7	4	3

Students should always first consult with *econ-advising* to confirm that the Barnard elective they wish to take does not overlap with a Columbia elective that they have already taken or plan to take. Students may *not* take the Barnard core economics, math, statistics, or seminar courses for credit towards the completion of major requirements.

School of Professional Studies Courses

The Department of Economics does not accept *any* of the courses offered through the School of Professional Studies for credit towards the economics major, concentration, or interdepartmental majors with the exception of the courses offered by the Economics Department during the summer session at Columbia.

Other Department and School Courses

Please note that with the exception of the above Barnard courses and the specific courses listed below for the financial economics major, no other courses offered through the different departments and schools at Columbia count toward the economics majors or concentration.

Transfer Credits

Students are required to take a minimum number of courses in the Columbia Economics Department. For all majors and interdepartmental majors, students must complete a minimum of *five* lecture courses in the Columbia department. Students may fulfill their remaining requirements for economics lecture courses through AP (or IB or GCE) credits, Barnard electives, transfer courses, and study abroad courses (the latter two are subject to the approval of the Economics Department). The following table summarizes the new rules:

Program	Number of required economics lecture courses	Minimum number which must be taken in the department	Maximum number of outside allowed
Economics major	9	5	4

- Lecture courses** do not include seminars, which must be taken in the Columbia Economics Department. The lecture course counts are counts of economics courses only and do **not** include math, statistics, or courses in other departments;
- At least two of the three *3000*-level economics core courses must be taken in the department and no corresponding Barnard courses are accepted. ECON UN3025 Financial Economics and ECON UN3265 The Economics of Money and Banking are counted as departmental courses regardless of the instructor;
- Outside courses** include AP (or IB or GCE) credits, transfer credits, Barnard *2000*- and *3000*-level elective courses and transfer credits from other universities. In the case where two or more courses taken outside of Columbia are used as the equivalent of ECON UN1105 Principles of Economics, those courses are counted as one transfer course.

Approval of transfer credits to fulfill economics requirements must be obtained in writing from the Department of Economics (see the departmental website (<http://www.columbia.edu/cu/economics/>) or speak with your advising dean for information regarding applications for transfer credit). Approval is granted only for courses that are considered to be comparable to those offered at Columbia.

Summer courses taken at other institutions must be approved in writing by the department's transfer credit adviser before the course is taken. The department does not accept transfer credits for any 3000 level core courses taken during a summer session outside of Columbia University. Summer courses taken from the department of economics at Columbia University do not need approval.

Guidelines and instructions on how to request transfer credit approval can be found in the *Transfer Credit Information* page of the departmental website (<http://www.columbia.edu/cu/economics/>).

MAJOR IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 311) above.

The economics major requires a minimum of 35 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 44 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least five electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

Economics Seminar

Select one economics seminar course

CONCENTRATION IN ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 311) above.

The economics concentration requires a minimum of 25 points in economics, 6 points in mathematics, and 3 points in statistics, for a total of at least 34 points as follows:

Economics Core Courses

All economics core courses

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Select at least three electives, of which no more than one may be taken at the 2000-level (including Barnard courses)

MAJOR IN FINANCIAL ECONOMICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 311) above.

The Department of Economics offers the major in financial economics, which provides an academic framework to explore the role of financial markets and intermediaries in the allocation (and misallocation) of capital. Among the topics studied in financial economics are financial markets, banks and other financial intermediaries, asset valuation, portfolio allocation, regulation and corporate governance.

The financial economics major requires 26 points in economics, 6 points in mathematics, 3 points in statistics, 3 points in business, and 12 points from a list of selected courses for a total minimum of 50 points as follows:

Economics Core Courses

All economics core courses

Finance Core Courses *

ECON UN3025 Financial Economics

ECON GU4280 Corporate Finance

BUSI UN3013 Financial Accounting

*NOTE: The department considers BUSI UN3013 and IEOR E2261 as overlapping courses. Students who take both courses shall be credited with one course only. Financial economics majors who are also in the Business Management concentration program (CNBUMG) must take an additional elective from either the financial economics prescribed elective list (below) or from the CNBUMB prescribed list.

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Electives

Select four of the following, of which two must be from the Columbia or Barnard economics departments, or equivalent economics transfer credits:

ECON BC3014	Entrepreneurship
ECON BC3017	Economics of Business Organization
ECON UN3265	The Economics of Money and Banking
ECON UN3952	Seminar in Macroeconomics and Formation of Expectations
ECON GU4020	Economics of Uncertainty and Information
ECON GU4213	Advanced Macroeconomics
ECON GU4251	Industrial Organization
ECON GU4260	Market Design
ECON GU4412	Advanced Econometrics
ECON GU4415	Game Theory
ECON GU4465	Public Economics
ECON GU4500	International Trade
ECON GU4505 or ECON BC3038	International Macroeconomics International Money and Finance
ECON G4526	Transition Reforms, Globalization and Financial Crisis
ECON GU4700	Financial Crises
ECON GU4710	Finance and the Real Economy
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON GU4860	Behavioral Finance
BIOT GU4180	Entrepreneurship in Biotechnology
BUSI UN3021	Marketing Management

BUSI UN3701	Strategy Formulation
BUSI UN3702	Venturing to Change the World
BUSI UN3703	Leadership in Organizations
BUSI UN3704	Making History Through Venturing
COMS W1002	Computing in Context
HIST W2904	History of Finance
IEOR E3106	Stochastic Systems and Applications
IEOR E4700	Introduction to Financial Engineering
MATH UN3050	Discrete Time Models in Finance
POLS UN3630	Politics of International Economic Relations
STAT W3201	Math Finance in Continuous Time
STAT GU4261	Statistical Methods in Finance
STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance

Seminar

The seminar must be chosen from a list of seminars eligible for the financial economics major. The department indicates which seminars are eligible for the major on the Senior Seminars page of the departmental website.

Students must have completed at least one of ECON UN3025 or ECON GU4280 prior to taking their senior seminar.

- * Students must complete the finance core no later than fall of their senior year.

MAJOR IN ECONOMICS-MATHEMATICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 311) above.

The major in economics and mathematics provides students with a grounding in economic theory comparable to that provided by the general economics major and exposes students to rigorous and extensive training in mathematics. The program is recommended for any student planning to do graduate work in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Mathematics has an assigned adviser with whom students may consult on mathematics requirements. The economics adviser can only advise on economics requirements; the mathematics adviser can only advise on mathematics requirements.

The economics-mathematics major requires a total of 52 or 56 points (depending on mathematics sequence) : 29 points in

economics and 23-27 points in mathematics and statistics as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I
 - MATH UN1102 and Calculus II
 - MATH UN1201 and Calculus III
 - MATH UN2010 and Linear Algebra

MATH UN1101 Calculus I
 - MATH UN1102 and Calculus II
 - MATH UN1205 and Accelerated Multivariable
 - MATH UN2010 Calculus
 and Linear Algebra

MATH UN1207 Honors Mathematics A
 - MATH UN1208 and Honors Mathematics B

Note: Students who take MATH UN1205 may not receive credit for both MATH UN1201 and MATH UN1202.

Analysis requirement:

MATH UN2500 Analysis and Optimization

Select three of the following:

MATH UN1202 Calculus IV
 MATH UN2030 Ordinary Differential Equations
 Any mathematics course at the 3000-level or above

Note: Students who take MATH UN1205 will not receive credit for MATH UN1202.

Statistics

Select one of the following sequences:

STAT GU4001 Introduction to Probability and
 Statistics
 STAT GU4203 PROBABILITY THEORY
 - STAT GU4204 and Statistical Inference

Economics Seminar

Select an economics seminar

NOTE:

1. Students who fulfill the statistics requirement with STAT GU4203 and STAT GU4204, may count STAT GU4203 or STAT GU4204 as one of the three required mathematics electives.
2. Students who choose the one year sequence (STAT GU4203/ STAT GU4204), must complete the year long sequence *prior* to taking ECON UN3412. Students receive elective credit for the probability course.

MAJOR IN ECONOMICS- PHILOSOPHY

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 311) above.

Economics-philosophy is an interdisciplinary major that introduces students to basic methodologies of economics and philosophy and stresses areas of particular concern to both, e.g. rationality and decision making, justice and efficiency, freedom and collective choice, logic of empirical theories and testing. Many issues are dealt with historically. Classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Philosophy has an assigned adviser with whom students may consult on philosophy requirements. The economics adviser can only advise on economics requirements; the philosophy adviser can only advise on philosophy requirements.

The economics-philosophy major requires a total minimum of 54 points: 25 points in economics, 16 points in philosophy, 6 points in mathematics, 3 points in statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Mathematics

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three Electives are required; two must be selected from the below list, and the remaining elective may be any economics elective at the 3000-level or above.

ECON GU4020	Economics of Uncertainty and Information
ECON GU4211	Advanced Microeconomics
ECON GU4213	Advanced Macroeconomics
ECON GU4228	Urban Economics
ECON GU4230	Economics of New York City
ECON GU4235	HISTORICAL FOUNDATIONS OF MODERN ECONOMICS: Adam Smith to J M Keynes
ECON GU4301	Economic Growth and Development
ECON GU4370	Political Economy
ECON GU4400	Labor Economics
ECON GU4415	Game Theory
ECON GU4438	Economics of Race in the U.S.

ECON GU4465	Public Economics
ECON GU4480	Gender and Applied Economics
ECON GU4500	International Trade
ECON W4615	Law and Economics
ECON GU4625	Economics of the Environment
or ECON BC3039	Environmental and Natural Resource Economics
ECON GU4750	Globalization and Its Risks
ECON GU4840	Behavioral Economics
ECON GU4850	Cognitive Mechanisms and Economic Behavior
ECON BC3011	Inequality and Poverty

Philosophy Courses

PHIL UN1010	Methods and Problems of Philosophical Thought
PHIL UN3411	Symbolic Logic
PHIL UN3701	Ethics
PHIL UN3551	Philosophy of Science
or PHIL UN3960	Epistemology
PHIL GU4561	Probability and Decision Theory

Seminar

ECPH GU4950	Economics and Philosophy Seminar
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Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN ECONOMICS- POLITICAL SCIENCE

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 311) above.

Political economy is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Political Science has an assigned adviser with whom students may consult on political science requirements. The economics adviser can only advise on economics requirements; the political science adviser can only advise on political science requirements.

The economics-political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods,

4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows.

The political science courses are grouped into four areas, i.e. subfields: (1) American Politics, (2) Comparative Politics, (3) International Relations, and (4) Political Theory. For the political science part of the major, students are required to select one area as a major subfield and one as a minor subfield. The corresponding introductory courses in both subfields must be taken, plus two electives in the major subfield, and one in the minor subfield.

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON GU4370	Political Economy

Mathematics

Select a mathematics sequence

Statistical Methods

STAT UN1201	Calculus-Based Introduction to Statistics
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Select one of the following:

ECON UN3412	Introduction To Econometrics
POLS GU4712	PRINC OF QUANT POL RESEARCH 2

Economics Electives

Select two electives (6 points) at the 3000-level or above

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921	Seminar In Political Economy
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and a Political Science Department seminar, in the student's Primary Subfield. Please select one of the following: *

POLS UN3911	Seminar in Political Theory
or POLS UN3912	Seminar in Political Theory
POLS UN3921	Seminar in American Politics
or POLS UN3922	Seminar in American Politics
POLS UN3951	Seminar in Comparative Politics
or POLS UN3952	Seminar in Comparative Politics
POLS UN3961	International Politics Seminar
or POLS UN3962	INTERNATIONAL POLITICS SEMINAR

- Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN ECONOMICS-STATISTICS

Please read Guidelines for all for Economics Majors, Concentrators, and Interdepartmental Majors (p. 311) above.

The major in economics-statistics provides students with a grounding in economic theory comparable to that provided by the general economics major, but also exposes students to a significantly more rigorous and extensive statistics training than is provided by the general major. This program is recommended for students with strong quantitative skills and for those contemplating graduate studies in economics.

The Department of Economics has graduate student advisers with whom students may consult on economics requirements. The Department of Statistics has an assigned adviser with whom students may consult on statistics requirements. The economics adviser can only advise on economics requirements; the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, 3 points in computer science as follows:

Economics Core Courses

All economics core courses

Economics Electives

Select three electives at the 3000-level or above

Mathematics

Select one of the following sequences:

MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1201	and Calculus III
- MATH UN2010	and Linear Algebra
MATH UN1101	Calculus I
- MATH UN1102	and Calculus II
- MATH UN1205	and Accelerated Multivariable Calculus
- MATH UN2010	and Linear Algebra
MATH UN1207	Honors Mathematics A
- MATH UN1208	and Honors Mathematics B

Statistics

STAT UN1201	Calculus-Based Introduction to Statistics
STAT GU4203	PROBABILITY THEORY

STAT GU4204	Statistical Inference
STAT GU4205	Linear Regression Models

One elective in statistics from among courses numbered STAT GU 4206 through GU 4266.

Computer Science

Select one of the following:

COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1005	Introduction to Computer Science and Programming in MATLAB
COMS W1007	Honors Introduction to Computer Science
ENGI E1006	Introduction to Computing for Engineers and Applied Scientists
STAT UN2102	Applied Statistical Computing

Economics Seminar

ECON GU4918	Seminar In Econometrics
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Students who declared before Spring 2014: The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MEDIEVAL AND RENAISSANCE STUDIES*

***Medieval and Renaissance Studies is offered exclusively as a concentration.**

Program Director: Prof. Adam Kosto, 404 Fayerweather Hall, ajkosto@columbia.edu

Program Administrator: To be announced, medren@columbia.edu

Medieval and Renaissance studies is an interdisciplinary program in which a student combines a concentration in medieval or Renaissance civilization with a major or concentration in one of the following departments:

- Art History and Archaeology
- Classics
- East Asian Languages and Cultures
- English and Comparative Literature
- French and Romance Philology
- Germanic Languages
- History
- Italian
- Latin American and Iberian Cultures
- Middle Eastern, South Asian, and African Studies
- Music
- Philosophy

- Religion
- Slavic Languages

For more information about the special concentration in medieval and Renaissance studies, visit <http://medren.columbia.edu/>.

EXECUTIVE COMMITTEE OF THE INTERDEPARTMENTAL COMMITTEE ON MEDIEVAL AND RENAISSANCE STUDIES

Christopher Baswell (English and Comparative Literature)
 Susan Boynton (Music; Program Director, Medieval and Renaissance Studies)
 Consuelo Dutschke (Rare Book and Manuscript Library)
 Rachel Eisendrath (Barnard Department of English, Barnard Medieval and Renaissance Studies)
 Carmela Franklin (Classics)
 Seth Kimmel (Latin American and Iberian Cultures)
 Adam Kosto (History)
 Pamela Smith (History)
 Alan Stewart (English and Comparative Literature)
 Jesus Rodriguez-Velasco (Latin American and Iberian Cultures)
 Michael Waters (Art History and Archaeology)
 Eliza Zingesser (French and Romance Philology)

Full Faculty List: <https://medren.columbia.edu/people> (<https://medren.columbia.edu/people/>)

SPECIAL CONCENTRATION IN MEDIEVAL AND RENAISSANCE STUDIES

Students considering the special concentration in medieval and Renaissance studies should consult with the director in advance of course registration to ensure that their selection of courses will count towards the special concentration.

Please note that requirements for the Special Concentration were revised November 2017.

In addition to fulfilling the requirements for a departmental major or concentration, students with this special concentration should plan on taking an additional four (4) courses in other departments of the program, to be chosen in consultation with an appropriate member of the committee.

Students must also demonstrate an ability to work with original language sources (other than in Early Modern English) from the medieval and/or Early Modern periods, either through language coursework focusing on the historical language (e.g., LATN UN3033 Medieval Language and Literature, MDES GU4214 Fourth Year Classical Arabic I) or through research (e.g., a senior thesis or seminar paper with substantial use of original language sources). Any courses outside the major

used to demonstrate the language requirement may also count toward the course requirement for the special concentration. Students should gain approval of the director of the program in advance for plans to fulfill this language requirement.

MIDDLE EASTERN, SOUTH ASIAN, AND AFRICAN STUDIES

Departmental Office: 401 Knox; 212-854-2556
<http://www.columbia.edu/cu/mesaas/>

Director of Undergraduate Studies: Timothy Mitchell,
407 Knox; 212-854-5252; tm2421@columbia.edu
(kk2918@columbia.edu)

Language Coordinators:

African Languages: Mariame Sy, 408 Knox; 212-851-2439;
sms2168@columbia.edu

Arabic: Taoufik Ben Amor, 308 Knox; 212-854-2985;
tb46@columbia.edu

Armenian: Charry Karamanoukian, 407 Knox; 212-851-4002;
ck2444@columbia.edu

Hebrew: Naama Harel, 410 Knox Hall, 212-854-6668;
nh2508@columbia.edu

Hindi/Urdu: Rakesh Ranjan, 409 Knox; 212-851-4107;
rr2574@columbia.edu

Persian: Saeed Honarmand, 313 Knox; sh3468@columbia.edu

Sanskrit: Tyler Richard, 311 Knox; 212-854-1304;
tmr2151@columbia.edu (gl2392@columbia.edu)

Tamil: Tyler Richard, 311 Knox; 212-854-1304;
tmr2151@columbia.edu (dss2121@columbia.edu)

Turkish: Zuleyha Colak, 412 Knox; 212-854-0473;
zc2208@columbia.edu

The undergraduate program in Middle Eastern, South Asian, and African studies (MESAAS) offers students the opportunity to study in depth the cultures, ideas, histories, and politics of several overlapping world regions. The program emphasizes a close engagement with intellectual traditions, creative movements, and political debates, drawing on a wide variety of historical and contemporary sources in literature, religion, political thought, law, the visual and performing arts, and new media. Courses also examine the historical and cultural contexts in which these traditions and debates have been produced.

MAJORS AND CONCENTRATIONS

Majors develop two closely related skills. The first is linguistic expertise. A minimum of two years of course work in one language is required, and further work (including intensive summer language study) is greatly encouraged, because the aim is to study a cultural field through its own texts and discourses. The Department of Middle Eastern, South Asian, and African Studies offers courses in Arabic, Persian, Turkish, Hebrew,

Armenian, Sanskrit, Hindi/Urdu, Bengali, Tamil, Swahili, Wolof, and Zulu.

The second skill is learning how to think and write about complex cultural formations, drawing on a variety of methods and disciplinary approaches. The approaches vary according to the faculty members' expertise, incorporating methods from relevant fields in the humanities and social sciences, such as literary criticism, film studies, cultural studies, political theory, and intellectual history.

The only difference between the MESAAS major and the concentration is that the latter does not require language proficiency.

PROFESSORS

Gil Anidjar
Muhsin J. Ali al-Musawi
Partha Chatterjee
Hamid Dabashi
Mamadou Diouf
Wael Hallaq
Gil Hochberg
Sudipta Kaviraj
Rashid Khalidi
Mahmood Mamdani
Joseph Massad
Brinkley Messick
Dan Miron (*emeritus*)
Timothy Mitchell
Sheldon Pollock
Frances Pritchett (*emeritus*)
George Saliba (*emeritus*)

ASSOCIATE PROFESSORS

Allison Busch
Mana Kia
Jennifer Wenzel

ASSISTANT PROFESSORS

Sarah bin Tyer
Debashree Mukherjee
Elaine van Dalen
Elleni Centime Zeleke

SENIOR LECTURERS

Taoufik Ben Amor
Zuleyha Colak
Abdul Nanji
Rakesh Ranjan

LECTURERS

Ouijdane Absi
Aftab Ahmad
May Ahmar
Rym Bettaieb

Abdelrazzaq Ben Tarif
 Ihsan Colak
 Reem Faraj
 Illan Gonen
 Jacqueline Habra
 Naama Harel
 Saeed Honarmand
 Charry Karamanoukian
 Danielle Katz
 Khatchig Mouradian
 Youssef Nouhi
 Michelle Quay
 Tyler Richard
 Jishnu Shankar
 Mariame Sy

ON LEAVE

Profs. Absi, Ben Amor, Busch, Dabashi, Pollock (Fall 2019)
 Profs. Absi, Ben Amor, Chatterjee, Mamdani, Mukherjee,
 Pollock (Spring, 2020)

GUIDELINES FOR ALL MIDDLE EASTERN, SOUTH ASIAN, AND AFRICAN STUDIES MAJORS AND CONCENTRATORS

Introduction to MESAAS

Majors and concentrators begin their work with an introductory course that emphasizes a particular area (the Middle East, South Asia, or Africa). For instance, students interested in the Middle East would take ASCM UN2003 Introduction to Islamic Civilization or ASCM UN2008 Contemporary Islamic Civilization. Students keen on learning more about South Asia would take ASCM UN2357 Introduction to Indian Civilization, HSME UN3810 History of South Asia I: al-Hind to Hindustan, or HIST W3811 South Asia II: Empire and Its Aftermath. The introductory course generally recommended for students interested in Africa is MDES UN2030 Major Debates in the Study of Africa.

Required Core Courses

All majors must take two additional core courses. The first is a small seminar in which they explore some of the classic texts of the region, either AHUM UN1399 Colloquium on Major Texts: Middle East and South Asia (for those focusing on the Middle East and South Asia) or AFCV UN1020 African Civilizations (for those focusing on Africa).

With this background, students are ready to take MDES UN3000 Theory and Culture generally in the junior or senior year. This course examines critical approaches to the study of language, culture, and politics and encourages

students to reflect on their own work from many different perspectives.

Additional Requirements

Fifteen additional points (generally five courses) are chosen in consultation with the director of undergraduate studies. These may include six points of coursework from other departments, subject to the director of undergraduate studies' approval. Although students may have a particular interest (e.g., Arab political thought, Urdu literature, Armenian history, Iranian cinema, or contemporary West Africa), they are encouraged to gain exposure to the fullest range of courses and approaches offered by the faculty, and to familiarize themselves with other regions beyond their core area.

In Fulfillment of the Language Requirement (for Majors)

Enrollment in language courses is in some cases determined by placement exams. For more information, see *Languages* on the departmental website (<http://www.columbia.edu/cu/mesaas/>) and, if necessary, consult the relevant Coordinator listed on that page. The website includes separate pages for each language, describing the program of instruction, courses for heritage speakers, summer language programs, and more. Language courses must be taken for a letter grade. Pass/D/Fail or Registration credit (R) is not permitted. Those seeking to waive a language requirement must take a proficiency test.

Students who enter with language proficiency at only the second-year level must complete one additional year of language study and one additional MESAAS course. When students enter with language proficiency at the third year level (or in cases where only two years of a particular language are offered in MESAAS), they must substitute three additional MESAAS courses.

Advising

Newly declared majors and concentrators should meet with the director of undergraduate studies in order to plan a program of study. The goal is to strike a balance between courses that help a student achieve depth in a particular area/discipline and those that foster a wider perspective.

Although students are encouraged to approach faculty in the department based on their specific interests, the director of undergraduate studies functions as an ad hoc adviser for all entering students, addressing issues of course requirements, credit, approval for courses in other departments or schools, study abroad, and, eventually, honors requirements (including the senior thesis). Students should not hesitate to contact the director of undergraduate studies to set up an appointment.

Grading

Courses in which the grade of D has been received do not count toward the major or concentration requirements, nor do

those taken Pass/D/Fail, except for the first course taken toward the major or concentration.

Honors Program/Senior Thesis

Students may also wish to write a thesis. While not required for graduation, the thesis enables a student to be considered for departmental honors. It is advisable to begin planning for the thesis during the student's junior year. Interested students should attend the relevant information sessions and identify a potential faculty adviser.

All students who wish to write a thesis must enroll in MDES UN3960 MESAAS Honors Thesis Seminar, a full year course consisting of a 1-point segment in the Fall semester and a 3-point segment in the Spring semester. Students work closely with their peers in a supportive environment to produce a substantial piece of research (in the range of 40 pages). The primary intellectual guidance is provided by the faculty adviser, whereas the director of undergraduate studies and the honors seminar teaching assistant oversee the general development of the project. Every year in April, MESAAS hosts a senior colloquium in which students present their research. For more information on the honors program, see *Frequently Asked Questions* on the departmental website (<http://www.columbia.edu/cu/mesaas/>).

MAJOR IN MIDDLE EASTERN, SOUTH ASIAN, AND AFRICAN STUDIES

Students should obtain a Major Declaration form (available in the online major declaration system or from your adviser) and bring it to the director of undergraduate studies for approval. The director of undergraduate studies meets with students as necessary in order to establish and approve their individual programs of study. The requirements for the major are as follows:

Select a one-term introductory culture course, to be approved by the director of undergraduate studies

AHUM UN1399	Colloquium on Major Texts: Middle East and South Asia
MDES UN3000	Theory and Culture

Select two years of a language regularly taught in the department, or substitutional courses for students who test out of this requirement with the approval of the director of undergraduate studies

Select 15 points of coursework, which may include up to six points from other departments, selected in consultation with the director of undergraduate studies

The MESAAS Major and its 'tracks'

Students majoring in MESAAS are studying the languages, and central cultural and political aspects of the societies of the Middle East, South Asia, and Africa, in past and present. This can be done either with a focus on one of these three

regions, i.e. the 'African Studies', the 'South Asian Studies', or the 'Middle Eastern Studies' track, or a comparative perspective on them, the 'combined track'.

The coursework for each of those 'tracks' is composed of the same five elements: 1. an approved Introductory course; 2. a seminar on texts from the region; 3. 'Theory and Culture'; 4. five approved elective courses; 5. the regional language requirement.

Note that some MESAAS courses are already comparative by design and connect more than one region: for example, Societies and Cultures Across the Indian Ocean, or Postcolonial Thought, or courses on Persianate culture that include North India, or Middle East courses that include North Africa. These may satisfy requirements for more than one track, subject to approval by the Director of Undergraduate Studies (DUS).

African Studies

1. MDES UN3130 Major Debates in the Study of Africa or another approved introductory lecture course.
2. CC1020 African Civilization
3. MDES UN3000 Theory and Culture
4. Five additional courses on Africa, such as: South African Literature and Culture: Apartheid and After; East Africa and the Swahili Coast; or Pan Africanism (see the Courses page for more options). You may include up to two courses from other departments, in fields such as African history, politics, and philosophy, the anthropology of Africa, and African art, subject to the approval of the Director of Undergraduate Studies. For a listing of courses in other departments, see here (<http://www.ias.columbia.edu/academics/>).
5. Language: A minimum of two years of course work in Swahili, Arabic, Pular, or another African language. See the MESAAS language programs here (<http://www.columbia.edu/cu/mesaas/languages/>). Those already fluent in an African language may substitute other courses—see FAQ (<http://www.columbia.edu/cu/mesaas/undergraduate/faqs.html#fluent>). Not required for the concentration.

Middle Eastern Studies

1. ASCM UN2003 Islamic Civilization or another approved introductory lecture course.
2. Asian Humanities UN1399 Major Texts: Middle East/India
3. MDES UN3000 Theory and Culture
4. Five additional courses on the Middle East, such as: Arabic Self-Narratives; Central Questions in Islamic Law, Palestinian-Israeli Politics and Society, or Epics and Empires (see the Courses page for more options). You may include up to two courses from other departments, in fields such as Middle Eastern history, politics, and anthropology, or Islamic art, subject to the approval of the Director of Undergraduate Studies. Find a list of Middle East courses in other departments here (<http://www.mei.columbia.edu/>).
5. Language: A minimum of two years of coursework in Arabic, Hebrew, Persian, Turkish, or Armenian. See the MESAAS language programs here (<http://www.columbia.edu/cu/mesaas/languages/>).

www.columbia.edu/cu/mesaas/languages/). Those already fluent in a Middle Eastern language may substitute other courses—see FAQ (<http://www.columbia.edu/cu/mesaas/undergraduate/faqs.html#fluent>). Not required for the concentration.

South Asian Studies

1. MDES UN2357 Indian Civilization or another approved introductory lecture course.
2. Asian Humanities UN3399 Major Texts: Middle East/India
3. MDES UN3000 Theory and Culture
4. Five additional courses on South Asia, such as: Mughal India; Gandhi and his Interlocutors; or Cinemas of India (see the Courses page for more options). You may include up to six points of course work from other departments, in fields such as South Asian history, politics, and anthropology, or Indian art, subject to the approval of the Director of Undergraduate Studies. Find a list of South Asia courses in other departments here (<http://sai.columbia.edu/courses/>).
5. Language: A minimum of two years of course work in Hindi/Urdu, Sanskrit, Persian, or other South Asian languages. See the MESAAS language programs here (<http://www.columbia.edu/cu/mesaas/languages/>). Those already fluent in a South Asian language may substitute other courses—see FAQ (<http://www.columbia.edu/cu/mesaas/undergraduate/faqs.html#fluent>). Not required for the concentration.

Combined

There is also a combined option. For this, you may satisfy the five requirements by choosing courses from any of the three tracks.

1. An approved introductory lecture course.
2. Asian Humanities UN1399 Major Texts: Middle East/India – OR: CC1020 African Civilization
3. MDES UN3000 Theory and Culture
4. Five additional courses, fitting one's course of study, to be approved by DUS
5. Language: A minimum of two years of course work in any of the regional MESAAS languages, to be approved by the DUS.

CONCENTRATION IN MIDDLE EASTERN, SOUTH ASIAN, AND AFRICAN STUDIES

The requirements are identical with those for the major, except that there is no departmental language requirement. Fifteen points in department courses, selected with the approval of the director of undergraduate studies. These may not include elementary or intermediate language courses. Not more than two courses out of the general 15 points may be devoted to language study.

MODERN GREEK STUDIES*

***Modern Greek Studies is offered exclusively as a concentration.**

Departmental Office: 617 Hamilton; 212-854-3902; classics@columbia.edu
<http://www.columbia.edu/cu/classics/>

Director of Undergraduate Studies (Classics): Prof. Gareth Williams; 212-854-7856; gdw5@columbia.edu

Director of Undergraduate Studies (Modern Greek Studies): Prof. Nikolas Kakkoufa; 212-854-3902; nk2776@columbia.edu

Director of Academic Administration and Finance: Juliana Driever; 212-854-2726; jd2185@columbia.edu

When one visits Rome or Athens, they also visit the many layers of physical, historical, and cultural development that have contributed to the complex evolution of those cities. When one tours the Roman Forum or the Greek Parthenon, they set foot on monuments whose physical impressiveness symbolizes political strength and historical importance; in a very physical way they experience the past. When one studies Latin and Greek language and culture, they embark on a tour of an alternative kind, making their way through texts and other cultural forms—such as paintings, sculptures, and philosophical ideas—that bring them directly into contact with the Greco-Roman past. Literature, philosophy, history, art and architecture, linguistics, papyrology, religion: all (and more) are branches of investigation to which the modern student of classics/classical studies has access through the surviving literary and material evidence.

But when one studies in the original language Virgil's *Aeneid*, say, or Plato's philosophical writings, they find that ancient Greek or Latin literature deals with issues and ideas that are, for us, of central contemporary importance: e.g., How can I be happy? What is the best political constitution for our (or any) state? What responsibilities do I have to the society in which I live? What national significance is served or owed by literature?

The study of Greek and Latin language and culture concentrates in one main area (ancient Greece and Rome) and on many of the questions that are of direct pertinence to the ways in which modern lives are shaped and lived; at the same time, Greco-Roman literature and philosophy, so fundamental to the later development of the Western tradition, boast works of great intrinsic worth and interest. While all Columbia students get an introduction to classical texts in *Literature Humanities* and *Contemporary Civilization*, classics/classical studies provides a more advanced study of ancient cultural issues and habits of mind already sampled in the Core.

Study abroad in Greece or Italy offers a variety of educational experiences that are continuous with those of the major, enriching both linguistic expertise and cultural awareness. Students in classics have the opportunity to take part in archaeological digs abroad and, on occasion, to assist faculty in research projects that require, for example, bibliographical collection or the checking of research data.

Many majors pursue graduate study in classics and classical studies. Upon earning their graduate degrees, they often embark on teaching careers in universities, colleges, and high schools. Many graduating majors also enter a number of other professional fields, among them law, banking, accountancy, publishing, and museum-work. Employers tend to find that students in classics are articulate on paper, as well as orally; are organized of mind; and have good skills in general reasoning, an ability developed by the study of Greek and Latin language. In effect, the study of classics opens up a wide array of options, both in education and in the wider world.

The program of the department aims for a comprehensive understanding of classical literature and culture, and the mastery of Greek and Latin on which such understanding depends. Careful study of the language occupies the largest part of the first-year courses and is not omitted in the more advanced courses. Although literature becomes the chief subject only in the advanced courses, important authors like Homer, Plato, and Virgil are studied as literary texts already in the intermediate courses. A wide variety of courses are offered in translation.

Through a joint program with Barnard, the department offers a broad range of subjects. The department annually offers four advanced courses in each language (at the 3000- or 4000-level), the content of which changes each year in order to provide a curricular range and to balance authors and genres over a two-year period.

Opportunities for individual projects of reading and research are available. Students are also permitted to take graduate courses if they are sufficiently prepared. Additionally, they can supplement their studies within the department through work in other departments, such as art history and archaeology, history, philosophy, and the other departments of languages and literature.

It is not necessary to have previously studied either language in order to major in it. A student starting Greek or Latin at Columbia can meet all the requirements of a major within an ordinary undergraduate program.

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT

Students beginning the study of Greek or Latin at Columbia must take four terms of either of the following two-year sequences:

Greek

GREK UN1101 - GREK UN1102	Elementary Greek I and Elementary Greek II
GREK UN2101 - GREK UN2102	Intermediate Greek I Attic Prose and Intermediate Greek II: Homer

Latin

LATN UN1101 - LATN UN1102	Elementary Latin I and Elementary Latin II
LATN UN2101 - LATN UN2102	Intermediate Latin I and Intermediate Latin II

With the permission of the director of undergraduate studies, GREK UN2102 Intermediate Greek II: Homer may be taken before GREK UN2101 Intermediate Greek I Attic Prose.

The intensive elementary courses GREK UN1121 Intensive Elementary Greek and LATN UN1121 Intensive Elementary Latin may be substituted for the two-term *UN1101-UN1102* sequence. The intensive intermediate courses GREK S2121Q Intensive Intermediate Greek: Poetry and Prose and LATN S2121Q Intensive Intermediate Latin: Poetry and Prose may be substituted for the two-term *UN2101-UN2102* sequence.

LATN UN2101 Intermediate Latin I should be taken before LATN UN2102 Intermediate Latin II.

For students with secondary-school training in Greek or Latin, the director of undergraduate studies determines, on the basis of records and test scores, what further work is needed to fulfill the language requirement.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 5 on the Latin AP exam, which also satisfies the foreign language requirement, upon successful completion (with a grade of B or higher) of a Latin class at the 3000-level or higher.

MAJOR PROGRAM

The department offers a major in classics and a major track in classical studies. The major in classics involves the intensive study of both Greek and Latin, as well as their cultural matrix; the track in classical studies offers a more interdisciplinary approach. The major in classics is recommended for students planning to continue the study of classics in graduate school. The department also participates in the interdepartmental ancient studies program and offers a concentration in classics; these are all described below.

The major in classics and the track in classical studies are designed in part to build on the experience of the ancient world that undergraduates have acquired at Columbia in the Core Curriculum (especially in *Literature Humanities*). The major in classics is structured on the principle of gradual and closely monitored linguistic progress from the elementary (1100-level) to the advanced (3000- and 4000-levels) and ultimately to the

literature survey courses (*GU4105-GU4106*) in Greek and/or Latin.

Those majors intending to embark on graduate study in classics are especially encouraged to undertake, in their senior year, an independent research project (*UN3998*). This option is designed to allow students to personalize their experience in the major by conducting advanced study in a specialized area under the guidance of the specializing faculty member of their choice.

UN3998 is required in the classical studies track. Otherwise, students in classical studies are not required to take advanced courses beyond *UN3996 The Major Seminar*, but are expected to follow a coherent plan of study by taking a sequence of cognate courses in different but related departments (e.g., art history and archaeology, history, etc.).

The director of undergraduate studies is responsible for overseeing the path of study followed by each student in classics or classical studies. Through close interaction with the director of undergraduate studies, as well as with other faculty members where appropriate, each major is strongly encouraged to debate the strengths and weaknesses of his or her own trajectory of study even as the requirements for the major are being completed.

Students should contact the director of undergraduate studies with any questions about the classics majors and course offerings. The director of undergraduate studies can provide students with a worksheet to help in planning their progress toward major requirements.

PROFESSORS

Kathy Eden
 Helene P. Foley (Barnard)
 Carmela V. Franklin
 Stathis Gourgouris
 John Ma (Chair)
 Kristina Milnor (Barnard, Chair)
 Seth R. Schwartz
 Deborah T. Steiner
 Karen Van Dyck
 Katharina Volk
 Gareth D. Williams
 Nancy Worman (Barnard)

ASSOCIATE PROFESSORS

Marcus Folch
 Joseph Howley
 Elizabeth Irwin
 Ellen Morris (Barnard)

ASSISTANT PROFESSORS

Alan Ross

SENIOR LECTURER

Elizabeth Scharffenberger

LECTURERS

Dimitrios Antoniou
 Nikolas Kakkoufa
 Darcy Krasne

MAJOR IN CLASSICS

The major in classics involves a program in both Greek and Latin languages and literatures, and in Greek and Roman civilization. Students generally emphasize the study of one of the languages (the primary language), but significant study of the other (secondary) language is required as well.

The major requires the completion of 11 courses (a minimum of 34 points) and must include the following:

1. In a primary language:
 - Four courses at or above the UN2100-level;
 - *The Major Seminar UN3996*;
 - Two courses from the following four advanced options: *GU4105*, *GU4106*, *GU4139*, *UN3998* (any others may count toward the four upper level requirement).
2. In a secondary language:
 - Two courses at or above the UN2100-level.
3. Two ancient culture courses, including:
 - One course in the culture of the primary language;
 - One course in any aspect of ancient history or culture (*HIST*, *AHIS*, *PHIL*, *CLLT*, *CLCV*). All substitutions must be approved by the director of undergraduate studies.

The classical languages follow a standard track of elementary (1100-level) and intermediate (2100-level) levels, followed by 3000- and 4000-level classes that may generally be taken in any order.

Although it is easier to complete the major if at least one classical language is begun no later than the first year, it is possible to begin one classical language in the sophomore year and the other in the junior year and still complete the major.

Those planning to go on to graduate study in classics are urged to take both terms of *GU4105-GU4106* if possible, to write a senior research thesis, and to acquire a reading knowledge of German and preferably also of French (Italian is also useful).

To be eligible for departmental honors and prizes, students must take *UN3998*.

MAJOR TRACK IN CLASSICAL STUDIES

The major track in classical studies requires the completion of 11 courses (a minimum of 35 points) and must include the following:

1. Five courses, at or above the UN1102-level, in either or both Latin and Greek;
2. *The Major Seminar UN3996*;
3. Four classes in Ancient History, Art, Philosophy, Religion, and Civilization. Note that certain courses may be 6 credits, e.g., ICCS's *City of Rome* course, and may count as two courses towards this requirement. Students in doubt about a course's relevance should confirm it with the director of undergraduate studies as soon as possible;
4. *Senior Thesis UN3998*, completed on a chosen aspect of Greek or Roman civilization under the direction of a faculty member (3 points).

Summer courses 1221/1221 are counted as four credits for the purposes of major requirements.

MAJOR IN ANCIENT STUDIES

CONCENTRATION IN CLASSICS

Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The concentration in classics is designed for those who cannot fit the complete major into their undergraduate schedule, but still wish to take a substantial program in Greek and Latin.

The concentration requires the completion of seven courses (a minimum of 21 points) and must include the following:

1. In a primary language, six courses distributed as follows:
 - Five courses above the 1100-level, three of which must be 3000- or 4000-level;
 - One course from the following three advanced options: *GU4105*, *GU4106*, *GU4139*.
2. One course in Ancient History or Classical Civilization (3 points).

SPECIAL CONCENTRATION IN HELLENIC STUDIES

The courses in the Hellenic Studies program are designed to develop the student's proficiency in aspects of Modern Greek culture, language, and history. The minimum credit requirement for the Hellenic Studies Concentration is 21 credits and includes:

1. Modern Greek language and culture courses (Elementary, Intermediate, Advanced, Conversation I & II, Reading in Greek; minimum 8 credits). Students will work with undergraduate advisor to determine their level of the language,
2. Modern Greek Studies interdepartmental courses (CLGM, CSGM, HSGM; minimum 12 credits). The program of study should be planned as early as possible with the Director of Undergraduate Studies. Students meet with the Director of Undergraduate Studies each semester in order to obtain program approval. Opportunities exist for study abroad in Greece, Cyprus and Turkey for the summer or an academic term for credit. Students work closely with the concentration advisor on the selection of the foreign schools and the transfer of credit.

Students may also wish to write a Senior Thesis which will substitute one Modern Greek Studies interdepartmental seminar. While not required for graduation, the thesis enables a student to be considered for departmental honors. It is advisable to begin planning for the thesis during the student's junior year. Interested students should identify a potential faculty advisor.

MUSIC

Departmental Office: 621 Dodge; 212-854-3825
<http://www.music.columbia.edu/>

Director of Undergraduate Studies: Prof. Aaron Fox, 804 Dodge; 212-854-7185; aaf19@columbia.edu

Music Humanities Chair: Prof. Elaine Sisman, 604 Dodge; 212-854-7728; es53@columbia.edu

Music Performance Program Director: Magdalena Stern-Baczewska, 618A Dodge; 212-854-2348; mb3713@columbia.edu

The music major provides aspiring musicians and/or scholars with a wide range of ways to think about music (performance-related, theoretical, historical, cultural, and compositional) and to concentrate on the aspects of music that most interest them—from popular and world music to computer music. Our faculty engage in cultural studies (i.e., ethnomusicology) and with current literary theory, connect with faculty of other departments (i.e., English, Philosophy, and Psychology), and are on the cutting edge of technological change. Students who have a passion for music and who have already developed basic skills in areas including performance, music history, composition, or ethnography, should consider a major in music.

MUSIC PERFORMANCE

For information on auditions, registration, and other aspects of performance not included below, visit <https://mpp.music.columbia.edu/>

or contact Magdalena Stern-Baczewska, Director of the Music Performance Program, in 618 Dodge, 212-854-1257.

Students with questions about the Columbia-Juilliard programs should consult *Special Programs* in this Bulletin or contact Rebecca Schiavo, 212-854-9478, rab2195@columbia.edu.

Lessons

Individual lessons on instruments listed under Courses of Instruction may be taken for one half hour per week for 1 point of credit (or in the case of voice lessons at Barnard College, one full hour per week for 2 points). Auditions are only offered in the fall semester and courses are a one year commitment. There is a \$300 lesson fee per semester for each instrumental instruction course.

- MPP UN1401 Bassoon Instruction
- MPP UN1403 Cello Instruction
- MPP UN1405 Clarinet Instruction
- MPP UN1407 Classical Saxophone Instruction
- MPP UN1409 Flute Instruction
- MPP UN1411 French Horn Instruction
- MPP UN1413 Guitar (Bluegrass) Instruction
- MPP UN1415 Guitar (Classical) Instruction
- MPP UN1417 Harp Instruction
- MPP UN1419 Oboe Instruction
- MPP UN1421 Organ Instruction
- MPP UN1423 Percussion Instruction
- MPP UN1425 Piano Instruction
- MPP UN1427 String Bass Instruction
- MPP UN1429 Trombone Instruction
- MPP UN1431 Trumpet Instruction
- MPP UN1433 Tuba Instruction
- MPP UN1435 Viola Instruction
- MPP UN1437 Violin Instruction
- MPP UN1439 Early Instruments: Harpsichord
- MPP UN1441 Early Instruments: Viola da Gamba
- MPP UN1443 Jazz Bass Instruction
- MPP UN1445 Jazz Bass (Electric) Instruction
- MPP UN1447 Jazz Guitar (Electric) Instruction
- MPP UN1449 Jazz Orchestration
- MPP UN1451 Jazz Percussion Instruction
- MPP UN1453 Jazz Piano Instruction
- MPP UN1455 Jazz Saxophone Instruction
- MPP UN1457 Jazz Trombone Instruction
- MPP UN1459 Jazz Trumpet Instruction
- MPP UN1461 Jazz Voice Instruction

Ensembles

Participation in the following ensembles is open to all members of the University community. Students who wish to receive

course credit may register for 1 point per semester for these courses as listed.

See Music Performance Program website (<https://mpp.music.columbia.edu/>) for audition and activity information about all of the below.

- *Columbia University Orchestra* – Jeffrey Milarsky, *Conductor*
See -MPP UN1521 *University Orchestra* for audition and activity information.
- *Chamber Music Ensemble* – Magdalena Stern-Baczewska, *Director, Music Performance Program*
See -MPP UN1531 *Chamber Ensemble* for audition and activity information.
- *Barnard-Columbia Chorus and Chamber Singers* – Gail Archer, *Director*
See MUSI UN1593 *Barnard-Columbia Chorus*-
MUSI UN1594 *Barnard-Columbia Chorus* and
MUSI UN1595 *Barnard-Columbia Chamber Singers*-
MUSI UN1596 *Barnard-Columbia Chamber Singers* for
audition and activity information.
- *Collegium Musicum*
See - MPP UN1511 *Collegium Musicum* for audition and
activity information.
- *Jazz Ensembles* – Christopher Washburne, *Director*
See -MPP UN1541 *Columbia University Jazz Ensemble* for
audition and activity information.
- *World Music Ensembles* – Magdalena Stern-
Baczewska, *Director, Music Performance Program*
See- MPP UN1551 *World Music Ensemble*

PRACTICE ROOMS

Please see Practice Rooms and Policies (<https://music.columbia.edu/music-practice-rooms-and-policies/>) for the most up to date information.

GRADING

Ensembles: Letter Grade

Instrumental Lesson: P/F

DEPARTMENTAL HONORS

For departmental honors, see the director of undergraduate studies during the first week of the first semester of senior year. A formal written proposal is required. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

PROFESSORS

Susan Boynton
Joseph Dubiel
Walter Frisch
Bradford Garton
Giuseppe Gerbino
Georg Friedrich Haas
Ellie Hisama

George Lewis
Ana Maria Ochoa
Elaine Sisman

ASSOCIATE PROFESSORS

Aaron Fox
Christopher Washburne

ASSISTANT PROFESSORS

Alessandra Ciucci
Zosha Di Castri
Julia Doe
Kevin A. Fellezs
Mariusz Kozak
Benjamin Steege

COORDINATOR OF MUSICIANSHIP

Peter Susser

LECTURERS

Taylor Brook
Ehichung Rachel Chung
Galen DeGraf
Thomas Fogg
Theodore Gordon
Anne Levitsky
Jeffrey Milarsky
Matthew Ricketts
Magdalena Stern-Baczewska
Peter Susser
Yun Emily Wang

ASSOCIATES IN MUSIC PERFORMANCE

Sarah Adams
Dmitry Alexeev
Gail Archer (Barnard)
Eliot Bailen
Bruce Barth
Cyrus S. Beroukhim
Allen Blustine
Vicki Bodner
Paul Bollenback
Yari Bond
Maja Cerar
Vince Cherico
Kenneth Cooper
Christine Correa
Adriano Dos Santos
David Fulmer
Brad Gemeinhardt
John David Gibson
Marc Goldberg
June Han

Brad Jones
Sue Ann Kahn
Arthur Kampela
James Kerr
Louis Kosma
Victor Lin
Paul-Martin Maki
Andrew Milne
Tony Moreno
Ah-Ling Neu
Ugonna Okegwo
Muneko Otani
Susan Palma-Nidel
Richard Rood
Susan Rotholz
Louise Sasaki
James Nyoraku Schlefer
Michael Seltzer
Don Sickler
Michael Skelly
Helen Sung
Jessica Thompson
Masayo Ishigure Tokue
Leo Traversa
Michael Truesdell
Reiko Uchida
Jeffrey Warschauer
James Wilson

ON LEAVE

Susan Boynton (2019-20)
Alessandra Ciucci (Fall 2019)
Giuseppe Gerbino (2019-20)

Georg Haas (Spring 2020)

Ellie Hisama (2019-20)
George Lewis (Fall 2019)

GUIDELINES FOR ALL MUSIC MAJORS AND CONCENTRATORS

A program of study should be planned with the Director of Undergraduate Studies (DUS) in the first semester of the sophomore year. Students planning to focus on a particular area (i.e. computer music, composition, ethnomusicology, music theory or music history) may wish to select a faculty adviser in that area.

Music Theory & Ear-Training

All music majors and concentrators are required to take the Music Theory sequence through Music Theory IV and the Ear-Training sequence through Ear-Training IV. Placement exams are given prior to your initial enrollment in both the Music Theory sequence and Ear-Training sequence, to determine at what level you will be placed in each. For students who do not place in Music Theory I and/or Ear Training I on the placement

exam, they must complete these course(s) before they start the corresponding sequence(s):

MUSI UN1002 Fundamentals of Music and MUSI UN1312 Introductory Ear Training.

Keyboard Proficiency

All music majors are required to take a keyboard proficiency exam upon entrance into the first semester of Theory. Those who do not pass the exam are required to take *MUSI UN1518 Keyboard Harmony and Musicianship*.

Language Recommendations

For students who plan to do graduate work in music, studying German, French, Italian and/or Latin is recommended.

Focus in Composition

For students interested in focusing on the area of Composition, you must take these courses in this order:

MUSI UN2319 Music Theory II
 MUSI UN3310 Techniques of 20th Century Music
 MUSI UN3239 Introduction to Composition
 MUSI UN3241 Advanced Composition

MAJOR IN MUSIC

The major in music requires a minimum of 40 points, including the following courses:

You must complete up to Music Theory IV:

MUSI UN2318 - MUSI UN2319	Music Theory I and Music Theory II
MUSI UN3321 - MUSI UN3322	Music Theory III and Music Theory IV
You must complete up to Ear-Training IV, ET V is optional:	
MUSI UN2314 - MUSI UN2315	Ear Training, I and Ear Training, II
MUSI UN3316 - MUSI UN3317	Ear Training, III and Ear Training, IV
MUSI GU4318	Ear Training, V
MUSI UN3128 - MUSI UN3129	History of Western Music I: Middle Ages To Baroque and History of Western Music II: Classical To the 20th Century
MUSI UN3400	Topics in Music and Society

Electives: At least two 3000- or 4000-level electives.

The remaining points are to be earned through 1000-level MPP courses, 2000, 3000 or 4000-level courses subject to these constraints:

1. No more than 6 points of 2000-level courses.
2. No more than 4 points of 1000-level MPP courses and UN1518 combined (list below):

MPP UN1401	Bassoon Instruction
MPP UN1403	Cello Instruction
MPP UN1405	Clarinet Instruction
MPP UN1407	Classical Saxophone Instruction
MPP UN1409	Flute Instruction
MPP UN1411	French Horn Instruction
MPP UN1413	Guitar (Bluegrass) Instruction
MPP UN1415	Guitar (Classical) Instruction
MPP UN1417	Harp Instruction
MPP UN1419	Oboe Instruction
MPP UN1421	Organ Instruction
MPP UN1423	Percussion Instruction
MPP UN1425	Piano Instruction
MPP UN1427	String Bass Instruction
MPP UN1429	Trombone Instruction
MPP UN1431	Trumpet Instruction
MPP UN1433	Tuba Instruction
MPP UN1435	Viola Instruction
MPP UN1437	Violin Instruction
MPP UN1439	Early Instruments: Harpsichord
MPP UN1441	Early Instruments: Viola da Gamba
MPP UN1443	Jazz Bass Instruction
MPP UN1445	Jazz Bass (Electric) Instruction
MPP UN1447	Jazz Guitar (Electric) Instruction
MPP UN1449	Jazz Orchestration
MPP UN1451	Jazz Percussion Instruction
MPP UN1453	Jazz Piano Instruction
MPP UN1455	Jazz Saxophone Instruction
MPP UN1457	Jazz Trombone Instruction
MPP UN1459	Jazz Trumpet Instruction
MPP UN1461	Jazz Voice Instruction
MPP UN1511	Collegium Musicum
MPP UN1521	University Orchestra
MPP UN1531	Chamber Ensemble
MPP UN1541	Columbia University Jazz Ensemble
MPP UN1551	World Music Ensemble

CONCENTRATION IN MUSIC

The concentration in music requires a minimum of 28 points, including the following courses:

You must complete up to Music Theory IV:

MUSI UN2318 - MUSI UN2319	Music Theory I and Music Theory II
MUSI UN3321 - MUSI UN3322	Music Theory III and Music Theory IV
You must complete up to Ear-Training IV, ET V is optional:	
MUSI UN2314 - MUSI UN2315	Ear Training, I and Ear Training, II
MUSI UN3316 - MUSI UN3317	Ear Training, III and Ear Training, IV

MUSI GU4318	Ear Training, V
MUSI UN3128	History of Western Music I:
- MUSI UN3129	Middle Ages To Baroque
	and History of Western Music II:
	Classical To the 20th Century
MUSI UN3400	Topics in Music and Society

Electives: At least one 3000- or 4000-level electives.

The remaining points are to be earned through 1000-level MPP courses, 2000, 3000 or 4000-level courses subject to these constraints:

1. No more than 6 points of 2000-level courses.
2. No more than 4 points of 1000-level MPP courses and UN1518 combined (list below):

MPP UN1401	Bassoon Instruction
MPP UN1403	Cello Instruction
MPP UN1405	Clarinet Instruction
MPP UN1407	Classical Saxophone Instruction
MPP UN1409	Flute Instruction
MPP UN1411	French Horn Instruction
MPP UN1413	Guitar (Bluegrass) Instruction
MPP UN1415	Guitar (Classical) Instruction
MPP UN1417	Harp Instruction
MPP UN1419	Oboe Instruction
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MPP UN1433	Tuba Instruction
MPP UN1435	Viola Instruction
MPP UN1437	Violin Instruction
MPP UN1439	Early Instruments: Harpsichord
MPP UN1441	Early Instruments: Viola da Gamba
MPP UN1443	Jazz Bass Instruction
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MPP UN1447	Jazz Guitar (Electric) Instruction
MPP UN1449	Jazz Orchestration
MPP UN1451	Jazz Percussion Instruction
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MPP UN1455	Jazz Saxophone Instruction
MPP UN1457	Jazz Trombone Instruction
MPP UN1459	Jazz Trumpet Instruction
MPP UN1461	Jazz Voice Instruction
MPP UN1511	Collegium Musicum
MPP UN1521	University Orchestra
MPP UN1531	Chamber Ensemble

MPP UN1541	Columbia University Jazz Ensemble
MPP UN1551	World Music Ensemble

SPECIAL CONCENTRATION IN JAZZ STUDIES

Students interested in a special concentration in jazz studies should see *Jazz Studies*.

NEUROSCIENCE AND BEHAVIOR

Departmental Office: 406 Schermerhorn; 212-854-3608
<https://psychology.columbia.edu/>

Directors of Undergraduate Studies:

Psychology Major and Concentration:

Prof. Patricia Lindemann, 358E Schermerhorn Extension; pgl2@columbia.edu (Students with last names beginning A-H)

Prof. Katherine Fox-Glassman, 314

Schermerhorn; kjt2111@columbia.edu (Students with last names beginning I-S)

Prof. Chris Baldassano, 370 Schermerhorn

Extension; cab2304@columbia.edu (Students with last names beginning T-Z)

Prof. Nim Tottenham, 370 Schermerhorn

Extension; nlt7@psych.columbia.edu (nlt7@columbia.edu) (Honors)

Neuroscience and Behavior Major:

Psychology: Prof. Alfredo Spagna, 318B Schermerhorn (Students with last names beginning A-L)

Psychology: Prof. Caroline Marvin, 317 Schermerhorn; cbm2118@columbia.edu (Students with last names beginning M-Z)

Biology (CC): Prof. Jian Yang, 917A Fairchild; jy160@columbia.edu

Biology (GS): Prof. Deborah Mowshowitz, 744 Mudd; dbm2@columbia.edu

Director of Instruction and Academic Affairs:

Prof. Caroline Marvin, 317

Schermerhorn; cbm2118@columbia.edu

Director of Psychology Honors Program:

Prof. Nim Tottenham, 370 Schermerhorn Extension; nlt7@columbia.edu

Preclinical Adviser: Prof. E'mett McCaskill, 415O Milbank; emccaski@barnard.edu

Administrative Coordinator: Joanna Borchert-Kopczuk, 406 Schermerhorn; 212-854-3940; jb2330@columbia.edu

Undergraduate Curriculum Assistant: Liz Parish, 406 Schermerhorn; 212-854-8859; uca@psych.columbia.edu

The Department of Psychology (<https://psychology.columbia.edu/>) offers students a comprehensive curriculum in psychological science, including research methods, cognition, neuroscience, developmental, social, and clinical areas. The curriculum prepares majors for graduate education in these fields and also provides a relevant background for social work, education, medicine, law, and business. Psychology course offerings are designed to meet the varying needs and interests of students, from those wishing to explore a few topics in psychology or to fulfill the science requirement, to those interested in majoring in Psychology (<https://psychology.columbia.edu/content/psychology-major/>) or in Neuroscience and Behavior (<https://psychology.columbia.edu/content/neuroscience-behavior-major/>).

PROGRAM GOALS

The department's program goals (<https://psychology.columbia.edu/content/psychology-program-goals/>) start with the development of a solid knowledge base in psychological science. Consistent with the value psychology places on empirical evidence, courses at every level of the curriculum nurture the development of skills in research methods, quantitative literacy, and critical thinking, and foster respect for the ethical values that undergird the science of psychology.

Most of these program goals (<https://psychology.columbia.edu/content/psychology-program-goals/>) are introduced in PSYC UN1001 The Science of Psychology, the recommended first psychology course required for all majors that satisfies the prerequisite for most 2000-level courses. These goals are extended and reinforced in our statistics (1600-level) and research methods (1400-level) research methods courses, as well as in the 2000-level lecture courses and 3000- and 4000-level seminars. Each of the 2000-level lecture courses enables students to study systematically, and in greater depth, one of the content areas introduced in PSYC UN1001 The Science of Psychology. These lecture courses are the principal means by which psychology majors satisfy the distribution requirements, ensuring not only depth but also breadth of coverage across three central areas of psychology: (1) perception and cognition, (2) psychobiology and neuroscience, and (3) social, personality, and abnormal psychology. To complete the major, students take one or more advanced seminars and are encouraged to participate in supervised research courses, where they have the opportunity to explore research questions in depth and further develop their written and oral communication skills.

RESEARCH PARTICIPATION

All qualified students are welcome to apply to join a research lab and contribute to ongoing projects. Students may volunteer to work in a lab, register for supervised individual research (PSYC UN3950 (<https://psychology.columbia.edu/content/supervised-individual-research/>) Supervised Individual Research), or participate in the department's two-year Honors Program (<https://psychology.columbia.edu/content/honors-program/>). Information on faculty research (<https://psychology.columbia.edu/content/faculty/>) is available on the departmental website. Students are advised to read about research laboratories on faculty lab sites (<https://psychology.columbia.edu/content/lab-websites/>) and visit the professor's office hours to discuss opportunities. At the beginning of the fall term, the department also hosts a Lab-Preview (<https://psychology.columbia.edu/sites/default/files/content/Lab%20Preview%20Handout%20Fa18%20%20Final.pdf>) event for students to learn about research opportunities (<https://psychology.columbia.edu/content/research-opportunities/>) for the upcoming semester.

PROGRAM PLANNING

Majors and concentrators in psychology and majors in neuroscience and behavior should begin planning a program of study as early as possible. All necessary forms and information are available in Program Planning Tips (<https://psychology.columbia.edu/content/program-planning-tips/>). All majors and concentrators in Psychology (<https://psychology.columbia.edu/content/psychology-major/>) and majors in Neuroscience and Behavior (<https://psychology.columbia.edu/content/neuroscience-behavior-major/>) should complete a Major Requirement Checklist (<https://psychology.columbia.edu/content/major-concentration-requirement-checklists/>) before consulting a program adviser to discuss program plans. At minimum, all students must submit a Major Requirement Checklist (<https://psychology.columbia.edu/content/major-concentration-requirement-checklists/>) prior to the start of their final semester, so that graduation eligibility can be certified.

ADVISING

The Department of Psychology offers a variety of advising resources to provide prospective and current undergraduate majors and concentrators with the information and support needed to successfully plan their programs. An overview of these resources is provided on the Psychology Undergraduate Advising Resources website (<https://psychology.columbia.edu/content/advising/>).

Students are encouraged to consult with Peer, Faculty, and Program Advisers as they plan their course of study in Psychology or Neuroscience and Behavior. Faculty and Peer Advisers are important contacts for general advice on class choices, research opportunities, and post-graduation plans. For definitive answers to questions regarding major requirements and other aspects of your degree, including

transfer credit, current and prospective majors should consult their Program Adviser (Director of Undergraduate Studies) or the Undergraduate Curriculum Assistant (<https://psychology.columbia.edu/content/elizabeth-walters/>) in the departmental office. Program Adviser assignments (<https://psychology.columbia.edu/content/advisors/>) and contact information are provided on the departmental website. For additional information about program, faculty, peer, and pre-clinical advising, please see the Psychology Undergraduate Advising Resources website (<https://psychology.columbia.edu/content/advising/>).

EMAIL COMMUNICATION

The department maintains an e-mail distribution list with the UNIs of all declared majors and concentrators. Students are held responsible for information sent to their Columbia e-mail addresses. Students should read these messages from the department regularly and carefully. They are intended to keep students informed about deadlines, requirements, events, and opportunities. Prospective majors or concentrators who would like to be added to the e-mail distribution list should contact the Undergraduate Curriculum Assistant (uca@psych.columbia.edu) in the departmental office.

GUIDE TO COURSE NUMBERS

Course numbers reflect the structure of the Psychology curriculum:

- The *1000*-level comprises introductions to psychology, introductory research methods courses, and statistics. PSYC UN1001 The Science of Psychology is an introductory course with no prerequisites, which can serve as the prerequisite for most of the *2000*-level courses. The *1400s* contain the research methods laboratory courses, and the *1600s* contain statistics courses; these two course types are designed to prepare students to be able to understand, critique, and conduct the types of research found in many psychology and neuroscience labs.
- The *2000*-level comprises lecture courses that are introductions to areas within psychology; most require PSYC UN1001 The Science of Psychology as a prerequisite.
- The *3000*-level comprises more advanced and specialized undergraduate courses; most are given in a seminar format and require instructor permission.
- The *3900s* are the courses providing research opportunities for undergraduates.
- The *4000*-level comprises advanced seminars suitable for both advanced undergraduates and graduate students.

Subcategories within the *2000*-, *3000*-, and *4000*-levels correspond to the three groups in our distribution requirement for undergraduate Psychology majors:

1. Perception and cognition (*2200s*, *3200s*, and *4200s*),
2. Psychobiology and neuroscience (*2400s*, *3400s*, and *4400s*), and

3. Social, personality, and abnormal psychology (*2600s*, *3600s*, and *4600s*).

Note that Barnard psychology courses do not follow the same numbering scheme.

HONORS PROGRAM

The department offers a two-year Honors Program (<https://psychology.columbia.edu/content/honors-program/>), designed for a limited number of juniors and seniors interested in conducting original research. Beginning in the first term of junior year and continuing through senior year, students take PSYC UN3910 Honors Seminar and simultaneously participate in an honors research course (PSYC UN3920 Honors Research) under the supervision of a member of the department. Students make a formal presentation and complete an honors essay based on this research toward the end of their senior year.

To qualify for honors, students must take a total of 6 points beyond the number required for their major and satisfy all other requirements for the major. The additional 6 points may include the *Honors Seminar* and *Honors Research* courses.

Interested students should apply at the end of their sophomore year, and are also required to identify and meet with a potential faculty mentor prior to applying.

Instructions and an application form are available on the Honors Program page of the department website. Typically no more than 10% of graduating majors receive departmental honors in a given academic year.

REQUIREMENTS FOR ADMISSION TO GRADUATE PROGRAMS IN PSYCHOLOGY

Most graduate programs in psychology, including those in clinical psychology, require:

An undergraduate course in introductory psychology:

PSYC UN1001	The Science of Psychology
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A course in statistics such as one of the following:

PSYC UN1610	Introductory Statistics for Behavioral Scientists
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PSYC UN1660	Advanced Statistical Inference
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STAT UN1001	Introduction to Statistical Reasoning
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STAT UN1101	Introduction to Statistics
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STAT UN1201	Calculus-Based Introduction to Statistics
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A laboratory course in research methods such as one of the following:

PSYC UN1420	RESEARCH METHODS - HUMAN BEHAVIOR
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PSYC UN1450	Experimental Psychology: Social Cognition and Emotion
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PSYC UN1455	Experimental Psychology: Social and Personality
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PSYC UN1490

Experimental Psychology:
Cognition and Decision Making

Students should also take a variety of more advanced undergraduate courses and seminars. Students interested in PhD programs in any area of psychology are very strongly encouraged to participate in a research lab and enroll in PSYC UN3950 (<http://bulletin.columbia.edu/search/?P=PSYC%20UN3950/>) Supervised Individual Research. Students are also encouraged to apply for the Psychology Honors Program at the end of their sophomore year.

Students interested in clinical psychology should obtain experience working in a community service program in addition to supervised individual research experience. Students should consult the department's pre-clinical adviser, Prof. E'mett McCaskill (<https://psychology.columbia.edu/content/emett-mccaskill/>), and attend the department's pre-clinical advising events for more information. Additional resources to help prepare students for graduate study in psychology, and for careers in clinical psychology, are available on the Department of Psychology's website (<https://psychology.columbia.edu/>).

ONLINE INFORMATION

The Department of Psychology website (<https://psychology.columbia.edu/>) provides access to a wide variety of information for majors and prospective majors. Among other useful resources, students will find syllabi posted for most lecture and lab courses and for many advanced seminars. Students should read the on-line course syllabi prior to registering for psychology courses. For assistance in finding all necessary resources, students should contact the undergraduate curriculum assistant (uca@psych.columbia.edu).

SCIENCE REQUIREMENT

PSYC UN1001 The Science of Psychology, PSYC UN1010 Mind, Brain and Behavior (no longer offered), and any PSYC course in the 2200- or 2400-level may be used to fulfill the science requirement.

2600-level and some other psychology courses, including PSYC BC1001 Introduction to Psychology and other Barnard psychology courses, may not be used to fulfill the science requirement.

With prior departmental approval, 3- and 4-point courses numbered in the 32xx, 34xx, 42xx, and 44xx, and some additional courses, may partially fulfill the science requirement. For more detailed information regarding psychology courses that may be applied toward the science requirement, see Core Requirements (<http://bulletin.columbia.edu/general-studies/undergraduates/degree-fulfillment/core/>) in the General Studies bulletin.

EVENING AND COLUMBIA SUMMER COURSES

The department normally offers at least one lab course (currently PSYC UN1420 RESEARCH METHODS - HUMAN BEHAVIOR and PSYC UN1450 Experimental Psychology: Social Cognition and Emotion) in the late afternoon with evening labs. A number of other courses are occasionally offered in late afternoon and evening hours. No more than one quarter of the courses required for the major are normally available in the evening. Working students may find the wide variety of early morning (8:40 a.m.) classes, as well as Summer Session offerings, helpful in completing degree requirements.

Any course offered by the Psychology Department during the Summer Session is applicable toward the same major requirement(s) as the corresponding course of that same number offered during the academic year. For instance, PSYC S1001D The Science of Psychology meets the same major requirements as does PSYC UN1001 The Science of Psychology.

See Summer Courses (<https://gs.columbia.edu/summer-courses/>) for policies governing Summer Session courses.

PROFESSORS

Niall Bolger
Lila Davachi
Geraldine Downey
William Fifer (Psychiatry, Pediatrics)
Norma Graham
Carl Hart
Tory Higgins
Donald C. Hood
Nikolaus Kriegeskorte
Janet Metcalfe
Kevin Ochsner (Chair)
Shige Oishi (Visiting Professor)
Rae Silver (Barnard)
Daphna Shohamy
Herbert Terrace
Nim Tottenham
Sarah M.N. Woolley

ASSOCIATE PROFESSORS

Valerie Purdie-Greenaway
Randy Auerbach (Psychiatry)

ASSISTANT PROFESSORS

Mariam Aly
Christopher Baldassano
Robert Brotherton (Barnard)
Larisa Heiphetz
Micheal Wheaton (Barnard)

Sarah Canetta (Psychiatry)

LECTURERS IN DISCIPLINE

Katherine Fox-Glassman
 Patricia Lindemann
 Caroline Marvin
 Alfredo Spagna

ADJUNCT FACULTY

Tal Ben-Shahar
 Jennifer Blaze
 Helen Brew
 Frances Champagne
 James Curley
 David Friedman
 Karyn Gunnet-Shoval
 Nora Isacoff
 Tina Kao
 Scott Kaufman
 Karen Kelly
 Svetlana Komissarouk
 Victoria Leavitt
 E'mett McCaskill
 Michele Miozzo
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 Eric Schoenberg
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GUIDELINES FOR ALL PSYCHOLOGY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Double Majors/Concentrations

All students attempting to complete double majors, double concentrations, or a combination of a major and a concentration should consult the college rules for double counting of courses (<https://www.college.columbia.edu/news/committee-instruction-announces-updated-academic-policy/>).

Overlapping Courses

Students cannot receive credit for two courses—one completed at Columbia and one at another institution (including Barnard)—if those courses have largely overlapping content. For example, PSYC UN1001 The Science of Psychology is similar in content to introductory psychology courses offered at many other institutions, including Barnard; only one such course will receive credit. Similarly, PSYC UN2630 Social Psychology and PSYC BC1138 Social Psychology have overlapping content; only one will receive credit. Please refer to the table of Overlapping Courses (<https://psychology.columbia.edu/sites/default/files/content/>

[bc_overlapping%2002.06.19.pdf](#)) for a partial list of courses at Columbia and Barnard that are known to overlap.

Grade Requirements for the Major

A grade of C- or higher must be earned and revealed on the transcript in any Columbia or Barnard course, including the first, that is used to satisfy the major requirements. The grade of P is not accepted for credit towards the Psychology major (<https://psychology.columbia.edu/content/psychology-major/>), Psychology concentration (<https://psychology.columbia.edu/content/psychology-concentration/>), or Neuroscience and Behavior major (<https://psychology.columbia.edu/content/neuroscience-behavior-major/>). Courses taken on a Pass/D/Fail basis may not be used to satisfy the major or concentration requirements unless the grade of P is uncovered by the Registrar's deadline. Students may petition to have their P/D/F grades uncovered after the registrar's deadline for the following three courses only: PSYC UN1001 Science of Psychology, PSYC UN1010 Mind, Brain, & Behavior (no longer offered), and PSYC UN1610 Introductory Statistics for Behavioral Scientists. Courses taken only on a Pass/Fail basis may not be used to satisfy the major or concentration requirements under any circumstances.

Major Requirement Checklist

Prior to the start of their final semester, all seniors must submit a Major Requirement Checklist (<https://psychology.columbia.edu/content/major-concentration-requirement-checklists/>) showing all major courses they have taken and those they plan to take. The Psychology department evaluates each checklist to determine whether or not the course plan completes the major requirements and then notifies the student accordingly. If the student's course plan changes, or if it does not satisfy the major requirements, a revised checklist must be submitted. Departmental approval of an accurate and up-to-date checklist will help ensure completion of all major requirements on time for graduation.

MAJOR IN PSYCHOLOGY

Please read Guidelines for all Psychology Majors, Concentrators, and Interdepartmental Majors (p. 334) above.

Thirty or more points are needed to complete the major (<https://psychology.columbia.edu/content/psychology-major/>) and must include:

The Introductory Psychology Course

- PSYC UN1001 The Science of Psychology

A Statistics Course

Select one of the following:

- PSYC UN1610 Introductory Statistics for Behavioral Scientists

- PSYC UN1660 Advanced Statistical Inference
- STAT UN1001 Introduction to Statistical Reasoning
- STAT UN1101 Introduction to Statistics (formerly *STAT W1111*)
- STAT UN1201 Calculus-Based Introduction to Statistics (formerly *STAT W1211*)

A Research Methods Course

Select one of the following:

- PSYC UN1420 RESEARCH METHODS - HUMAN BEHAVIOR
- PSYC UN1450 Experimental Psychology: Social Cognition and Emotion
- PSYC UN1455 Experimental Psychology: Social and Personality
- PSYC UN1490 Experimental Psychology: Cognition and Decision Making

Majors are strongly advised to complete the statistics and research methods requirements, in that order, by the fall term of their junior year. Students are advised to verify the specific prerequisites for research methods courses, most of which require prior completion of a statistics course.

Distribution Requirement

One course (3 points or more) must be taken from each of the following three groups (in addition to the introductory, statistics, and research methods courses described above):

- Group I—Perception and cognition: courses numbered in the *2200s*, *3200s*, or *4200s*.
- Group II—Psychobiology and neuroscience: courses numbered in the *2400s*, *3400s*, or *4400s*. Also PSYC UN1010 Mind, Brain and Behavior (no longer offered).
- Group III—Social, personality, and abnormal: courses numbered in the *2600s*, *3600s*, or *4600s*.

Beginning Fall 2019, Research Methods courses will no longer fulfill any of the Group distribution requirements.

Seminar Requirement

For students entering Columbia in Fall 2013 or later, one seminar course numbered in the *3000s* or *4000s* must be taken for 3 or more points.

Seminars are usually taken in the senior year as a culmination of the major program. Enrollment in seminar courses requires the instructor's permission; students are advised to contact instructors at least one month prior to registration to request seminar admission. Note that honors and supervised individual research courses (PSYC UN3910 Honors Seminar, PSYC UN3920 Honors Research, and PSYC UN3950 (<http://bulletin.columbia.edu/search/?P=PSYC>

(<http://bulletin.columbia.edu/search/?P=PSYC>) Supervised Individual Research) will not meet the seminar requirement.

No course may be counted twice in fulfillment of the above major requirements, with the following exception: a seminar course may fulfill both the seminar requirement and a group requirement if it meets the criteria for both.

Additional Courses

Additional psychology courses ("electives") must be taken for a total of 30 points. As described below, these may include a limited number of research courses, transfer courses, and Barnard psychology courses not approved for specific requirements.

Research Credits

No more than 4 points of PSYC UN3950 (<http://bulletin.columbia.edu/search/?P=PSYC>) Supervised Individual Research or PSYC UN3920 Honors Research may be taken in any one term, and no more than 8 points total of research and field work courses (PSYC UN3950 SUPERVISED INDIVIDUAL RESEARCH, PSYC BC3466 Field Work and Research Seminar: The Barnard Toddler Center, PSYC BC3473 Clinical Field Practicum, PSYC BC3592 Senior Research Seminar and PSYC BC3599 Individual Projects) may be applied toward the major. See below for further restrictions on applying Barnard courses toward the psychology major.

Barnard Courses

No more than 9 points (minus any transfer credits) from Barnard psychology courses may be applied as credit toward the major. The table of approved Barnard psychology courses (<https://psychology.columbia.edu/content/approved-barnard-courses/>) indicates which courses have been approved for specific requirements of the psychology major. Courses not on the approved list may only be applied toward a specific requirement with prior written approval from one of the directors of undergraduate studies (<https://psychology.columbia.edu/content/advising/>). Courses not on the approved list for a specific requirement may be applied as elective credit toward the 30 points for the major.

Beginning in Fall 2019, Barnard Lab courses will not count towards the Research Methods requirement of the Psychology Major or Concentration.

Transfer Credits

No more than 9 transfer credits (or combination of transfer and Barnard credits) will be accepted toward the psychology major. Approval of transfer credits on a student's Entrance Credit Report toward general requirements for the B.A. degree does **not** grant approval of these credits toward the psychology major. Students must apply for written approval of transfer credit towards the major by submitting the Major Requirement Substitution Form (<https://>

psychology.columbia.edu/sites/default/files/content/Major%20Substitution%20Form%20(Updated%20170611)_0.pdf). This form, along with additional information about transfer credits can be found on the Transfer Credit page of our website (<https://psychology.columbia.edu/content/transfer-credit/>). To be approved for the major, a course taken at another institution should be substantially similar to one offered by the department, the grade received must be a B- or better, and the course must have been taken within the past 8 years. As noted above, if two courses overlap in content, only one will be applied towards the major. With the exception of approved Barnard courses, students should consult with one of the directors of undergraduate studies (<https://psychology.columbia.edu/content/advisors/>) before registering for psychology courses offered outside the department.

Students who have completed an introductory psychology course at another institution prior to declaring a psychology major should consult with one of the directors of undergraduate studies (<https://psychology.columbia.edu/content/advisors/>) to verify whether or not this course meets departmental standards for major transfer credit. If transfer credit toward the major is not approved, the student must enroll in PSYC UN1001 The Science of Psychology or PSYC BC1001 Introduction to Psychology to complete this major requirement. Beginning in Fall 2019, the Psychology Department will accept a score of 5 on the AP Psychology exam, or a score of 7 on the Higher Level IB Psychology exam, to meet the Science of Psychology requirement. The AP/IB Psychology exam does not count as a course or toward a student's points total for their program; students placing out of the Science of Psychology requirement in this way will need to take an additional course to fulfill the required number of courses or points for their program.

The College Board Advanced Placement (AP) statistics scores do not satisfy the statistics requirement. Students who have completed AP statistics may opt to take a more advanced statistics course to fulfill this requirement with the approval of one of the directors of undergraduate studies (<https://psychology.columbia.edu/content/advising/>).

MAJOR IN NEUROSCIENCE AND BEHAVIOR

Please read Guidelines for all Psychology Majors, Concentrators, and Interdepartmental Majors (p. 334) above.

The department cosponsors an interdepartmental major in neuroscience and behavior with the Department of Biological Sciences. For assistance in planning the psychology portion of the neuroscience and behavior major, refer to the Program Planning Tips website (<https://psychology.columbia.edu/content/program-planning-tips/>) and use the appropriate

major requirement checklist (<https://psychology.columbia.edu/content/major-concentration-requirement-checklists/>).

No course may be counted twice in fulfillment of the biology or psychology requirements described below. Most graduate programs in neuroscience also require one year of calculus, one year of physics, and chemistry through organic.

Required Courses

In addition to one year of general chemistry (or the high school equivalent), ten courses are required to complete the major—five from the Department of Biological Sciences and five from the Department of Psychology. For the definitive list of biology requirements, see the Department of Biological Sciences website (<http://biology.columbia.edu/>).

Required Biology Courses

1. BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology
2. BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology
3. BIOL UN3004 Neurobiology I: Cellular and Molecular Neurobiology
4. BIOL UN3005 Neurobiology II: Development & Systems
5. One additional 3000- or 4000-level biology course from a list approved by the biology adviser (<http://www.columbia.edu/cu/biology/pages/undergrad/cur/majors/neuro.html>) to the program.
 - BIOL UN3006 Physiology
 - BIOL UN3022 Developmental Biology
 - BIOL UN3025 Neurogenetics
 - BIOL UN3031 Genetics
 - BIOL UN3799 Molecular Biology of Cancer
 - BIOL UN3034 Biotechnology
 - BIOL UN3041 Cell Biology
 - BIOL UN3073 Cellular and Molecular Immunology
 - BIOL UN3193 Stem Cell Biology and Applications
 - BIOC UN3300 Biochemistry
 - BIOC UN3501 Biochemistry: Structure and Metabolism
 - BIOL UN3310 Virology
 - BIOL UN3404 Seminar on the Global Threat of Antimicrobial Resistance
 - BIOC UN3512 Molecular Biology
 - BIOL GU4008 The Cellular Physiology of Disease
 - BIOL GU4082 Theoretical Foundations and Applications of Biophysical Methods
 - BIOL GU4300 Drugs and Disease
 - BIOL GU4510 Genomics of Gene Regulation
 - BIOL GU4560 Evolution in the age of genomics
 - BIOL GU4035 Seminar in Epigenetics

- BIOL GU4070 The Biology and Physics of Single Molecules
- BIOL GU4075 Biology at Physical Extremes
- BIOL GU4080 The Ancient and Modern RNA Worlds
- BIOL GU4260 Proteomics Laboratory
- BIOL GU4290 Biological Microscopy
- BIOL GU4305 Seminar in Biotechnology

Required Psychology Courses

1. PSYC UN1001 The Science of Psychology
2. PSYC UN2430 Cognitive Neuroscience or PSYC UN2450 Behavioral Neuroscience
 - Students who have previously taken PSYC UN1010 Mind, Brain and Behavior (no longer offered) may use that course to fulfill this requirement.

3. One statistics or research methods course from the following:
 - PSYC UN1450 Experimental Psychology: Social Cognition and Emotion
 - PSYC UN1490 Experimental Psychology: Cognition and Decision Making
 - PSYC UN1610 Introductory Statistics for Behavioral Scientists
 - PSYC UN1660 Advanced Statistical Inference
 - STAT UN1101 Introduction to Statistics (formerly *STAT W1111*)
 - STAT UN1201 Calculus-Based Introduction to Statistics (formerly *STAT W1211*)
 - *Please note, STAT UN1001 does not count towards the Neuroscience & Behavior major.*

4. One additional 2000- or 3000-level psychology lecture course from a list* approved by the psychology adviser (<http://biology.columbia.edu/pages/neuroscience-and-behavior-major-requirements/>) (https://psychology.columbia.edu/content/neuroscience-behavior-major/#/cu_accordion_item-1255) to the program:
 - PSYC S2210Q Cognition: Basic Processes
 - PSYC UN2215 Cognition and the Brain or PSYC S2215D Cognition and the Brain
 - PSYC UN2220 Cognition: Memory and Stress
 - PSYC W2225 Attention and Perception
 - PSYC W2230 Perception and Sensory Processes

- PSYC UN2235 Thinking and Decision Making or PSYC S2235Q Thinking and Decision Making
- PSYC UN2250 Evolution of Cognition
- PSYC UN2280 Introduction to Developmental Psychology
- PSYC UN2420 Animal Behavior
- PSYC UN2430 Cognitive Neuroscience
- PSYC W2440 Language and the Brain
- PSYC UN2450 Behavioral Neuroscience or PSYC S2450Q Behavioral Neuroscience
- PSYC UN2460 Drugs and Behavior
- PSYC W2480 The Developing Brain
- PSYC UN2620 Abnormal Behavior or PSYC S2620Q Abnormal Behavior

**Please make careful note of this list, as courses not listed here will not count towards the P4 requirement.*

5. One advanced psychology seminar from a list approved by the psychology adviser (https://psychology.columbia.edu/content/neuroscience-behavior-major/#/cu_accordion_item-1257) to the program:
 - PSYC W3225 The Wandering Mind: Psychological Approaches to Distraction
 - PSYC W3250 Seminar in Space Perception (Seminar)/ PSYC G4230 Sensation and Perception (Seminar)
 - PSYC W3255 Modern Classics in Visual Perception, Visual Science and Visual Neuroscience (Seminar)/ PSYC G4255 Modern Classics in Visual Perception, Visual Science and Visual Neuroscience (Seminar)
 - PSYC W3265 Auditory Perception (Seminar)
 - PSYC UN3270 Computational Approaches to Human Vision (Seminar)
 - PSYC W3280 Seminar In Infant Development or PSYC S3280D Seminar in Infant Development
 - PSYC S3285D The Psychology of Disaster Preparedness
 - PSYC UN3290 Self: A Cognitive Exploration (Seminar)
 - PSYC G4220 Cognition and Psychopathology (Seminar)
 - PSYC GU4222 The Cognitive Neuroscience of Aging (Seminar)
 - PSYC GU4223 Memory and Executive Function Through the Lifespan

- PSYC GU4225 Consciousness and Attention (Seminar)
 - PSYC GU4229 Attention and Perception
 - PSYC G4230 Sensation and Perception (Seminar)
 - PSYC GU4232 Production and Perception of Language
 - PSYC GU4235 Special Topics in Vision (Seminar)
 - PSYC GU4239 Cognitive neuroscience of narrative and film
 - PSYC G4250 Evolution of Intelligence, Cognition, and Language (Seminar)
 - PSYC GU4270 Cognitive Processes (Seminar)
 - PSYC G4272 Advanced Seminar in Language Development
 - PSYC G4275 Contemporary Topics in Language and Communication (Seminar)
 - PSYC GU4280 Core Knowledge (Seminar)
 - PSYC GU4281 The Psychology of Curiosity
 - PSYC G4285 Multidisciplinary Approaches to Human Decision Making (Seminar)
 - PSYC GU4287 Decision Architecture
 - PSYC GU4289 The Games People Play: The Psychology of Strategic Decision Making
 - PSYC S3410Q Seminar in Emotion
 - PSYC S3425D Animals in Our Own Backyard: The Science of Observing Behavior
 - PSYC W3435 Neurobiology of Reproductive Behavior (Seminar)
 - PSYC W3440 Issues In Brain and Behavior (Seminar)
 - PSYC UN3445 The Brain & Memory
 - PSYC UN3450 Evolution of Intelligence and Consciousness (Seminar)/ PSYC G4450 The Evolution of Intelligence & Consciousness (Seminar)
 - PSYC UN3460 Evolution of Behavior (Seminar)
 - PSYC UN3470 Brain Evolution: Becoming Human (Seminar)
 - PSYC UN3481 Critical Periods in Brain Development and Behavior
 - PSYC S3483D The Dynamic Brain: Plasticity from Birth to Old Age
 - PSYC W3484 Life Span Development: Theory and Methods
 - PSYC UN3496 Neuroscience and Society or PSYC S3496Q Neuroscience and Society
 - PSYC GU4420 Animal Cognition (Seminar)
 - PSYC GU4430 Learning and the Brain (Seminar)
 - PSYC GU4435 Non-Mnemonic Functions of Memory Systems
 - PSYC GU4440 Topics in Neurobiology and Behavior (Seminar) or PSYC S4440Q Topics in Neurobiology and Behavior
 - PSYC G4460 Cognitive Neuroscience and the Media (Seminar)
 - PSYC G4475 Neurobiology of Social Behavior
 - PSYC GU4480 Psychobiology of Infant Development (Seminar)
 - PSYC G4485 Affective Neuroscience (Seminar)
 - PSYC GU4486 Developmental and Affective Neuroscience (Seminar)
 - PSYC GU4490 Inheritance (Seminar)
 - PSYC G4492 Psychobiology of Stress
 - PSYC G4495 Ethics, Genetics, and the Brain
 - PSYC GU4498 Behavioral Epigenetics
 - PSYC G4499 Behavioral Psychopharmacology (Seminar)
 - PSYC UN3615 Children at Risk (Lecture)
 - PSYC UN3620 Seminar in Developmental Psychopathology
 - PSYC UN3624 Adolescent Mental Health: Causes, Correlates, Consequences
 - PSYC UN3625 Clinical Neuropsychology (Seminar) or PSYC S3625D Clinical Neuropsychology Seminar
 - PSYC UN3680 Social Cognitive Neuroscience (Seminar)/ PSYC GU4685 Social Cognitive Neuroscience (Seminar)
 - PSYC GU4627 Seminar in Anxiety, Obsessive-Compulsive, and Related Disorders
 - PSYC G4635 The Unconscious Mind (Seminar)
 - PSYC GU4690 Social Factors and Psychopathology (Seminar)
- Note:** Students wishing to use a seminar course not listed above to meet the P5 seminar requirement must contact their psychology adviser before enrolling to request permission for an exception. Generally speaking, permission for such exceptions is only granted when there is a compelling case related to the student's research or area of study. Students requesting permission to use a course not on this list must ensure that their substantive coursework in the seminar (generally their final paper) is on a neuroscience-focused topic.

Transfer Credit for Psychology Courses Taken Elsewhere

Students should consult a psychology adviser (<https://psychology.columbia.edu/content/advising/>) before registering for psychology courses offered outside the department. With the adviser's approval, one, and only one, course from another institution, including Barnard, may be applied

toward the psychology portion of the Neuroscience and Behavior major. Students who wish to obtain credit for a course taken at Barnard or at another institution should complete the Major Requirement Substitution Form (<https://psychology.columbia.edu/content/transfer-credit/>). **To be approved for the major, the course should be substantially similar to one offered by this department and approved for this major, and the grade received must be a C- or better if from Barnard, or B- or better if from another institution.**

Beginning in Fall 2019, the Psychology department will accept a score of 5 on the AP Psychology exam, or a score of 7 on the Higher Level IB Psychology exam, to meet the PSYC UN1001 The Science of Psychology requirement. The AP/IB Psychology exam does not count as a course or toward a student's points total for their program; students placing out of the Science of Psychology requirement in this way will need to take an additional course -- approved by the Psychology adviser -- to fulfill the required number of courses for their program.

Advanced Placement (AP) statistics scores will not satisfy the statistics/research methods requirement. Students who have completed AP Stats are encouraged to enroll in a 1400-level research methods course to fulfill this requirement.

Exceptions to Biology Requirements

Any exceptions must be approved in advance by a biology adviser and students must receive an email notification of that approval. Students may substitute Barnard College courses only with prior permission from an adviser.

CONCENTRATION IN PSYCHOLOGY

Please read Guidelines for all Psychology Majors, Concentrators, and Interdepartmental Majors (p. 334) above.

A concentration in psychology (<https://psychology.columbia.edu/content/psychology-concentration/>) requires a minimum of 18 points, including PSYC UN1001 The Science of Psychology and courses in at least two of the three groups listed under "Distribution Requirement" for the psychology major. Restrictions on research credits, Barnard credits, and transfer credits are modified from those of the psychology major as follows:

1. Only 4 points total may be applied toward the concentration from research or field-work courses, including: PSYC UN3950 (<http://bulletin.columbia.edu/search/?P=PSYC%20UN3950/>) Supervised Individual Research, PSYC UN3920 Honors Research PSYC BC3466 Field Work and Research Seminar: The Barnard Toddler Center, PSYC BC3473 Clinical Field Practicum,

PSYC BC3592 Senior Research Seminar, and PSYC BC3599 Individual Projects;

2. Only 5 points from Barnard (including PSYC BC1001 Introduction to Psychology) may be applied toward the concentration.
3. Only 5 points total (including any Barnard points) from approved psychology courses taken outside the department may be applied toward the concentration.

*Beginning Fall 2019, Barnard Lab courses will not count towards the Research Methods requirement of the Psychology Major or Concentration.

Except as noted above, other regulations outlined in the Psychology Major section regarding grades, transfer credits, and overlapping courses also apply toward the concentration.

PHILOSOPHY

Departmental Office: 708 Philosophy; 212-854-3196
www.philosophy.columbia.edu (<http://philosophy.columbia.edu/>)

Director of Undergraduate Studies: Christia Mercer, 707 Philosophy; 212-854-4884; cm50@columbia.edu (da5@columbia.edu)

Economics-Philosophy Adviser: Philip Kitcher, 717 Philosophy; 212-854-4884; psk16@columbia.edu

Students interested in philosophy may pursue a major either in philosophy or in economics-philosophy. Because philosophy treats issues fundamental to both the sciences and the humanities, students are also welcome to combine their philosophy major with work in other fields. Before declaring a major in philosophy or economics-philosophy, and before deciding to combine philosophy with another discipline, students should meet with the director of undergraduate studies to formulate the program best for them.

Philosophy majors are given a foundation in logic and philosophical methodology, and are asked to confront fundamental questions in the main areas of philosophy: epistemology and metaphysics, ethics and political philosophy, philosophy of mind and language, and history of philosophy. The department requires that all majors take at least one seminar (PHIL UN3912), designed to allow students to focus on particular philosophical issues or texts in greater depth. Outstanding seniors may also pursue their own philosophical project in a senior thesis.

Over and above the courses required of all majors, there is room for considerable flexibility. Through an appropriate choice of electives from among the department's offerings (and from related courses in other departments), there are special opportunities for focusing more intensively on one or two subfields of philosophy, e.g., logic and the philosophy of mathematics, philosophy of science, ethics and political

philosophy, or the history of philosophy. Students should consult with the director of undergraduate studies on how best to pursue such programs.

STUDY ABROAD: REID HALL, PARIS

For information on the Columbia in Paris Program at Reid Hall, including summer courses, consult the *Columbia University in Paris Bulletin* (available in 606 Kent and online at the Office of Global Programs (<http://ogp.columbia.edu/>) website), call 212-854-2559, or send an email to reidhall@columbia.edu. For information on applicability of Reid Hall courses to the major or concentration, consult the director of undergraduate studies.

GRADING

Courses in which a grade of D has been received do not count toward the major or concentration requirements.

SENIOR THESIS

Undergraduates majoring in Philosophy or Economics-Philosophy may propose to write a senior thesis. Students who wish to write a thesis should approach a faculty member at the end of their junior or beginning of their senior year, and begin working on the proposal early in the fall semester of their senior year. Proposals are due in early December, and will be reviewed by a committee which will include the Director of Undergraduate Studies; students will be notified of the committee's decision within two weeks. Students whose proposals are approved should register for their faculty advisor's section of Supervised Independent Research for the spring term of the senior year. Theses are due in early April.

Students who have a grade point average of 3.6 or above in the major and who complete a thesis will be placed into consideration for departmental honors, though any senior may complete a thesis regardless of their grade point average (upon approval of the proposal).

See the full policy and procedure concerning senior theses on the departmental webpage:

<http://philosophy.columbia.edu/content/senior-thesis-philosophy> (<http://philosophy.columbia.edu/content/senior-thesis-philosophy/>)

DEPARTMENTAL HONORS

Departmental honors are highly competitive. Normally no more than 10% of the majors graduating in the department each year will receive departmental honors.

In order to qualify for departmental honors in philosophy, a student must have a grade point average of at least 3.6 in the major.

For students with a GPA of 3.6 or above, there are two possible routes to consideration:

1. A student may complete a senior thesis; those students who complete senior theses will automatically be considered for honors without having to be nominated.
2. A student may be nominated by a faculty member early in the spring semester of the senior year; nominated students will be invited to submit a writing sample at least 15 pages in length. A nominated student who is also writing a thesis may submit their thesis as the writing sample, or may choose to submit a different work.

Both the senior theses and writing samples are due in early April. The departmental honors committee will then review the submitted material and the academic records of the writers, and will report to the full faculty.

The full faculty will then decide which students to recommend for departmental honors to the Columbia College and General Studies administrations.

PROFESSORS

David Albert
Akeel Bilgrami
Taylor Carman (Barnard)
Haim Gaifman
Lydia Goehr
Robert Gooding-Williams
Axel Honneth
Jenann Ismael
Patricia Kitcher
Philip Kitcher
Wolfgang Mann
Christia Mercer
Michele Moody-Adams
John Morrison (Barnard)
Fred Neuhouser (Barnard)
Christopher Peacocke
Carol Rovane
Achille Varzi
Katja Vogt

ASSOCIATE PROFESSORS

Jessica Collins

ASSISTANT PROFESSORS

Justin Clarke-Doane
Melissa Fusco
Dhananjay Jagannathan
Tamar Lando
Karen Lewis (Barnard)
Francey Russell (Barnard)

AFFILIATED FACULTY

Souleymane Bachir Diagne (French and Romance Philology)
Jon Elster (Political Science)

Kent Greenawalt (University Professor)
 Wayne Proudfoot (Religion)
 Joseph Raz (Law School)
 Gayatri Spivak (University Professor)

MAJOR IN PHILOSOPHY

Students considering a major in philosophy are strongly encouraged to meet with the director of undergraduate studies early in their sophomore year. All majors must consult with the director of undergraduate studies each term before registering for classes in order to plan and update their individual programs of study.

Students planning to major in philosophy are advised to begin with PHIL UN1010 Methods and Problems of Philosophical Thought. Beginning students are especially encouraged to take 2000-level courses, both in the history of philosophy and in systematic philosophy. These courses are typically less specialized and less narrowly focused than higher-numbered ones. More advanced students are encouraged to take 3000-level courses. The department requires that all majors take at least one seminar, PHIL UN3912.

No more than one course at the 1000-level can be counted toward the major. In order to enroll in one of the 4000-level courses, students must have taken at least four courses in Philosophy.

The major requires a minimum of 30 points in philosophy chosen from courses prefixed with *UN* or *GU*:

PHIL UN2101	The History of Philosophy I: Presocratics to Augustine
PHIL UN2201	History of Philosophy II: Aquinas to Kant
PHIL UN3411	Symbolic Logic

At least one course in either metaphysics or epistemology e.g., PHIL W3960, or a related course to be chosen in consultation with the director of undergraduate studies.

Select at least one course in either ethics or social and political philosophy from the following:

PHIL UN2702	Contemporary Moral Problems
PHIL UN3701	Ethics
PHIL UN3751	Political Philosophy

A related course to be chosen in consultation with the director of undergraduate studies.

PHIL UN3912	Seminar
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CONCENTRATION IN PHILOSOPHY

Philosophy, as an academic discipline, has significant points of contact with a wide range of other subjects—in the humanities, the social sciences, and the natural sciences. A concentration in philosophy thus can be an attractive option for many students. Those considering becoming concentrators are strongly encouraged to meet with the director of undergraduate studies

early in their sophomore year, in order to discuss their specific interests and to plan their programs of study. All concentrators should consult with the director of undergraduate studies each term before registering for courses.

The concentration requires a minimum of 24 points in philosophy, chosen from courses prefixed with UN or GU. There are no specific courses required for the concentration.

Students may choose courses prefixed with *GR* only with the instructor's permission.

PHIL UN3912 is open to junior and senior concentrators who have taken at least four courses in philosophy.

MAJOR IN ECONOMICS-PHILOSOPHY

Economics-Philosophy is an interdisciplinary major that, while introducing students to the basic methodologies of economics and philosophy, stresses areas of particular concern to both. These include subjects such as rationality and decision making, justice and efficiency, freedom and collective choice, and the logic of empirical theories and their testing. Many of the issues are dealt with historically, and classic texts of Plato, Kant, Mill, Marx, and Smith are reviewed.

Two advisers are assigned for the interdepartmental major, one in the Department of Economics and one in the Department of Philosophy. Please note that the Economics adviser can only advise on the Economics requirements and the Philosophy adviser can only advise on the Philosophy requirements.

The Economics-Philosophy major requires a total minimum of 54 points: 25 points in Economics, 16 points in Philosophy, 6 points in Mathematics, 3 points in Statistics, and 4 points in the interdisciplinary seminar as follows:

Economics Core Courses

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics

Mathematics Sequence

Select a mathematics sequence

Statistics

Select a statistics course

Economics Electives

Three electives are required; refer to the Economics section of this bulletin.

Philosophy Courses

PHIL UN1010	Methods and Problems of Philosophical Thought
PHIL UN3411	Symbolic Logic

PHIL UN3701	Ethics (a social or political philosophy course may be substituted, please consult the Philosophy DUS)
PHIL UN3551 or PHIL UN3960	Philosophy of Science Epistemology
PHIL GU4561	Probability and Decision Theory

Seminar

ECPH GU4950	Economics and Philosophy Seminar (or another seminar in philosophy or economics approved by advisers in both department)
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Students who declared before Spring 2014:

The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

PHYSICS

Departmental Office: 704 Pupin; 212-854-3348
<http://www.columbia.edu/cu/physics> (<http://www.columbia.edu/cu/physics/>)

Director of Undergraduate Studies: Dr. Jeremy Dodd, 924 Pupin; 212-854-3969; jeremy.dodd@columbia.edu

The physics major offers a rigorous preparation in the intellectual developments of modern physics, along with extensive exposure to the mathematical and experimental techniques required to conduct basic and applied research in physics.

For the major, the department offers a set of required courses well-suited to prepare students for the most rigorous course of graduate study. These can be supplemented by elective courses in a variety of advanced topics. Although most majors go on to graduate work in physics, the intellectual skills acquired in the study of physics can also provide the basis for work in a variety of other scientific and nonscientific areas.

The physics concentration is for students who are interested in physics but are uncertain about graduate study in physics; for those who want to explore other subjects along with physics; for those who want to find a physics- or technology-related job after graduation; or for those who are considering a professional school such as law or medicine. The department helps concentrators custom design programs to ensure maximum flexibility in meeting students' intellectual needs and career goals. With appropriate selection of courses, the concentrator can explore other subjects yet maintain the option of graduate study in physics.

Research is an extremely important component of the Columbia physics experience. Because the department has a

very small student-to-faculty ratio, essentially all physics majors and concentrators engage in experimental, computational, or theoretical research under the close supervision of a faculty member during part, if not all, of their time at Columbia.

REGISTRATION FOR INTRODUCTORY COURSES

The department offers a stand-alone one-semester course for nonscience majors, one introductory sequence in physics intended primarily for preprofessional students, and three introductory sequences in physics for engineering and physical science majors. Students are given credit for courses from only one of the different sequence groups.

Mixing courses across the sequences is strongly discouraged; however, physics majors who begin their studies with PHYS UN1401 Introduction To Mechanics and Thermodynamics - PHYS UN1402 Introduction To Electricity, Magnetism, and Optics should take PHYS UN2601 Physics, III: Classical and Quantum Waves as the third-semester course.

Introductory Sequences

Nonscience Majors:

PHYS UN1001 Physics for Poets

Preprofessional Students:

PHYS UN1201 General Physics I
- PHYS UN1202 and General Physics II

Accompanying laboratory course:

PHYS UN1291 General Physics Laboratory
- PHYS UN1292 and General Physics Laboratory II

Engineering and Physical Science Majors:

Select one of the following sequences with accompanying laboratory course:

Sequence A:

PHYS UN1401 Introduction To Mechanics and
- PHYS UN1402 Thermodynamics
- PHYS UN1403 and Introduction To Electricity,
Magnetism, and Optics
and Introduction to Classical and
Quantum Waves

Sequence B:

PHYS UN1601 Physics, I: Mechanics and
- PHYS UN1602 Relativity
- PHYS UN2601 and Physics, II: Thermodynamics,
Electricity, and Magnetism
and Physics, III: Classical and
Quantum Waves

Sequence C:

PHYS UN2801 Accelerated Physics I
- PHYS UN2802 and Accelerated Physics II

Sequence A is a self-contained group of three courses, while Sequences B and C anticipate more course work in the Physics

Department. Students considering a physics major are strongly encouraged to begin one of these sequences in their first year.

LABORATORY

Many of the introductory courses include a laboratory, as indicated. A \$75 per term *laboratory fee* is charged for all 1000-level and 2000-level laboratories.

ADVANCED PLACEMENT

Students may earn a maximum of 6 credits in physics. The department grants 6 credits for a score of 4 or 5 on the AP Physics B exam, but the student is not entitled to any exemptions. The amount of credit is reduced to 3 if the student takes a 1000-level physics course.

The department grants 3 credits for a score of 4 or 5 on the AP Physics C/MECH exam, but the student is not entitled to any exemptions. The amount of credit is reduced to 0 if the student takes PHYS UN1001, PHYS UN1201, PHYS UN1401 or PHYS UN1601.

The department grants 3 credits for a score of 4 or 5 on the AP Physics C/E&M exam, but the student is not entitled to any exemptions. The amount of credit is reduced to 0 if the student takes PHYS UN1001, PHYS UN1202, PHYS UN1402 or PHYS UN1602.

PROFESSORS

Igor Aleiner
 Boris Altshuler
 Elena Aprile
 Dmitri Bassov
 Andrei Beloborodov
 Allan Blaer (*emeritus*)
 Gustaaf Brooijmans
 Norman Christ
 Brian Cole
 Frederik Deneff
 Richard Friedberg (*Barnard emeritus*)
 Brian Greene (Mathematics)
 Miklos Gyulassy (*emeritus*)
 Charles J. Hailey
 Timothy Halpin-Healy (Barnard)
 Sven Hartmann (*emeritus*)
 Tony Heinz (*emeritus*)
 Emlyn Hughes
 Lam Hui
 Laura Kay (Barnard Astronomy)
 Tsung Dao Lee (*emeritus*)
 Yuri Levin
 Szabolcs Marka
 Robert Mawhinney (Chair)
 Andrew Millis
 Alfred H. Mueller
 Reshmi Mukherjee (Barnard)
 John Parsons
 Aron Pinczuk (Applied Physics)

Malvin Ruderman
 Frank Sciulli (*emeritus*)
 Michael Shaevitz
 Michael Tuts
 Yasutomo Uemura
 Erick Weinberg
 William Zajc

ASSOCIATE PROFESSORS

Brian Humensky
 Janna Levin (Barnard)
 Brian Metzger
 Alberto Nicolis
 Abhay Pasupathy
 Ozgur Sahin (Biology)
 Tanya Zelevinsky

ASSISTANT PROFESSORS

Cory Dean
 Bradley Johnson
 Georgia Karagiorgi
 Rachel Rosen
 Sebastian Will

SENIOR LECTURER IN DISCIPLINE

Jeremy Dodd

ADJUNCT PROFESSOR

Morgan May

LECTURER

Burton Budick
 Eric Raymer

ON LEAVE

Amber Miller

GUIDELINES FOR ALL PHYSICS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Majors and concentrators should plan their programs of study with the director of undergraduate studies before the beginning of the junior year.

Prospective physics majors are strongly encouraged to begin one of the introductory physics sequences in their first year. Majors should aim to acquire as extensive a background in mathematics as possible.

The department considers laboratory experience to be an essential part of the physics curriculum. Majors and concentrators can gain such experience in the intermediate-level laboratories, the electronics laboratory, and through experimental research in faculty research groups.

Grading

A grade of C- or better must be obtained for a course to count toward the majors or the concentration. The grade of P is not acceptable, but a course that was taken P/D/F may be counted if and only if the P is uncovered by the Registrar's deadline.

MAJOR IN PHYSICS

Physics Courses

The major in physics requires a minimum of 41 points in physics courses, including:

Introductory Sequences

Select one of the following sequences:

Sequence A: Students with a limited background in high school physics may elect to take:

PHYS UN1401	Introduction To Mechanics and Thermodynamics and Introduction To Electricity, Magnetism, and Optics and Physics, III: Classical and Quantum Waves
- PHYS UN1402	
- PHYS UN2601	

Sequence B:

PHYS UN1601	Physics, I: Mechanics and Relativity and Physics, II: Thermodynamics, Electricity, and Magnetism and Physics, III: Classical and Quantum Waves
- PHYS UN1602	
- PHYS UN2601	

Sequence C: Students with advanced preparation in both physics and mathematics may be eligible to take:

PHYS UN2801	Accelerated Physics I and Accelerated Physics II
- PHYS UN2802	

Core Physics Courses

PHYS UN3003	Mechanics
PHYS UN3007	Electricity and Magnetism
PHYS UN3008	Electromagnetic Waves and Optics
PHYS GU4021	Quantum Mechanics I
PHYS GU4022	Quantum Mechanics II
PHYS GU4023	Thermal and Statistical Physics

Elective Courses

Select at least six points of the following courses:

PHYS UN3002	From Quarks To the Cosmos: Applications of Modern Physics
PHYS GU4003	Advanced Mechanics
PHYS GU4011	Particle Astrophysics and Cosmology
PHYS GU4018	Solid-State Physics
PHYS GU4019	Mathematical Methods of Physics
PHYS GU4040	Introduction to General Relativity
PHYS GU4050	Introduction to Particle Physics

With the permission of the Director of Undergraduate Studies, 4000- or 6000-level courses offered in this or other science departments

Laboratory Work at the Intermediate Level *

Select one of the following options:

Option 1:

PHYS UN3081	Intermediate Laboratory Work (two semesters)
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PHYS UN3083	Electronics Laboratory
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Option 2:

PHYS UN3081	Intermediate Laboratory Work (three semesters)
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Senior Seminar

PHYS UN3072	Seminar in Current Research Problems
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* Approved experimental work with a faculty research group may satisfy one semester of the laboratory requirement.

Mathematics Courses

Calculus through MATH UN1202 Calculus IV or MATH UN1208 Honors Mathematics B; and MATH UN3027 Ordinary Differential Equations or the equivalent.

Recommended cognate courses: MATH UN2010 Linear Algebra, MATH UN3007 Complex Variables, and MATH UN3028 Partial Differential Equations.

CONCENTRATION IN PHYSICS

The concentration in physics requires a minimum of 24 points in physics, including one of the introductory sequences.

INTERDISCIPLINARY MAJOR

It is also possible to major in astrophysics, biophysics, and chemical physics. Students interested in these areas should consult with the director of undergraduate studies and with cognate departments (astronomy, biological sciences, chemistry).

For astrophysics requirements please see:

<http://bulletin.columbia.edu/columbia-college/departments-instruction/astronomy/#requirements-text> (<http://bulletin.columbia.edu/columbia-college/departments-instruction/astronomy/#requirements-text>)

For biophysics requirements please see:

<http://bulletin.columbia.edu/columbia-college/departments-instruction/biological-sciences/#requirements-text> (<http://bulletin.columbia.edu/columbia-college/departments-instruction/biological-sciences/#requirements-text>)

For chemical physics requirements please see:

<http://bulletin.columbia.edu/columbia-college/departments-instruction/chemistry/#requirements-text>

POLITICAL SCIENCE

Departmental Office: 710 International Affairs Building;
212-854-3707
<http://www.polisci.columbia.edu>

Director of Undergraduate Studies:

Prof. David Johnston, 720 International Affairs Building;
212-854-3955; d (ajn1@columbia.edu)cj1@columbia.edu
(dcj1@columbia.edu)

Economics-Political Science Advisers:

Economics: Prof. Susan Elmes, Director of Undergraduate Studies, 1006 International Affairs Building; se5@columbia.edu
Political Science: Prof. Michael Ting, 701 International Affairs Building; 212-854-7945; mmt2033@columbia.edu

Political Science-Statistics Advisers:

Political Science: Prof. Andrew Gelman, 1016 Social Work Building; 212-851-2142; gelman@stat.columbia.edu
(gelman@stat.columbia.edu)
Statistics: Prof. Banu Baydil, 612 West 115th Street, Room 611; 212-853-1397; bb2717@columbia.edu
Statistics: Prof. Ronald Neath, 612 West 115th Street, Room 612; 212-853-1398; rcn2112@columbia.edu

The discipline of political science focuses on issues of power and governance and, in particular, on political institutions, both formal and informal. It also focuses on political behavior, political processes, political economy, and state-society relations.

The field consists of four substantive subfields: *American politics*, which covers such topics as national and local politics, elections, and constitutional law; *comparative politics*, which aims at understanding the political systems of other countries, both by studying individual states and by engaging in cross-national comparisons; *international relations*, which deals with the ways that states and other political actors behave in the international arena, including such topics as security, foreign policies, international organizations, and international economic relations; and *political theory*, which analyzes the history of normative political thought as well as of analytic concepts such as the nature of justice or liberty.

Other broad topics, such as “political economy,” or the study of the relationships between economic and political processes, overlap with the subfields, but also constitute a separate program (see below). Methodology, including statistical analysis and formal modeling, also occupies an important place in the discipline.

ADVANCED PLACEMENT

The department grants credit toward the major for work completed under the College Entrance Examination Board (CEEB) Advanced Placement Program. Students receive 3 academic credits and exemption from POLS UN1201

Introduction To American Government and Politics or POLS UN1501 Introduction to Comparative Politics for scores of 5 in the United States and Comparative Government and Politics AP Exams.

ADVISING

The Department of Political Science offers a variety of advising resources to provide undergraduate majors and concentrators with the information and support needed to successfully navigate through the program. These resources are described below.

Undergraduate Advising Office

Students should take questions or concerns about the undergraduate program to the department's undergraduate advising office first. If advisers cannot answer a student's question, they then refer the student to the appropriate person.

The undergraduate advising office is staffed by a political science Ph.D. student who holds open office hours at least once per week (the schedule can be found on-line at <https://polisci.columbia.edu/content/undergraduate-advising> (<https://polisci.columbia.edu/content/undergraduate-advising/>)). Students should stop by during these hours with questions about requirements, course selection, course of study, transfer and study abroad credit, and any other aspect of the program. Students may also reach the adviser by email at polisciadvising@columbia.edu.

Students should also visit the undergraduate advising office for assistance in completing the political science program planning form (available in the office, or on-line at <https://polisci.columbia.edu/content/undergraduate-forms-library> (<https://polisci.columbia.edu/content/undergraduate-forms-library/>)). The advisers must sign and date this form in the approval column next to any listed class that requires approval to be counted toward the program (transfer courses, non-traditional courses, etc.). These forms cannot be completed by faculty advisers. Each student's planning form is kept on file in the department, so that each semester they may meet with an adviser to update it.

The advisers are also available to speak with students about more substantive issues, including research interests, internships, and post-college plans. Since the advisers have been through the graduate school application process, they are great resources with whom students may discuss the process. Also, because they are current Ph.D. students in the department, they are familiar with the research interests of political science faculty and can therefore refer students to a professor for thesis advice, a research assistant job, or a faculty member whose research corresponds to the student's interests.

Requesting a Faculty Adviser

Often the best way for students to obtain advising from a faculty member is to contact a professor with whom they have taken a class in an area of interest. Students also have the option

of having a faculty adviser assigned by the department. To request a faculty adviser, students should complete the Faculty Adviser Request Form and submit it to the undergraduate coordinator during the first two weeks of the semester.

Students may consult with their faculty adviser for any substantive issue, but still must visit walk-in advising hours to have courses approved, to fill out and update planning forms, and to discuss departmental requirements and regulations.

Director of Undergraduate Studies

The director of undergraduate studies oversees the undergraduate program and is available during office hours. While a student's first stop for advising should be the undergraduate advising office, the director of undergraduate studies is available to answer any questions that the undergraduate advisers or the undergraduate coordinator cannot. In such cases, the undergraduate coordinator and advisers refer students to the director of undergraduate studies.

Economics–Political Science Adviser

Economics–political science majors may consult with the economics–political science adviser during office hours. Please note that students should also see an undergraduate adviser to discuss major requirements and fill out a planning form. For any questions about the economics–political science program that an undergraduate adviser cannot answer, students are referred to the economics–political science adviser.

Political Science–Statistics Adviser

Political science–statistics majors may consult with the political science–statistics adviser during office hours. Please note that students should also see an undergraduate adviser to discuss major requirements and fill out a planning form. For any questions about the political science–statistics program that an undergraduate adviser cannot answer, students are referred to the political science–statistics adviser.

Faculty At-Large

Students are encouraged to contact any professor for advice during his or her office hours, or by appointment, to discuss interests in political science, course selection, and other academic or post-college issues. The faculty may provide advice about graduate schools, suggest literature that the student might consult as sources for research, recommend specific courses or professors based on the student's interests, or offer information about research opportunities with faculty. However, students should note that any issues surrounding departmental regulations and requirements, major certification, course approvals, etc., are addressed at the undergraduate advising office.

HONORS PROGRAM

The department offers the Honors Program for a limited number of seniors who want to undertake substantial research

projects and write honors theses. The honors thesis is expected to be at least 75 pages in length and of exceptional quality.

Honors students perform research as part of a full-year honors seminar (POLS UN3998-POLS UN3999, 8 points total) during their senior year, in place of the seminar requirement for majors. Honors students may, however, take regular seminars to fulfill other course requirements for the major. Theses are due in late March or early April. To be awarded departmental honors, the student must satisfy all the requirements for the major, maintain a 3.6 GPA in the major, and complete a thesis of sufficiently high quality to merit honors.

The honors seminar director provides general direction for the seminar. The honors seminar director supervises all students; each student also works with a faculty member in his or her major subfield (American politics, comparative politics, international relations, or political theory) and a preceptor. The honors seminar meets weekly for part of the year and addresses general issues involved in research and thesis writing, such as how to develop research questions and projects, methodology, sources of evidence, and outlining and drafting long papers. The sessions are also used for group discussions of students' research and thesis presentations. Students are also expected to meet periodically with the supervising professor and preceptor.

Students who wish to apply to the Honors Program must notify the department in writing by the end of the spring semester of the junior year. Please check the department website for the official deadline. Normally no more than 10% of graduating majors receive departmental honors in a given academic year. Applicants are required to have already completed the methods requirement for the major.

Application Materials

Applications to the Honors Program must include the following:

1. A cover page with the student's name, CUID number, e-mail address, and school (Columbia College or General Studies);
2. An official transcript, which may be obtained from the Office of the Registrar (<http://www.registrar.columbia.edu/>) in Kent Hall, or from Student Services Online (<https://ssol.columbia.edu/>) (SSOL);
3. A writing sample, preferably a paper written for a political science course;
4. A brief description (no more than one page) of a possible thesis topic.

Complete applications should be sent to:

Department of Political Science
Attn: Departmental Honors
420 West 118th Street
Mail Code 3320
New York, NY 10027

In addition, students are encouraged to find a faculty sponsor for their thesis proposal. Students who have identified a faculty sponsor should indicate the sponsor in the proposal; students without a faculty sponsor should identify a faculty member with whom they would like to work. Research areas for the political science department faculty are listed on the department's website (<http://www.columbia.edu/cu/polisci/>). Students will be notified by e-mail of the decision taken on their applications before fall registration.

DEPARTMENTAL PRIZES AND FELLOWSHIPS

The Department of Political Science administers the following prizes and awards. Unless otherwise noted, students do not play an active part in the nomination process. Rather, faculty members nominate students at their own discretion. Departmental prizes are reserved for political science majors.

Charles A. Beard Prize

A cash prize awarded every other year to the student who writes the best paper in political science during the academic year.

Caroline Phelps Stokes Prize

Allan J. Willen Memorial Prize

Edwin Robbins Academic Research/Public Service Fellowship

The Arthur Ross Foundation Award

A cash prize awarded to GS students for excellence in the field of political science.

Phyllis Stevens Sharp Fellowship in American Politics

The Phyllis Stevens Sharp Endowment Fund provides stipends each year during either academic semester or the summer for one or more Columbia College or School of General Studies students majoring or concentrating in political science to support research in American politics or policy making, or otherwise uncompensated internships in a government office, agency, or other public service organization. Each spring, the department invites students to submit fellowship proposals. Awards are announced in late April or early May.

EARLY ADMISSION TO THE MASTER'S DEGREE PROGRAM IN POLITICAL SCIENCE FOR COLUMBIA AND BARNARD POLITICAL SCIENCE UNDERGRADUATES

While the Department of Political Science does not offer a joint bachelor of arts/master's degree, it does allow Columbia and Barnard undergraduates to apply for early admission to its

master's degree program. This enables qualified undergraduates majoring or concentrating in political science to obtain the B.A. degree and M.A. degree in fewer than five years (ten semesters) from the time of their entrance into Columbia or Barnard, if they fulfill the M.A. course and residency requirements through summer course work after receiving the B.A. or accelerated study during the course of their undergraduate career.

Students should apply during the fall semester of their senior year for admission to the M.A. program in the following fall semester, after completion of the B.A. degree. The department and the Graduate School of Arts and Sciences may award up to one-half residence unit of advanced standing and/or up to three courses (nine to twelve credits) of transfer credit for graduate courses (4000-level and above) taken at Columbia in excess of the requirements for the Columbia bachelor's degree, as certified by the dean of the undergraduate school awarding the bachelor's degree.

For further information about the application process and minimum qualifications for early admission, please contact the director of undergraduate studies.

For further information about requirements for the M.A. degree, see <https://gsas.columbia.edu/degree-programs/ma-programs/political-science> (<https://gsas.columbia.edu/degree-programs/ma-programs/political-science/>).

PROFESSORS

Richard K. Betts
 Jagdish Bhagwati (also Economics)
 Alessandra Casella (also Economics)
 Partha Chatterjee (Anthropology)
 Jean L. Cohen
 Michael Doyle (also School of International and Public Affairs; Law School)
 Jon Elster
 Robert Erikson
 Virginia Page Fortna
 Timothy Frye
 Ester Fuchs (School of International and Public Affairs)
 Andrew Gelman (also Statistics)
 Donald P. Green
 Bernard Harcourt (Law)
 Fredrick Harris
 Jeffrey Henig (Teachers College)
 Shigeo Hirano
 John Huber
 Macartan Humphreys
 Robert Jervis
 David C. Johnston
 Ira Katznelson (also History)
 Sudipta Kaviraj (Middle Eastern, South Asian, and African Studies)
 Jeffrey Lax
 Mahmood Mamdani (Anthropology)

Karuna Mantena
 M. Victoria Murillo (also School of International and Public Affairs)
 Andrew J. Nathan
 Sharyn O'Halloran (also School of International and Public Affairs)
 Justin Phillips
 Kenneth Prewitt (School of International and Public Affairs)
 Robert Y. Shapiro
 Jack Snyder
 Michael Ting (also School of International and Public Affairs)
 Nadia Urbinati
 Gregory Wawro (Chair)
 Andreas Wimmer (also Sociology)
 Keren Yarhi-Milo (also School of International and Public Affairs)

ASSOCIATE PROFESSORS

Allison Carnegie
 Daniel Corstange (also School of International and Public Affairs)
 Turkuler Isiksel
 Kimuli Kasara
 Tonya Putnam

ASSISTANT PROFESSORS

Sarah Daly
 Nikhar Gaikwad
 John Marshall
 Carlo Prato
 Joshua Simon
 Yamil Velez

LECTURERS

Michelle Chun
 Elise Giuliano
 Jessica Kimpell Johnson
 Lara Nettelfield
 Chiara Superti
 Inga Winkler

ON LEAVE

Profs. Daly, Doyle, Frye, Fuchs, Humphreys, Katznelson, Prato (2019-2020)
 Profs. Carnegie, Corstange, Erikson, Phillips (Fall 2019)
 Profs. Betts, Green, Jervis, Mamdani, Marshall (Spring 2020)

GUIDELINES FOR ALL POLITICAL SCIENCE MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Planning Forms

Major Planning forms are available on the department website (<https://polisci.columbia.edu/content/undergraduate-forms-library/>).

Policy on Double-Counting Courses

- Policies about double-counting courses to fulfill requirements in more than one major may be found here:
 - Columbia College (<http://bulletin.columbia.edu/columbia-college/requirements-degree-bachelor-arts/>)
 - School of General Studies (<http://bulletin.columbia.edu/general-studies/undergraduates/degree-fulfillment/major/#double>)
- Courses in the Core Curriculum do not fulfill requirements for the Political Science major.

Policy on Counting Credits outside the Department of Political Science

- Courses taken at other institutions or other Columbia departments may not be used to meet the requirement of a major or concentration in political science without the approval of the Director of Undergraduate Studies or the department's undergraduate adviser. Students should secure such approval in advance of registration.

Pass/D/Fail and Grading Policy

- A grade of "Pass" is acceptable only for the first course taken toward the major or concentration.
 - The course used to fulfill the research methods requirement cannot be taken Pass/D/Fail.
- Students must receive a grade of at least C- in order for a course to count towards the major or concentration.

AP Credit Policy

- Students who receive transfer credit for one or more AP exams in political science may count a maximum of one AP course toward the major or concentration, contingent upon completing an upper-level (3000 or higher) course with a grade of C or higher in the subfield in which the AP exam was taken. All transfer credits must be approved by the Director of Undergraduate Studies or the undergraduate adviser (polisciadvising@columbia.edu).

Transfer Credit Policy

- A maximum of three 3-point or 4-point courses in Political Science may be transferred from other institutions toward the major; a maximum of two courses in Political Science may be transferred toward the concentration and the two

interdepartmental joint majors. This includes study abroad and AP credit. All transfer credits must be approved by the Director of Undergraduate Studies or the undergraduate adviser (polisciadv@columbia.edu).

- Students wishing to count transfer credits toward the major or concentration should send the undergraduate adviser (polisciadv@columbia.edu) their transfer credit report, the syllabi of the courses they want to count toward departmental requirements, and a statement of how they want to apply the transfer credits to the requirements.

Independent Study Policy

- Independent Study (POLS UN3901 Independent Reading and Research I in the fall or POLS UN3902 Independent Reading and Research II in the spring) taken in fulfillment of course requirements for the major/concentration must be taken for at least 3 points of credit.

MAJOR IN POLITICAL SCIENCE

Program of Study

To be planned with the department as soon as the student starts to register for courses toward the major. Students should not wait until they formally declare the major before meeting with an undergraduate adviser during the registration period to plan their programs for the major.

Course Requirements

Students must choose a **Primary Subfield** and a **Secondary Subfield** to study. The subfields are as follows:

- American Politics (AP)
- Comparative Politics (CP)
- International Relations (IR)
- Political Theory (PT)

The major in political science requires a minimum of 9 courses in political science, to be distributed as follows:

Introductory Courses

Students must take two of the following introductory courses:

POLS UN1201	Introduction To American Government and Politics
POLS UN1501	Introduction to Comparative Politics
POLS UN1601	INTERNATIONAL POLITICS
POLS UN1101	Political Theory I

NOTE: Introductory courses taken that do not fit into the Primary or Secondary Subfield will be counted in the Political Science Elective category.

Primary Subfield

Minimum three courses.

Minor Subfield

Minimum two courses.

Seminars

Two 4-point 3000-level seminars, at least one of which is in the student's Primary Subfield.

(See "Seminars" section below for more information)

Research Methods *

Minimum one course in research methods. Courses that satisfy the research methods requirement are:

POLS UN3220	Logic of Collective Choice
POLS UN3704	Data Analysis and Statistics for Political Science Research
POLS UN3708	Empirical Research Methods
POLS UN3720	Scope and Methods
POLS GU4710	Principles of Quantitative Political Research
POLS GU4712	PRINC OF QUANT POL RESEARCH 2
POLS GU4714	Quantitative Methods I: Probability and Statistical Inference
POLS GU4730	Game Theory and Political Theory
POLS GU4732	Research Topics in Game Theory
POLS GU4764	Design and Analysis of Sample Surveys
POLS GU4768	Experimental Research: Design, Analysis and Interpretation
POLS GU4790	Advanced Topics in Quantitative Research
POLS GU4792	Quantitative Methods: Research Topics

Political Science Electives

Minimum one course (in any subfield).

- * A student may take another course inside or outside the department that provides relevant training in research methods to satisfy this requirement only with the written permission in advance of the Director of Undergraduate Studies or the department's undergraduate adviser. If a course outside the political science department is used to satisfy the research methods requirement, this same course cannot be used toward other majors/concentrations or programs.

Seminars

Students are expected to take two 3000-level 4-point seminars: one in their junior year and another in their senior year (with exceptions made for students on leave or studying abroad). They may choose from among the seminars offered, though at least one of the seminars taken must be in the student's Primary Subfield (that in which at least 9 other points have been completed). Entry into seminars requires instructor's permission.

For detailed seminar registration guidelines, see t (<http://polisci.columbia.edu/undergraduate-programs/seminar-registration-guidelines/>)he (<https://polisci.columbia.edu/content/undergraduate-seminars/>) department website

(<https://polisci.columbia.edu/content/undergraduate-seminars/>). Seminars cannot be taken for R credit or Pass/D/Fail.

Barnard colloquia are open to students with the permission of the instructor. However, Barnard colloquia may **not** be used to fulfill the seminar requirement, though they may be used to fulfill subfield or elective requirements. Note that admission to Barnard colloquia is by application to the Barnard Political Science Department only. Please consult with the Barnard Political Science Department for more information.

Recommended Courses

In addition to political science courses, students are strongly advised, but not required, to take six points in a related social science field.

MAJOR IN ECONOMICS– POLITICAL SCIENCE

The major in economics-political science is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

Two advisers are assigned for the interdepartmental major, one in the Department of Economics and one in the Department of Political Science. Please note that the economics adviser can only advise on economics requirements and the political science adviser can only advise on political science requirements.

Course Requirements

For the political science part of the major, students must choose a **Primary Subfield** and a **Secondary Subfield** to study. The corresponding introductory courses in both subfields must be taken, plus two electives in the Primary Subfield and one in the Secondary Subfield. The subfields are as follows:

- American Politics (AP)
- Comparative Politics (CP)
- International Relations (IR)
- Political Theory (PT)

The economics-political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows:

Core Requirements in Economics

Students must take all of the following core economics courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics

ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics
or POLS GU4712	PRINC OF QUANT POL RESEARCH 2
ECON GU4370	Political Economy

Core Requirements in Mathematics and Statistics

Students must take all of the following core mathematics and statistics courses:

MATH UN1101	Calculus I
MATH UN1201	Calculus III
STAT UN1201	Calculus-Based Introduction to Statistics

Economics Electives

Students must take two electives at the 3000 level or higher in the Department of Economics.

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921	Seminar In Political Economy
and a Political Science Department seminar, in the student's Primary Subfield. Please select one of the following: *	
POLS UN3911	Seminar in Political Theory
or POLS UN3912	Seminar in Political Theory
POLS UN3921	Seminar in American Politics
or POLS UN3922	Seminar in American Politics
POLS UN3951	Seminar in Comparative Politics
or POLS UN3952	Seminar in Comparative Politics
POLS UN3961	International Politics Seminar
or POLS UN3962	INTERNATIONAL POLITICS SEMINAR

* Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN POLITICAL SCIENCE– STATISTICS

The interdepartmental major of political science-statistics is designed for students who desire an understanding of political science to pursue advanced study in this field and who also wish to have at their command a broad range of sophisticated

statistical tools to analyze data related to social science and public policy research.

Students should be aware of the rules regarding the use of the Pass/D/Fail option. Courses in which a grade of D has been received do not count toward the major requirements.

Political science–statistics students are eligible for all prizes reserved for political science majors.

The political science–statistics major requires a minimum of 15 courses in political science, statistics, and mathematics, to be distributed as follows:

POLITICAL SCIENCE

Primary Subfield

-Students must choose a Primary Subfield to study. Within the subfield, students must take a minimum of three courses, including the subfield's introductory course. The subfields and their corresponding introductory courses are as follows:

American Politics:

POLS UN1201 Introduction To American Government and Politics

Comparative Politics:

POLS UN1501 Introduction to Comparative Politics

International Relations:

POLS UN1601 INTERNATIONAL POLITICS

Political Theory:

POLS UN1101 Political Theory I

-Additionally, students must take one 4-point 3000-level seminar in their Primary Subfield.

Research Methods

-Students must take the following two research methods courses:

POLS GU4710 Principles of Quantitative Political Research

or POLS UN3704 Data Analysis and Statistics for Political Science Research

POLS GU4712 PRINC OF QUANT POL RESEARCH 2

STATISTICS

-Students must take one of the following sequences:

Sequence A — recommended for students preparing for graduate study in statistics¹

MATH UN1101 Calculus I

MATH UN1102 Calculus II

MATH UN2010 Linear Algebra

STAT UN1201 Calculus-Based Introduction to Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

STAT GU4206 Statistical Computing and Introduction to Data Science

or

Sequence B — recommended for students preparing to apply statistical methods to other fields

STAT UN1101 Introduction to Statistics

STAT UN2102 Applied Statistical Computing

STAT UN2103 Applied Linear Regression Analysis

STAT UN2104 Applied Categorical Data Analysis

STAT UN3105 Applied Statistical Methods

STAT UN3106 Applied Data Mining

Statistics Elective

-Students must take an approved elective in a statistics or a quantitatively oriented course in a social science.

1. Students taking Statistics Sequence A may replace the mathematics requirements with both MATH UN1207 Honors Mathematics A and MATH UN1208 Honors Mathematics B.

CONCENTRATION IN POLITICAL SCIENCE

Program of Study

To be planned with the department as soon as the student starts to register for courses toward the concentration. Students should not wait until they formally declare the concentration before meeting with an undergraduate adviser during the registration period to plan their programs for the concentration.

Concentration Requirements

Students must choose a **Primary Subfield** and a **Secondary Subfield** to study. The subfields are as follows:

- American Politics (AP)
- Comparative Politics (CP)
- International Relations (IR)
- Political Theory (PT)

The concentration in political science requires a minimum of 7 courses in political science, to be distributed as follows:

Introductory Courses

Students must take two of the following introductory courses:

POLS UN1201 Introduction To American Government and Politics

POLS UN1501 Introduction to Comparative Politics

POLS UN1601 INTERNATIONAL POLITICS

POLS UN1101 Political Theory I

NOTE: Introductory courses taken that do not fit into the Primary or Secondary Subfield will be counted in the Political Science Elective category.

Primary Subfield

Minimum two courses.

Secondary Subfield

Minimum two courses.

Research Methods *

Minimum one course in research methods. Courses that satisfy the methods requirement are:

POLS UN3220	Logic of Collective Choice
POLS UN3704	Data Analysis and Statistics for Political Science Research
POLS UN3708	Empirical Research Methods
POLS UN3720	Scope and Methods
POLS GU4710	Principles of Quantitative Political Research
POLS GU4712	PRINC OF QUANT POL RESEARCH 2
POLS GU4714	Quantitative Methods I: Probability and Statistical Inference
POLS GU4730	Game Theory and Political Theory
POLS GU4732	Research Topics in Game Theory
POLS GU4764	Design and Analysis of Sample Surveys
POLS GU4768	Experimental Research: Design, Analysis and Interpretation
POLS GU4790	Advanced Topics in Quantitative Research
POLS GU4792	Quantitative Methods: Research Topics

Political Science Electives

Minimum two courses (in any subfield).

* A student may take another course inside or outside the department that provides relevant training in research methods to satisfy this requirement only with the written permission in advance of the Director of Undergraduate Studies or the department's undergraduate adviser. If a course outside the political science department is used to satisfy the research methods requirement, this same course cannot be used toward other majors/concentrations or programs.

Recommended Courses

In addition to courses in political science, students are strongly advised, but not required, to take six credits in a related social science field.

POLITICAL SCIENCE- STATISTICS

Departmental Office: 710 International Affairs Building;
212-854-3707
<http://www.polisci.columbia.edu>

Director of Undergraduate Studies:

Prof. David Johnston, 720 International Affairs Building;
212-854-3955; d (ajn1@columbia.edu)cj1@columbia.edu
(dcj1@columbia.edu)

Economics-Political Science Advisers:

Economics: Prof. Susan Elmes, Director of Undergraduate Studies, 1006 International Affairs Building; se5@columbia.edu
Political Science: Prof. Michael Ting, 701 International Affairs Building; 212-854-7945; mmt2033@columbia.edu

Political Science-Statistics Advisers:

Political Science: Prof. Andrew Gelman, 1016 Social Work Building; 212-851-2142; gelman@stat.columbia.edu (gelman@stat.columbia.edu)
Statistics: Prof. Banu Baydil, 612 West 115th Street, Room 611; 212-853-1397; bb2717@columbia.edu
Statistics: Prof. Ronald Neath, 612 West 115th Street, Room 612; 212-853-1398; rcn2112@columbia.edu

The discipline of political science focuses on issues of power and governance and, in particular, on political institutions, both formal and informal. It also focuses on political behavior, political processes, political economy, and state-society relations.

The field consists of four substantive subfields: *American politics*, which covers such topics as national and local politics, elections, and constitutional law; *comparative politics*, which aims at understanding the political systems of other countries, both by studying individual states and by engaging in cross-national comparisons; *international relations*, which deals with the ways that states and other political actors behave in the international arena, including such topics as security, foreign policies, international organizations, and international economic relations; and *political theory*, which analyzes the history of normative political thought as well as of analytic concepts such as the nature of justice or liberty.

Other broad topics, such as “political economy,” or the study of the relationships between economic and political processes, overlap with the subfields, but also constitute a separate program (see below). Methodology, including statistical analysis and formal modeling, also occupies an important place in the discipline.

ADVANCED PLACEMENT

The department grants credit toward the major for work completed under the College Entrance Examination Board (CEEB) Advanced Placement Program. Students receive 3 academic credits and exemption from POLS UN1201 Introduction To American Government and Politics or POLS UN1501 Introduction to Comparative Politics for scores of 5 in the United States and Comparative Government and Politics AP Exams.

ADVISING

The Department of Political Science offers a variety of advising resources to provide undergraduate majors and concentrators

with the information and support needed to successfully navigate through the program. These resources are described below.

Undergraduate Advising Office

Students should take questions or concerns about the undergraduate program to the department's undergraduate advising office first. If advisers cannot answer a student's question, they then refer the student to the appropriate person.

The undergraduate advising office is staffed by a political science Ph.D. student who holds open office hours at least once per week (the schedule can be found on-line at <https://polisci.columbia.edu/content/undergraduate-advising> (<https://polisci.columbia.edu/content/undergraduate-advising/>)). Students should stop by during these hours with questions about requirements, course selection, course of study, transfer and study abroad credit, and any other aspect of the program. Students may also reach the adviser by email at polisciadvising@columbia.edu.

Students should also visit the undergraduate advising office for assistance in completing the political science program planning form (available in the office, or on-line at <https://polisci.columbia.edu/content/undergraduate-forms-library> (<https://polisci.columbia.edu/content/undergraduate-forms-library/>)). The advisers must sign and date this form in the approval column next to any listed class that requires approval to be counted toward the program (transfer courses, non-traditional courses, etc.). These forms cannot be completed by faculty advisers. Each student's planning form is kept on file in the department, so that each semester they may meet with an adviser to update it.

The advisers are also available to speak with students about more substantive issues, including research interests, internships, and post-college plans. Since the advisers have been through the graduate school application process, they are great resources with whom students may discuss the process. Also, because they are current Ph.D. students in the department, they are familiar with the research interests of political science faculty and can therefore refer students to a professor for thesis advice, a research assistant job, or a faculty member whose research corresponds to the student's interests.

Requesting a Faculty Adviser

Often the best way for students to obtain advising from a faculty member is to contact a professor with whom they have taken a class in an area of interest. Students also have the option of having a faculty adviser assigned by the department. To request a faculty adviser, students should complete the Faculty Adviser Request Form and submit it to the undergraduate coordinator during the first two weeks of the semester.

Students may consult with their faculty adviser for any substantive issue, but still must visit walk-in advising hours to

have courses approved, to fill out and update planning forms, and to discuss departmental requirements and regulations.

Director of Undergraduate Studies

The director of undergraduate studies oversees the undergraduate program and is available during office hours. While a student's first stop for advising should be the undergraduate advising office, the director of undergraduate studies is available to answer any questions that the undergraduate advisers or the undergraduate coordinator cannot. In such cases, the undergraduate coordinator and advisers refer students to the director of undergraduate studies.

Economics–Political Science Adviser

Economics–political science majors may consult with the economics–political science adviser during office hours. Please note that students should also see an undergraduate adviser to discuss major requirements and fill out a planning form. For any questions about the economics–political science program that an undergraduate adviser cannot answer, students are referred to the economics–political science adviser.

Political Science–Statistics Adviser

Political science–statistics majors may consult with the political science–statistics adviser during office hours. Please note that students should also see an undergraduate adviser to discuss major requirements and fill out a planning form. For any questions about the political science–statistics program that an undergraduate adviser cannot answer, students are referred to the political science–statistics adviser.

Faculty At-Large

Students are encouraged to contact any professor for advice during his or her office hours, or by appointment, to discuss interests in political science, course selection, and other academic or post-college issues. The faculty may provide advice about graduate schools, suggest literature that the student might consult as sources for research, recommend specific courses or professors based on the student's interests, or offer information about research opportunities with faculty. However, students should note that any issues surrounding departmental regulations and requirements, major certification, course approvals, etc., are addressed at the undergraduate advising office.

HONORS PROGRAM

The department offers the Honors Program for a limited number of seniors who want to undertake substantial research projects and write honors theses. The honors thesis is expected to be at least 75 pages in length and of exceptional quality.

Honors students perform research as part of a full-year honors seminar (POLS UN3998-POLS UN3999, 8 points total) during their senior year, in place of the seminar requirement for majors. Honors students may, however, take regular seminars to fulfill other course requirements for the major. Theses are

due in late March or early April. To be awarded departmental honors, the student must satisfy all the requirements for the major, maintain a 3.6 GPA in the major, and complete a thesis of sufficiently high quality to merit honors.

The honors seminar director provides general direction for the seminar. The honors seminar director supervises all students; each student also works with a faculty member in his or her major subfield (American politics, comparative politics, international relations, or political theory) and a preceptor. The honors seminar meets weekly for part of the year and addresses general issues involved in research and thesis writing, such as how to develop research questions and projects, methodology, sources of evidence, and outlining and drafting long papers. The sessions are also used for group discussions of students' research and thesis presentations. Students are also expected to meet periodically with the supervising professor and preceptor.

Students who wish to apply to the Honors Program must notify the department in writing by the end of the spring semester of the junior year. Please check the department website for the official deadline. Normally no more than 10% of graduating majors receive departmental honors in a given academic year. Applicants are required to have already completed the methods requirement for the major.

Application Materials

Applications to the Honors Program must include the following:

1. A cover page with the student's name, CUID number, e-mail address, and school (Columbia College or General Studies);
2. An official transcript, which may be obtained from the Office of the Registrar (<http://www.registrar.columbia.edu/>) in Kent Hall, or from Student Services Online (<https://ssol.columbia.edu/>) (SSOL);
3. A writing sample, preferably a paper written for a political science course;
4. A brief description (no more than one page) of a possible thesis topic.

Complete applications should be sent to:

Department of Political Science
Attn: Departmental Honors
420 West 118th Street
Mail Code 3320
New York, NY 10027

In addition, students are encouraged to find a faculty sponsor for their thesis proposal. Students who have identified a faculty sponsor should indicate the sponsor in the proposal; students without a faculty sponsor should identify a faculty member with whom they would like to work. Research areas for the political science department faculty are listed on the department's website (<http://www.columbia.edu/cu/polisci/>).

Students will be notified by e-mail of the decision taken on their applications before fall registration.

DEPARTMENTAL PRIZES AND FELLOWSHIPS

The Department of Political Science administers the following prizes and awards. Unless otherwise noted, students do not play an active part in the nomination process. Rather, faculty members nominate students at their own discretion. Departmental prizes are reserved for political science majors.

Charles A. Beard Prize

A cash prize awarded every other year to the student who writes the best paper in political science during the academic year.

Caroline Phelps Stokes Prize

Allan J. Willen Memorial Prize

Edwin Robbins Academic Research/Public Service Fellowship

The Arthur Ross Foundation Award

A cash prize awarded to GS students for excellence in the field of political science.

Phyllis Stevens Sharp Fellowship in American Politics

The Phyllis Stevens Sharp Endowment Fund provides stipends each year during either academic semester or the summer for one or more Columbia College or School of General Studies students majoring or concentrating in political science to support research in American politics or policy making, or otherwise uncompensated internships in a government office, agency, or other public service organization. Each spring, the department invites students to submit fellowship proposals. Awards are announced in late April or early May.

EARLY ADMISSION TO THE MASTER'S DEGREE PROGRAM IN POLITICAL SCIENCE FOR COLUMBIA AND BARNARD POLITICAL SCIENCE UNDERGRADUATES

While the Department of Political Science does not offer a joint bachelor of arts/master's degree, it does allow Columbia and Barnard undergraduates to apply for early admission to its master's degree program. This enables qualified undergraduates majoring or concentrating in political science to obtain the B.A. degree and M.A. degree in fewer than five years (ten semesters) from the time of their entrance into Columbia or Barnard, if they fulfill the M.A. course and residency requirements through summer course work after receiving

the B.A. or accelerated study during the course of their undergraduate career.

Students should apply during the fall semester of their senior year for admission to the M.A. program in the following fall semester, after completion of the B.A. degree. The department and the Graduate School of Arts and Sciences may award up to one-half residence unit of advanced standing and/or up to three courses (nine to twelve credits) of transfer credit for graduate courses (4000-level and above) taken at Columbia in excess of the requirements for the Columbia bachelor's degree, as certified by the dean of the undergraduate school awarding the bachelor's degree.

For further information about the application process and minimum qualifications for early admission, please contact the director of undergraduate studies.

For further information about requirements for the M.A. degree, see <https://gsas.columbia.edu/degree-programs/ma-programs/political-science> (<https://gsas.columbia.edu/degree-programs/ma-programs/political-science/>).

PROFESSORS

Richard K. Betts
 Jagdish Bhagwati (also Economics)
 Alessandra Casella (also Economics)
 Partha Chatterjee (Anthropology)
 Jean L. Cohen
 Michael Doyle (also School of International and Public Affairs; Law School)
 Jon Elster
 Robert Erikson
 Virginia Page Fortna
 Timothy Frye
 Ester Fuchs (School of International and Public Affairs)
 Andrew Gelman (also Statistics)
 Donald P. Green
 Bernard Harcourt (Law)
 Fredrick Harris
 Jeffrey Henig (Teachers College)
 Shigeo Hirano
 John Huber
 Macartan Humphreys
 Robert Jervis
 David C. Johnston
 Ira Katznelson (also History)
 Sudipta Kaviraj (Middle Eastern, South Asian, and African Studies)
 Jeffrey Lax
 Mahmood Mamdani (Anthropology)
 Karuna Mantena
 M. Victoria Murillo (also School of International and Public Affairs)
 Andrew J. Nathan
 Sharyn O'Halloran (also School of International and Public Affairs)

Justin Phillips
 Kenneth Prewitt (School of International and Public Affairs)
 Robert Y. Shapiro
 Jack Snyder
 Michael Ting (also School of International and Public Affairs)
 Nadia Urbinati
 Gregory Wawro (Chair)
 Andreas Wimmer (also Sociology)
 Keren Yarhi-Milo (also School of International and Public Affairs)

ASSOCIATE PROFESSORS

Allison Carnegie
 Daniel Corstange (also School of International and Public Affairs)
 Turkuler Isiksel
 Kimuli Kasara
 Tonya Putnam

ASSISTANT PROFESSORS

Sarah Daly
 Nikhar Gaikwad
 John Marshall
 Carlo Prato
 Joshua Simon
 Yamil Velez

LECTURERS

Michelle Chun
 Elise Giuliano
 Jessica Kimpell Johnson
 Lara Nettelield
 Chiara Superti
 Inga Winkler

ON LEAVE

Profs. Daly, Doyle, Frye, Fuchs, Humphreys, Katznelson, Prato (2019-2020)
 Profs. Carnegie, Corstange, Erikson, Phillips (Fall 2019)
 Profs. Betts, Green, Jervis, Mamdani, Marshall (Spring 2020)

GUIDELINES FOR ALL POLITICAL SCIENCE MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Planning Forms

Major Planning forms are available on the department website (<https://polisci.columbia.edu/content/undergraduate-forms-library/>).

Policy on Double-Counting Courses

- Policies about double-counting courses to fulfill requirements in more than one major may be found here:
 - Columbia College (<http://bulletin.columbia.edu/columbia-college/requirements-degree-bachelor-arts/>)
 - School of General Studies (<http://bulletin.columbia.edu/general-studies/undergraduates/degree-fulfillment/major/#double>)
- Courses in the Core Curriculum do not fulfill requirements for the Political Science major.

Policy on Counting Credits outside the Department of Political Science

- Courses taken at other institutions or other Columbia departments may not be used to meet the requirement of a major or concentration in political science without the approval of the Director of Undergraduate Studies or the department's undergraduate adviser. Students should secure such approval in advance of registration.

Pass/D/Fail and Grading Policy

- A grade of "Pass" is acceptable only for the first course taken toward the major or concentration.
 - The course used to fulfill the research methods requirement cannot be taken Pass/D/Fail.
- Students must receive a grade of at least C- in order for a course to count towards the major or concentration.

AP Credit Policy

- Students who receive transfer credit for one or more AP exams in political science may count a maximum of one AP course toward the major or concentration, contingent upon completing an upper-level (3000 or higher) course with a grade of C or higher in the subfield in which the AP exam was taken. All transfer credits must be approved by the Director of Undergraduate Studies or the undergraduate adviser (polisciadvise@columbia.edu).

Transfer Credit Policy

- A maximum of three 3-point or 4-point courses in Political Science may be transferred from other institutions toward the major; a maximum of two courses in Political Science may be transferred toward the concentration and the two interdepartmental joint majors. This includes study abroad and AP credit. All transfer credits must be approved by the Director of Undergraduate Studies or the undergraduate adviser (polisciadvise@columbia.edu).
- Students wishing to count transfer credits toward the major or concentration should send the undergraduate adviser (polisciadvise@columbia.edu) their transfer credit report, the syllabi of the courses they want to count toward departmental requirements, and a statement of how they want to apply the transfer credits to the requirements.

Independent Study Policy

- Independent Study (POLS UN3901 Independent Reading and Research I in the fall or POLS UN3902 Independent Reading and Research II in the spring) taken in fulfillment of course requirements for the major/concentration must be taken for at least 3 points of credit.

MAJOR IN POLITICAL SCIENCE

Program of Study

To be planned with the department as soon as the student starts to register for courses toward the major. Students should not wait until they formally declare the major before meeting with an undergraduate adviser during the registration period to plan their programs for the major.

Course Requirements

Students must choose a **Primary Subfield** and a **Secondary Subfield** to study. The subfields are as follows:

- American Politics (AP)
- Comparative Politics (CP)
- International Relations (IR)
- Political Theory (PT)

The major in political science requires a minimum of 9 courses in political science, to be distributed as follows:

Introductory Courses

Students must take two of the following introductory courses:

POLS UN1201	Introduction To American Government and Politics
POLS UN1501	Introduction to Comparative Politics
POLS UN1601	INTERNATIONAL POLITICS
POLS UN1101	Political Theory I

NOTE: Introductory courses taken that do not fit into the Primary or Secondary Subfield will be counted in the Political Science Elective category.

Primary Subfield

Minimum three courses.

Minor Subfield

Minimum two courses.

Seminars

Two 4-point 3000-level seminars, at least one of which is in the student's Primary Subfield.

(See "Seminars" section below for more information)

Research Methods *

Minimum one course in research methods. Courses that satisfy the research methods requirement are:

POLS UN3220	Logic of Collective Choice
POLS UN3704	Data Analysis and Statistics for Political Science Research
POLS UN3708	Empirical Research Methods

POLS UN3720	Scope and Methods
POLS GU4710	Principles of Quantitative Political Research
POLS GU4712	PRINC OF QUANT POL RESEARCH 2
POLS GU4714	Quantitative Methods I: Probability and Statistical Inference
POLS GU4730	Game Theory and Political Theory
POLS GU4732	Research Topics in Game Theory
POLS GU4764	Design and Analysis of Sample Surveys
POLS GU4768	Experimental Research: Design, Analysis and Interpretation
POLS GU4790	Advanced Topics in Quantitative Research
POLS GU4792	Quantitative Methods: Research Topics

Political Science Electives

Minimum one course (in any subfield).

* A student may take another course inside or outside the department that provides relevant training in research methods to satisfy this requirement only with the written permission in advance of the Director of Undergraduate Studies or the department's undergraduate adviser. If a course outside the political science department is used to satisfy the research methods requirement, this same course cannot be used toward other majors/concentrations or programs.

Seminars

Students are expected to take two 3000-level 4-point seminars: one in their junior year and another in their senior year (with exceptions made for students on leave or studying abroad). They may choose from among the seminars offered, though at least one of the seminars taken must be in the student's Primary Subfield (that in which at least 9 other points have been completed). Entry into seminars requires instructor's permission.

For detailed seminar registration guidelines, see <http://polisci.columbia.edu/undergraduate-programs/seminar-registration-guidelines/> or <https://polisci.columbia.edu/content/undergraduate-seminars/> department website (<https://polisci.columbia.edu/content/undergraduate-seminars/>). Seminars cannot be taken for R credit or Pass/D/Fail.

Barnard colloquia are open to students with the permission of the instructor. However, Barnard colloquia may **not** be used to fulfill the seminar requirement, though they may be used to fulfill subfield or elective requirements. Note that admission to Barnard colloquia is by application to the Barnard Political Science Department only. Please consult with the Barnard Political Science Department for more information.

Recommended Courses

In addition to political science courses, students are strongly advised, but not required, to take six points in a related social science field.

MAJOR IN ECONOMICS–POLITICAL SCIENCE

The major in economics-political science is an interdisciplinary major that introduces students to the methodologies of economics and political science and stresses areas of particular concern to both. This program is particularly beneficial to students planning to do graduate work in schools of public policy and international affairs.

Two advisers are assigned for the interdepartmental major, one in the Department of Economics and one in the Department of Political Science. Please note that the economics adviser can only advise on economics requirements and the political science adviser can only advise on political science requirements.

Course Requirements

For the political science part of the major, students must choose a **Primary Subfield** and a **Secondary Subfield** to study. The corresponding introductory courses in both subfields must be taken, plus two electives in the Primary Subfield and one in the Secondary Subfield. The subfields are as follows:

- American Politics (AP)
- Comparative Politics (CP)
- International Relations (IR)
- Political Theory (PT)

The economics-political science major requires a total of 59 points: 22 points in economics, 17 points in political science, 6 points in mathematics, 6 points in statistical methods, 4 points in a political science seminar, and 4 points in the interdisciplinary seminar as follows:

Core Requirements in Economics

Students must take all of the following core economics courses:

ECON UN1105	Principles of Economics
ECON UN3211	Intermediate Microeconomics
ECON UN3213	Intermediate Macroeconomics
ECON UN3412	Introduction To Econometrics
or POLS GU4712	PRINC OF QUANT POL RESEARCH 2
ECON GU4370	Political Economy

Core Requirements in Mathematics and Statistics

Students must take all of the following core mathematics and statistics courses:

MATH UN1101	Calculus I
MATH UN1201	Calculus III
STAT UN1201	Calculus-Based Introduction to Statistics

Economics Electives

Students must take two electives at the 3000 level or higher in the Department of Economics.

Political Science Courses

Students must choose a Primary Subfield and a Secondary Subfield to study. The subfields are as follows: American Politics (AP), Comparative Politics (CP), International Relations (IR), and Political Theory (PT).

Primary Subfield: Minimum three courses, one of which must be the subfield's introductory course.

Secondary Subfield: Minimum two courses, one of which must be the subfield's introductory course.

Seminars

Students must take the following two seminars:

ECPS GU4921 Seminar In Political Economy

and a Political Science Department seminar, in the student's Primary Subfield. Please select one of the following: *

POLS UN3911 Seminar in Political Theory
or POLS UN3912 Seminar in Political Theory

POLS UN3921 Seminar in American Politics
or POLS UN3922 Seminar in American Politics

POLS UN3951 Seminar in Comparative Politics
or POLS UN3952 Seminar in Comparative Politics

POLS UN3961 International Politics Seminar
or POLS UN3962 INTERNATIONAL POLITICS SEMINAR

* Students who wish to count toward the political science seminar requirement a course that is not in the above list of approved seminars must obtain permission from the political science Director of Undergraduate studies. Barnard colloquia can count for seminar credit only with the written permission of the Director of Undergraduate Studies. Note that admission to Barnard colloquia is by application to the Barnard political science department only.

MAJOR IN POLITICAL SCIENCE–STATISTICS

The interdepartmental major of political science–statistics is designed for students who desire an understanding of political science to pursue advanced study in this field and who also wish to have at their command a broad range of sophisticated statistical tools to analyze data related to social science and public policy research.

Students should be aware of the rules regarding the use of the Pass/D/Fail option. Courses in which a grade of D has been received do not count toward the major requirements.

Political science–statistics students are eligible for all prizes reserved for political science majors.

The political science–statistics major requires a minimum of 15 courses in political science, statistics, and mathematics, to be distributed as follows:

POLITICAL SCIENCE**Primary Subfield**

-Students must choose a Primary Subfield to study. Within the subfield, students must take a minimum of three courses, including the subfield's introductory course. The subfields and their corresponding introductory courses are as follows:

American Politics:

POLS UN1201 Introduction To American Government and Politics

Comparative Politics:

POLS UN1501 Introduction to Comparative Politics

International Relations:

POLS UN1601 INTERNATIONAL POLITICS

Political Theory:

POLS UN1101 Political Theory I

-Additionally, students must take one 4-point 3000-level seminar in their Primary Subfield.

Research Methods

-Students must take the following two research methods courses:

POLS GU4710 Principles of Quantitative Political Research

or POLS UN3704 Data Analysis and Statistics for Political Science Research

POLS GU4712 PRINC OF QUANT POL RESEARCH 2

STATISTICS

-Students must take one of the following sequences:

Sequence A — recommended for students preparing for graduate study in statistics ¹

MATH UN1101 Calculus I

MATH UN1102 Calculus II

MATH UN2010 Linear Algebra

STAT UN1201 Calculus-Based Introduction to Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

STAT GU4206 Statistical Computing and Introduction to Data Science

or

Sequence B — recommended for students preparing to apply statistical methods to other fields

STAT UN1101 Introduction to Statistics

STAT UN2102 Applied Statistical Computing

STAT UN2103 Applied Linear Regression Analysis

STAT UN2104 Applied Categorical Data Analysis

STAT UN3105 Applied Statistical Methods

STAT UN3106 Applied Data Mining

Statistics Elective

-Students must take an approved elective in a statistics or a quantitatively oriented course in a social science.

1. Students taking Statistics Sequence A may replace the mathematics requirements with both MATH UN1207 Honors Mathematics A and MATH UN1208 Honors Mathematics B.

CONCENTRATION IN POLITICAL SCIENCE

Program of Study

To be planned with the department as soon as the student starts to register for courses toward the concentration. Students should not wait until they formally declare the concentration before meeting with an undergraduate adviser during the registration period to plan their programs for the concentration.

Concentration Requirements

Students must choose a **Primary Subfield** and a **Secondary Subfield** to study. The subfields are as follows:

- American Politics (AP)
- Comparative Politics (CP)
- International Relations (IR)
- Political Theory (PT)

The concentration in political science requires a minimum of 7 courses in political science, to be distributed as follows:

Introductory Courses

Students must take two of the following introductory courses:

POLS UN1201	Introduction To American Government and Politics
POLS UN1501	Introduction to Comparative Politics
POLS UN1601	INTERNATIONAL POLITICS
POLS UN1101	Political Theory I

NOTE: Introductory courses taken that do not fit into the Primary or Secondary Subfield will be counted in the Political Science Elective category.

Primary Subfield

Minimum two courses.

Secondary Subfield

Minimum two courses.

Research Methods *

Minimum one course in research methods. Courses that satisfy the methods requirement are:

POLS UN3220	Logic of Collective Choice
POLS UN3704	Data Analysis and Statistics for Political Science Research
POLS UN3708	Empirical Research Methods
POLS UN3720	Scope and Methods
POLS GU4710	Principles of Quantitative Political Research
POLS GU4712	PRINC OF QUANT POL RESEARCH 2

POLS GU4714	Quantitative Methods I: Probability and Statistical Inference
POLS GU4730	Game Theory and Political Theory
POLS GU4732	Research Topics in Game Theory
POLS GU4764	Design and Analysis of Sample Surveys
POLS GU4768	Experimental Research: Design, Analysis and Interpretation
POLS GU4790	Advanced Topics in Quantitative Research
POLS GU4792	Quantitative Methods: Research Topics

Political Science Electives

Minimum two courses (in any subfield).

- * A student may take another course inside or outside the department that provides relevant training in research methods to satisfy this requirement only with the written permission in advance of the Director of Undergraduate Studies or the department's undergraduate adviser. If a course outside the political science department is used to satisfy the research methods requirement, this same course cannot be used toward other majors/concentrations or programs.

Recommended Courses

In addition to courses in political science, students are strongly advised, but not required, to take six credits in a related social science field.

PORTUGUESE STUDIES

***Portuguese Studies is offered exclusively as a concentration.**

Departmental Office:

101 Casa Hispánica | 612 W. 116th Street | (212) 854-4187
<http://www.laic.columbia.edu/>

Director of Undergraduate Studies:

Prof. Seth Kimmel | 408 Casa Hispánica | (212) 854-6238 | srk29@columbia.edu

Director of Graduate Studies:

Prof. Alessandra Russo | 405 Casa Hispánica | (212) 854-4187 | ar2701@columbia.edu

Director of the Spanish Language Program:

Dr. Lee B. Abraham | 402 Casa Hispánica | (212) 854-3764 | lba2133@columbia.edu

Director of the Portuguese Language Program:

José Antonio Castellanos-Pazos | 501 Casa Hispánica | (212) 854-0277 | jc846 (jc846@columbia.edu)@columbia.edu (lba2133@columbia.edu)

The Department of Latin American and Iberian Cultures (LAIC) at Columbia, located in the Casa Hispánica, has long enjoyed an international reputation as a center for Hispanic and Lusophone studies. The department provides linguistic preparation in Spanish, Portuguese, and Catalan, and offers a flexible program to study manifestations of the Hispanic and Lusophone worlds in all historical periods—from the medieval to the globalized present—and in a variety of cultural contexts: the Iberian Peninsula, Latin America, the former colonies of Portugal, and the United States.

Students can enter the program at any level of linguistic and cultural preparedness. The department offers a placement exam to determine the level at which students may either begin or continue study. Majors and concentrators in Hispanic studies and Portuguese studies are typically double majors who bring insights and methods from fields such as history, political science, women's studies, anthropology, economics, Latino studies, Latin American studies, etc., which fosters engaging discussions.

ACADEMIC PROGRAMS

The department offers two majors. The major in Hispanic studies gives students a well-rounded preparation in the history and culture of the Hispanic world. The second option, a major in Hispanic studies with specialization, allows students to study the Hispanic world through a number of fields, among them Latin American studies, gender studies, political science, economics, history, and sociology. The department also offers two concentrations: Hispanic studies and Portuguese studies.

The language and major programs have also been designed in close consultation and cooperation with Barnard's Department of Spanish and Latin American Cultures. All courses taken in one program may be used to fulfill the requirements of the other. Hence, Columbia and Barnard students may move freely between departments of both institutions for courses that best fit their intellectual interests and schedules.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 5 on the AP Spanish Language exam, which satisfies the foreign language requirement. Credit is awarded upon successful completion of a 3300-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in Spanish. Courses taught in English may not be used for language AP credit.

The department grants 0 credits for a score of 4 on the AP Spanish Language exam, but the foreign language requirement is satisfied.

The department grants 3 credits for a score of 5 on the AP Spanish Literature exam, which satisfies the foreign language

requirement. Credit is awarded upon successful completion of a 3300-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in Spanish. Courses taught in English may not be used for language AP credit.

The department grants 0 credits for a score of 4 on the AP Spanish Literature exam, but the foreign language requirement is satisfied.

STUDY ABROAD

The department strongly recommends that all Hispanic and Portuguese studies majors/concentrators study abroad. Most courses taken abroad can be used to fulfill the requirements for the major and concentration, and with adequate planning, even some of the requirements for a second major or concentration. A maximum of four (4) courses taken abroad may be applied to the major, and a maximum of three (3) to the concentration in Hispanic or Portuguese studies.

All students are strongly advised to take either SPAN UN3349 Hispanic Cultures I: Islamic Spain through the Colonial Period or SPAN UN3350 Hispanic Cultures II: Enlightenment to the Present before studying abroad. Actual or potential majors and concentrators in Hispanic or Portuguese studies should seek tentative approval of their programs from the director of undergraduate studies before their departure.

INTERNSHIPS

The department maintains an updated list of internship resources and volunteer opportunities in New York City, the United States, and abroad. No academic credit is given for internships.

THE HISPANIC INSTITUTE

The department hosts the Hispanic Institute at Columbia. Founded in 1920 as the Instituto de las Españas, the Institute sponsors and disseminates research on Hispanic and Luso-Brazilian culture. Since 1934, the Institute has published the *Revista Hispánica Moderna*, a distinguished journal in Hispanic criticism and theory.

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT

For students with no knowledge of Spanish, Portuguese, or Catalan, at least four terms of the language are required: *UN1101-UN1102* (or *UN1120*) and *UN2101-UN2102* (or *UN2120*). **All courses must be taken for a letter grade to fulfill the language requirement.**

Students with prior knowledge of Spanish who plan to continue studying Spanish are required to take the department's on-line placement examination (<http://laic.columbia.edu/programs/placement-examination/>) before registering for

courses. Students with prior knowledge of Portuguese or Catalan should speak with the director of language programs.

Students may be exempted from the language requirement in one of four ways:

1. Present a score of 4 or 5 on the AP Spanish Language or Spanish Literature Exams. Students who receive a score of 5 in either exam are awarded 3 AP credits upon successful completion of a 3300-level (or above) course with a grade of B or higher. AP credit is not granted for a score of 4.
2. Present a score of 780 or above on the SAT Subject Test. Students with a score lower than 780 should take the department's on-line placement exam and follow the placement advice received.
3. Present a score of a 7, 6, or 5 on the International Baccalaureate Higher Level Exam in Spanish.
4. Obtain a score of 625 or higher in the department's on-line placement exam (<http://laic.columbia.edu/programs/placement-examination/>). If the score in the on-line test qualifies a student for exemption from the language requirement, they are required to take a written version of the placement exam during orientation (for entering students) or during the semester (for continuing students). This written exam is offered every year on the Thursday before the beginning of classes in the fall semester from 10:00 a.m.- 2:00 p.m. in Room 352 of the International Affairs Building (the Language Resource Center Computer Lab). Students do not need to make an appointment to take the exam.

DEPARTMENTAL HONORS

Beginning in Spring 2015, the department put in place a new timeline and training program for juniors, to assist students with planning and completing the Honors Thesis during their senior year. The Honors Thesis is an excellent option for any student interested in pursuing a Master's degree or Ph.D.; but, above all, it is a highly formative research and writing experience—one that can bear unexpected fruits toward any path the student decides to take in the future.

All students pursuing a major through the department may apply to write an Honors Thesis. The department envisions the thesis as an intellectually challenging and rewarding experience that crowns four years of undergraduate studies with an original contribution in the field chosen by the student.

The department supports students in shaping their research topic and provides frequent advising throughout the research and writing process. The timeline is as follows:

- During the junior year, students take into consideration the possibility of writing an Honors Thesis in the following year. The topic of the Honors Thesis may likely originate in an advanced course taken during the junior year; students may also choose to develop ideas discussed or papers written in courses taken in previous years. Juniors schedule

a meeting (or, if the student is studying abroad, a Skype conversation) with the director of undergraduate studies to discuss their proposed topic and faculty adviser.

- By May 15, juniors who have decided to write an Honors Thesis in their senior year send a formal proposal to the director of undergraduate studies, which includes:
 - A title and a one-page abstract;
 - The name of the proposed faculty adviser;
 - An application for departmental partial funding support (for those who would like to pursue research during the summer).
- By May 30, the Honors Thesis committee reviews the proposals and informs the students of its decision.
- In the fall of the senior year:
 - Seniors selected to write the Honors Thesis enroll in SPAN UN3998 Supervised Individual Research (Spring) with their faculty adviser and write the Honors Thesis during the entire senior year under the direction of their adviser. For the purposes of the major, this independent study counts as a 3-point course towards elective courses.
 - Faculty advisers organize Honors Thesis Workshops to discuss students' ongoing projects and provide advising on research tools, methodological and theoretical frames, and overall writing process.
- In either the fall or spring of the senior year, students enroll in a Senior Seminar.
- By April 15 of the senior year, students complete and present their Honors Thesis for consideration towards departmental honors and prizes. Students submit their thesis in hard copy, following the formatting specifications provided on the LAIC website (<http://laic.columbia.edu/programs/formatting-specifications-for-the-senior-thesis/>).
- By May 1, the Honors Thesis committee informs the students of its decision. Departmental honors and prizes are assigned. The committee provides publishing options to students whose work has resulted in a highly original scholarship piece.

In order to facilitate the transition to this new schedule, the department will organize an *Honors Thesis Introductory Session* during the last week of April 2015. All undergraduate students are welcome; students in the junior year will have the opportunity to discuss possible research themes and thesis topics.

To be considered for departmental honors, a student must write an Honors Thesis and maintain a GPA of at least 3.6 in major courses. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

UNDERGRADUATE PRIZES

The faculty awards an undergraduate prize every year:

Dr. Antonio G. Mier Prize

Awarded for excellence in Hispanic Studies to a major degree candidate in the School of General Studies at Columbia University.

PROFESSORS

Carlos J. Alonso
 Bruno Bosteels
 Patricia E. Grieve
 Alberto Medina
 Graciela R. Montaldo
 Gustavo Pérez-Firmat
 Alessandra Russo
 Jesús R. Velasco

ASSOCIATE PROFESSORS

Seth Kimmel

ASSISTANT PROFESSORS

Karen Benezra
 Ana M. Fernández-Cebrián
 Ana Paulina Lee

SENIOR LECTURER

Guadalupe Ruiz-Fajardo
 José Antonio Castellanos-Pazos
 Angelina Craig-Flórez
 Reyes Llopis-García
 Francisco Rosales-Varo
 José Plácido Ruiz-Campillo

LECTURERS

Lee B. Abraham
 Francisca Aguiló Mora
 Leyre Alejaldre Biel
 Irene Alonso-Aparicio
 Dolores Barbazán Capeáns
 Lorena García Barroso
 Ana Paula Huback
 Juan Pablo Jiménez-Caicedo
 Francisco Meizoso
 João Nemi Neto
 Diana P. Romero
 Elsa Úbeda

MAJOR IN HISPANIC STUDIES

Students who declared this program before March 2016 (when requirements changed) should contact the Director of Undergraduate Studies to confirm their correct course of study.

Students may only register once in each of the Core Courses (SPAN UN3300, SPAN UN3349 and SPAN UN3350).

The major in Hispanic studies requires 11 courses (minimum of 33 points) as follows:

Core Courses

SPAN UN3300	Advanced Language through Content [in Spanish]
SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present

Elective Courses

Select seven elective courses (21 points): a minimum of three 3000- or 4000-level electives must be chosen within the department and up to three electives related to Hispanic Studies may be taken outside the department.

Senior Seminar

SPAN UN3991	Senior Seminar
or SPAN UN3992	Senior Seminar: Modern Cities and Global Cities

MAJOR IN HISPANIC STUDIES WITH SPECIALIZATION

Students who declared this program before March 2016 (when requirements changed) should contact the Director of Undergraduate Studies to confirm their correct course of study.

Students may only register once in each of the Core Courses (SPAN UN3300, SPAN UN3349 and SPAN UN3350).

The major in Hispanic studies with specialization requires 14 courses (minimum of 42 points) as follows. Students should consult the director of undergraduate studies to plan their program and refer to the Hispanic Studies Major Worksheet.

Core Courses

SPAN UN3300	Advanced Language through Content [in Spanish]
SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present

Elective Courses

Select ten elective courses (30 points): four of which must be chosen within the department and six of which must be in the field of specialization. Approved courses taken abroad may be counted as inside or outside the department for the specialization. A maximum of four courses taken abroad may be counted toward the major.

Senior Seminar *

SPAN UN3991	Senior Seminar
or SPAN UN3992	Senior Seminar: Modern Cities and Global Cities

* In exceptional cases and with the director of undergraduate studies' approval, students may take a senior seminar in their area of specialization as a seventh course outside the department, if they have completed enough foundational courses to manage the demands of an advanced seminar. In such cases, the director of undergraduate studies must receive a letter or e-mail from the seminar instructor indicating approval of a student's membership in the course; the seminar project must be on a Hispanic topic; and a copy of the project must be turned in to the director of undergraduate studies for the student's file upon completion of the course. Students who complete the senior seminar in another department may also count it as the third elective course on a Hispanic topic outside the department, in which case they may take a fourth 3000- or 4000-level course in the department.

CONCENTRATION IN HISPANIC STUDIES

Students who declared this program before March 2016 (when requirements changed) should contact the Director of Undergraduate Studies to confirm their correct course of study.

Students may only register once in each of the Core Courses (SPAN UN3300, SPAN UN3349 and SPAN UN3350).

The concentration in Hispanic studies requires eight courses (minimum of 24 points) as follows:

Core Courses

SPAN UN3300	Advanced Language through Content [in Spanish]
SPAN UN3349	Hispanic Cultures I: Islamic Spain through the Colonial Period
SPAN UN3350	Hispanic Cultures II: Enlightenment to the Present

Elective Courses

Select five elective courses (15 points): a minimum of four 3000- or 4000-level courses must be chosen within the department and up to one elective related to Hispanic Studies may be taken outside the department. A maximum of three courses taken abroad may be counted toward the concentration.

CONCENTRATION IN PORTUGUESE STUDIES

The concentration in Portuguese studies requires eight courses (minimum 24 points) as follows:

Core Courses

PORT UN3101	Conversation about the Lusophone World
PORT UN3300	Advanced Language through Content

PORT UN3330	Introduction to Portuguese Studies
PORT UN3350	Lusophone Africa and Afro Brazilian Culture

Elective Courses

Select four elective courses (12 points): at least two must have a PORT designation and be chosen from the department's 3000-level offerings. Electives taken outside of the department must have the director of undergraduate studies' approval and be related to Portuguese studies. A maximum of two courses taught in English may be counted toward the concentration overall. Refer to the Portuguese Concentration Worksheet.

PSYCHOLOGY

Departmental Office: 406 Schermerhorn; 212-854-3608
<https://psychology.columbia.edu/>

Directors of Undergraduate Studies:

Psychology Major and Concentration:

Prof. Patricia Lindemann, 358E Schermerhorn Extension; pgl2@columbia.edu (Students with last names beginning A-H)

Prof. Katherine Fox-Glassman, 314 Schermerhorn; kjt2111@columbia.edu (Students with last names beginning I-S)

Prof. Chris Baldassano, 370 Schermerhorn Extension; cab2304@columbia.edu (Students with last names beginning T-Z)

Prof. Nim Tottenham, 370 Schermerhorn Extension; nlt7@psych.columbia.edu (nlt7@columbia.edu) (Honors)

Neuroscience and Behavior Major:

Psychology: Prof. Alfredo Spagna, 318B Schermerhorn (Students with last names beginning A-L)

Psychology: Prof. Caroline Marvin, 317 Schermerhorn; cbm2118@columbia.edu (Students with last names beginning M-Z)

Biology (CC): Prof. Jian Yang, 917A Fairchild; jy160@columbia.edu

Biology (GS): Prof. Deborah Mowshowitz, 744 Mudd; dbm2@columbia.edu

Director of Instruction and Academic Affairs:

Prof. Caroline Marvin, 317 Schermerhorn; cbm2118@columbia.edu

Director of Psychology Honors Program:

Prof. Nim Tottenham, 370 Schermerhorn Extension; nlt7@columbia.edu

Preclinical Adviser: Prof. E'mett McCaskill, 415O Milbank; emccaski@barnard.edu

Administrative Coordinator: Joanna Borchert-Kopczuk, 406 Schermerhorn; 212-854-3940; jb2330@columbia.edu

Undergraduate Curriculum Assistant: Liz Parish, 406 Schermerhorn; 212-854-8859; uca@psych.columbia.edu

The Department of Psychology (<https://psychology.columbia.edu/>) offers students a comprehensive curriculum in psychological science, including research methods, cognition, neuroscience, developmental, social, and clinical areas. The curriculum prepares majors for graduate education in these fields and also provides a relevant background for social work, education, medicine, law, and business. Psychology course offerings are designed to meet the varying needs and interests of students, from those wishing to explore a few topics in psychology or to fulfill the science requirement, to those interested in majoring in Psychology (<https://psychology.columbia.edu/content/psychology-major/>) or in Neuroscience and Behavior (<https://psychology.columbia.edu/content/neuroscience-behavior-major/>).

PROGRAM GOALS

The department's program goals (<https://psychology.columbia.edu/content/psychology-program-goals/>) start with the development of a solid knowledge base in psychological science. Consistent with the value psychology places on empirical evidence, courses at every level of the curriculum nurture the development of skills in research methods, quantitative literacy, and critical thinking, and foster respect for the ethical values that undergird the science of psychology.

Most of these program goals (<https://psychology.columbia.edu/content/psychology-program-goals/>) are introduced in PSYC UN1001 The Science of Psychology, the recommended first psychology course required for all majors that satisfies the prerequisite for most 2000-level courses. These goals are extended and reinforced in our statistics (1600-level) and research methods (1400-level) research methods courses, as well as in the 2000-level lecture courses and 3000- and 4000-level seminars. Each of the 2000-level lecture courses enables students to study systematically, and in greater depth, one of the content areas introduced in PSYC UN1001 The Science of Psychology. These lecture courses are the principal means by which psychology majors satisfy the distribution requirements, ensuring not only depth but also breadth of coverage across three central areas of psychology: (1) perception and cognition, (2) psychobiology and neuroscience, and (3) social, personality, and abnormal psychology. To complete the major, students take one or more advanced seminars and are encouraged to participate in supervised research courses, where they have the opportunity to explore research questions in depth and further develop their written and oral communication skills.

RESEARCH PARTICIPATION

All qualified students are welcome to apply to join a research lab and contribute to ongoing projects. Students may volunteer to work in a lab, register for supervised individual research (PSYC UN3950 (<https://psychology.columbia.edu/content/supervised-individual-research/>) Supervised Individual Research), or participate in the department's two-year Honors Program (<https://psychology.columbia.edu/content/honors-program/>). Information on faculty research (<https://psychology.columbia.edu/content/faculty/>) is available on the departmental website. Students are advised to read about research laboratories on faculty lab sites (<https://psychology.columbia.edu/content/lab-websites/>) and visit the professor's office hours to discuss opportunities. At the beginning of the fall term, the department also hosts a Lab-Preview (<https://psychology.columbia.edu/sites/default/files/content/Lab%20Preview%20Handout%20Fa18%20%20Final.pdf>) event for students to learn about research opportunities (<https://psychology.columbia.edu/content/research-opportunities/>) for the upcoming semester.

PROGRAM PLANNING

Majors and concentrators in psychology and majors in neuroscience and behavior should begin planning a program of study as early as possible. All necessary forms and information are available in Program Planning Tips (<https://psychology.columbia.edu/content/program-planning-tips/>). All majors and concentrators in Psychology (<https://psychology.columbia.edu/content/psychology-major/>) and majors in Neuroscience and Behavior (<https://psychology.columbia.edu/content/neuroscience-behavior-major/>) should complete a Major Requirement Checklist (<https://psychology.columbia.edu/content/major-concentration-requirement-checklists/>) before consulting a program adviser to discuss program plans. At minimum, all students must submit a Major Requirement Checklist (<https://psychology.columbia.edu/content/major-concentration-requirement-checklists/>) prior to the start of their final semester, so that graduation eligibility can be certified.

ADVISING

The Department of Psychology offers a variety of advising resources to provide prospective and current undergraduate majors and concentrators with the information and support needed to successfully plan their programs. An overview of these resources is provided on the Psychology Undergraduate Advising Resources website (<https://psychology.columbia.edu/content/advising/>).

Students are encouraged to consult with Peer, Faculty, and Program Advisers as they plan their course of study in Psychology or Neuroscience and Behavior. Faculty and Peer Advisers are important contacts for general advice on class choices, research opportunities, and post-graduation plans. For definitive answers to questions regarding major requirements and other aspects of your degree, including

transfer credit, current and prospective majors should consult their Program Adviser (Director of Undergraduate Studies) or the Undergraduate Curriculum Assistant (<https://psychology.columbia.edu/content/elizabeth-walters/>) in the departmental office. Program Adviser assignments (<https://psychology.columbia.edu/content/advisors/>) and contact information are provided on the departmental website. For additional information about program, faculty, peer, and pre-clinical advising, please see the Psychology Undergraduate Advising Resources website (<https://psychology.columbia.edu/content/advising/>).

EMAIL COMMUNICATION

The department maintains an e-mail distribution list with the UNIs of all declared majors and concentrators. Students are held responsible for information sent to their Columbia e-mail addresses. Students should read these messages from the department regularly and carefully. They are intended to keep students informed about deadlines, requirements, events, and opportunities. Prospective majors or concentrators who would like to be added to the e-mail distribution list should contact the Undergraduate Curriculum Assistant (uca@psych.columbia.edu) in the departmental office.

GUIDE TO COURSE NUMBERS

Course numbers reflect the structure of the Psychology curriculum:

- The *1000*-level comprises introductions to psychology, introductory research methods courses, and statistics. PSYC UN1001 The Science of Psychology is an introductory course with no prerequisites, which can serve as the prerequisite for most of the *2000*-level courses. The *1400s* contain the research methods laboratory courses, and the *1600s* contain statistics courses; these two course types are designed to prepare students to be able to understand, critique, and conduct the types of research found in many psychology and neuroscience labs.
- The *2000*-level comprises lecture courses that are introductions to areas within psychology; most require PSYC UN1001 The Science of Psychology as a prerequisite.
- The *3000*-level comprises more advanced and specialized undergraduate courses; most are given in a seminar format and require instructor permission.
- The *3900s* are the courses providing research opportunities for undergraduates.
- The *4000*-level comprises advanced seminars suitable for both advanced undergraduates and graduate students.

Subcategories within the *2000*-, *3000*-, and *4000*-levels correspond to the three groups in our distribution requirement for undergraduate Psychology majors:

1. Perception and cognition (*2200s*, *3200s*, and *4200s*),
2. Psychobiology and neuroscience (*2400s*, *3400s*, and *4400s*), and

3. Social, personality, and abnormal psychology (*2600s*, *3600s*, and *4600s*).

Note that Barnard psychology courses do not follow the same numbering scheme.

HONORS PROGRAM

The department offers a two-year Honors Program (<https://psychology.columbia.edu/content/honors-program/>), designed for a limited number of juniors and seniors interested in conducting original research. Beginning in the first term of junior year and continuing through senior year, students take PSYC UN3910 Honors Seminar and simultaneously participate in an honors research course (PSYC UN3920 Honors Research) under the supervision of a member of the department. Students make a formal presentation and complete an honors essay based on this research toward the end of their senior year.

To qualify for honors, students must take a total of 6 points beyond the number required for their major and satisfy all other requirements for the major. The additional 6 points may include the *Honors Seminar* and *Honors Research* courses.

Interested students should apply at the end of their sophomore year, and are also required to identify and meet with a potential faculty mentor prior to applying.

Instructions and an application form are available on the Honors Program page of the department website. Typically no more than 10% of graduating majors receive departmental honors in a given academic year.

REQUIREMENTS FOR ADMISSION TO GRADUATE PROGRAMS IN PSYCHOLOGY

Most graduate programs in psychology, including those in clinical psychology, require:

An undergraduate course in introductory psychology:

PSYC UN1001	The Science of Psychology
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A course in statistics such as one of the following:

PSYC UN1610	Introductory Statistics for Behavioral Scientists
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PSYC UN1660	Advanced Statistical Inference
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STAT UN1001	Introduction to Statistical Reasoning
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STAT UN1101	Introduction to Statistics
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STAT UN1201	Calculus-Based Introduction to Statistics
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A laboratory course in research methods such as one of the following:

PSYC UN1420	RESEARCH METHODS - HUMAN BEHAVIOR
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PSYC UN1450	Experimental Psychology: Social Cognition and Emotion
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PSYC UN1455	Experimental Psychology: Social and Personality
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PSYC UN1490

Experimental Psychology:
Cognition and Decision Making

Students should also take a variety of more advanced undergraduate courses and seminars. Students interested in PhD programs in any area of psychology are very strongly encouraged to participate in a research lab and enroll in PSYC UN3950 (<http://bulletin.columbia.edu/search/?P=PSYC%20UN3950/>) Supervised Individual Research. Students are also encouraged to apply for the Psychology Honors Program at the end of their sophomore year.

Students interested in clinical psychology should obtain experience working in a community service program in addition to supervised individual research experience. Students should consult the department's pre-clinical adviser, Prof. E'mett McCaskill (<https://psychology.columbia.edu/content/emett-mccaskill/>), and attend the department's pre-clinical advising events for more information. Additional resources to help prepare students for graduate study in psychology, and for careers in clinical psychology, are available on the Department of Psychology's website (<https://psychology.columbia.edu/>).

ONLINE INFORMATION

The Department of Psychology website (<https://psychology.columbia.edu/>) provides access to a wide variety of information for majors and prospective majors. Among other useful resources, students will find syllabi posted for most lecture and lab courses and for many advanced seminars. Students should read the on-line course syllabi prior to registering for psychology courses. For assistance in finding all necessary resources, students should contact the undergraduate curriculum assistant (uca@psych.columbia.edu).

SCIENCE REQUIREMENT

PSYC UN1001 The Science of Psychology, PSYC UN1010 Mind, Brain and Behavior (no longer offered), and any PSYC course in the 2200- or 2400-level may be used to fulfill the science requirement.

2600-level and some other psychology courses, including PSYC BC1001 Introduction to Psychology and other Barnard psychology courses, may not be used to fulfill the science requirement.

With prior departmental approval, 3- and 4-point courses numbered in the 32xx, 34xx, 42xx, and 44xx, and some additional courses, may partially fulfill the science requirement. For more detailed information regarding psychology courses that may be applied toward the science requirement, see Core Requirements (<http://bulletin.columbia.edu/general-studies/undergraduates/degree-fulfillment/core/>) in the General Studies bulletin.

EVENING AND COLUMBIA SUMMER COURSES

The department normally offers at least one lab course (currently PSYC UN1420 RESEARCH METHODS - HUMAN BEHAVIOR and PSYC UN1450 Experimental Psychology: Social Cognition and Emotion) in the late afternoon with evening labs. A number of other courses are occasionally offered in late afternoon and evening hours. No more than one quarter of the courses required for the major are normally available in the evening. Working students may find the wide variety of early morning (8:40 a.m.) classes, as well as Summer Session offerings, helpful in completing degree requirements.

Any course offered by the Psychology Department during the Summer Session is applicable toward the same major requirement(s) as the corresponding course of that same number offered during the academic year. For instance, PSYC S1001D The Science of Psychology meets the same major requirements as does PSYC UN1001 The Science of Psychology.

See Summer Courses (<https://gs.columbia.edu/summer-courses/>) for policies governing Summer Session courses.

PROFESSORS

Niall Bolger
Lila Davachi
Geraldine Downey
William Fifer (Psychiatry, Pediatrics)
Norma Graham
Carl Hart
Tory Higgins
Donald C. Hood
Nikolaus Kriegeskorte
Janet Metcalfe
Kevin Ochsner (Chair)
Shige Oishi (Visiting Professor)
Rae Silver (Barnard)
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ASSOCIATE PROFESSORS

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Larisa Heiphetz
Micheal Wheaton (Barnard)

Sarah Canetta (Psychiatry)

LECTURERS IN DISCIPLINE

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 Patricia Lindemann
 Caroline Marvin
 Alfredo Spagna

ADJUNCT FACULTY

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 Jennifer Blaze
 Helen Brew
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 Victoria Leavitt
 E'mett McCaskill
 Michele Miozzo
 Jenna Reinen
 Svetlana Rosis
 Eric Schoenberg
 Ciara Torres

GUIDELINES FOR ALL PSYCHOLOGY MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

Double Majors/Concentrations

All students attempting to complete double majors, double concentrations, or a combination of a major and a concentration should consult the college rules for double counting of courses (<https://www.college.columbia.edu/news/committee-instruction-announces-updated-academic-policy/>).

Overlapping Courses

Students cannot receive credit for two courses—one completed at Columbia and one at another institution (including Barnard)—if those courses have largely overlapping content. For example, PSYC UN1001 The Science of Psychology is similar in content to introductory psychology courses offered at many other institutions, including Barnard; only one such course will receive credit. Similarly, PSYC UN2630 Social Psychology and PSYC BC1138 Social Psychology have overlapping content; only one will receive credit. Please refer to the table of Overlapping Courses (<https://psychology.columbia.edu/sites/default/files/content/>

[bc_overlapping%2002.06.19.pdf](#)) for a partial list of courses at Columbia and Barnard that are known to overlap.

Grade Requirements for the Major

A grade of C- or higher must be earned and revealed on the transcript in any Columbia or Barnard course, including the first, that is used to satisfy the major requirements. The grade of P is not accepted for credit towards the Psychology major (<https://psychology.columbia.edu/content/psychology-major/>), Psychology concentration (<https://psychology.columbia.edu/content/psychology-concentration/>), or Neuroscience and Behavior major (<https://psychology.columbia.edu/content/neuroscience-behavior-major/>). Courses taken on a Pass/D/Fail basis may not be used to satisfy the major or concentration requirements unless the grade of P is uncovered by the Registrar's deadline. Students may petition to have their P/D/F grades uncovered after the registrar's deadline for the following three courses only: PSYC UN1001 Science of Psychology, PSYC UN1010 Mind, Brain, & Behavior (no longer offered), and PSYC UN1610 Introductory Statistics for Behavioral Scientists. Courses taken only on a Pass/Fail basis may not be used to satisfy the major or concentration requirements under any circumstances.

Major Requirement Checklist

Prior to the start of their final semester, all seniors must submit a Major Requirement Checklist (<https://psychology.columbia.edu/content/major-concentration-requirement-checklists/>) showing all major courses they have taken and those they plan to take. The Psychology department evaluates each checklist to determine whether or not the course plan completes the major requirements and then notifies the student accordingly. If the student's course plan changes, or if it does not satisfy the major requirements, a revised checklist must be submitted. Departmental approval of an accurate and up-to-date checklist will help ensure completion of all major requirements on time for graduation.

MAJOR IN PSYCHOLOGY

Please read Guidelines for all Psychology Majors, Concentrators, and Interdepartmental Majors (p. 367) above.

Thirty or more points are needed to complete the major (<https://psychology.columbia.edu/content/psychology-major/>) and must include:

The Introductory Psychology Course

- PSYC UN1001 The Science of Psychology

A Statistics Course

Select one of the following:

- PSYC UN1610 Introductory Statistics for Behavioral Scientists

- PSYC UN1660 Advanced Statistical Inference
- STAT UN1001 Introduction to Statistical Reasoning
- STAT UN1101 Introduction to Statistics (formerly *STAT W1111*)
- STAT UN1201 Calculus-Based Introduction to Statistics (formerly *STAT W1211*)

A Research Methods Course

Select one of the following:

- PSYC UN1420 RESEARCH METHODS - HUMAN BEHAVIOR
- PSYC UN1450 Experimental Psychology: Social Cognition and Emotion
- PSYC UN1455 Experimental Psychology: Social and Personality
- PSYC UN1490 Experimental Psychology: Cognition and Decision Making

Majors are strongly advised to complete the statistics and research methods requirements, in that order, by the fall term of their junior year. Students are advised to verify the specific prerequisites for research methods courses, most of which require prior completion of a statistics course.

Distribution Requirement

One course (3 points or more) must be taken from each of the following three groups (in addition to the introductory, statistics, and research methods courses described above):

- Group I—Perception and cognition: courses numbered in the *2200s*, *3200s*, or *4200s*.
- Group II—Psychobiology and neuroscience: courses numbered in the *2400s*, *3400s*, or *4400s*. Also PSYC UN1010 Mind, Brain and Behavior (no longer offered).
- Group III—Social, personality, and abnormal: courses numbered in the *2600s*, *3600s*, or *4600s*.

Beginning Fall 2019, Research Methods courses will no longer fulfill any of the Group distribution requirements.

Seminar Requirement

For students entering Columbia in Fall 2013 or later, one seminar course numbered in the *3000s* or *4000s* must be taken for 3 or more points.

Seminars are usually taken in the senior year as a culmination of the major program. Enrollment in seminar courses requires the instructor's permission; students are advised to contact instructors at least one month prior to registration to request seminar admission. Note that honors and supervised individual research courses (PSYC UN3910 Honors Seminar, PSYC UN3920 Honors Research, and PSYC UN3950 (<http://bulletin.columbia.edu/search/?P=PSYC>

(<http://bulletin.columbia.edu/search/?P=PSYC>) Supervised Individual Research) will not meet the seminar requirement.

No course may be counted twice in fulfillment of the above major requirements, with the following exception: a seminar course may fulfill both the seminar requirement and a group requirement if it meets the criteria for both.

Additional Courses

Additional psychology courses ("electives") must be taken for a total of 30 points. As described below, these may include a limited number of research courses, transfer courses, and Barnard psychology courses not approved for specific requirements.

Research Credits

No more than 4 points of PSYC UN3950 (<http://bulletin.columbia.edu/search/?P=PSYC>) Supervised Individual Research or PSYC UN3920 Honors Research may be taken in any one term, and no more than 8 points total of research and field work courses (PSYC UN3950 SUPERVISED INDIVIDUAL RESEARCH, PSYC BC3466 Field Work and Research Seminar: The Barnard Toddler Center, PSYC BC3473 Clinical Field Practicum, PSYC BC3592 Senior Research Seminar and PSYC BC3599 Individual Projects) may be applied toward the major. See below for further restrictions on applying Barnard courses toward the psychology major.

Barnard Courses

No more than 9 points (minus any transfer credits) from Barnard psychology courses may be applied as credit toward the major. The table of approved Barnard psychology courses (<https://psychology.columbia.edu/content/approved-barnard-courses/>) indicates which courses have been approved for specific requirements of the psychology major. Courses not on the approved list may only be applied toward a specific requirement with prior written approval from one of the directors of undergraduate studies (<https://psychology.columbia.edu/content/advising/>). Courses not on the approved list for a specific requirement may be applied as elective credit toward the 30 points for the major.

Beginning in Fall 2019, Barnard Lab courses will not count towards the Research Methods requirement of the Psychology Major or Concentration.

Transfer Credits

No more than 9 transfer credits (or combination of transfer and Barnard credits) will be accepted toward the psychology major. Approval of transfer credits on a student's Entrance Credit Report toward general requirements for the B.A. degree does **not** grant approval of these credits toward the psychology major. Students must apply for written approval of transfer credit towards the major by submitting the Major Requirement Substitution Form (<https://>

[psychology.columbia.edu/sites/default/files/content/Major%20Substitution%20Form%20\(Updated%20170611\)_0.pdf](https://psychology.columbia.edu/sites/default/files/content/Major%20Substitution%20Form%20(Updated%20170611)_0.pdf)). This form, along with additional information about transfer credits can be found on the Transfer Credit page of our website (<https://psychology.columbia.edu/content/transfer-credit/>). To be approved for the major, a course taken at another institution should be substantially similar to one offered by the department, the grade received must be a B- or better, and the course must have been taken within the past 8 years. As noted above, if two courses overlap in content, only one will be applied towards the major. With the exception of approved Barnard courses, students should consult with one of the directors of undergraduate studies (<https://psychology.columbia.edu/content/advisors/>) before registering for psychology courses offered outside the department.

Students who have completed an introductory psychology course at another institution prior to declaring a psychology major should consult with one of the directors of undergraduate studies (<https://psychology.columbia.edu/content/advisors/>) to verify whether or not this course meets departmental standards for major transfer credit. If transfer credit toward the major is not approved, the student must enroll in PSYC UN1001 The Science of Psychology or PSYC BC1001 Introduction to Psychology to complete this major requirement. Beginning in Fall 2019, the Psychology Department will accept a score of 5 on the AP Psychology exam, or a score of 7 on the Higher Level IB Psychology exam, to meet the Science of Psychology requirement. The AP/IB Psychology exam does not count as a course or toward a student's points total for their program; students placing out of the Science of Psychology requirement in this way will need to take an additional course to fulfill the required number of courses or points for their program.

The College Board Advanced Placement (AP) statistics scores do not satisfy the statistics requirement. Students who have completed AP statistics may opt to take a more advanced statistics course to fulfill this requirement with the approval of one of the directors of undergraduate studies (<https://psychology.columbia.edu/content/advising/>).

MAJOR IN NEUROSCIENCE AND BEHAVIOR

Please read Guidelines for all Psychology Majors, Concentrators, and Interdepartmental Majors (p. 367) above.

The department cosponsors an interdepartmental major in neuroscience and behavior with the Department of Biological Sciences. For assistance in planning the psychology portion of the neuroscience and behavior major, refer to the Program Planning Tips website (<https://psychology.columbia.edu/content/program-planning-tips/>) and use the appropriate

major requirement checklist (<https://psychology.columbia.edu/content/major-concentration-requirement-checklists/>).

No course may be counted twice in fulfillment of the biology or psychology requirements described below. Most graduate programs in neuroscience also require one year of calculus, one year of physics, and chemistry through organic.

Required Courses

In addition to one year of general chemistry (or the high school equivalent), ten courses are required to complete the major—five from the Department of Biological Sciences and five from the Department of Psychology. For the definitive list of biology requirements, see the Department of Biological Sciences website (<http://biology.columbia.edu/>).

Required Biology Courses

1. BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology
2. BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology
3. BIOL UN3004 Neurobiology I: Cellular and Molecular Neurobiology
4. BIOL UN3005 Neurobiology II: Development & Systems
5. One additional 3000- or 4000-level biology course from a list approved by the biology adviser (<http://www.columbia.edu/cu/biology/pages/undergrad/cur/majors/neuro.html>) to the program.
 - BIOL UN3006 Physiology
 - BIOL UN3022 Developmental Biology
 - BIOL UN3025 Neurogenetics
 - BIOL UN3031 Genetics
 - BIOL UN3799 Molecular Biology of Cancer
 - BIOL UN3034 Biotechnology
 - BIOL UN3041 Cell Biology
 - BIOL UN3073 Cellular and Molecular Immunology
 - BIOL UN3193 Stem Cell Biology and Applications
 - BIOC UN3300 Biochemistry
 - BIOC UN3501 Biochemistry: Structure and Metabolism
 - BIOL UN3310 Virology
 - BIOL UN3404 Seminar on the Global Threat of Antimicrobial Resistance
 - BIOC UN3512 Molecular Biology
 - BIOL GU4008 The Cellular Physiology of Disease
 - BIOL GU4082 Theoretical Foundations and Applications of Biophysical Methods
 - BIOL GU4300 Drugs and Disease
 - BIOL GU4510 Genomics of Gene Regulation
 - BIOL GU4560 Evolution in the age of genomics
 - BIOL GU4035 Seminar in Epigenetics

- BIOL GU4070 The Biology and Physics of Single Molecules
- BIOL GU4075 Biology at Physical Extremes
- BIOL GU4080 The Ancient and Modern RNA Worlds
- BIOL GU4260 Proteomics Laboratory
- BIOL GU4290 Biological Microscopy
- BIOL GU4305 Seminar in Biotechnology

Required Psychology Courses

1. PSYC UN1001 The Science of Psychology
2. PSYC UN2430 Cognitive Neuroscience or PSYC UN2450 Behavioral Neuroscience
 - Students who have previously taken PSYC UN1010 Mind, Brain and Behavior (no longer offered) may use that course to fulfill this requirement.

3. One statistics or research methods course from the following:
 - PSYC UN1450 Experimental Psychology: Social Cognition and Emotion
 - PSYC UN1490 Experimental Psychology: Cognition and Decision Making
 - PSYC UN1610 Introductory Statistics for Behavioral Scientists
 - PSYC UN1660 Advanced Statistical Inference
 - STAT UN1101 Introduction to Statistics (formerly *STAT W1111*)
 - STAT UN1201 Calculus-Based Introduction to Statistics (formerly *STAT W1211*)
 - *Please note, STAT UN1001 does not count towards the Neuroscience & Behavior major.*

4. One additional 2000- or 3000-level psychology lecture course from a list* approved by the psychology adviser (<http://biology.columbia.edu/pages/neuroscience-and-behavior-major-requirements/>) (https://psychology.columbia.edu/content/neuroscience-behavior-major/#/cu_accordion_item-1255) to the program:
 - PSYC S2210Q Cognition: Basic Processes
 - PSYC UN2215 Cognition and the Brain or PSYC S2215D Cognition and the Brain
 - PSYC UN2220 Cognition: Memory and Stress
 - PSYC W2225 Attention and Perception
 - PSYC W2230 Perception and Sensory Processes

- PSYC UN2235 Thinking and Decision Making or PSYC S2235Q Thinking and Decision Making
- PSYC UN2250 Evolution of Cognition
- PSYC UN2280 Introduction to Developmental Psychology
- PSYC UN2420 Animal Behavior
- PSYC UN2430 Cognitive Neuroscience
- PSYC W2440 Language and the Brain
- PSYC UN2450 Behavioral Neuroscience or PSYC S2450Q Behavioral Neuroscience
- PSYC UN2460 Drugs and Behavior
- PSYC W2480 The Developing Brain
- PSYC UN2620 Abnormal Behavior or PSYC S2620Q Abnormal Behavior

**Please make careful note of this list, as courses not listed here will not count towards the P4 requirement.*

5. One advanced psychology seminar from a list approved by the psychology adviser (https://psychology.columbia.edu/content/neuroscience-behavior-major/#/cu_accordion_item-1257) to the program:
 - PSYC W3225 The Wandering Mind: Psychological Approaches to Distraction
 - PSYC W3250 Seminar in Space Perception (Seminar)/ PSYC G4230 Sensation and Perception (Seminar)
 - PSYC W3255 Modern Classics in Visual Perception, Visual Science and Visual Neuroscience (Seminar)/ PSYC G4255 Modern Classics in Visual Perception, Visual Science and Visual Neuroscience (Seminar)
 - PSYC W3265 Auditory Perception (Seminar)
 - PSYC UN3270 Computational Approaches to Human Vision (Seminar)
 - PSYC W3280 Seminar In Infant Development or PSYC S3280D Seminar in Infant Development
 - PSYC S3285D The Psychology of Disaster Preparedness
 - PSYC UN3290 Self: A Cognitive Exploration (Seminar)
 - PSYC G4220 Cognition and Psychopathology (Seminar)
 - PSYC GU4222 The Cognitive Neuroscience of Aging (Seminar)
 - PSYC GU4223 Memory and Executive Function Through the Lifespan

- PSYC GU4225 Consciousness and Attention (Seminar)
 - PSYC GU4229 Attention and Perception
 - PSYC G4230 Sensation and Perception (Seminar)
 - PSYC GU4232 Production and Perception of Language
 - PSYC GU4235 Special Topics in Vision (Seminar)
 - PSYC GU4239 Cognitive neuroscience of narrative and film
 - PSYC G4250 Evolution of Intelligence, Cognition, and Language (Seminar)
 - PSYC GU4270 Cognitive Processes (Seminar)
 - PSYC G4272 Advanced Seminar in Language Development
 - PSYC G4275 Contemporary Topics in Language and Communication (Seminar)
 - PSYC GU4280 Core Knowledge (Seminar)
 - PSYC GU4281 The Psychology of Curiosity
 - PSYC G4285 Multidisciplinary Approaches to Human Decision Making (Seminar)
 - PSYC GU4287 Decision Architecture
 - PSYC GU4289 The Games People Play: The Psychology of Strategic Decision Making
 - PSYC S3410Q Seminar in Emotion
 - PSYC S3425D Animals in Our Own Backyard: The Science of Observing Behavior
 - PSYC W3435 Neurobiology of Reproductive Behavior (Seminar)
 - PSYC W3440 Issues In Brain and Behavior (Seminar)
 - PSYC UN3445 The Brain & Memory
 - PSYC UN3450 Evolution of Intelligence and Consciousness (Seminar)/ PSYC G4450 The Evolution of Intelligence & Consciousness (Seminar)
 - PSYC UN3460 Evolution of Behavior (Seminar)
 - PSYC UN3470 Brain Evolution: Becoming Human (Seminar)
 - PSYC UN3481 Critical Periods in Brain Development and Behavior
 - PSYC S3483D The Dynamic Brain: Plasticity from Birth to Old Age
 - PSYC W3484 Life Span Development: Theory and Methods
 - PSYC UN3496 Neuroscience and Society or PSYC S3496Q Neuroscience and Society
 - PSYC GU4420 Animal Cognition (Seminar)
 - PSYC GU4430 Learning and the Brain (Seminar)
 - PSYC GU4435 Non-Mnemonic Functions of Memory Systems
 - PSYC GU4440 Topics in Neurobiology and Behavior (Seminar) or PSYC S4440Q Topics in Neurobiology and Behavior
 - PSYC G4460 Cognitive Neuroscience and the Media (Seminar)
 - PSYC G4475 Neurobiology of Social Behavior
 - PSYC GU4480 Psychobiology of Infant Development (Seminar)
 - PSYC G4485 Affective Neuroscience (Seminar)
 - PSYC GU4486 Developmental and Affective Neuroscience (Seminar)
 - PSYC GU4490 Inheritance (Seminar)
 - PSYC G4492 Psychobiology of Stress
 - PSYC G4495 Ethics, Genetics, and the Brain
 - PSYC GU4498 Behavioral Epigenetics
 - PSYC G4499 Behavioral Psychopharmacology (Seminar)
 - PSYC UN3615 Children at Risk (Lecture)
 - PSYC UN3620 Seminar in Developmental Psychopathology
 - PSYC UN3624 Adolescent Mental Health: Causes, Correlates, Consequences
 - PSYC UN3625 Clinical Neuropsychology (Seminar) or PSYC S3625D Clinical Neuropsychology Seminar
 - PSYC UN3680 Social Cognitive Neuroscience (Seminar)/ PSYC GU4685 Social Cognitive Neuroscience (Seminar)
 - PSYC GU4627 Seminar in Anxiety, Obsessive-Compulsive, and Related Disorders
 - PSYC G4635 The Unconscious Mind (Seminar)
 - PSYC GU4690 Social Factors and Psychopathology (Seminar)
- Note:** Students wishing to use a seminar course not listed above to meet the P5 seminar requirement must contact their psychology adviser before enrolling to request permission for an exception. Generally speaking, permission for such exceptions is only granted when there is a compelling case related to the student's research or area of study. Students requesting permission to use a course not on this list must ensure that their substantive coursework in the seminar (generally their final paper) is on a neuroscience-focused topic.

Transfer Credit for Psychology Courses Taken Elsewhere

Students should consult a psychology adviser (<https://psychology.columbia.edu/content/advising/>) before registering for psychology courses offered outside the department. With the adviser's approval, one, and only one, course from another institution, including Barnard, may be applied

toward the psychology portion of the Neuroscience and Behavior major. Students who wish to obtain credit for a course taken at Barnard or at another institution should complete the Major Requirement Substitution Form (<https://psychology.columbia.edu/content/transfer-credit/>). **To be approved for the major, the course should be substantially similar to one offered by this department and approved for this major, and the grade received must be a C- or better if from Barnard, or B- or better if from another institution.**

Beginning in Fall 2019, the Psychology department will accept a score of 5 on the AP Psychology exam, or a score of 7 on the Higher Level IB Psychology exam, to meet the PSYC UN1001 The Science of Psychology requirement. The AP/IB Psychology exam does not count as a course or toward a student's points total for their program; students placing out of the Science of Psychology requirement in this way will need to take an additional course -- approved by the Psychology adviser -- to fulfill the required number of courses for their program.

Advanced Placement (AP) statistics scores will not satisfy the statistics/research methods requirement. Students who have completed AP Stats are encouraged to enroll in a 1400-level research methods course to fulfill this requirement.

Exceptions to Biology Requirements

Any exceptions must be approved in advance by a biology adviser and students must receive an email notification of that approval. Students may substitute Barnard College courses only with prior permission from an adviser.

CONCENTRATION IN PSYCHOLOGY

Please read Guidelines for all Psychology Majors, Concentrators, and Interdepartmental Majors (p. 367) above.

A concentration in psychology (<https://psychology.columbia.edu/content/psychology-concentration/>) requires a minimum of 18 points, including PSYC UN1001 The Science of Psychology and courses in at least two of the three groups listed under "Distribution Requirement" for the psychology major. Restrictions on research credits, Barnard credits, and transfer credits are modified from those of the psychology major as follows:

1. Only 4 points total may be applied toward the concentration from research or field-work courses, including: PSYC UN3950 (<http://bulletin.columbia.edu/search/?P=PSYC%20UN3950/>) Supervised Individual Research, PSYC UN3920 Honors Research PSYC BC3466 Field Work and Research Seminar: The Barnard Toddler Center, PSYC BC3473 Clinical Field Practicum,

PSYC BC3592 Senior Research Seminar, and PSYC BC3599 Individual Projects;

2. Only 5 points from Barnard (including PSYC BC1001 Introduction to Psychology) may be applied toward the concentration.
3. Only 5 points total (including any Barnard points) from approved psychology courses taken outside the department may be applied toward the concentration.

*Beginning Fall 2019, Barnard Lab courses will not count towards the Research Methods requirement of the Psychology Major or Concentration.

Except as noted above, other regulations outlined in the Psychology Major section regarding grades, transfer credits, and overlapping courses also apply toward the concentration.

PUBLIC HEALTH SPECIAL CONCENTRATION IN PUBLIC HEALTH

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FACULTY

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Anne Paxton (<https://www.mailman.columbia.edu/people/our-faculty/ap428/>)

Marni Sommer (<https://www.mailman.columbia.edu/people/our-faculty/ms2778/>)

SPECIAL CONCENTRATION IN PUBLIC HEALTH

The special concentration, comprising a **minimum of 25 points** of coursework, consists of **five required courses (16 points)** and **at least three electives (minimum of 9 points)**

that provide additional depth and dimension to the underlying themes of the concentration.

Core Public Health Course Requirements

The required courses create a rich intellectual foundation in public health, providing students with a multifaceted view of the social production of health, as well as an integrated exposure to and understanding of the core disciplines of public health. Together, they serve to illuminate and allow students to analyze critically the social production of health and its connections with and implications for civil society. These courses have no prerequisites, and can be taken individually, as the student's schedule permits.

Required Courses for the Special Concentration in Public Health

PUBH UN3100	Fundamentals of Global Health
PUBH UN3200	Introduction to Public Health
PUBH GU4100	(Y)our Longer Life
PUBH GU4200	Environment, Health, and Justice: Concepts and Practice
HSPB UN2950	Social History of American Public Health

Elective Courses

Elective courses (minimum of 9 points) in the Special Concentration in Public Health will allow students to draw upon courses offered in a wide range of departments and centers across the University. Proposed electives must be approved by the Director of Undergraduate Studies.

Examples of departments with relevant elective courses include: African American Studies; Comparative Literature and Society; The Center for Ethnicity and Race; Earth and Environmental Sciences; Economics; Ecology, Evolution, and Environmental Biology; History; Human Rights; History of South East Asia; Political Science; Psychology; Sociology; Statistics; Sustainable Development; Women's Studies; Urban Studies. Elective courses are designed to allow students to add dimension and depth to their interests in public health, along the main themes of the Special Concentration. Electives may also allow students to amplify the connections to public health in their major area of study. Conversely, students may choose to take electives that allow them to gain more breadth in concepts to which they have been exposed in the set of required public health courses.

Elective Examples (At least 3)

Population Health, Inequality, and Society

AFAS GU4035	Criminal Justice and the Carceral State in the 20th Century United States
CPLS GU4320	Marginalization in Medicine: A Practical Understanding of the Social Implications of Race

CPLS GU4220	Narrative, Health, and Social Justice
CSER UN3445	City, Environment, and Vulnerability
CSER UN3905	Asian Americans and the Psychology of Race
CSER UN3924	Latin American and Latina/o Social Movements
CSER UN3942	Race and Racisms
CSER GU4340	Visionary Medicine: Racial Justice, Health and Speculative Fictions
CSER GU4482	Indigenous People's Rights: From Local Identities to the Global Indigenous Movement
CSER GU4483	Subcitizenship
ECON GU4438	Economics of Race in the U.S.
EEEB GU4321	Human Nature: DNA, Race & Identity
HIST UN2523	History of Health Inequality in the Modern United States
HIST UN3437	Poisoned Worlds: Corporate Behavior and Public Health
HIST UN3911	Medicine and Western Civilization
HIST W4985	Citizenship, Race, Gender and the Politics of Exclusion
HIST GU4584	Drug Policy and Race
HIST GU4588	Substance Abuse Politics in African-American History
HRTS BC3850	Human Rights and Public Health
HRTS GU4215	NGOs and the Human Rights Movement: Strategies, Successes and Challenges
HRTS GU4230	Refugees, Forced Migration, and Displacement
HRTS GU4500	SOCIO-ECONOMIC RIGHTS
HRTS GU4700	Ethical Dilemmas in Healthcare: A Human Rights Approach
HRTS GU4880	Human Rights in the United States
POLS UN3220	Logic of Collective Choice
POLS UN3245	Race and Ethnicity In American Politics
POLS UN3595	Social Protection Around the World
SOCI V2230	Food and the Social Order
SOCI W2420	Race and Place in Urban America
SOCI UN3010	Methods for Social Research
SOCI UN3213	Sociology of African American Life
SOCI W3214	Immigration and the Transformation of American Society
SOCI UN3261	Sexuality and Society
SOCI UN3265	Sociology of Work and Gender

SOCI UN3323	Race, Gender, Sexuality, and Punishment
SOCI W3643	Stratification and Inequality
SOCI W3913	Race and Ethnicity in a Global World
SOCI UN3914	Seminar in Inequality, Poverty, and Mobility
WMST GU4506	Gender Justice
SOCI UN3915	Stigma and Discrimination
SOCI UN3920	Social Networks
SOCI UN3931	Sociology of the Body
SOCI W3923	Adolescent Society
SOCI UN3960	Law, Science, and Society

Globalization, Urbanization, Development, and the Environment

EEEE GU4127	Disease Ecology
EEEE GU4111	Ecosystem Ecology and Global Change
EEEE GU4260	Food, Ecology, and Globalization
EESC UN2330	Science for Sustainable Development
EESC W4403	Managing and adapting to climate change
EESC GU4600	Earth Resources and Sustainable Development
FSPH UN1100	FOOD, PUBLIC HEALTH & PUBLIC POLICY
HIST GU4811	Encounters with Nature: The History of Environment and Health in South Asia and Beyond
HRTS GU4915	Human Rights and Urban Public Space
HSEA GU4844	GLOBAL HONG KONG
SDEV UN2300	Challenges of Sustainable Development
SDEV UN3330	Ecological and Social Systems for Sustainable Development
SDEV UN3350	(Environmental Policy and Governance for Sustainability)
SDEV UN3355	Climate Change and Law
SDEV UN3360	Disasters and Development
SDEV UN3400	Human Populations and Sustainable Development
SDEV UN3410	Urbanization and Sustainable Development
SDEV GU4050	Essential Connections: US Water & Energy Policy in a Resource-Constrained World
SOCI UN3324	Global Urbanism
URBS UN3450	Neighborhood and Community Development
URBS UN3993	Senior Seminar: The Built Environment

URBS UN3565	Cities in Developing Countries: Problems and Prospects
URBS UN3315	Metropolitics of Race and Place
URBS UN3550	Community Building and Economic Development
URBS UN3565	Cities in Developing Countries: Problems and Prospects

Individuals, Bodies, and Population Health

FSEB UN1020	Food and the Body
PSYC UN2460	Drugs and Behavior
PSYC UN2480	The Developing Brain (The Developing Brain)
PSYC UN2650	Introduction to Cultural Psychology

Quantitative Foundations

STAT UN1001	Introduction to Statistical Reasoning
STAT UN1101	Introduction to Statistics

REGIONAL STUDIES EAST CENTRAL EUROPEAN CENTER

<http://ece.columbia.edu/>

Director: Prof. Alan Timberlake, 1228 International Affairs Building; 212-854-8488; at2205@columbia.edu

Related Departments: Anthropology, Economics, History, Political Science, Slavic Languages and Literatures, and Sociology.

Language Requirement: Two years or demonstrated reading knowledge of one of the following languages: Czech, Hungarian, Polish, Romanian, Russian, Bosnian/Croatian/Serbian, or Ukrainian.

The regional studies major is designed to give undergraduates the general mastery of a discipline and at the same time permit them to do specialized work in the history and cultures of a particular geographic area through the associated institutes of the Faculty of Arts and Sciences. It is an interdisciplinary major in which students divide their work between the associated institute and an appropriate academic department. Students plan their programs with the consultant of the associated institute they have selected.

MAJOR IN REGIONAL STUDIES

The major in regional studies requires a minimum of 36 points, of which 18 must be credited by the associated institute, i.e. East Central European Center, and an additional 18 must be in one of the College departments designated as relevant by the institute. Six points of seminar work approved by the institute

are required of all majors and are included in the total of 36 points.

Language Study

Courses taken to satisfy the institute's language requirement are not counted toward the 18 institute points.

RELIGION

Departmental Office: Room 103, 80 Claremont;
212-851-4122

<http://www.columbia.edu/cu/religion> (<http://www.columbia.edu/cu/religion/>)

Director of Undergraduate Studies: Professor Courtney Bender, 80 Claremont; 212-851-4134; cb337@columbia.edu

The Religion Department's curriculum is designed to engage students in critical, comparative, and interdisciplinary exploration of religious life. The faculty's research and teaching build upon the shared understandings that religion continues to be a central and influential component of human life, society, and politics—and that, furthermore, religious transmission and authority are constantly being shaped in dynamic interactions with other religious traditions, societies, and cultures. Courses and seminars in religion teach students how to analyze and investigate religious texts, histories, beliefs, bodies, and communities using a variety of disciplinary and methodological approaches.

Students are also encouraged to conduct their studies by exploring one or more zone of inquiry. These are focus areas that integrated in the departmental curriculum and complement the tradition-based approaches. They provide broad and alternative frames that aim to identify problems, chart trajectories cutting across different field specialties, and set parameters for theoretical and methodological questions. The zones are: *Time* (History, Modernity), *Transmission* (Tradition, Memory, Institutions), *Space* (Place, Geography, Virtual Space), *Body* (Materiality, Mind, Bio-ethics), and *Media* (Transportation, Information, Communication).

Majors and concentrators in religion gain both a foundation in the study of religious traditions in historical contexts and zones of inquiry, all grounded in theoretical and methodological debates that shape academic and public discussions about religion. Lecture courses, seminars, and colloquia are designed to balance students' growing understanding of particular religious topics, dynamics, and traditions with intensive engagement with critical theoretical, political, and philosophical debates. Students are encouraged to pursue a course of study in which they develop breadth and depth, as well as the tools and expertise to pose (and even answer) necessary questions about religious phenomena of the past or present.

As the study of religion is truly interdisciplinary, students find their work in the department enhanced by their coursework in the College's Core curriculum and in related departments. Many religion courses are listed in the College's Global Core requirement, and numerous religious works are central texts in Literature Humanities and Contemporary Civilization. Majors and concentrators are required to take courses outside of religion in related fields to expand their vision of approaches to religion.

In addition, the University's wide offerings in the languages of various religious traditions (including Arabic, Chinese, Greek, Hebrew, Japanese, Persian, Latin, Sanskrit, and Tibetan) augment many students' abilities to conduct research in religion. Students likewise are actively encouraged to explore the world-renowned archival resources within Columbia's libraries (including the Rare Book and Manuscript Room, the Burke Library at Union Theological Seminary, the C.V. Starr East Asian Library), and to explore and investigate the equally wide range of living religious communities represented in New York's global neighborhoods.

Prospective majors should first arrange to meet with the Director of Undergraduate Studies. All students are then allocated a faculty adviser, and must submit a copy of the Declaration of Major form to the director of undergraduate studies. After agreeing upon a plan for the major or concentration, students must obtain final approval and confirmation from the Director of Undergraduate Studies.

GUIDELINES FOR ALL RELIGION MAJORS AND CONCENTRATORS

Major in Religion

All majors are encouraged to pursue both depth and breadth by constructing a program of study in consultation with the Director of Undergraduate Studies. The program should include courses in a variety of religious traditions. Students who write a senior thesis may include a term of individually supervised research as one of the courses for their major.

Courses

For the major the following 9 courses are required:

- 1 gateway course (1000 level)
- 2 introductory courses (2000 level)
- 2 intermediate courses (3000 level)
- 2 seminars (4000 level)
- 1 additional course at any level
- RELI UN3199 Theory (formerly Juniors Colloquium)

Concentration in Religion

To be planned in consultation with the Director of Undergraduate Studies and with a member of the faculty in an

area in which the student has a particular interest. The program should include some study in a breadth of religious traditions.

Courses

For the concentration the following 7 courses are required:

- 1 gateway course (1000 level)
- 2 introductory courses (2000 level)
- 2 intermediate courses (3000 level)
- 1 seminar (4000 level)
- RELI UN3199 Theory

DEPARTMENTAL HONORS

Students who write a senior thesis and maintain a GPA of 3.66 or above in the major may be considered for departmental honors. Writing a senior thesis qualifies a student for consideration for departmental honors but does not assure it. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

COURSE NUMBERING

Courses are numbered by level and type:

- 1000-level: Gateway lecture course
- 2000-level: Introductory and “traditions” lectures
- 3000-level: Intermediate lecture
- 4000-level: Seminar

and Zone:

- x100-199: Theory (RELI UN3199)
- x200-299: Time (zone)
- x300-399: Transmission (zone)
- x400-499: Space (zone)
- x500-599: Body (zone)
- x600-699: Media (zone)

PROFESSORS

Gil Anidjar (Chair)
 Courtney Bender
 Beth Berkowitz (Barnard)
 Elizabeth Castelli (Barnard)
 Matthew Engelke
 Katherine Pratt Ewing
 Bernard Faure
 Najam Haider (Barnard)
 John Hawley (Barnard)
 Rachel McDermott (Barnard)
 David (Max) Moerman (Barnard)
 Wayne Proudfoot
 Robert Somerville
 Mark Taylor

ASSOCIATE PROFESSORS

Michael Como
 Josef Sorett

ASSISTANT PROFESSORS

Clémence Boulouque
 Tiffany Hale (Barnard)
 Gale Kenny (Barnard)
 Zhaohua Yang

ADJUNCT FACULTY

Obery Hendricks
 David Kittay
 Derek Mancini-Lander
 Hussein Rashid
 Thomas Yarnall

POSTDOCTORAL FELLOWS

Mohamed Ait Amer Meziane (IRCPL)
 Daniel Herskowitz (IIJS)
 Rajbir Judge (IRCPL)
 Kwi Jeong Lee

ON LEAVE

Prof. Como (Spring 2020)
 Prof. Ewing (2019-20)
 Prof. Proudfoot (2019-20)
 Prof. Somerville (Fall 2019)

PROFESSORS EMERETI

George Rupp
 Robert Thurman
 Chun-fang Yu

GUIDELINES FOR ALL RELIGION MAJORS AND CONCENTRATORS

Senior Thesis

Many students choose to write a senior honors thesis in order to pursue an advanced topic in greater depth, or to work on a particular area of interest with one of their professors. This opportunity is available to all students who major in the department, regardless of GPA, and serves for many as their undergraduate capstone experience.

Students who write a senior thesis may apply for up to 3 points of directed reading with their thesis adviser. The deadline for application for the honors thesis in religion is the last day of exams in the student's junior spring term, and must be submitted for approval to the director of undergraduate studies. The application must include both a prospectus for the paper and a letter of support by the faculty member who has agreed to direct the thesis. The prospectus (5-7 pages) should detail a research program and the central question(s) to be pursued in the paper, preparation for the thesis, and a timeline. The primary adviser of the thesis must be a member of the Religion Department faculty.

Many students find that identifying a thesis project earlier in the junior year, in conjunction with the Juniors colloquium, presents an opportunity to develop a proposal in advance of deadlines for summer research funding from various sources, including the undergraduate schools and the Institute for Religion Culture and Public Life.

Grading

Courses in which a grade of D has been received do not count toward the major or concentration requirements.

MAJOR IN RELIGION

All majors are encouraged to pursue both depth and breadth by constructing a program of study in consultation with the Director of Undergraduate Studies and with a member of the faculty in an area in which they have particular interest. The program should include courses in a variety of religious traditions. Students who write a senior thesis may include a term of individually supervised research as one of the courses for their major.

For the major the following 9 courses are required::

- 1 gateway course (1000 level)
- 2 introductory courses (2000 level)
- 2 intermediate courses (3000 level)
- 2 seminars (4000 level)
- 1 additional course at any level
- RELI UN3199 Theory (formerly Juniors Colloquium)

CONCENTRATION IN RELIGION

To be planned in consultation with the Director of Undergraduate Studies and with a member of the faculty in an area in which the student has a particular interest. The program should include some study in a breadth of religious traditions.

For the concentration the following 7 courses are required:

- 1 gateway course (1000 level)
- 2 introductory courses (2000 level)
- 2 intermediate courses (3000 level)
- 1 seminar (4000 level)
- RELI UN3199 Theory

RUSSIAN LANGUAGE AND CULTURE

Departmental Office: 708 Hamilton; 212-854-3941
<http://www.columbia.edu/cu/slavic/>

Director of Undergraduate Studies:

Prof. Cathy Popkin, 706 Hamilton Hall; 212-854-3941;
 cp18@columbia.edu

Russian Language Program Director:

Prof. Alla Smyslova, 708 Hamilton; 212-854-8155;
 as2157@columbia.edu

The Department of Slavic Languages and Literatures is devoted to the study of the cultures, literatures, and languages of Russia and other Slavic peoples and lands. We approach our study and teaching of these cultures with an eye to their specificity and attention to their interaction with other cultures, in history and in the contemporary global context. We focus not only on the rich literary tradition, but also on the film, theater, politics, art, music, media, religious thought, critical theory, and intellectual history of Russians and other Slavs. Our approach is interdisciplinary.

Students who take our courses have different interests. Many of our courses are taught in English with readings in English and have no prerequisites. As a consequence, our majors and concentrators are joined by students from other literature departments, by students of history and political science who have a particular interest in the Slavic region, and by others who are drawn to the subject matter for a variety of intellectual and practical reasons.

We provide instruction in Russian at all levels (beginning through very advanced), with a special course for heritage speakers. To improve the proficiency of Russian learners and speakers, we offer a number of literature and culture courses in which texts are read in the original and discussion is conducted in Russian. We offer three levels of other Slavic languages: Bosnian-Croatian-Serbian, Czech, Polish, and Ukrainian (with additional courses in culture in English). All language courses in the Slavic Department develop the four basic language skills (speaking, listening, reading, and writing) and cultural understanding.

Our department prides itself on the intellectual vitality of its program and on the sense of community among students and faculty. As they explore Russian and Slavic languages, literatures, and cultures, students develop not only their specific knowledge and cultural understanding, but also the capacity for critical thought, skills in analyzing literary and other texts, and the ability to express their ideas orally and in writing. Our graduates have used their knowledge and skills in different ways: graduate school, Fulbright and other fellowships, journalism, publishing, law school, NGO work, public health, government work, and politics. Our faculty is proud of its students and graduates.

MAJORS AND CONCENTRATIONS

Guided by the director of undergraduate studies and other faculty members, students majoring in Slavic create a program that suits their intellectual interests and academic goals. They choose from three tracks: Russian Language and Culture (for those with a strong interest in mastering the language),

Russian Literature and Culture (for those who want to focus on literary and cultural studies), and Slavic Studies (a flexible regional studies major for those interested in one or more Slavic cultures). In each major, students may count related courses in other departments among their electives.

In addition to its majors, the department offers five concentrations. Three are analogous to the major tracks (Russian Language and Culture, Russian Literature and Culture, and Slavic Studies). There is also a concentration in Russian Literature that does not require language study and another concentration in Slavic Cultures that allows students to focus on a Slavic language and culture other than Russian.

Motivated seniors are encouraged but not required to write a senior thesis. Those who write a thesis enroll in the Senior Seminar in the fall term and work individually with a thesis adviser. Students have written on a wide range of topics in literature, culture, media, and politics.

SLAVIC CULTURE AT COLUMBIA OUTSIDE OF THE CLASSROOM

All interested students are welcome to take part in departmental activities, such as conversation hours, Slavic student organizations, the department's various film series (Russian, East Central European, Central Asian, and Ukrainian), and the country's first undergraduate journal of Eastern European and Eurasian Culture, *The Birch*. The Slavic Department has close ties to the Harriman Institute and the East Central European Center, which sponsor lectures, symposia, performances, and conferences.

STUDY AND RESEARCH ABROAD

The department encourages its students to enrich their cultural knowledge and develop their language skills by spending a semester or summer studying in Russia, the Czech Republic, Poland, Ukraine, or the countries of the former Yugoslavia. The department helps students find the program that suits their needs and interests. Undergraduates may apply to the Harriman Institute for modest scholarships for research during winter/spring breaks or the summer.

ADVANCED/NEWL PLACEMENT

A score of 5 on the AP/NEWL Russian exam satisfies the foreign language requirement. Upon successful completion of a 3-point 3000 level (or higher) course at Columbia, the Department of Slavic Languages will award 3 points of AP credit, provided the grade in the course is a B or better. Courses taught in English may not be used to earn AP credit. No credit or placement is given for the SAT II Subject test. If you wish to continue with Russian at Columbia, you should take the departmental placement test and speak with the Russian program director prior to registration to ensure proper placement.

PROFESSORS

Valentina Izmirlieva
Liza Knapp
Mark Lipovetsky (Leiderman)
Cathy Popkin
Irina Reyfman (Chair)

ASSISTANT PROFESSORS

Adam Leeds
Jessica Merrill

VISITING ASSISTANT PROFESSORS

Holly Myers (Barnard)

SENIOR LECTURERS

Alla Smyslova

LECTURERS

Aleksandar Boskovic
Christopher Caes
Christopher Harwood
Nataliya Kun
Yuri Shevchuk

ON LEAVE

Valentina Izmirlieva (Fall 2019, Spring 2020)
Jessica Merrill (Fall 2019, Spring 2020)
Aleksandar Boskovic (Fall 2019, Spring 2020)

GUIDELINES FOR ALL SLAVIC MAJORS AND CONCENTRATORS

Senior Thesis

A senior thesis is not required for any Slavic major. Students who wish to undertake a thesis project should confer with the director of undergraduate studies during the registration period in April of their junior year and register to take RUSS UN3595 Senior Seminar in the fall term of their senior year. Students can opt to expand the thesis into a two-semester project register for RUSS UN3998 Supervised Individual Research, with their thesis adviser, in the spring term of their senior year. *Senior Seminar* may satisfy one elective requirement; the optional second semester of thesis work adds one course to the 15 required for the major.

Grading

Courses in which a grade of D has been received do not count toward major or concentration requirements.

MAJOR IN RUSSIAN LANGUAGE AND CULTURE

This major is intended for students who aim to attain maximal proficiency in the Russian language. Intensive language training is complemented by an array of elective courses in Russian culture that allow students to achieve critical understanding of contemporary Russian society and of Russian-speaking communities around the world. Since this major emphasizes language acquisition, it is not appropriate for native Russian speakers.

The program of study consists of 15 courses, distributed as follows:

Eight semesters of coursework in Russian language (from first- through fourth-year Russian) or the equivalent

Select two of the following surveys; at least one of these should be a Russian literature survey (RUSS UN3220 or RUSS UN3221):

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'
SLCL UN3001	Slavic Cultures
RUSS GU4006	Russian Religious Thought, Praxis, and Literature
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism
RUSS GU4107	Russian Literature and Culture in the New Millennium

Five additional courses in Russian culture, history, literature, art, film, music, or in linguistics, chosen in consultation with the director of undergraduate studies. At least one of the selected courses should be taught in Russian

MAJOR IN RUSSIAN LITERATURE AND CULTURE

The goal of this major is to make students conversant with a variety of Russian literary, historical and theoretical texts in the original, and to facilitate a critical understanding of Russian literature, culture, and society. It is addressed to students who would like to complement serious literary studies with intensive language training, and is especially suitable for those who intend to pursue an academic career in the Slavic field.

The program of study consists of 15 courses, distributed as follows:

Six semesters of coursework in Russian language (from first- through third-year Russian) or the equivalent.

Select three of the following surveys; two of which must be in Russian literature (RUSS UN3220 and RUSS UN3221)

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'
SLCL UN3001	Slavic Cultures
RUSS GU4006	Russian Religious Thought, Praxis, and Literature
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism
RUSS GU4107	Russian Literature and Culture in the New Millennium

Six additional courses in Russian literature, culture, history, film, art, music, or in advanced Russian language, chosen in consultation with the director of undergraduate studies. At least one course should be taught in Russian

Students considering graduate study in Russian literature are strongly advised to complete four years of language training.

MAJOR IN SLAVIC STUDIES

This flexible major provides opportunities for interdisciplinary studies within the Slavic field. Students are encouraged to choose one target language (Bosnian-Croatian-Serbian, Czech, Polish, Russian, or Ukrainian), though there are possibilities for studying a second Slavic language as well. Generally, the major has one disciplinary focus in history, political science, economics, religion, anthropology, sociology, art, film, or music. In addition, this program allows students to focus on a particular Slavic (non-Russian) literature and culture or to do comparative studies of several Slavic literatures, including Russian. Students should plan their program with the director of undergraduate studies as early as possible, since course availability varies from year to year.

The program of study consists of 15 courses, distributed as follows:

Six semesters of coursework in one Slavic language (from first- through third-year Russian, Bosnian-Croatian-Serbian, Czech, Polish, or Ukrainian) or the equivalent.

Two relevant courses in Russian, East/Central European or Eurasian history.

Two relevant literature or culture courses in Slavic, preferably related to the target language.

Five additional courses with Slavic content in history, political science, economics, literature, religion, anthropology, sociology, art, film, or music, chosen in consultation with the director of undergraduate studies. Two of these electives may be language courses for students who opt to include a second Slavic language in their program.

Altogether students should complete four courses in a single discipline, including, if appropriate, the required history or literature/culture courses.

CONCENTRATION IN RUSSIAN LANGUAGE AND CULTURE

This program is intended for students who aim to attain proficiency in the Russian language. Intensive language training is complemented by an array of elective courses in Russian culture that allow students to achieve critical understanding of contemporary Russian society and of Russian-speaking communities around the world. Since this concentration emphasizes language acquisition, it is not appropriate for native Russian speakers.

The program of study consists of 10 courses, distributed as follows:

Six semesters of coursework in Russian language (from first-through third-year Russian) or the equivalent.

Select one of the following surveys:

SLCL UN3001	Slavic Cultures
RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism

Three additional courses in Russian culture, history, literature, art, film, music, or in linguistics, chosen in consultation with the director of undergraduate studies; at least one of the selected courses should be taught in Russian.

RUSS GU4107	Russian Literature and Culture in the New Millennium
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CONCENTRATION IN SLAVIC (NON-RUSSIAN) LANGUAGE AND CULTURE

This program is intended for students who aim to attain proficiency in a Slavic language other than Russian. Intensive language training is complemented by an array of elective courses in Slavic cultures that allow students to achieve critical understanding of the communities that are shaped by the Slavic language of their choice. Since this concentration emphasizes language acquisition, it is not appropriate for native speakers of the target language.

The program of study consists of 10 courses, distributed as follows:

Six semesters of coursework in one Slavic language (from first- through third-year Bosnian-Croatian-Serbian, Czech, Polish, or Ukrainian) or the equivalent.

Four additional courses in Slavic literature, culture or history, or in linguistics, chosen in consultation with the director of undergraduate studies; at least two should be directly related to the target language of study.

CONCENTRATION IN RUSSIAN LITERATURE AND CULTURE

The goal of this concentration is to make students conversant with a variety of Russian literary texts and cultural artifacts that facilitate a critical understanding of Russian culture. It is addressed to students who would like to combine language training with study of the Russian literary tradition.

The program of study consists of 10 courses, distributed as follows:

Four semesters of coursework in Russian language (first- and second-year Russian) or the equivalent.

Select two of the following surveys; one of which must be a literature survey (RUSS UN3220 or RUSS UN3221)

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'
RUSS GU4006	Russian Religious Thought, Praxis, and Literature
SLCL UN3001	Slavic Cultures
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism
RUSS GU4107	Russian Literature and Culture in the New Millennium

Four additional courses in Russian literature, culture, and history, chosen in consultation with the director of undergraduate studies.

CONCENTRATION IN SLAVIC STUDIES

This flexible concentration provides opportunities for interdisciplinary studies within the Slavic field. Students are encouraged to choose one target language (Bosnian-Croatian-Serbian, Czech, Polish, Russian, or Ukrainian), and one disciplinary focus in history, political science, economics, religion, anthropology, sociology, art, film, or music. In addition, this program allows students to focus on a particular Slavic (non-Russian) literature and culture, or to do comparative studies of several Slavic literatures, including Russian.

The program of study consists of 10 courses, distributed as follows:

Four semesters of coursework in one Slavic language (first- and second-year Bosnian-Croatian-Serbian, Czech, Polish, Russian, or Ukrainian) or the equivalent.

One relevant course in Russian, East/Central European or Eurasian history.

One relevant literature or culture course in Slavic, preferably related to the target language.

Four additional courses with Slavic content in history, political science, economics, literature, religion, anthropology, sociology, art, film, or music, chosen in consultation with the director of undergraduate studies

Altogether students should complete three courses in a single discipline, including, if appropriate, the required history or literature/culture courses.

CONCENTRATION IN RUSSIAN LITERATURE

This concentration is addressed to serious literature students who would like to pursue Russian literature but have no training in Russian. It allows students to explore the Russian literary tradition, while perfecting their critical skills and their techniques of close reading in a variety of challenging courses in translation.

The program of study consists of 8 courses, with no language requirements, distributed as follows:

Select two of the following Russian literature surveys (in translation):

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]

Six additional courses, focused primarily on Russian literature, culture, and history, though courses in other Slavic literatures are also acceptable if approved by the director of undergraduate studies.

Relevant literature courses from other departments may count toward the concentration only if approved by the director of undergraduate studies.

RUSSIAN LITERATURE AND CULTURE

Departmental Office: 708 Hamilton; 212-854-3941
<http://www.columbia.edu/cu/slavic/>

Director of Undergraduate Studies:

Prof. Cathy Popkin, 706 Hamilton Hall; 212-854-3941;
 cp18@columbia.edu

Russian Language Program Director:

Prof. Alla Smyslova, 708 Hamilton; 212-854-8155;
 as2157@columbia.edu

The Department of Slavic Languages and Literatures is devoted to the study of the cultures, literatures, and languages of Russia and other Slavic peoples and lands. We approach our study and teaching of these cultures with an eye to their specificity and attention to their interaction with other cultures, in history and in the contemporary global context. We focus not only on the rich literary tradition, but also on the film, theater, politics, art, music, media, religious thought, critical theory, and intellectual history of Russians and other Slavs. Our approach is interdisciplinary.

Students who take our courses have different interests. Many of our courses are taught in English with readings in English and have no prerequisites. As a consequence, our majors and concentrators are joined by students from other literature departments, by students of history and political science who have a particular interest in the Slavic region, and by others who are drawn to the subject matter for a variety of intellectual and practical reasons.

We provide instruction in Russian at all levels (beginning through very advanced), with a special course for heritage speakers. To improve the proficiency of Russian learners and speakers, we offer a number of literature and culture courses in which texts are read in the original and discussion is conducted in Russian. We offer three levels of other Slavic languages: Bosnian-Croatian-Serbian, Czech, Polish, and Ukrainian (with additional courses in culture in English). All language courses in the Slavic Department develop the four basic language skills (speaking, listening, reading, and writing) and cultural understanding.

Our department prides itself on the intellectual vitality of its program and on the sense of community among students and faculty. As they explore Russian and Slavic languages, literatures, and cultures, students develop not only their specific knowledge and cultural understanding, but also the capacity for critical thought, skills in analyzing literary and other texts, and the ability to express their ideas orally and in writing. Our graduates have used their knowledge and skills in different ways: graduate school, Fulbright and other fellowships, journalism, publishing, law school, NGO work, public health, government work, and politics. Our faculty is proud of its students and graduates.

MAJORS AND CONCENTRATIONS

Guided by the director of undergraduate studies and other faculty members, students majoring in Slavic create a program that suits their intellectual interests and academic goals. They choose from three tracks: Russian Language and Culture (for those with a strong interest in mastering the language),

Russian Literature and Culture (for those who want to focus on literary and cultural studies), and Slavic Studies (a flexible regional studies major for those interested in one or more Slavic cultures). In each major, students may count related courses in other departments among their electives.

In addition to its majors, the department offers five concentrations. Three are analogous to the major tracks (Russian Language and Culture, Russian Literature and Culture, and Slavic Studies). There is also a concentration in Russian Literature that does not require language study and another concentration in Slavic Cultures that allows students to focus on a Slavic language and culture other than Russian.

Motivated seniors are encouraged but not required to write a senior thesis. Those who write a thesis enroll in the Senior Seminar in the fall term and work individually with a thesis adviser. Students have written on a wide range of topics in literature, culture, media, and politics.

SLAVIC CULTURE AT COLUMBIA OUTSIDE OF THE CLASSROOM

All interested students are welcome to take part in departmental activities, such as conversation hours, Slavic student organizations, the department's various film series (Russian, East Central European, Central Asian, and Ukrainian), and the country's first undergraduate journal of Eastern European and Eurasian Culture, *The Birch*. The Slavic Department has close ties to the Harriman Institute and the East Central European Center, which sponsor lectures, symposia, performances, and conferences.

STUDY AND RESEARCH ABROAD

The department encourages its students to enrich their cultural knowledge and develop their language skills by spending a semester or summer studying in Russia, the Czech Republic, Poland, Ukraine, or the countries of the former Yugoslavia. The department helps students find the program that suits their needs and interests. Undergraduates may apply to the Harriman Institute for modest scholarships for research during winter/spring breaks or the summer.

ADVANCED/NEWL PLACEMENT

A score of 5 on the AP/NEWL Russian exam satisfies the foreign language requirement. Upon successful completion of a 3-point 3000 level (or higher) course at Columbia, the Department of Slavic Languages will award 3 points of AP credit, provided the grade in the course is a B or better. Courses taught in English may not be used to earn AP credit. No credit or placement is given for the SAT II Subject test. If you wish to continue with Russian at Columbia, you should take the departmental placement test and speak with the Russian program director prior to registration to ensure proper placement.

PROFESSORS

Valentina Izmirlieva
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Irina Reyfman (Chair)

ASSISTANT PROFESSORS

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SENIOR LECTURERS

Alla Smyslova

LECTURERS

Aleksandar Boskovic
Christopher Caes
Christopher Harwood
Nataliya Kun
Yuri Shevchuk

ON LEAVE

Valentina Izmirlieva (Fall 2019, Spring 2020)
Jessica Merrill (Fall 2019, Spring 2020)
Aleksandar Boskovic (Fall 2019, Spring 2020)

GUIDELINES FOR ALL SLAVIC MAJORS AND CONCENTRATORS

Senior Thesis

A senior thesis is not required for any Slavic major. Students who wish to undertake a thesis project should confer with the director of undergraduate studies during the registration period in April of their junior year and register to take RUSS UN3595 Senior Seminar in the fall term of their senior year. Students can opt to expand the thesis into a two-semester project register for RUSS UN3998 Supervised Individual Research, with their thesis adviser, in the spring term of their senior year. *Senior Seminar* may satisfy one elective requirement; the optional second semester of thesis work adds one course to the 15 required for the major.

Grading

Courses in which a grade of D has been received do not count toward major or concentration requirements.

MAJOR IN RUSSIAN LANGUAGE AND CULTURE

This major is intended for students who aim to attain maximal proficiency in the Russian language. Intensive language training is complemented by an array of elective courses in Russian culture that allow students to achieve critical understanding of contemporary Russian society and of Russian-speaking communities around the world. Since this major emphasizes language acquisition, it is not appropriate for native Russian speakers.

The program of study consists of 15 courses, distributed as follows:

Eight semesters of coursework in Russian language (from first- through fourth-year Russian) or the equivalent

Select two of the following surveys; at least one of these should be a Russian literature survey (RUSS UN3220 or RUSS UN3221):

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'
SLCL UN3001	Slavic Cultures
RUSS GU4006	Russian Religious Thought, Praxis, and Literature
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism
RUSS GU4107	Russian Literature and Culture in the New Millennium

Five additional courses in Russian culture, history, literature, art, film, music, or in linguistics, chosen in consultation with the director of undergraduate studies. At least one of the selected courses should be taught in Russian

MAJOR IN RUSSIAN LITERATURE AND CULTURE

The goal of this major is to make students conversant with a variety of Russian literary, historical and theoretical texts in the original, and to facilitate a critical understanding of Russian literature, culture, and society. It is addressed to students who would like to complement serious literary studies with intensive language training, and is especially suitable for those who intend to pursue an academic career in the Slavic field.

The program of study consists of 15 courses, distributed as follows:

Six semesters of coursework in Russian language (from first- through third-year Russian) or the equivalent.

Select three of the following surveys; two of which must be in Russian literature (RUSS UN3220 and RUSS UN3221)

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'
SLCL UN3001	Slavic Cultures
RUSS GU4006	Russian Religious Thought, Praxis, and Literature
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism
RUSS GU4107	Russian Literature and Culture in the New Millennium

Six additional courses in Russian literature, culture, history, film, art, music, or in advanced Russian language, chosen in consultation with the director of undergraduate studies. At least one course should be taught in Russian

Students considering graduate study in Russian literature are strongly advised to complete four years of language training.

MAJOR IN SLAVIC STUDIES

This flexible major provides opportunities for interdisciplinary studies within the Slavic field. Students are encouraged to choose one target language (Bosnian-Croatian-Serbian, Czech, Polish, Russian, or Ukrainian), though there are possibilities for studying a second Slavic language as well. Generally, the major has one disciplinary focus in history, political science, economics, religion, anthropology, sociology, art, film, or music. In addition, this program allows students to focus on a particular Slavic (non-Russian) literature and culture or to do comparative studies of several Slavic literatures, including Russian. Students should plan their program with the director of undergraduate studies as early as possible, since course availability varies from year to year.

The program of study consists of 15 courses, distributed as follows:

Six semesters of coursework in one Slavic language (from first- through third-year Russian, Bosnian-Croatian-Serbian, Czech, Polish, or Ukrainian) or the equivalent.

Two relevant courses in Russian, East/Central European or Eurasian history.

Two relevant literature or culture courses in Slavic, preferably related to the target language.

Five additional courses with Slavic content in history, political science, economics, literature, religion, anthropology, sociology, art, film, or music, chosen in consultation with the director of undergraduate studies. Two of these electives may be language courses for students who opt to include a second Slavic language in their program.

Altogether students should complete four courses in a single discipline, including, if appropriate, the required history or literature/culture courses.

CONCENTRATION IN RUSSIAN LANGUAGE AND CULTURE

This program is intended for students who aim to attain proficiency in the Russian language. Intensive language training is complemented by an array of elective courses in Russian culture that allow students to achieve critical understanding of contemporary Russian society and of Russian-speaking communities around the world. Since this concentration emphasizes language acquisition, it is not appropriate for native Russian speakers.

The program of study consists of 10 courses, distributed as follows:

Six semesters of coursework in Russian language (from first-through third-year Russian) or the equivalent.

Select one of the following surveys:

SLCL UN3001	Slavic Cultures
RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism

Three additional courses in Russian culture, history, literature, art, film, music, or in linguistics, chosen in consultation with the director of undergraduate studies; at least one of the selected courses should be taught in Russian.

RUSS GU4107	Russian Literature and Culture in the New Millennium
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CONCENTRATION IN SLAVIC (NON-RUSSIAN) LANGUAGE AND CULTURE

This program is intended for students who aim to attain proficiency in a Slavic language other than Russian. Intensive language training is complemented by an array of elective courses in Slavic cultures that allow students to achieve critical understanding of the communities that are shaped by the Slavic language of their choice. Since this concentration emphasizes language acquisition, it is not appropriate for native speakers of the target language.

The program of study consists of 10 courses, distributed as follows:

Six semesters of coursework in one Slavic language (from first- through third-year Bosnian-Croatian-Serbian, Czech, Polish, or Ukrainian) or the equivalent.

Four additional courses in Slavic literature, culture or history, or in linguistics, chosen in consultation with the director of undergraduate studies; at least two should be directly related to the target language of study.

CONCENTRATION IN RUSSIAN LITERATURE AND CULTURE

The goal of this concentration is to make students conversant with a variety of Russian literary texts and cultural artifacts that facilitate a critical understanding of Russian culture. It is addressed to students who would like to combine language training with study of the Russian literary tradition.

The program of study consists of 10 courses, distributed as follows:

Four semesters of coursework in Russian language (first- and second-year Russian) or the equivalent.

Select two of the following surveys; one of which must be a literature survey (RUSS UN3220 or RUSS UN3221)

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'
RUSS GU4006	Russian Religious Thought, Praxis, and Literature
SLCL UN3001	Slavic Cultures
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism
RUSS GU4107	Russian Literature and Culture in the New Millennium

Four additional courses in Russian literature, culture, and history, chosen in consultation with the director of undergraduate studies.

CONCENTRATION IN SLAVIC STUDIES

This flexible concentration provides opportunities for interdisciplinary studies within the Slavic field. Students are encouraged to choose one target language (Bosnian-Croatian-Serbian, Czech, Polish, Russian, or Ukrainian), and one disciplinary focus in history, political science, economics, religion, anthropology, sociology, art, film, or music. In addition, this program allows students to focus on a particular Slavic (non-Russian) literature and culture, or to do comparative studies of several Slavic literatures, including Russian.

The program of study consists of 10 courses, distributed as follows:

Four semesters of coursework in one Slavic language (first- and second-year Bosnian-Croatian-Serbian, Czech, Polish, Russian, or Ukrainian) or the equivalent.

One relevant course in Russian, East/Central European or Eurasian history.

One relevant literature or culture course in Slavic, preferably related to the target language.

Four additional courses with Slavic content in history, political science, economics, literature, religion, anthropology, sociology, art, film, or music, chosen in consultation with the director of undergraduate studies

Altogether students should complete three courses in a single discipline, including, if appropriate, the required history or literature/culture courses.

CONCENTRATION IN RUSSIAN LITERATURE

This concentration is addressed to serious literature students who would like to pursue Russian literature but have no training in Russian. It allows students to explore the Russian literary tradition, while perfecting their critical skills and their techniques of close reading in a variety of challenging courses in translation.

The program of study consists of 8 courses, with no language requirements, distributed as follows:

Select two of the following Russian literature surveys (in translation):

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]

Six additional courses, focused primarily on Russian literature, culture, and history, though courses in other Slavic literatures are also acceptable if approved by the director of undergraduate studies.

Relevant literature courses from other departments may count toward the concentration only if approved by the director of undergraduate studies.

SLAVIC STUDIES

Departmental Office: 708 Hamilton; 212-854-3941
<http://www.columbia.edu/cu/slavic/>

Director of Undergraduate Studies:

Prof. Cathy Popkin, 706 Hamilton Hall; 212-854-3941;
 cp18@columbia.edu

Russian Language Program Director:

Prof. Alla Smyslova, 708 Hamilton; 212-854-8155;
 as2157@columbia.edu

The Department of Slavic Languages and Literatures is devoted to the study of the cultures, literatures, and languages of Russia and other Slavic peoples and lands. We approach our study and teaching of these cultures with an eye to their specificity and attention to their interaction with other cultures, in history and in the contemporary global context. We focus not only on the rich literary tradition, but also on the film, theater, politics, art, music, media, religious thought, critical theory, and intellectual history of Russians and other Slavs. Our approach is interdisciplinary.

Students who take our courses have different interests. Many of our courses are taught in English with readings in English and have no prerequisites. As a consequence, our majors and concentrators are joined by students from other literature departments, by students of history and political science who have a particular interest in the Slavic region, and by others who are drawn to the subject matter for a variety of intellectual and practical reasons.

We provide instruction in Russian at all levels (beginning through very advanced), with a special course for heritage speakers. To improve the proficiency of Russian learners and speakers, we offer a number of literature and culture courses in which texts are read in the original and discussion is conducted in Russian. We offer three levels of other Slavic languages: Bosnian-Croatian-Serbian, Czech, Polish, and Ukrainian (with additional courses in culture in English). All language courses in the Slavic Department develop the four basic language skills (speaking, listening, reading, and writing) and cultural understanding.

Our department prides itself on the intellectual vitality of its program and on the sense of community among students and faculty. As they explore Russian and Slavic languages, literatures, and cultures, students develop not only their specific knowledge and cultural understanding, but also the capacity for critical thought, skills in analyzing literary and other texts, and the ability to express their ideas orally and in writing. Our graduates have used their knowledge and skills in different ways: graduate school, Fulbright and other fellowships, journalism, publishing, law school, NGO work, public health, government work, and politics. Our faculty is proud of its students and graduates.

MAJORS AND CONCENTRATIONS

Guided by the director of undergraduate studies and other faculty members, students majoring in Slavic create a program that suits their intellectual interests and academic goals. They choose from three tracks: Russian Language and Culture (for those with a strong interest in mastering the language), Russian Literature and Culture (for those who want to focus on literary and cultural studies), and Slavic Studies (a flexible regional studies major for those interested in one or more Slavic

cultures). In each major, students may count related courses in other departments among their electives.

In addition to its majors, the department offers five concentrations. Three are analogous to the major tracks (Russian Language and Culture, Russian Literature and Culture, and Slavic Studies). There is also a concentration in Russian Literature that does not require language study and another concentration in Slavic Cultures that allows students to focus on a Slavic language and culture other than Russian.

Motivated seniors are encouraged but not required to write a senior thesis. Those who write a thesis enroll in the Senior Seminar in the fall term and work individually with a thesis adviser. Students have written on a wide range of topics in literature, culture, media, and politics.

SLAVIC CULTURE AT COLUMBIA OUTSIDE OF THE CLASSROOM

All interested students are welcome to take part in departmental activities, such as conversation hours, Slavic student organizations, the department's various film series (Russian, East Central European, Central Asian, and Ukrainian), and the country's first undergraduate journal of Eastern European and Eurasian Culture, *The Birch*. The Slavic Department has close ties to the Harriman Institute and the East Central European Center, which sponsor lectures, symposia, performances, and conferences.

STUDY AND RESEARCH ABROAD

The department encourages its students to enrich their cultural knowledge and develop their language skills by spending a semester or summer studying in Russia, the Czech Republic, Poland, Ukraine, or the countries of the former Yugoslavia. The department helps students find the program that suits their needs and interests. Undergraduates may apply to the Harriman Institute for modest scholarships for research during winter/spring breaks or the summer.

ADVANCED/NEWL PLACEMENT

A score of 5 on the AP/NEWL Russian exam satisfies the foreign language requirement. Upon successful completion of a 3-point 3000 level (or higher) course at Columbia, the Department of Slavic Languages will award 3 points of AP credit, provided the grade in the course is a B or better. Courses taught in English may not be used to earn AP credit. No credit or placement is given for the SAT II Subject test. If you wish to continue with Russian at Columbia, you should take the departmental placement test and speak with the Russian program director prior to registration to ensure proper placement.

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ON LEAVE

Valentina Izmirlieva (Fall 2019, Spring 2020)
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GUIDELINES FOR ALL SLAVIC MAJORS AND CONCENTRATORS

Senior Thesis

A senior thesis is not required for any Slavic major. Students who wish to undertake a thesis project should confer with the director of undergraduate studies during the registration period in April of their junior year and register to take RUSS UN3595 Senior Seminar in the fall term of their senior year. Students can opt to expand the thesis into a two-semester project register for RUSS UN3998 Supervised Individual Research, with their thesis adviser, in the spring term of their senior year. *Senior Seminar* may satisfy one elective requirement; the optional second semester of thesis work adds one course to the 15 required for the major.

Grading

Courses in which a grade of D has been received do not count toward major or concentration requirements.

MAJOR IN RUSSIAN LANGUAGE AND CULTURE

This major is intended for students who aim to attain maximal proficiency in the Russian language. Intensive language training is complemented by an array of elective courses in Russian

culture that allow students to achieve critical understanding of contemporary Russian society and of Russian-speaking communities around the world. Since this major emphasizes language acquisition, it is not appropriate for native Russian speakers.

The program of study consists of 15 courses, distributed as follows:

Eight semesters of coursework in Russian language (from first- through fourth-year Russian) or the equivalent

Select two of the following surveys; at least one of these should be a Russian literature survey (RUSS UN3220 or RUSS UN3221):

RUSS UN3220 Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]

RUSS UN3221 Literature & Revolution [In English]

RUSS UN3223 Magical Mystery Tour: The Legacy of Old Rus'

SLCL UN3001 Slavic Cultures

RUSS GU4006 Russian Religious Thought, Praxis, and Literature

CLRS GU4022 Russia and Asia: Orientalism, Eurasianism, Internationalism

RUSS GU4107 Russian Literature and Culture in the New Millennium

Five additional courses in Russian culture, history, literature, art, film, music, or in linguistics, chosen in consultation with the director of undergraduate studies. At least one of the selected courses should be taught in Russian

MAJOR IN RUSSIAN LITERATURE AND CULTURE

The goal of this major is to make students conversant with a variety of Russian literary, historical and theoretical texts in the original, and to facilitate a critical understanding of Russian literature, culture, and society. It is addressed to students who would like to complement serious literary studies with intensive language training, and is especially suitable for those who intend to pursue an academic career in the Slavic field.

The program of study consists of 15 courses, distributed as follows:

Six semesters of coursework in Russian language (from first- through third-year Russian) or the equivalent.

Select three of the following surveys; two of which must be in Russian literature (RUSS UN3220 and RUSS UN3221)

RUSS UN3220 Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]

RUSS UN3221 Literature & Revolution [In English]

RUSS UN3223 Magical Mystery Tour: The Legacy of Old Rus'

SLCL UN3001 Slavic Cultures

RUSS GU4006 Russian Religious Thought, Praxis, and Literature

CLRS GU4022 Russia and Asia: Orientalism, Eurasianism, Internationalism

RUSS GU4107 Russian Literature and Culture in the New Millennium

Six additional courses in Russian literature, culture, history, film, art, music, or in advanced Russian language, chosen in consultation with the director of undergraduate studies. At least one course should be taught in Russian

Students considering graduate study in Russian literature are strongly advised to complete four years of language training.

MAJOR IN SLAVIC STUDIES

This flexible major provides opportunities for interdisciplinary studies within the Slavic field. Students are encouraged to choose one target language (Bosnian-Croatian-Serbian, Czech, Polish, Russian, or Ukrainian), though there are possibilities for studying a second Slavic language as well. Generally, the major has one disciplinary focus in history, political science, economics, religion, anthropology, sociology, art, film, or music. In addition, this program allows students to focus on a particular Slavic (non-Russian) literature and culture or to do comparative studies of several Slavic literatures, including Russian. Students should plan their program with the director of undergraduate studies as early as possible, since course availability varies from year to year.

The program of study consists of 15 courses, distributed as follows:

Six semesters of coursework in one Slavic language (from first- through third-year Russian, Bosnian-Croatian-Serbian, Czech, Polish, or Ukrainian) or the equivalent.

Two relevant courses in Russian, East/Central European or Eurasian history.

Two relevant literature or culture courses in Slavic, preferably related to the target language.

Five additional courses with Slavic content in history, political science, economics, literature, religion, anthropology, sociology, art, film, or music, chosen in consultation with the director of undergraduate studies. Two of these electives may be language courses for students who opt to include a second Slavic language in their program.

Altogether students should complete four courses in a single discipline, including, if appropriate, the required history or literature/culture courses.

CONCENTRATION IN RUSSIAN LANGUAGE AND CULTURE

This program is intended for students who aim to attain proficiency in the Russian language. Intensive language training

is complemented by an array of elective courses in Russian culture that allow students to achieve critical understanding of contemporary Russian society and of Russian-speaking communities around the world. Since this concentration emphasizes language acquisition, it is not appropriate for native Russian speakers.

The program of study consists of 10 courses, distributed as follows:

Six semesters of coursework in Russian language (from first-through third-year Russian) or the equivalent.

Select one of the following surveys:

SLCL UN3001	Slavic Cultures
RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'
CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism

Three additional courses in Russian culture, history, literature, art, film, music, or in linguistics, chosen in consultation with the director of undergraduate studies; at least one of the selected courses should be taught in Russian.

RUSS GU4107	Russian Literature and Culture in the New Millennium
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CONCENTRATION IN SLAVIC (NON-RUSSIAN) LANGUAGE AND CULTURE

This program is intended for students who aim to attain proficiency in a Slavic language other than Russian. Intensive language training is complemented by an array of elective courses in Slavic cultures that allow students to achieve critical understanding of the communities that are shaped by the Slavic language of their choice. Since this concentration emphasizes language acquisition, it is not appropriate for native speakers of the target language.

The program of study consists of 10 courses, distributed as follows:

Six semesters of coursework in one Slavic language (from first- through third-year Bosnian-Croatian-Serbian, Czech, Polish, or Ukrainian) or the equivalent.

Four additional courses in Slavic literature, culture or history, or in linguistics, chosen in consultation with the director of undergraduate studies; at least two should be directly related to the target language of study.

CONCENTRATION IN RUSSIAN LITERATURE AND CULTURE

The goal of this concentration is to make students conversant with a variety of Russian literary texts and cultural artifacts that facilitate a critical understanding of Russian culture. It is addressed to students who would like to combine language training with study of the Russian literary tradition.

The program of study consists of 10 courses, distributed as follows:

Four semesters of coursework in Russian language (first- and second-year Russian) or the equivalent.

Select two of the following surveys; one of which must be a literature survey (RUSS UN3220 or RUSS UN3221)

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]
RUSS UN3223	Magical Mystery Tour: The Legacy of Old Rus'

RUSS GU4006	Russian Religious Thought, Praxis, and Literature
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SLCL UN3001	Slavic Cultures
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CLRS GU4022	Russia and Asia: Orientalism, Eurasianism, Internationalism
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RUSS GU4107	Russian Literature and Culture in the New Millennium
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Four additional courses in Russian literature, culture, and history, chosen in consultation with the director of undergraduate studies.

CONCENTRATION IN SLAVIC STUDIES

This flexible concentration provides opportunities for interdisciplinary studies within the Slavic field. Students are encouraged to choose one target language (Bosnian-Croatian-Serbian, Czech, Polish, Russian, or Ukrainian), and one disciplinary focus in history, political science, economics, religion, anthropology, sociology, art, film, or music. In addition, this program allows students to focus on a particular Slavic (non-Russian) literature and culture, or to do comparative studies of several Slavic literatures, including Russian.

The program of study consists of 10 courses, distributed as follows:

Four semesters of coursework in one Slavic language (first- and second-year Bosnian-Croatian-Serbian, Czech, Polish, Russian, or Ukrainian) or the equivalent.

One relevant courses in Russian, East/Central European or Eurasian history.

One relevant literature or culture course in Slavic, preferably related to the target language.

Four additional courses with Slavic content in history, political science, economics, literature, religion, anthropology, sociology, art, film, or music, chosen in consultation with the director of undergraduate studies

Altogether students should complete three courses in a single discipline, including, if appropriate, the required history or literature/culture courses.

CONCENTRATION IN RUSSIAN LITERATURE

This concentration is addressed to serious literature students who would like to pursue Russian literature but have no training in Russian. It allows students to explore the Russian literary tradition, while perfecting their critical skills and their techniques of close reading in a variety of challenging courses in translation.

The program of study consists of 8 courses, with no language requirements, distributed as follows:

Select two of the following Russian literature surveys (in translation):

RUSS UN3220	Literature and Empire: The Reign of the Novel in Russia (19th Century) [In English]
RUSS UN3221	Literature & Revolution [In English]

Six additional courses, focused primarily on Russian literature, culture, and history, though courses in other Slavic literatures are also acceptable if approved by the director of undergraduate studies.

Relevant literature courses from other departments may count toward the concentration only if approved by the director of undergraduate studies.

SOCIOLOGY

Department Office: 501 Knox Hall; 212-853-1909
<http://www.sociology.columbia.edu>

Director of Undergraduate Studies: Teresa Sharpe, 501 Knox;
ts2785@columbia.edu

Director of Academic Administration and Finance:
Teresa Aguayo, 501C Knox Hall; 212-854-9890;
ta2015@columbia.edu

Student Program Coordinator: Kiamesha Wilson, 501B Knox; kw2510@columbia.edu

Sociology is the study of society. In examining patterns of association, sociologists explore the interactions of people, communities, and organizations. In this sense, sociology is not

the study of people; it is the study of the relationships among people. This study includes the associations between people and the products of human interaction, such as organizations, technologies, economies, cities, culture, media, and religion. In the kinds of questions it asks, sociology is a deeply humanist discipline and sociologists demand the analytic rigor of scientific investigation.

In training students in our department, we encourage them to ask big questions and we work to give them the tools to provide answers. These tools might mean ethnographic observation, pouring through historical archives, looking at census data, analyzing social networks, or interviewing people from various walks of life.

As a bridging discipline that seeks the scientific exploration of questions that matter to human communities, such as inequality and social injustice, sociology addresses many of the same areas of life as our neighboring social science disciplines. Yet we often approach these areas quite differently. For example, problems of economic and political life are a central concern to sociologists. Rather than explore these as independent or particular features of society, we seek to embed them within the complex whole of the social world. Students will find the Department of Sociology to be a broad, demanding department that provides its students with the conceptual and methodological tools to make sense of the opportunities and social problems of the global communities in which we live.

GRADING

A letter grade of C- or better is needed in all Sociology courses in order to satisfy the program requirements.

DEPARTMENTAL HONORS

In order to be considered for departmental honors, majors must have a minimum GPA of 3.6 overall and 3.8 in courses in the Department of Sociology. In addition, students must produce an exceptional honors thesis in the two-semester *Senior Seminar* (SOCI UN3995-SOCI UN3996 Senior Seminar).

In order to register for the *Senior Seminar*, students must have completed SOCI UN3010 Methods for Social Research and have had their research project accepted by the faculty member teaching the Senior Seminar. Submissions of research projects are due by May 1 preceding the seminar. Normally no more than 10% of graduating majors receive departmental honors in a given academic year.

PROFESSORS

Peter Bearman
Courtney Bender (Religion)
Elizabeth Bernstein (Barnard)
Yinon Cohen
Jonathan R. Cole
Thomas A. DiPrete
Gil Eyal
Todd Gitlin (Journalism)

Shamus Khan (Chair)
 Bruce Kogut (Business)
 Jennifer Lee
 Bruce Link (School of Public Health)
 Debra C. Minkoff (Barnard)
 Mignon Moore (Chair, Barnard)
 Aaron Pallas (Teachers College)
 Jonathan Rieder (Barnard)
 Saskia Sassen
 Seymour Spilerman
 David Stark (also School of International and Public Affairs)
 Julien Teitler (Social Work)
 Diane Vaughan
 Sudhir Alladi Venkatesh
 Amy Stuart Wells (Teachers College)
 Bruce Western
 Andreas Wimmer

ASSOCIATE PROFESSORS

Mark Hatzenbuehler (Sociomedical)
 Jennifer Lena (Teachers College)
 Desmond Upton Patton (School of Social Work)
 Adam Reich (Director of Graduate Studies)
 Emmanuelle Saada (French and Romance Philology)
 Josh Whitford

ASSISTANT PROFESSORS

Maria Abascal
 Debbie Becher (Barnard)
 Christel Kesler (Barnard)
 Yao Lu
 Angela M. Simms (Barnard)
 Gerard Torrats-Espinosa
 Dan Wang (Business School)
 Amy Yuan Zhou (Barnard)

LECTURERS

Denise Milstein
 Teresa Sharpe
 Kristin Murphy

ON LEAVE

Prof. Stark (2018 - 2019)
 Prof. Whitford (2019 - 2020)

MAJOR IN SOCIOLOGY

The major in sociology requires a minimum of 30-31 points as follows:

Core Courses

The following three courses are required (10 points):

SOCI UN1000	The Social World
SOCI UN3000	Social Theory
SOCI UN3010	Methods for Social Research

Elective Courses

Select six courses (20-21 points) in the Department of Sociology, to include at least three lecture courses (2000- or 3000-level, 3 points each) and at least two seminars (4 points each). The sixth course could be either a lecture course (to a total of 30 points) or a seminar (to a total of 31 points). For students taking the two-semester Senior Seminar, the sixth course must be a seminar. Some examples of electives include: *

SOCI UN3020	Social Statistics
SOCI UN3213	Sociology of African American Life
SOCI UN3235	Social Movements
SOCI UN3490	Mistake, Misconduct, Disaster
SOCI UN3285	Israeli Society and the Israeli-Palestinian Conflict
SOCI UN3264	The Changing American Family
SOCI UN3900	Societal Adaptations to Terrorism
SOCI UN3914	Seminar in Inequality, Poverty, and Mobility
SOCI UN3931	Sociology of the Body
SOCI UN3974	Sociology of Schools, Teaching and Learning
SOCI UN3995	Senior Seminar
SOCI UN3996	Senior Seminar

* These may include the two-semester *Senior Seminar* (SOCI UN3995-SOCI UN3996).

CONCENTRATION IN SOCIOLOGY

The concentration in sociology requires a minimum of 20 points as follows:

Core Courses

The following three courses are required (10 points):

SOCI UN1000	The Social World
SOCI UN3000	Social Theory
SOCI UN3010	Methods for Social Research

Elective Courses

Select three courses (10 points) in the Department of Sociology, one of which must be a seminar. Some examples of electives include:

SOCI UN3900	Societal Adaptations to Terrorism
SOCI UN3914	Seminar in Inequality, Poverty, and Mobility
SOCI UN3915	Stigma and Discrimination
SOCI UN3931	Sociology of the Body
SOCI UN3974	Sociology of Schools, Teaching and Learning
SOCI UN3985	Queer Practice
SOCI UN3995	Senior Seminar
SOCI UN3996	Senior Seminar

STATISTICS

The Statistics Department Office:

1005 School of Social Work (1255 Amsterdam Avenue);
212-851-2132
<http://www.stat.columbia.edu>

Statistics Major and Concentration Advising:

Ronald Neath, 612 Watson; 212-853-1398;
rcn2112@columbia.edu
Gabriel Young, 610 Watson; 212-853-1395;
gjy2107@columbia.edu (rcn2112@columbia.edu)

Data Science Major Advising:

Computer Science: Augustin Chaintreau, 610
CEPSR; 212-939-7082; augustin@cs.columbia.edu
(cannon@cs.columbia.edu)
Statistics: Ronald Neath, 612 Watson;
212-853-1398; rcn2112@columbia.edu
Statistics: Gabriel Young, 610 Watson;
212-853-1395; gjy2107@columbia.edu
(rcn2112@columbia.edu)

Economics - Statistics Major Advising:

Economics: Susan Elmes, 1006 IAB; 212-854-9124;
se5@columbia.edu
Statistics: Ronald Neath, 612 Watson;
212-853-1398; rcn2112@columbia.edu
Statistics: Gabriel Young, 610 Watson;
212-853-1395; gjy2107@columbia.edu
(rcn2112@columbia.edu)

Mathematics - Statistics Major Advising:

Mathematics: Julien Dubedat, 601 Mathematics;
212-854-8806; jd2653@columbia.edu
Statistics: Ronald Neath, 612 Watson;
212-853-1398; rcn2112@columbia.edu
Statistics: Gabriel Young, 610 Watson;
212-853-1395; gjy2107@columbia.edu
(rcn2112@columbia.edu)

Political Science - Statistic Major Advising:

Political Science: Alessandra Casella, 1030 IAB; 212-854-8059;
acasella@columbia.edu (rys3@columbia.edu)
Statistics: Ronald Neath, 612 Watson;
212-853-1398; rcn2112@columbia.edu
Statistics: Gabriel Young, 610 Watson;
212-853-1395; gjy2107@columbia.edu
(rcn2112@columbia.edu)

Department Administrator:

Dood Kalicharan, 1003 School of Social Work;
212-851-2130; dk@stat.columbia.edu

The Department offers several introductory courses. Students interested in statistical concepts, who plan on consuming, but not creating statistics, should take STAT UN1001 Introduction to Statistical Reasoning. The course is designed for students

who have taken a pre-calculus course, and the focus is on general principles. It is suitable for students seeking to satisfy the Barnard quantitative reasoning requirements. Students seeking an introduction to applied statistics should take STAT UN1101 Introduction to Statistics. The course is designed for students who have some mathematical maturity, but who may not have taken a course in calculus, and the focus is on the elements of data analysis. It is recommended for pre-med students, and students contemplating the concentration in statistics. Students seeking a foundation for further study of probability theory and statistical theory and methods should take STAT UN1201 Calculus-Based Introduction to Statistics. The course is designed for students who have taken a semester of college calculus or the equivalent, and the focus is on preparation for a mathematical study of probability and statistics. It is recommended for students seeking to complete the prerequisite for econometrics, and for students contemplating the major in statistics. Students seeking a one-semester calculus-based survey of probability theory and statistical theory and methods should take STAT GU4001 Introduction to Probability and Statistics. This course is designed for students who have taken calculus, and is meant as a terminal course. It provides a somewhat abridged version of the more demanding sequence STAT GU4203 PROBABILITY THEORY and STAT GU4204 Statistical Inference. While some mathematically mature students take the more demanding sequence as an introduction to the field, it is generally recommended that students prepare for the sequence by taking STAT UN1201 Calculus-Based Introduction to Statistics.

The Department offers the Major in Statistics, the Concentration in Statistics, and interdisciplinary majors with Computer Science, Economics, Mathematics, and Political Science. The concentration is suitable for students preparing for work or study where substantial skills in data analysis are valued and may be taken without mathematical prerequisites. The concentration consists of a sequence of six courses in applied statistics, but students may substitute statistics electives numbered 4203 or above with permission of the concentration advisors. The major consists of mathematical and computational prerequisites, an introductory course, and five core courses in probability theory and theoretical and applied statistics together with three electives. The training in the undergraduate major is comparable to a masters degree in statistics.

Students may wish to consult the following guidelines when undertaking course planning. It is advisable to take STAT UN1101 Introduction to Statistics and STAT UN2102 Applied Statistical Computing before taking any of the more advanced concentration courses, STAT UN2103 Applied Linear Regression Analysis, STAT UN2104 Applied Categorical Data Analysis, STAT UN3105 Applied Statistical Methods, and STAT UN3106 Applied Data Mining. It is advisable to take STAT UN1201 Calculus-Based Introduction to

Statistics, STAT GU4203 PROBABILITY THEORY, STAT GU4204 Statistical Inference, and STAT GU4205 Linear Regression Models in sequence. Courses in stochastic analysis should be preceded by STAT GU4203 PROBABILITY THEORY, and for many students, it is advisable to take STAT GU4207 Elementary Stochastic Processes before embarking on STAT GU4262 Stochastic Processes for Finance, STAT GU4264 STOCHASTIC PROCESSES-APPLIC, or STAT GU4265 Stochastic Methods in Finance. Most of the statistics courses numbered from 4221 to 4234 are best preceded by STAT GU4205 Linear Regression Models. The data science courses STAT GU4206 Statistical Computing and Introduction to Data Science, STAT GU4241 Statistical Machine Learning, and STAT GU4242 Advanced Machine Learning should be taken in sequence.

ADVANCED PLACEMENT

The Department offers three points of advanced credit for a score of 5 on the AP statistics exam. Students who are required to take an introductory statistics course for their major should check with their major advisor to determine whether this credit provides exemption from their requirement.

DEPARTMENTAL HONORS

Students are considered for department honors on the basis of GPA and the comprehensiveness and difficulty of their course work in the Department. The Department is generally permitted to nominate one tenth of graduating students for departmental honors.

UNDERGRADUATE RESEARCH IN STATISTICS AND THE SUMMER INTERNSHIP

Matriculated students who will be undergraduates at Columbia College, Barnard College, the School of General Studies, or the School of Engineering and Applied Sciences may apply to the Department's summer internship program. The internship provides summer housing and a stipend. Students work with Statistics Department faculty mentors. Applicants should send a brief statement of interest and a copy of their transcript to Ms. Dood Kalicharan in the Statistics Department office by the end of March to be considered. If summer project descriptions are posted on the Department's website, please indicate in the statement of interest which project is of interest. Students seeking research opportunities with Statistics Department faculty during the academic year are advised to be entrepreneurial and proactive: identify congenial faculty whose research is appealing, request an opportunity to meet, and provide some indication of previous course work when asking for a project.

PROFESSORS

David Blei (with Computer Science)
Mark Brown
Richard R. Davis

Victor H. de la Peña
Andrew Gelman (with Political Science)
Shaw-Hwa Lo
David Madigan
Liam Paninski
Philip Protter
Daniel Rabinowitz
Michael Sobel
Simon Tavaré
Zhiliang Ying
Ming Yuan
Tian Zheng

ASSOCIATE PROFESSORS

John Cunningham
Yang Feng
Jingchen Liu
Marcel Nutz
Peter Orbanz
Bodhisattva Sen

ASSISTANT PROFESSORS

Samory Kpotufe
Arian Maleki
Sumit Mukherjee
Cynthia Rush

TERM ASSISTANT PROFESSORS

Marco Avella
Ruimeng Hu
Linxi Liu
Thibault Vatter

ADJUNCT PROFESSORS

Demissie Alemayehu
Flavio Bartmann
Guy Cohen
Regina Dolgoarshinnykh
Anthony Donoghue
Vincent Dorie
Hammou El Barmi
Xiaofu He
Irene Hueter
Ying Liu
Ha Nguyen
Michael Shnaidman
Larry Wright
Rongning Wu

LECTURERS IN DISCIPLINE

Banu Baydil
Wayne Lee
Ronald Neath
David Rios
Joyce Robbins

Gabriel Young

MAJOR IN STATISTICS

The requirements for this program were modified in March 2016. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

The major should be planned with the director of undergraduate studies. Courses in which the grade of D has been received do not count toward the major. The requirements for the major are as follows:

Mathematics and Computer Science Prerequisites

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN2010	Linear Algebra

One of the following five courses

COMS W1007	Honors Introduction to Computer Science
ENGI E1006	Introduction to Computing for Engineers and Applied Scientists
COMS W1005	Introduction to Computer Science and Programming in MATLAB
STAT UN2102	Applied Statistical Computing
COMS W1004	Introduction to Computer Science and Programming in Java

Core courses in probability and statistics

STAT UN1201	Calculus-Based Introduction to Statistics
STAT GU4203	PROBABILITY THEORY
STAT GU4204	Statistical Inference
STAT GU4205	Linear Regression Models
STAT GU4206	Statistical Computing and Introduction to Data Science
STAT GU4207	Elementary Stochastic Processes

Three approved electives in statistics or, with permission, a cognate field.

- Students preparing for a career in actuarial science are encouraged to replace STAT GU4205 Linear Regression Models with STAT GU4282 Linear Regression and Time Series Methods, and should take as one of their electives STAT GU4281 Theory of Interest.
- Students preparing for graduate study in statistics are encouraged to replace two electives with MATH GU4061 Introduction To Modern Analysis I and MATH GU4062 Introduction To Modern Analysis II .

CONCENTRATION IN STATISTICS

Courses in which the grade of D has been received do not count towards the concentration. The requirements for the concentration are as follows.

STAT UN1101	Introduction to Statistics
STAT UN2102	Applied Statistical Computing
STAT UN2103	Applied Linear Regression Analysis
STAT UN2104	Applied Categorical Data Analysis
STAT UN3105	Applied Statistical Methods
STAT UN3106	Applied Data Mining

- Students may replace courses required for the concentration by approved Statistics Department courses.

MAJOR IN DATA SCIENCE

In response to the ever growing importance of "big data" in scientific and policy endeavors, the last few years have seen an explosive growth in theory, methods, and applications at the interface between computer science and statistics. The Statistics Department and the Department of Computer Science have responded with a joint-major that emphasizes the interface between the disciplines.

Mathematical Prerequisites

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN2010	Linear Algebra

Statistics Required Courses

STAT UN1201	Calculus-Based Introduction to Statistics
STAT GU4203	PROBABILITY THEORY
STAT GU4204	Statistical Inference
STAT GU4205	Linear Regression Models
STAT GU4241	Statistical Machine Learning
or COMS W4771	Machine Learning

Statistics Electives

Select two of the following courses:

STAT UN3106	Applied Data Mining
STAT GU4206	Statistical Computing and Introduction to Data Science
STAT GU4243	Applied Data Science
STAT GU4224	Bayesian Statistics
STAT GU4242	Advanced Machine Learning

Computer Science Introductory Courses

Select one of the following courses:

COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1005	Introduction to Computer Science and Programming in MATLAB

ENGI E1006 Introduction to Computing for Engineers and Applied Scientists

COMS W1007 Honors Introduction to Computer Science

And select one of the following courses:

COMS W3134 Data Structures in Java

COMS W3136 Data Structures with C/C++

COMS W3137 Honors Data Structures and Algorithms

Computer Science Required Courses

COMS W3203 Discrete Mathematics: Introduction to Combinatorics and Graph Theory

CSOR W4231 Analysis of Algorithms I

Computer Science Electives

Select three of the following courses:

COMS W3261 Computer Science Theory

COMS W4236 Introduction to Computational Complexity

COMS W4252 Introduction to Computational Learning Theory

COMS W4111 Introduction to Databases

COMS W4130 Principles and Practice of Parallel Programming

Any COMS W47xx course EXCEPT W4771

MAJOR IN ECONOMICS-STATISTICS

Please read *Requirements for all Economics Majors, Concentrators, and Interdepartmental Majors* in the Economics section of this Bulletin.

The major in Economics-Statistics provides students with a grounding in economic theory comparable to that of the general economics major, but also exposes students to a more rigorous and extensive statistics training. This program is recommended for students with strong quantitative skills and for those contemplating graduate studies in economics.

Two advisers are assigned for the interdepartmental major, one in the Department of Economics and one in the Department of Statistics. The economics adviser can only advise on economics requirements and the statistics adviser can only advise on statistics requirements.

The economics-statistics major requires a total of 59 points: 29 in economics, 15 points in statistics, 12 points in mathematics, and 3 points in computer science, as follows:

Economics Core Courses

Complete the Economics core courses.

Economics Electives

Select three electives at the 3000-level or above, of which no more than one may be a Barnard course.

Mathematics

Select one of the following sequences:

MATH UN1101 Calculus I and Calculus II
- MATH UN1101 and Calculus III
- MATH UN1201 and Linear Algebra

MATH UN1101 Calculus I and Calculus II
- MATH UN1102 and Accelerated Multivariable Calculus
- MATH UN2010 and Linear Algebra

MATH UN1207 Honors Mathematics A
- MATH UN1208 and Honors Mathematics B

Statistics

STAT UN1201 Calculus-Based Introduction to Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

One elective from among courses numbered STAT GU4206 through GU4266.

Computer Science

Select one of the following courses:

COMS W1004 Introduction to Computer Science and Programming in Java

COMS W1005 Introduction to Computer Science and Programming in MATLAB

COMS W1007 Honors Introduction to Computer Science

ENGI E1006 Introduction to Computing for Engineers and Applied Scientists

STAT UN2102 Applied Statistical Computing

Seminar

ECON GU4918 Seminar In Econometrics

Students who declared before Spring 2014:

The requirements for this program were modified in 2014. Students who declared this program before Spring 2014 should contact the director of undergraduate studies for the department in order to confirm their options for major requirements.

MAJOR IN MATHEMATICS-STATISTICS

The program is designed to prepare the student for: (1) a career in industries such as finance and insurance that require a high level of mathematical sophistication and a substantial knowledge of probability and statistics; and (2) graduate study in quantitative disciplines. Students choose electives in finance, actuarial science, operations research, or other quantitative fields to complement requirements in mathematics, statistics, and computer science.

Mathematics

Select one of the following sequences:

MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1201	Calculus III
MATH UN2010	Linear Algebra
MATH UN2500	Analysis and Optimization
OR	
MATH UN1101	Calculus I
MATH UN1102	Calculus II
MATH UN1205	Accelerated Multivariable Calculus
MATH UN2010	Linear Algebra
MATH UN2500	Analysis and Optimization
OR	
MATH UN1207	Honors Mathematics A
MATH UN1208	Honors Mathematics B
MATH UN2500	Analysis and Optimization

Statistics required courses

STAT UN1201	Calculus-Based Introduction to Statistics
STAT GU4203	PROBABILITY THEORY
STAT GU4204	Statistical Inference
STAT GU4205	Linear Regression Models

And select one of the following courses:

STAT GU4207	Elementary Stochastic Processes
STAT GU4262	Stochastic Processes for Finance
STAT GU4264	STOCHASTIC PROCESSES-APPLIC
STAT GU4265	Stochastic Methods in Finance

Computer Science

Select one of the following courses:

COMS W1004	Introduction to Computer Science and Programming in Java
COMS W1005	Introduction to Computer Science and Programming in MATLAB
ENGI E1006	Introduction to Computing for Engineers and Applied Scientists
COMS W1007	Honors Introduction to Computer Science

or an advanced Computer Science offering in programming

Electives

An approved selection of three advanced courses in mathematics, statistics, applied mathematics, industrial engineering and operations research, computer science, or approved mathematical methods courses in a quantitative discipline. At least one elective must be a Mathematics Department course numbered 3000 or above.

- Students interested in modeling applications are recommended to take MATH UN3027 Ordinary Differential Equations and MATH UN3028 Partial Differential Equations
- Students interested in finance are recommended to include among their electives, MATH GR5010 Introduction to the Mathematics of Finance, STAT GU4261 Statistical

Methods in Finance, and STAT GU4221 Time Series Analysis.

- Students interested in graduate study in mathematics or in statistics are recommended to take MATH GU4061 Introduction To Modern Analysis I and MATH GU4062 Introduction To Modern Analysis II.
- Students preparing for a career in actuarial science are encouraged to replace STAT GU4205 Linear Regression Models with STAT GU4282 Linear Regression and Time Series Methods, and to take among their electives STAT GU4281 Theory of Interest.

MAJOR IN POLITICAL SCIENCE–STATISTICS

The interdepartmental major of political science–statistics is designed for students who desire an understanding of political science to pursue advanced study in this field and who also wish to have at their command a broad range of sophisticated statistical tools to analyze data related to social science and public policy research.

Students should be aware of the rules regarding the use of the Pass/D/Fail option. Courses in which a grade of D has been received do not count toward the major requirements.

Political science–statistics students are eligible for all prizes reserved for political science majors.

The political science–statistics major requires a minimum of 15 courses in political science, statistics, and mathematics, to be distributed as follows:

Political Science

Students must choose a primary subfield to study. Within the subfield, students must take a minimum of three courses, including the subfield's introductory course. The subfields and their corresponding introductory courses are as follows:

American Politics:

POLS UN1201	Introduction To American Government and Politics
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Comparative Politics:

POLS UN1501	Introduction to Comparative Politics
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International Relations:

POLS UN1601	INTERNATIONAL POLITICS
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Political Theory:

POLS UN1101	Political Theory I
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Additionally, students must take a 4-point seminar in their primary subfield.

Research Methods

Students must take the following two research methods courses:

POLS GU4710	Principles of Quantitative Political Research
or POLS UN3704	Data Analysis and Statistics for Political Science Research

POLS GU4712 PRINC OF QUANT POL
RESEARCH 2

Statistics

Select one of the following two sequences.

Sequence recommended for students preparing for graduate study in statistics.

MATH UN1101 Calculus I

MATH UN1102 Calculus II

MATH UN2010 Linear Algebra

STAT UN1201 Calculus-Based Introduction to Statistics

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

STAT GU4206 Statistical Computing and Introduction to Data Science

Students taking the first track may replace the Mathematics prerequisites with both of MATH UN1207 and MATH UN1208

or

Sequence recommend for students preparing to apply statistical methods in the social sciences.

STAT UN1101 Introduction to Statistics

STAT UN2102 Applied Statistical Computing

STAT UN2103 Applied Linear Regression Analysis

STAT UN2104 Applied Categorical Data Analysis

STAT UN3105 Applied Statistical Methods

STAT UN3106 Applied Data Mining

Statistics elective:

Students must take an approved elective in a statistics or a quantitatively oriented course in a social science.

SUSTAINABLE DEVELOPMENT

Departmental Office: The Earth Institute, Office of Academic and Research Programs, Hogan, B-Level; <http://sdev.ei.columbia.edu>

Co-Directors of Undergraduate Studies:

Ruth DeFries, 212-851-1647; rd2402@columbia.edu

Jason Smerdon, 845-365-8493; jsmerdon@ldeo.columbia.edu

Program Administrators:

Natalie Unwin-Kuroneri, 212-854-8536;

natalie@ei.columbia.edu

Cari Shimkus, 212-851-9350; cshimkus@ei.columbia.edu

Sustainable development is founded on the premise that human well-being should advance without irreparable harm to ecosystems and the vital services they provide, without depleting essential resources, and without posing risks to future generations. The term "sustainable" refers to managing the world's economy in a manner consistent with the continued

healthy functioning of Earth's ecosystems, oceans, atmosphere and climate. In this context, "development" refers to continued social, political, and economic progress aimed at improving the well-being of the global community, especially for the poorest people.

ACADEMIC PROGRAMS

The Earth Institute—in collaboration with Columbia College, the School of General Studies, the School of International and Public Affairs, and the Departments of Earth and Environmental Science; Ecology, Evolution, and Environmental Biology; and Earth and Environmental Engineering—offers a major and a special concentration in sustainable development.

These programs are designed to: engage students in this emergent interdisciplinary discussion, provide knowledge of the theory and practice of sustainable development, stimulate a critical examination of historical and conceptual antecedents, provide experience in the complex challenges of sustainable development through direct engagement, and help them imagine alternative futures for our rapidly changing world. With help from the Earth Institute faculty, courses are specifically created to address the very real and complex issues of development as they relate to the interactions of the natural and social systems.

The major focuses heavily on the sciences and provides students with a working knowledge of issues on a range of interacting subject areas. After declaring the major, students are assigned an academic adviser from within the Earth Institute, who advises on class selection and career development. Students benefit from a support system of faculty, advisers, and program managers, and have access to the multitude of resources for internships, study abroad programs, and career development.

The special concentration is intentionally more flexible, but its structure allows students to benefit from the cross-disciplinary courses and to build the expertise to allow them to address the fundamental issue of how to move towards a trajectory of sustainability.

The sustainable development program is structured to ensure that students graduate with the skills and knowledge to enable them to advance professionally in the public, private, governmental, and nonprofit sectors, and to pursue advanced degrees. Those interested in sustainable development are encouraged to participate in lectures, conferences, and other programs sponsored by the Earth Institute.

GRADING

A letter grade of C- or better is needed in all program-related courses in order to satisfy the program requirements.

SUSTAINABLE DEVELOPMENT FACULTY

Susana Adamo (Center for International Earth Information Network)

Satyajit Bose (School of International and Public Affairs)

Steve Cohen (The Earth Institute; School of International and Public Affairs)

Lisa Dale (The Earth Institute; Ecology, Evolution, and Environmental Biology)

Ruth DeFries (Ecology, Evolution, and Environmental Biology) (Co-Director)

Paul Gallay (Ecology, Evolution and Environmental Biology)

Michael Gerrard (Center for Climate Change Law and Columbia Law School)

Adela Gondok (Ecology, Evolution and Environmental Biology)

Radley Horton (Center for Climate Systems Research)

Joyce Klein-Rosenthal (The Earth Institute)

Jacqueline Klopp (The Earth Institute)

Upmanu Lall (Columbia Water Center; International Research Institute for Climate and Society)

Kytt McManus (Center for International Earth Science Information Network)

Dara Mendeloff (Center for International Earth Science Information Network)

Rachel Moresky (Population and Family Health)

John Mutter (Earth and Environmental Sciences; School of International and Public Affairs)

Linda Pistoletti (Center for International Earth Science Information Network)

Robert Pollack (Biological Sciences)

Elliott Sclar (The Earth Institute; Architecture, Planning, and Preservation; School of International and Public Affairs)

Jason Smerdon (Lamont-Doherty Earth Observatory) (Co-Director)

Marni Sommer (Mailman School of Public Health)

Martin Stute (Lamont-Doherty Earth Observatory)

Phil Weinberg (Ecology, Evolution and Environmental Biology)

MAJOR IN SUSTAINABLE DEVELOPMENT

The sustainable development foundation courses should be taken first and students should then work with the program adviser on further course selection and sequencing.

The major in sustainable development requires a minimum of 15 courses and a practicum as follows:

Sustainable Development Foundation

SDEV UN1900	Introduction to Sustainable Development Seminar
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SDEV UN2300	Challenges of Sustainable Development
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EESC UN2330	Science for Sustainable Development
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Basic Disciplinary Foundation

Select one of the following science sequences.

CHEM UN1403 - CHEM UN1404	General Chemistry I (Lecture) and General Chemistry II (Lecture)
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EEEB UN2001 - EEEB UN2002	Environmental Biology I: Elements to Organisms and Environmental Biology II: Organisms to the Biosphere (EESC UN2310 is a co-requisite with EEEB UN2002)
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EESC UN1600 - EESC UN2100	Earth Resources and Sustainable Development and Earth's Environmental Systems: The Climate System
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EESC UN1600 - EESC UN2200	Earth Resources and Sustainable Development and Earth's Environmental Systems: The Solid Earth System
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EESC UN1600 - EESC UN2300	Earth Resources and Sustainable Development and Earth's Environmental Systems: The Life System (EESC UN2310 is co-requisite with EESC UN2300)
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EESC UN2100 - EESC UN2200	Earth's Environmental Systems: The Climate System and Earth's Environmental Systems: The Solid Earth System
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EESC UN2100 - EESC UN2300	Earth's Environmental Systems: The Climate System and Earth's Environmental Systems: The Life System (EESC UN2310 is co-requisite with EESC UN2300)
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EESC UN2200 - EESC UN2300	Earth's Environmental Systems: The Solid Earth System and Earth's Environmental Systems: The Life System (EESC UN2310 is co-requisite with EESC UN2300)
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PHYS UN1201 General Physics I
- PHYS UN1202 and General Physics II (LABS
PHYS 1291 and PHYS 1292 also
required)

Select two of the following social science courses:

ANTH UN1002 The Interpretation of Culture

ANTH UN2004 Introduction to Social and
Cultural Theory

ECON UN1105 Principles of Economics

POLS UN1501 Introduction to Comparative
Politics

POLS UN1601 INTERNATIONAL POLITICS

SDEV UN2000 Introduction to Environmental
Law

SDEV UN2050 Environmental Policy and
Governance

SDEV UN3400 Human Populations and
Sustainable Development

SOCI UN1000 The Social World

Select one of the following quantitative foundations courses:

EEEB UN3005 Introduction to Statistics for
Ecology and Evolutionary Biology

EESC BC3017 Environmental Data Analysis

MATH UN2010 Linear Algebra

STAT UN1201 Calculus-Based Introduction to
Statistics

STAT UN2103 Applied Linear Regression
Analysis

STAT UN3105 Applied Statistical Methods

STAT UN3106 Applied Data Mining

STAT GU4203 PROBABILITY THEORY

STAT GU4204 Statistical Inference

STAT GU4205 Linear Regression Models

STAT GU4207 Elementary Stochastic Processes

Analysis and Solutions to Complex Problems

Select two of the following courses:

CIEE E3260 Engineering for developing
communities

EAAE W4304 Closing the carbon cycle

ECIA W4100 Management and development of
water systems

EESC BC3032 Agricultural and Urban Land Use:
Human-Environment Interactions

EESC BC3045 Responding to Climate Change

EESC GU4600 Earth Resources and Sustainable
Development

PLAN A4579 Introduction to Environmental
Planning

PUBH UN3100 Fundamentals of Global Health

SDEV UN3330 Ecological and Social Systems for
Sustainable Development

SDEV UN3355 Climate Change and Law

SDEV UN3360 Disasters and Development

SDEV UN3366 Energy Law

SDEV UN3410 Urbanization and Sustainable
Development

SOCI BC3932 Climate Change, Global
Migration, and Human Rights in
the Anthropocene

URBS UN3565 Cities in Developing Countries:
Problems and Prospects

SDEV GU4250 Climate Change: Resilience and
Adaptation

The Summer Ecosystems Experience for Undergraduates
(SEE-U) *

Skills/Actions

Select two of the following courses:

EAAE E4257 Environmental data analysis and
modeling

EESC GU4050 Global Assessment and
Monitoring Using Remote
Sensing

EESC BC3050 Big Data with Python: Python
for Environmental Analysis and
Visualisation

SDEV UN2320 Economic and Financial Methods
for Sustainable Development

SDEV UN3390 GIS for Sustainable Development

SDEV UN3450 Spatial Analysis and Modeling for
Sustainable Development

SDEV GU4015 Complexity Science

SOCI UN3010 Methods for Social Research

SUMA PS4100 Sustainability Management

SDEV GU4101 Qualitative Research Methods for
Sustainable Development

The Summer Ecosystems Experience for Undergraduates
(SEE-U) *

Practicum

Select one of the following courses:

INAF U4420 Oil, Rights and Development

SDEV UN3998 Sustainable Development
Independent Study

SUMA PS4310 Practicum in Innovation
Sustainability Leadership

SUMA PS4734 Earth Institute Practicum

Electives

Select two courses from the following areas. Courses can be
combined across Areas 2-5 only. If you select Area 1, you
must complete two thesis courses and these will fulfill the
elective requirement:

Area 1: Senior Thesis Sequence (EESC BC3800/
EESC BC3801 and EESC UN3901) **

Area 2: Upper level courses from the approved electives list
(see link in footnotes to access list) ***

Area 3: Additional courses listed under Analysis and
Solutions to Complex Problem

Area 4: Additional courses listed under Skills/Actions

Area 5

SDEV UN3310 Ethics of Sustainable
Development

SDEV GU4050	Essential Connections: US Water & Energy Policy in a Resource-Constrained World
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SDEV GU4350	Public Lands in the American West
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Capstone Workshop

SDEV UN3280	Workshop in Sustainable Development
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SDEV W3550	Bangladesh: Life on a Tectonically Active Delta
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* The Summer Ecosystem Experiences for Undergraduates (SEE-U): Please note that students in the major or the special concentration who take SEE-U as a 6-point course can use 3 points towards the Complex Problems requirement and 3 points towards the Skills/Action requirement. If SEE-U is taken for 3 points, it can only count as one Complex Problems class.

** If choosing the senior thesis option to fulfill the elective requirements, students must take both courses in the senior thesis sequence.

*** For a full list of previously approved electives, please visit the sustainable development program website: <http://sdev.ei.columbia.edu/curriculum/major/>.

NOTE: Please visit the Sustainable Development website for requirements:

Majors: <http://sdev.ei.columbia.edu/curriculum/major/>

SPECIAL CONCENTRATION IN SUSTAINABLE DEVELOPMENT

In addition to the requirements of the special concentration, students must complete a major.

The sustainable development foundation courses should be taken first and students should then work with the program adviser on further course selection and sequencing.

The special concentration in sustainable development requires a minimum of 9 courses and a practicum as follows:

Sustainable Development Foundation

SDEV UN1900	Introduction to Sustainable Development Seminar
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SDEV UN2300	Challenges of Sustainable Development
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EESC UN2330	Science for Sustainable Development
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Natural Science Systems

Select one of the following courses. NOTE--Associated Labs are also required:

CHEM UN1403	General Chemistry I (Lecture)
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EEEB UN1001	Biodiversity
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EEEB UN2002	Environmental Biology II: Organisms to the Biosphere (EESC UN2310 is co-requisite with EEBB UN2002)
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EESC UN1003	Climate and Society: Case Studies
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EESC UN1011	Earth: Origin, Evolution, Processes, Future
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EESC UN1201	Environmental Risks and Disasters
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EESC UN1600	Earth Resources and Sustainable Development
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EESC UN2100	Earth's Environmental Systems: The Climate System
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EESC UN2200	Earth's Environmental Systems: The Solid Earth System
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EESC UN2300	Earth's Environmental Systems: The Life System (EESC UN2310 is co-requisite with EESC UN2300)
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PHYS UN1201 - PHYS UN1291	General Physics I and General Physics Laboratory
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Human Science Systems

Select one of the following courses:

ANTH UN1002	The Interpretation of Culture
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ANTH UN2004	Introduction to Social and Cultural Theory
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ECON UN1105	Principles of Economics
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POLS UN1501	Introduction to Comparative Politics
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POLS UN1601	INTERNATIONAL POLITICS
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SDEV UN2000	Introduction to Environmental Law
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SDEV UN2050	Environmental Policy and Governance
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SDEV UN3400	Human Populations and Sustainable Development
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SOCI UN1000	The Social World
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Analysis and Solutions to Complex Problems

Select two of the following courses:

CIEE E3260	Engineering for developing communities
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EAAE W4304	Closing the carbon cycle
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ECIA W4100	Management and development of water systems
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EESC BC3032	Agricultural and Urban Land Use: Human-Environment Interactions
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EESC BC3045	Responding to Climate Change
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EESC GU4600	Earth Resources and Sustainable Development
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PLAN A4579	Introduction to Environmental Planning
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PUBH UN3100	Fundamentals of Global Health
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SDEV UN3330	Ecological and Social Systems for Sustainable Development
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SDEV UN3355	Climate Change and Law
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SDEV UN3360	Disasters and Development
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SDEV UN3366	Energy Law
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SDEV UN3410	Urbanization and Sustainable Development
SOCI BC3932	Climate Change, Global Migration, and Human Rights in the Anthropocene
URBS UN3565	Cities in Developing Countries: Problems and Prospects
The Summer Ecosystem Experiences for Undergraduates (SEE-U) *	
Skills/Actions	
Select one of the following courses:	
EAAE E4257	Environmental data analysis and modeling
EESC BC3050	Big Data with Python: Python for Environmental Analysis and Visualisation
EESC GU4050	Global Assessment and Monitoring Using Remote Sensing
SCNC W3010	Science, technology and society
SDEV UN2320	Economic and Financial Methods for Sustainable Development
SDEV UN3390	GIS for Sustainable Development
SDEV UN3450	Spatial Analysis and Modeling for Sustainable Development
SDEV GU4015	Complexity Science
SDEV GU4101	Qualitative Research Methods for Sustainable Development
SUMA PS4100	Sustainability Management
SOCI UN3010	Methods for Social Research
The Summer Ecosystem Experiences for Undergraduates (SEE-U) *	
Practicum	
Select one of the following courses:	
INAF U4420	Oil, Rights and Development
SDEV UN3998	Sustainable Development Independent Study
SUMA PS4310	Practicum in Innovation Sustainability Leadership
SUMA PS4734	Earth Institute Practicum
Capstone Workshop	
SDEV UN3280	Workshop in Sustainable Development
SDEV W3550	Bangladesh: Life on a Tectonically Active Delta

* The Summer Ecosystem Experiences for Undergraduates (SEE-U): Please note that students in the major or the special concentration who take SEE-U as a 6-point course can use 3 points towards the Complex Problems requirement and 3 points towards the Skills/Action requirement. If SEE-U is taken for 3 points, it can only count as one Complex Problems class.

Not Sustainable Development Website for Special Concentrators: <http://sdev.ei.columbia.edu/curriculum/special-concentration/>

URBAN STUDIES

713 Milstein Learning Center
212-854-4073

Department Assistant: Valerie Coates

MISSION

The Barnard–Columbia Urban Studies program enables students to explore and understand the urban experience in all of its richness and complexity. It recognizes the city as an amalgam of diverse peoples and their social, political, economic, and cultural interactions within a distinctive built environment. Students study the evolution and variety of urban forms and governance structures, which create opportunities for, as well as constrain, the exercise of human agency, individual and collective. They explore the place of the city in different historical and comparative contexts, as well as in the human imagination.

Majors build an intellectual foundation that combines interdisciplinary coursework and a concentration of study within a single field. Through the two-semester junior colloquium, students study urban history and contemporary issues, and at the same time hone their interdisciplinary, analytical and research skills. This shared experience prepares them for their independent research project in their senior year. We encourage our majors to use New York City as a laboratory, and many courses draw on the vast resources of the city and include an off-campus experience.

STUDENT LEARNING OUTCOMES

Having successfully completed the major in Urban Studies, the student will be able to:

- Apply concepts or methods from more than one social science or adjacent discipline to analyze an urban issue or problem.
- Describe the distinctive social, cultural, and spatial features of cities and illustrate their impacts on the urban experience.
- Apply basic skills of empirical reasoning to an urban problem.
- Explain how the idea of the city varies in different historical and comparative contexts.
- Demonstrate familiarity with a particular disciplinary approach to the city as an object of study.
- Demonstrate understanding of the history and variety of urban forms and governance structures.
- Articulate a well-defined research question, conduct independent research using primary sources and a variety

of theoretical and methodological approaches, and write a substantive research paper.

- Communicate ideas effectively in written or oral form.
- Organize and present group research projects.

Director: Gergely Baics (History and Urban Studies)

Associate Director: Aaron Passell (Urban Studies)

Columbia College Advisor: Amy Chazkel, Bernard Hirschhorn Associate Professor of Urban Studies

Urban Studies Faculty

Assistant Professors: Gergely Baics (History and Urban Studies), Deborah Becher (Sociology), Mary Rocco (Term, Urban Studies)

This program is supervised by the Committee on Urban Studies:

Director: Aaron Passell (Sociology)

Professor of Professional Practice: Karen Fairbanks (Chair, Architecture)

Columbia College Advisor: Amy Chazkel (History)

Professors: Ester Fuchs (International and Public Affairs, CU), Kenneth T. Jackson (History), Jose Moya (History), Elliot Sclar (Urban Planning and Public Policy), David Weiman (Economics)

Associate Professor: Randall Reback (Economics), Samuel Roberts (History and Sociomedical Sciences).

Assistant Professors: Gergely Baics (History), Deborah Becher (Sociology), Catherine Fennell (Anthropology), Maria Rivera Maulucci (Education), Van Tran (Sociology)

MAJOR IN URBAN STUDIES

The major in urban studies is comprised of six curricular requirements:

Requirement A: Urban-Related Social Sciences (3 courses)

One course dealing primarily with urban subject matter from *each of three* of the following disciplines: Anthropology, Economics, History, Political Science, Sociology. For students declaring a major in Urban Studies after Spring 2018, one of the three courses *must* be History.

Many courses offered through Urban Studies may count towards Requirement A. For example, URBS UN3420 Introduction to Urban Sociology counts as a Sociology course, URBS UN3550 Community Building and Economic Development counts as a Political Science course, etc. Students must complete at least two of the Requirement A courses before taking the Junior Seminar (see Requirement E, below). It is recommended that majors fulfill this requirement before their junior year.

Requirement B: Urban-Related Non-Social Science (1 course)

One course dealing primarily with urban subject matter from a discipline not listed above (such as Architecture, Art History, English, Environmental Science, etc.)

Requirement C: Methods of Analysis (1 course)

One course in methods of analysis, such as URBS UN3200 Spatial Analysis: GIS Methods and Urban Case Studies.

Requirement D: Specialization (5 courses)

Five or more courses in a specialization from one of the participating departments. Barnard College students can double-count one A, B, or C course toward this requirement (only one of five), with the approval of the Director; Columbia College and General Studies students cannot double-count courses. Barnard majors also have specific requirements for each specialization, which are outlined in detail on the program's website, urban.barnard.edu (<http://urban.barnard.edu/>).

Requirement E: Junior Seminar (2 courses)

URBS UN3545	Junior Seminar: The Shaping of the Modern City	4
URBS UN3546	Junior Colloquium: Contemporary Urban Issues	4

Requirement F: Senior Seminar (2 courses)

A senior thesis written in conjunction with a two-semester research seminar, chosen from the following four options:

URBS UN3992 - URBS UN3993	Senior Seminar: The Built Environment and Senior Seminar: The Built Environment	8
URBS UN3994 - URBS UN3995	Senior Seminar: New York Field Research and Senior Seminar: New York Field Research	8
URBS UN3996 - URBS UN3997	Senior Seminar: International Topics in Urban Studies and Senior Seminar: International Topics in Urban Studies	8

A research seminar in the department of specialization. This option must be approved by the Program Director.

A complete list and courses that fulfill requirements A–E can be found on the program's website, urban.barnard.edu (<http://urban.barnard.edu/>).

Appropriate substitutions may be made for courses listed above with the approval of the Program Director.

There is no concentration in urban studies.

VISUAL ARTS

Departmental Office: 310 Dodge; 212-854-4065
<http://arts.columbia.edu/visual-arts> (<http://arts.columbia.edu/visual-arts/>)

Director of Undergraduate Studies: Prof. Tomas Vu-Daniel,
tvd4@columbia.edu

Director of Academic Administration: Carrie Gundersdorf;
cg2817@columbia.edu

Manager of Academic Administration: Laura Mosquera;
lm3004@columbia.edu

The Visual Arts Program in the School of the Arts offers studio art classes as a component of a liberal arts education and as a means to an art major, concentration, and joint major with the Art History and Archaeology Department.

REGISTRATION

Visual Arts courses are open for on-line registration. If a Visual Arts class is full, visit arts.columbia.edu/undergraduate-visual-arts-program (<http://arts.columbia.edu/undergraduate-visual-arts-program/>).

DECLARING A MAJOR IN VISUAL ARTS

The Visual Arts Undergraduate Program requires a departmental signature when declaring a major. After meeting with their college academic adviser, students should set up a meeting to consult with the director of undergraduate studies, Professor Tomas Vu-Daniel. Please email Carrie Gundersdorf (cg2817@columbia.edu) or Laura Mosquera (lm3004@columbia.edu) for the current Requirements Worksheet for the Visual Arts Major, Art History and Visual Arts Interdepartmental Major or Visual Arts Concentration.

PROFESSORS

Gregory Amenoff
 Susanna Coffey (1 Year Appointment for 2019-20)
 Jon Kessler
 Sarah Sze
 Rirkrit Tiravanija
 Tomas Vu-Daniel (Director of Undergraduate Studies)

ASSOCIATE PROFESSORS

Matthew Buckingham (Chair)
 Shelly Silver

ASSISTANT PROFESSORS

Gabo Camnitzer (1 Year Appointment for 2019-20)
 Renee Cox (1 Year Appointment for 2019-20)
 Dana DeGiulio (1 Year Appointment for 2019-20), (Director of Graduate Studies)

Nicola López
 Leeza Meksin
 Aliza Nisenbaum

GUIDELINES FOR ALL VISUAL ARTS MAJORS, CONCENTRATORS, AND INTERDEPARTMENTAL MAJORS

A maximum of 12 credits from other degree-granting institutions may be counted toward the major, only with the approval of the director of undergraduate studies.

MAJOR IN VISUAL ARTS

A total of 35 points are required as follows:

Visual Arts (32 points)

VIAR UN1000 Basic Drawing (formerly VIAR R1001)

VIAR UN2300 Sculpture I
 or VIAR UN2200 Ceramics I

Five additional VIAR 3-point studio courses (15 points)

VIAR UN3800 Seminar in Contemporary Art Practice

Senior Thesis consists of the following four courses:

VIAR UN3900 Senior Thesis I
 - VIAR UN3910 and Visiting Critic I (formerly VIAR R3901 and VIAR R3921)

VIAR UN3901 Senior Thesis II
 - VIAR UN3911 and Visiting Critic II

Art History (3 points)

One 20th-century Art History 3-point course or equivalent, such as:

AHIS UN2405 Twentieth-Century Art (formerly AHIS W3650)

Senior Thesis

Before taking the Senior Thesis, majors are advised to complete 18 points of required Visual Arts courses. Senior Thesis consists of four 2-point courses taken over two semesters: VIAR UN3900 Senior Thesis I-VIAR UN3901 Senior Thesis II (4 points) and VIAR UN3910 Visiting Critic I-VIAR UN3911 Visiting Critic II (4 points). (*Senior Thesis I* and *Visiting Critic I* run concurrently and *Senior Thesis II* and *Visiting Critic II* run concurrently).

Visual arts majors must sign up for a portfolio review to enroll in Senior Thesis. Portfolio reviews are scheduled in April preceding the semester for which students seek entry. Portfolios are evaluated by the director of undergraduate studies and a faculty committee. After each semester of Senior Thesis, a faculty committee evaluates the work and performance completed.

MAJOR IN ART HISTORY AND VISUAL ARTS

The combined major requires the completion of sixteen or seventeen courses. Up to two 3-point courses in art history may be replaced by a related course in another department, with approval of the adviser. It is recommended that students interested in this major begin the requirements in their sophomore year. The requirements for the major are as follows :

Art History (25 points)

AHIS UN3000	Majors' Colloquium: the Literature and Methods of Art History (formerly VIAR W3895)
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Seven additional art history (AHIS) 3-point lecture courses:

At least one course in three of four historical periods, as listed below

An additional two courses drawn from at least two different world regions, as listed below

Two additional lectures of the student's choice

Visual Arts (21 points)

VIAR UN1000	Basic Drawing (formerly VIAR R1001)
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VIAR UN2300	Sculpture I (formerly VIAR R3330)
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or VIAR UN2200 Ceramics I

Five additional VIAR 3-point studio courses (15 points)

In the senior year, students must complete either a seminar in the Department of Art History and Archaeology or a senior project in visual arts (pending approval by the Visual Arts Department).

Students electing the combined major should consult with the director of undergraduate studies in Visual Arts, as well as with the undergraduate program coordinator in the Art History and Archaeology Department.

NOTE: Chronological divisions are approximate. In case of ambiguities about course eligibility to fill the requirement, consult the director of undergraduate studies in Art History and Archaeology.

Historical Periods

- Ancient (up to 400 CE/AD)
- 400 - 1400
- 1400 - 1700
- 1700 - present

World Regions

- Africa
- Asia
- Europe, North America, Australia
- Latin America
- Middle East

CONCENTRATION IN VISUAL ARTS

A total of 21 points are required as follows:

Visual Arts (18 points)

VIAR UN1000	Basic Drawing (formerly VIAR R1001)
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VIAR UN2300	Sculpture I (formerly VIAR R3330)
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or VIAR UN2200 Ceramics I

Four additional VIAR 3-point studio courses (12 points)

Art History (3 points)

One 20th-century Art History 3-point course or equivalent, such as:

AHIS UN2405	Twentieth-Century Art (formerly AHIS W3650)
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WOMEN'S AND GENDER STUDIES

Program Office: 763 Schermerhorn Extension; 212-854-3277; 212-854-7466 (fax)

<http://irwgs.columbia.edu/>

Director of Undergraduate Studies: Prof. Lila Abu-Lughod, 756 Schermerhorn Extension; 212 854 3693; la310@columbia.edu

Located within the Institute for Research on Women, Gender, and Sexuality and taught in cooperation with Barnard College's Department of Women's, Gender and Sexuality Studies, the program in women's and gender studies provides students with a culturally and historically situated, theoretically diverse understanding of feminist scholarship and its contributions to the disciplines. The program introduces students to feminist discourse on the cultural and historical representation of nature, power, and the social construction of difference. It encourages students to engage in the debates regarding the ethical and political issues of equality and justice that emerge in such discussion, and links the questions of gender and sexuality to those of racial, ethnic, and other kinds of hierarchical difference.

Through sequentially organized courses in women's, gender, and sexuality studies, as well as required discipline-based courses in the humanities and social sciences, the major provides a thoroughly interdisciplinary framework, methodological training, and substantive guidance in specialized areas of research. Small classes and mentored thesis-writing give students an education that is both comprehensive and tailored to individual needs. The major culminates in a thesis-writing class, in which students undertake original research and produce advanced scholarship.

Graduates leave the program well prepared for future scholarly work in women's, gender, and sexuality studies, as well as

for careers and future training in law, public policy, social work, community organizing, journalism, and professions in which there is a need for critical and creative interdisciplinary thought.

MAJOR IN WOMEN'S AND GENDER STUDIES

The requirements for this program were modified on September 22, 2014. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

Students should plan their course of study with the undergraduate director as early in their academic careers as possible. The requirements for the major are:

WMST UN1001	Introduction to Women's and Gender Studies
or WMST UN3125	Introduction to Sexuality Studies
WMST UN3311	Colloquium in Feminist Theory
WMST UN3514	Historical Approaches to Feminist Questions
WMST UN3521	Senior Seminar I
WMST UN3915	Gender and Power in Transnational Perspective

Six approved Elective Courses on women, gender, and/or sexuality in consultation with the director of undergraduate studies.*

* Electives will be selected in coordination with the director of undergraduate studies to best suit students' specific interests and to provide them with the appropriate range of courses, whether their focus is ethnic studies, pre-med, pre-law, sociology, public health, queer studies, visual culture, literature, or another area of interest. Students are encouraged to take a broad interdisciplinary approach. The director of undergraduate studies will help students fine-tune their academic program in conjunction with IRWGS courses, cross-listed courses, and other courses offered at Columbia.

CONCENTRATION IN WOMEN'S AND GENDER STUDIES

The requirements for this program were modified on September 22, 2014. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

The same requirements as for the major, with the exception of WMST UN3521 Senior Seminar I.

SPECIAL CONCENTRATION FOR THOSE MAJORING IN ANOTHER DEPARTMENT

The requirements for this program were modified on September 22, 2014. Students who declared this program before this date should contact the director of undergraduate studies for the department in order to confirm their correct course of study.

WMST UN1001 Introduction to Women's and Gender Studies; plus four additional approved elective courses on gender.

YIDDISH STUDIES

Departmental Office: 414 Hamilton; 212-854-3202
<https://germanic.columbia.edu/>

Director of Undergraduate Studies: Prof. Dorothea von Mücke, 410 Hamilton; 212-854-1891; dev1@columbia.edu (tw2284@columbia.edu)

Language Instruction: Jutta Schmiers-Heller, 403A Hamilton; 212-854-4824; js2331@columbia.edu (rak23@columbia.edu)

The Department of Germanic Languages and Literatures is considered one of the very best in the country. Many of the faculty specialize in the study of German literature and culture from 1700 to the present. German majors acquire proficiency in examining literary, philosophical, and historical texts in the original, as well as critical understanding of modern German culture and society. Particular attention is given to German-speaking traditions within larger European and global contexts. Courses taught in translation build on Columbia's Core Curriculum, thereby allowing students to enroll in upper-level seminars before completing the language requirement.

All classes are taught as part of a living culture. Students have ample opportunities to study abroad, to work with visiting scholars, and to take part in the cultural programs at Deutsches Haus. In addition, the department encourages internships with German firms, museums, and government offices. This hands-on experience immerses students in both language and culture, preparing them for graduate study and professional careers.

Upon graduation, German majors compete successfully for Fulbright or DAAD scholarships for research in Germany or Austria beyond the B.A. degree. Our graduating seniors are highly qualified to pursue graduate studies in the humanities and social sciences, as well as professional careers. Former majors and concentrators have gone on to careers in teaching, law, journalism, banking and consulting, international affairs, and communications.

German literature and culture courses are taught as seminars integrating philosophical and social questions. Topics include romanticism, revolution, and national identity; German intellectual history; minority literatures; Weimar cinema;

German-Jewish culture and modernity; the Holocaust and memory; and the history and culture of Berlin. Classes are small, with enrollment ranging from 5 to 15 students.

The department regularly offers courses in German literature and culture in English for students who do not study the German language. The department also participates in Columbia's excellent program in comparative literature and society.

ADVANCED PLACEMENT

The department grants 3 credits for a score of 5 on the AP German Language exam, which satisfies the foreign language requirement. Credit is awarded upon successful completion of a 3000-level (or higher) course with a grade of B or higher. This course must be for at least 3 points of credit and be taught in German. Courses taught in English may not be used for language AP credit. The department grants 0 credits for a score of 4 on the AP German Language exam, but the foreign language requirement is satisfied.

THE YIDDISH STUDIES PROGRAM

The Yiddish Studies Program at Columbia University, the global leader in Yiddish scholarship and teaching, focuses on the experiences and cultural efflorescence of Ashkenazic Jewry over a thousand years and five continents. It is a perfect exemplar of Columbia's interests in global and transnational study, weaving together language, literature, and culture in a way that echoes the best of Columbia's justly famed humanities programs.

The program in Yiddish studies offers both the undergraduate Major and Concentration, in addition to graduate studies leading to the Ph.D. In both the undergraduate and graduate program, emphasis is placed not merely on acquiring linguistic proficiency and textual study, but also viewing Yiddish literature in a larger cultural and interdisciplinary context. The graduate program, the only degree-granting Yiddish Studies Program in the United States, is considered one of the world's most important, with its graduates holding many of the major university positions in the field.

Students of Yiddish have ample opportunities to enhance their studies through a number of fellowships. The Naomi Fellowship (<https://www.iijs.columbia.edu/naomi-fellowship/>), a fully-subsidized Yiddish Study Abroad program allows students to explore Yiddish culture and history in Israel and Poland. The Irene Kronhill Pletka YIVO Fellowship (<https://germanic.columbia.edu/programs/yiddish/fellowships/>) enables students to expand on their archival research skills in New York. Upon graduation, our majors compete successfully for Fulbright and other prestigious scholarships, and are highly qualified to pursue careers in humanities, social sciences, as well as artistic and professional careers.

Students work with faculty in Germanic languages, Jewish studies, history, and Slavic studies to broaden their

understanding of the literature, language, and culture of Eastern European Jewry. The Yiddish Studies Program is also closely affiliated with the Institute for Israel and Jewish Studies (p.), which offers diverse programming and other fellowship opportunities. Classes are small, and instruction is individualized and carefully directed to ensure that students gain both a thorough general grounding and are able to pursue their own particular interests in a wide-spanning field. The program also offers classes taught in translation for students who do not study Yiddish. The Yiddish programming, such as lectures, monthly conversation hours, Meet a Yiddish Celebrity series, as well as the activities of the Yiddish Club of Columbia's Barnard/Hillel allows students to explore Yiddish culture outside the classroom.

THE GERMAN LANGUAGE PROGRAM

First- and second-year German language courses emphasize spoken and written communication, and provide a basic introduction to German culture. Goals include mastery of the structure of the language and enough cultural understanding to interact comfortably with native speakers.

After successfully completing the elementary German sequence, GERM UN1101 Elementary German Language Course, I-GERM UN1102 Elementary German Language Course, II, students are able to provide information about themselves, their interests, and daily activities. They can participate in simple conversations, read edited texts, and understand the main ideas of authentic texts. By the end of GERM UN1102 Elementary German Language Course, II, students are able to write descriptions, comparisons, and creative stories, and to discuss general information about the German-speaking countries.

The intermediate German sequence, GERM UN2101 Intermediate German I-GERM UN2102 Intermediate German II, increases the emphasis on reading and written communication skills, expands grammatical mastery, and focuses on German culture and literary texts. Students read short stories, a German drama, and increasingly complex texts. Regular exposure to video, recordings, the World Wide Web, and art exhibits heightens the cultural dimensions of the third and fourth semesters. Students create portfolios comprised of written and spoken work.

Upon completion of the second-year sequence, students are prepared to enter advanced courses in German language, culture, and literature at Columbia and/or at the Berlin Consortium for German Studies in Berlin. Advanced-level courses focus on more sophisticated use of the language structure and composition (GERM UN3001 Advanced German, I-GERM UN3002 *Advanced German II: Vienna*); on specific cultural areas; and on literary, historical, and philosophical areas in literature-oriented courses

(GERM UN3333 Introduction To German Literature [In German]).

IN FULFILLMENT OF THE LANGUAGE REQUIREMENT IN GERMAN

Students beginning the study of German at Columbia must take four terms of the following two-year sequence:

GERM UN1101	Elementary German Language Course, I
GERM UN1102	Elementary German Language Course, II
GERM UN2101	Intermediate German I
GERM UN2102	Intermediate German II

Entering students are placed, or exempted, on the basis of their College Board Achievement or Advanced Placement scores, or their scores on the placement test administered by the departmental language director. Students who need to take GERM UN1101 Elementary German Language Course, I-GERM UN1102 Elementary German Language Course, II may take GERM UN1125 Accelerated Elementary German I & II as preparation for GERM UN2101 Intermediate German I.

UNIVERSITY STUDY IN BERLIN DEUTSCHES HAUS

Deutsches Haus, 420 West 116th Street, provides a center for German cultural activities on the Columbia campus. It sponsors lectures, film series, and informal gatherings that enrich the academic programs of the department. Frequent events throughout the fall and spring terms offer students opportunities to practice their language skills.

GRADING

Courses in which a grade of D has been received do not count toward the major or concentration requirements.

DEPARTMENTAL HONORS

Normally no more than 10% of graduating majors receive departmental honors in a given academic year. For the requirements for departmental honors, see the director of undergraduate studies.

PROFESSORS

Mark Anderson
Stefan Andriopoulos
Claudia Breger
Jeremy Dauber
Andreas Huyssen (emeritus)
Harro Müller (emeritus)
Dorothea von Mücke
Oliver Simons (Chair)

SENIOR LECTURERS

Wijnie de Groot (Dutch)
Jutta Schmiers-Heller

LECTURERS

Agnieszka Legutko (Yiddish)
Silja Weber

MAJOR IN GERMAN LITERATURE AND CULTURAL HISTORY

The goal of the major is to provide students with reasonable proficiency in reading a variety of literary, philosophical, and historical texts in the original and, through this training, to facilitate a critical understanding of modern German-speaking cultures and societies. Students should plan their program of study with the director of undergraduate studies as early as possible. Competence in a second foreign language is strongly recommended, especially for those students planning to attend graduate school.

The major in German literature and cultural history requires a minimum of 30 points, distributed as follows:

GERM UN3001	Advanced German, I (can be waived and replaced by another 3000 level class upon consultation with the DUS)
or GERM UN3002	Advanced German II: Vienna

GERM UN3333	Introduction To German Literature [In German]
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Select two of the following survey courses in German literature and culture (at least one of these must focus on pre-20th-century cultural history):

GERM UN3442	Survey of 18th Century German Lit: Enlightenment, Sturm und Drang [In German]
GERM UN3443	Romanticism, Revolution, Realism [In German]
GERM UN3444	SURVEY OF GERMAN LIT:20C
GERM UN3445	German Literature After 1945 [In German]

One course in German intellectual history

GERM UN3991	Senior Seminar
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The remaining courses to be chosen from the 3000- or 4000-level offerings in German and Comparative Literature—German in consultation with the Director of Undergraduate Studies.

Senior Thesis

A senior thesis is not required for the major. Students interested in a senior thesis or research project may do so through independent study with a faculty member over one or two semesters.

MAJOR IN YIDDISH STUDIES

The program is designed as a combination of language and content courses. First- and second-year Yiddish language courses emphasize spoken and written communication, and provide a basic introduction to Eastern European Jewish culture. Goals include mastery of the structure of the language and enough cultural understanding to interact comfortably with native speakers.

After second-year Yiddish language courses are completed, students should feel sufficiently comfortable to begin to work with Yiddish literature in the original. Upper-level undergraduate/graduate courses are designed to accommodate students with a range of Yiddish language experience, and intensive language summer study abroad, such as the Naomi Praver Kadar International Yiddish Summer Program (the Yiddish Studies program at Columbia offers the fully-subsidized Naomi Fellowship (<http://www.iijs.columbia.edu/naomi-fellowship/>) for students of Yiddish), or other academic summer programs, is also encouraged for improvement in language acquisition and comprehension.

The goal is to provide students with reasonable proficiency in reading a variety of literary, philosophical, and historical texts in the original and, through this training, to provide them with a critical understanding of Yiddish-speaking culture and society.

The second pillar of the Yiddish program is an intimate exposure to the literature and culture of the Yiddish-speaking Jewry. That exposure is achieved through several courses in Yiddish literature, which, although they may cover a variety of subjects or proceed from a number of methodological and disciplinary orientations, share a rigorous commitment to analyzing and experiencing that literature within an overarching historical and cultural framework.

These courses in Yiddish literature, culture and Jewish history will provide students with a solid interdisciplinary foundation in Yiddish studies. Inevitably and necessary, these courses, whether taught in Yiddish, English, or in a combination of the Yiddish text and English language instruction – cover the sweep of Yiddish literary history from the early modern period to today.

Students should plan their program of study with the director of undergraduate studies as early as possible. There is a prerequisite of two years of Yiddish, or equivalent to be demonstrated through testing.

The Major in Yiddish Studies requires a minimum of 30 points, distributed as follows:

1. **Two courses of advanced language study** (6 points); YIDD UN3101, YIDD UN3102
2. **Three courses in Yiddish literature** (9 points); e.g. YIDD UN3500, YIDD GU4420
3. **At least one course related to a senior thesis** (3 points);

4. **Four related courses, at least one of which is in medieval or modern Jewish history** (12 points); e.g. HIST UN4604, YIDD GU4113.

A senior thesis **is required** for the Major in Yiddish Studies. Students interested in a senior thesis or research project may do so through independent study with a faculty member over one or two semesters. Students must conduct original research, some of which must take place in the Yiddish language, and are required to submit a culminating paper, of no less than 35 pages.

Elective courses: Elective courses can be taken at Columbia as well as at affiliated institutions such as the Jewish Theological Seminary, Barnard College, New York University, etc. Columbia's arrangements with the joint degree appointing program at JTS, i.e. JTS and GS Joint program with List College, offers students exposure to a wide variety of courses on Yiddish and Yiddish-related topics taught by experts in the field of Yiddish and comparative Jewish literature such as Profs. David Roskies and Barbara Mann.

Thanks to the consortial arrangements with other universities in the New York area (Barnard, NYU, Yale, Penn, etc.) students both in Columbia College and General Studies, can take courses at these institutions for degree credit, which allows for student exposure to experts in twentieth-century Soviet Yiddish literature, Yiddish women's writing, Yiddish literature in Israel, and much more (Profs. Gennady Estraiikh, Kathryn Hellerstein, and Hannan Hever). These arrangements allow students to have, if they so choose, an even broader intellectual experience than the already broad interdisciplinary opportunities available to them via the courses offered by the faculty on the Interdisciplinary Committee on Yiddish at Columbia.

Language courses need to be taken at Columbia.

Honors options: Departmental Honors in Yiddish Studies can be granted to a total of 10% of the students graduating with the Major in Yiddish Studies in a given year across both Columbia College and General Studies.

CONCENTRATION IN GERMAN LITERATURE AND CULTURAL HISTORY

The concentration in German literature and cultural history requires a minimum of 21 points in German courses.

GERM UN3333 Introduction To German Literature [In German]

At least one of the period survey courses in German literature and culture

GERM UN3442 Survey of 18th Century German Lit: Enlightenment, Sturm und Drang [In German]

GERM UN3443	Romanticism, Revolution, Realism [In German]
GERM UN3444	SURVEY OF GERMAN LIT:20C
GERM UN3445	German Literature After 1945 [In German]
GERM UN3991	Senior Seminar

The remaining courses to be chosen from the 3000- or 4000-level offerings in German and Comparative Literature-german in consultation with the Director of Undergraduate Studies

CONCENTRATION IN YIDDISH STUDIES

The concentration in Yiddish studies requires a minimum of 21 points, distributed as follows:

1. **Two courses of advanced language study** (6 points); YIDD UN3101, YIDD UN3102
2. **Two courses in Yiddish literature** (6 points); e.g. YIDD UN3500, YIDD GU4420
3. **Three related courses, at least one of which is in medieval or modern Jewish history** (9 points); e.g. HIST UN4604, YIDD GU4113.

SPECIAL CONCENTRATION IN GERMAN FOR COLUMBIA COLLEGE AND SCHOOL OF GENERAL STUDIES STUDENTS IN STEM FIELDS

The special concentration in German requires a minimum of 15 points.

GERM UN3333	Introduction To German Literature [In German]
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At least one of the period survey courses in German Literature and Culture

GERM UN3442	Survey of 18th Century German Lit: Enlightenment, Sturm und Drang [In German]
GERM UN3443	Romanticism, Revolution, Realism [In German]
GERM UN3444	SURVEY OF GERMAN LIT:20C
GERM UN3445	German Literature After 1945 [In German]
GERM UN3991	Senior Seminar

Two courses to be chosen from the 3000- or 4000-level (taught in German or English) offerings in German and Comparative Literature German in consultation with the Director of Undergraduate Studies

POSTBACCALAUREATE PREMEDICAL PROGRAM CURRICULUM AND COURSES

The academic curriculum of the Postbaccalaureate Premedical Program is designed to fulfill the prerequisites for medical school admission. Because course requirements for medical school can vary, our premedical curriculum is designed to prepare Postbac Premed students to train anywhere in the nation. For the sequencing of the following required courses, please review the program timetables: traditional (<http://bulletin.columbia.edu/general-studies/postbaccalaureate-premedical-program/curriculum-courses/sample-schedule/traditional-program-sequence/>), part-time (<http://bulletin.columbia.edu/general-studies/postbaccalaureate-premedical-program/curriculum-courses/sample-schedule/part-time-sequence/>), or accelerated (<http://bulletin.columbia.edu/general-studies/postbaccalaureate-premedical-program/curriculum-courses/sample-schedule/accelerated-sequence/>). While enrolled in the program, students must fulfill all requirements with courses offered by Columbia's Faculty of Arts & Sciences and they are expected to have their advisors approve their programs of study. In addition to the following courses, students must gain at least 120 hours of health care experience (<http://gs.columbia.edu/postbac/clinical-and-research-opportunities/>).

ENGLISH

One year of college English or the equivalent is required. Most Postbac Premed students have completed this requirement as undergraduates and do not need to complete course work in English at Columbia. Students should inform their advisors early on when they are especially interested in particular medical school programs (linkage or non-linkage), since some may have specific requirements for this subject of study.

MATHEMATICS

Students are required to complete one year (6 points) of college mathematics beyond pre-calculus, consisting of one term of calculus and one term of statistics. (Some students elect to take a second semester of calculus instead of statistics.)

If a student has not already successfully completed Calculus I, it may be taken as a co-requisite of Physics I or General Chemistry I.

Courses

MATH UN1101 Calculus I. 3 points.

Prerequisites: (see *Courses for First-Year Students*). Functions, limits, derivatives, introduction to integrals, or an understanding of pre-calculus will be assumed.

The Help Room in 333 Milbank Hall (Barnard College) is open during the day, Monday through Friday, to students seeking individual help from the teaching assistants. (SC)

Fall 2019: MATH UN1101

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
MATH 1101	001/29218	M W 10:10am - 11:25am 203 Mathematics Building	Daniele Alessandrini	3	41/64
MATH 1101	002/50794	M W 2:40pm - 3:55pm 203 Mathematics Building	Daniele Alessandrini	3	46/100
MATH 1101	003/50795	M W 4:10pm - 5:25pm 207 Mathematics Building	Akash Sengupta	3	63/100
MATH 1101	004/50796	M W 6:10pm - 7:25pm 312 Mathematics Building	Chao Li	3	111/116
MATH 1101	005/50797	T Th 8:40am - 9:55am 312 Mathematics Building	Zachary Sylvan	3	54/100
MATH 1101	006/50798	T Th 10:10am - 11:25am 312 Mathematics Building	Michael Woodbury	3	69/100
MATH 1101	007/50799	T Th 11:40am - 12:55pm 203 Mathematics Building	Michael Woodbury	3	63/100
MATH 1101	008/50800	T Th 2:40pm - 3:55pm 207 Mathematics Building	Alisa Knizel	3	80/100
MATH 1101	009/50801	M W 1:10pm - 2:25pm 407 Mathematics Building	Oleksandr Kravets	3	23/30
MATH 1101	010/50802	T Th 1:10pm - 2:25pm 407 Mathematics Building	Zhi Li	3	31/31

Spring 2020: MATH UN1101

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
MATH 1101	001/13846	M W 11:40am - 12:55pm 407 Mathematics Building	Cailan Li	3	30/30
MATH 1101	002/12024	M W 2:40pm - 3:55pm 203 Mathematics Building	Akash Sengupta	3	44/110
MATH 1101	003/12025	M W 6:10pm - 7:25pm 407 Mathematics Building	Gerhardt Hinkle	3	23/30
MATH 1101	004/12026	T Th 10:10am - 11:25am 203 Mathematics Building	Alexandra Florea	3	103/110

MATH 1101	005/12027	T Th 11:40am - 12:55pm 203 Mathematics Building	William Chen	3	33/110
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MATH UN1102 Calculus II. 3 points.

Prerequisites: MATH UN1101 or the equivalent.

Methods of integration, applications of the integral, Taylor's theorem, infinite series. (SC)

Fall 2019: MATH UN1102

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
MATH 1102	001/29219	M W 1:10pm - 2:25pm 417 Mathematics Building	Yi Sun	3	55/64
MATH 1102	002/50788	T Th 10:10am - 11:25am 417 Mathematics Building	Peter Woit	3	19/64
MATH 1102	003/50789	T Th 4:10pm - 5:25pm 203 Mathematics Building	Nathan Dowlin	3	96/100
MATH 1102	004/50790	T Th 6:10pm - 7:25pm 203 Mathematics Building	Nathan Dowlin	3	46/100
MATH 1102	005/50791	M W 4:10pm - 5:25pm 407 Mathematics Building	Xuan Wu	3	18/30
MATH 1102	006/50792	T Th 11:40am - 12:55pm 407 Mathematics Building	Donghan Kim	3	33/36

Spring 2020: MATH UN1102

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
MATH 1102	001/12029	M W 1:10pm - 2:25pm 207 Mathematics Building	Yi Sun	3	33/125
MATH 1102	002/12030	M W 2:40pm - 3:55pm 407 Mathematics Building	Semen Rezchikov	3	30/30
MATH 1102	003/12031	T Th 11:40am - 12:55pm 207 Mathematics Building	Michael Woodbury	3	63/125
MATH 1102	004/12032	T Th 6:10pm - 7:25pm 407 Mathematics Building	Iakov Kononov	3	29/30

STAT UN1101 Introduction to Statistics. 3 points.

CC/GS: Partial Fulfillment of Science Requirement, BC: Fulfillment of General Education Requirement: Quantitative and Deductive Reasoning (QUA).

Prerequisites: intermediate high school algebra.

Designed for students in fields that emphasize quantitative methods. Graphical and numerical summaries, probability, theory of sampling distributions, linear regression, analysis

of variance, confidence intervals and hypothesis testing. Quantitative reasoning and data analysis. Practical experience with statistical software. Illustrations are taken from a variety of fields. Data-collection/analysis project with emphasis on study designs is part of the coursework requirement.

Fall 2019: STAT UN1101

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
STAT 1101	001/48411	M W 8:40am - 9:55am 517 Hamilton Hall	Banu Baydil	3	58/86
STAT 1101	002/10361	T Th 11:40am - 12:55pm 702 Hamilton Hall	Banu Baydil	3	76/86
STAT 1101	003/48412	M W 6:10pm - 7:25pm 602 Hamilton Hall	Ha Nguyen	3	47/86

Spring 2020: STAT UN1101

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
STAT 1101	001/46713	M W 8:40am - 9:55am Room TBA	Banu Baydil	3	73/86
STAT 1101	002/46714	T Th 10:10am - 11:25am Room TBA	David Rios	3	60/86
STAT 1101	003/46715	T Th 6:10pm - 7:25pm Room TBA	Ha Nguyen	3	58/86

BIOLOGY

Students are required to complete one year (6 points) of biology emphasizing biochemistry, genetics, evolution, cell biology, developmental biology, and physiology, and one semester (3 points) of biology lab involving dissection, experimentation, and data analysis. Students may take the laboratory course in either the fall or spring semester or in the first summer session after the completion of the year of biology.

Courses

BIOL UN2401 Contemporary Biology I: Biochemistry, Genetics & Molecular Biology. 3 points.

Prerequisites: a course in college chemistry or the written permission of either the instructor or the premedical adviser. Recommended as the introductory biology course for science majors who have completed a year of college chemistry and premedical students. The fundamental principles of biochemistry, molecular biology, and genetics. Website: <http://www.columbia.edu/cu/biology/courses/c2005/index.html>. (<http://www.columbia.edu/cu/biology/courses/c2005/>) SPS and TC students may register for this course, but they must first obtain the written permission of the instructor, by filling out a paper Registration Adjustment Form (Add/Drop form). The form can be downloaded at the URL below, but must be signed by the instructor and returned to the office of the registrar. <http://registrar.columbia.edu/sites/default/files/content/reg-adjustment.pdf>

Fall 2019: BIOL UN2401

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
BIOL 2401	001/52848	T Th 4:10pm - 5:25pm 309 Havemeyer Hall	Lawrence Chasin, Deborah Mowshowitz, Marko Jovanovic	3	83/220

BIOL UN2501 Contemporary Biology Laboratory. 3 points. Enrollment per section limited to 28. Lab Fee: \$150. Fee: Lab Fee - 150.00

Prerequisites: Strongly recommended prerequisite or corequisite: BIOL UN2005 or BIOL UN2401. Experiments focus on genetics and molecular biology, with an emphasis on data analysis and experimental techniques. The class also includes a study of mammalian anatomy and histology. SPS and TC students may register for this course, but they must first obtain the written permission of the instructor, by filling out a paper Registration Adjustment Form (Add/Drop form). The form can be downloaded at the URL below, but must be signed by the instructor and returned to the office of the registrar. <http://registrar.columbia.edu/sites/default/files/content/reg-adjustment.pdf>

Fall 2019: BIOL UN2501

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
BIOL 2501	001/52802	M 1:10pm - 5:00pm 922 Schermerhorn Hall	Claire Hazen	3	19/28
BIOL 2501	002/52803	T 1:10pm - 5:00pm 922 Schermerhorn Hall	Claire Hazen	3	28/28
BIOL 2501	003/52804	W 1:10pm - 5:00pm 922 Schermerhorn Hall	Claire Hazen	3	27/28
BIOL 2501	004/52805	Th 6:40pm - 10:30pm 922 Schermerhorn Hall	Claire Hazen	3	30/28
BIOL 2501	005/52806	F 1:10pm - 5:00pm 922 Schermerhorn Hall	Claire Hazen	3	23/28
BIOL 2501	006/52807	W 6:40pm - 10:30pm 922 Schermerhorn Hall	Claire Hazen	3	21/28

Spring 2020: BIOL UN2501

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
BIOL 2501	001/12011	T 1:10pm - 5:00pm 922 Schermerhorn Hall	Claire Hazen	3	21/28
BIOL 2501	002/12012	W 1:10pm - 5:00pm 922 Schermerhorn Hall	Claire Hazen	3	23/28
BIOL 2501	003/12013	Th 1:10pm - 5:00pm	Claire Hazen	3	11/28

	922 Schermerhorn Hall				
BIOL 2501 004/12014	Th 6:40pm - 10:30pm	Claire Hazen	3	20/28	
	922 Schermerhorn Hall				
BIOL 2501 005/12015	F 1:10pm - 5:00pm	Claire Hazen	3	15/28	
	922 Schermerhorn Hall				

BIOL UN2402 Contemporary Biology II: Cell Biology, Development & Physiology. 3 points.

Prerequisites: a course in college chemistry and BIOL UN2005 or BIOL UN2401, or the written permission of either the instructor or the premedical adviser.

Cellular biology and development; physiology of cells and organisms. Same lectures as *BIOL UN2006*, but recitation is optional. For a detailed description of the differences between the two courses, see the course web site or <http://www.columbia.edu/cu/biology/ug/advice/faqs/gs.html>.

Website: <http://www.columbia.edu/cu/biology/courses/c2006/>

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SPS, Barnard, and TC students may register for this course, but they must first obtain the written permission of the instructor, by filling out a paper Registration Adjustment Form (Add/Drop form). The form can be downloaded at the URL below, but must be signed by the instructor and returned to the office of the registrar. <http://registrar.columbia.edu/sites/default/files/content/reg-adjustment.pdf>

Spring 2020: BIOL UN2402

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
BIOL 2402	001/11549	T Th 4:10pm - 5:25pm Room TBA	Deborah Mowshowitz, Mary Ann Price	3	62/339

BIOCHEMISTRY (RECOMMENDED)

Because increasing numbers of medical schools require a semester of biochemistry, it is strongly recommended that postbacs take biochemistry. Usually, students take it during the application year.

Courses

BIOC UN3300 Biochemistry. 3 points.

Prerequisites: one year each of Introductory Biology and General Chemistry. Corequisites: Organic Chemistry. Primarily aimed at nontraditional students and undergraduates who have course conflicts with BIOC UN3501.

Biochemistry is the study of the chemical processes within organisms that give rise to the immense complexity of life. This complexity emerges from a highly regulated and coordinated flow of chemical energy from one biomolecule to another. This course serves to familiarize students with the spectrum of biomolecules (carbohydrates, lipids, amino acids, nucleic acids, etc.) as well as the fundamental chemical processes (glycolysis, citric acid cycle, fatty acid metabolism, etc.) that allow life to

happen. In particular, this course will employ active learning techniques and critical thinking problem-solving to engage students in answering the question: how is the complexity of life possible? NOTE: While Organic Chemistry is listed as a corequisite, it is highly recommended that you take Organic Chemistry beforehand.

Spring 2020: BIOC UN3300

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
BIOC 3300	001/11855	T 7:10pm - 9:30pm Room TBA	Danny Ho	3	82/100

CHEMISTRY

Students are required to complete one year (8 points) of general chemistry and one semester (3 points) of general chemistry laboratory. The General Chemistry sequence must be completed before taking Biology or Organic Chemistry. General chemistry lecture courses have corresponding, mandatory recitations. The laboratory course has a mandatory one-hour laboratory lecture course associated with it, and should be taken alongside or after General Chemistry II. AP credits cannot be used to fulfill the general chemistry requirement.

Chemistry is a course sequence that students may begin in the fall or spring term. Students who enroll in Chemistry I in the spring should plan to take the 12-week Chemistry II course in the summer.

Courses

CHEM UN1403 General Chemistry I (Lecture). 4 points. CC/GS: Partial Fulfillment of Science Requirement

Corequisites: MATH UN1101

Preparation equivalent to one year of high school chemistry is assumed. Students lacking such preparation should plan independent study of chemistry over the summer or take CHEM UN0001 before taking CHEM UN1403. Topics include stoichiometry, states of matter, nuclear properties, electronic structures of atoms, periodic properties, chemical bonding, molecular geometry, introduction to quantum mechanics and atomic theory, introduction to organic and biological chemistry, solid state and materials science, polymer science and macromolecular structures and coordination chemistry. Although CHEM UN1403 and CHEM UN1404 are separate courses, students are expected to take both terms sequentially. The order of presentation of topics may differ from the order presented here, and from year to year. Students must ensure they register for the recitation that corresponds to the lecture section. Please check the Directory of Classes for details.

Fall 2019: CHEM UN1403

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
CHEM 1403	001/99403	M W 10:10am - 11:25am 309 Havemeyer Hall	Gerard Parkin	4	282/300

CHEM 1403	002/48018	T Th 6:10pm - 7:25pm 309 Havemeyer Hall	Ruben Savizky	4	200/200
CHEM 1403	003/48019	M W 6:10pm - 7:25pm 304 Barnard Hall	Robert Beer	4	179/200

Spring 2020: CHEM UN1403

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
CHEM 1403	001/11594	T Th 6:10pm - 7:25pm 309 Havemeyer Hall	Ruben Savizky	4	71/132

CHEM UN1500 General Chemistry Laboratory. 3 points.

CC/GS: Partial Fulfillment of Science Requirement
Lab Fee: \$140.

Corequisites: CHEM UN1403, CHEM UN1404

An introduction to basic lab techniques of modern experimental chemistry, including quantitative procedures and chemical analysis. Students must register for a Lab Lecture section for this course (*CHEM UN1501*). Please check the Directory of Classes for details. Please note that *CHEM UN1500* is offered in the fall and spring semesters. Mandatory lab check-in will be held during the first week of classes in both the fall and spring semesters.

Fall 2019: CHEM UN1500

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
CHEM 1500	001/99399	T 1:10pm - 4:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	10/46
CHEM 1500	002/99398	T 6:10pm - 9:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	29/46
CHEM 1500	003/99397	W 1:10pm - 4:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	29/46
CHEM 1500	004/99396	Th 1:10pm - 4:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	9/46

Spring 2020: CHEM UN1500

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
CHEM 1500	001/11597	M 1:10pm - 4:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	24/24
CHEM 1500	002/11598	T 1:10pm - 4:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	46/46
CHEM 1500	003/11625	T 6:10pm - 9:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	46/46
CHEM 1500	004/11626	W 1:10pm - 4:50pm	Joseph Ulichny,	3	46/46

CHEM 1500	005/11627	Th 1:10pm - 4:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	39/46
CHEM 1500	006/11628	Th 6:10pm - 9:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	45/46
CHEM 1500	007/11629	F 8:40am - 12:25pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	24/46
CHEM 1500	008/11630	F 1:10pm - 4:50pm 302 Havemeyer Hall	Joseph Ulichny, Sarah Hansen	3	23/24

CHEM UN1404 General Chemistry II (Lecture). 4 points.

CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: CHEM UN1403

Although CHEM UN1403 and CHEM UN 1404 are separate courses, students are expected to take both terms sequentially. Topics include gases, kinetic theory of gases, states of matter: liquids and solids, chemical equilibria, applications of equilibria, acids and bases, chemical thermodynamics, energy, enthalpy, entropy, free energy, periodic properties, chemical kinetics, and electrochemistry. The order of presentation of topics may differ from the order presented here, and from year to year. Students must ensure they register for the recitation that corresponds to the lecture section. Please check the Directory of Classes for details.

Spring 2020: CHEM UN1404

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
CHEM 1404	001/11595	T Th 11:40am - 12:55pm 309 Havemeyer Hall	Angelo Cacciuto	4	151/190
CHEM 1404	002/11596	M W 6:10pm - 7:25pm Room TBA	Robert Beer	4	190/190

ORGANIC CHEMISTRY

Students are required to complete one year (8 points) of organic chemistry. Organic chemistry lecture courses have corresponding, mandatory recitations. Students are also required to take 1.5 points of organic chemistry lab along with a one-hour mandatory laboratory lecture in both fall and spring semesters (for a total of 3 points). Alternatively, with the exception of linkage applicants, students may take a 3-point lab over a six-week summer session after completing the lecture sequence.

Courses**CHEM UN2443 Organic Chemistry I (Lecture). 4 points.**

Prerequisites: (CHEM UN1403 and CHEM UN1404) or CHEM UN1604

The principles of organic chemistry. The structure and reactivity of organic molecules are examined from the standpoint of modern theories of chemistry. Topics include stereochemistry, reactions of organic molecules, mechanisms of organic reactions, syntheses and degradations of organic molecules, and spectroscopic techniques of structure determination. Although CHEM UN2443 and CHEM UN2444 are separate courses, students are expected to take both terms sequentially. Students must ensure they register for the recitation which corresponds to the lecture section. Please check the Directory of Classes for details.

Fall 2019: CHEM UN2443

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
CHEM 2443	001/48005	M W 11:40am - 12:55pm 309 Havemeyer Hall	Karen Phillips	4	149/190
CHEM 2443	002/48006	M W 1:10pm - 2:25pm 309 Havemeyer Hall	Talha Siddiqui	4	75/190
CHEM 2443	003/48007	M W 6:10pm - 7:25pm 309 Havemeyer Hall	Charles Doubleday	4	112/120

CHEM UN2444 Organic Chemistry II (Lecture). 4 points.

Prerequisites: CHEM UN1404 or CHEM UN1604 and CHEM UN1500

The principles of organic chemistry. The structure and reactivity of organic molecules are examined from the standpoint of modern theories of chemistry. Topics include stereochemistry, reactions of organic molecules, mechanisms of organic reactions, syntheses and degradations of organic molecules, and spectroscopic techniques of structure determination. Although CHEM UN2443 and CHEM UN2444 are separate courses, students are expected to take both terms sequentially. Students must ensure they register for the recitation which corresponds to the lecture section. Please check the Directory of Classes for details.

Spring 2020: CHEM UN2444

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
CHEM 2444	001/12120	M W 11:40am - 12:55pm 309 Havemeyer Hall	Karen Phillips	4	143/180
CHEM 2444	002/12219	M W 6:10pm - 7:25pm 309 Havemeyer Hall	Charles Doubleday	4	187/170

CHEM UN2493 Organic Chemistry Laboratory I (Techniques). 0 points.

Lab Fee: \$63.00

Prerequisites: (CHEM UN1403 and CHEM UN1404) or (CHEM UN1604) and (CHEM UN1500 or CHEM UN1507)

Corequisites: CHEM UN2443

Techniques of experimental organic chemistry, with emphasis on understanding fundamental principles underlying the experiments in methodology of solving laboratory problems involving organic molecules. Attendance at the first lab lecture and laboratory session is mandatory. Please note that CHEM UN2493 is the first part of a full year organic chemistry laboratory course. Students must register for the lab lecture section (CHEM UN2495) which corresponds to their lab section. Students must attend ONE lab lecture and ONE lab section every other week. Please contact your advisers for further information.

Fall 2019: CHEM UN2493

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
CHEM 2493	001/99417	M 1:10pm - 5:00pm 202 Havemeyer Hall	Raymundo Pantoja, Talha Siddiqui	0	15/24
CHEM 2493	002/99416	T 1:10pm - 5:00pm 202 Havemeyer Hall	Raymundo Pantoja, Talha Siddiqui	0	16/24
CHEM 2493	003/99415	T 6:10pm - 10:00pm 202 Havemeyer Hall	Raymundo Pantoja, Talha Siddiqui	0	30/34
CHEM 2493	004/99414	W 1:10pm - 5:00pm 202 Havemeyer Hall	Anna Ghurbanyan	0	31/34
CHEM 2493	005/99413	Th 1:10pm - 5:00pm 202 Havemeyer Hall	Anna Ghurbanyan	0	28/34
CHEM 2493	006/99412	F 1:10pm - 5:00pm 202 Havemeyer Hall	Anna Ghurbanyan	0	31/34
CHEM 2493	007/99411	M 1:10pm - 5:00pm 202a Havemeyer Hall	Raymundo Pantoja, Talha Siddiqui	0	12/24
CHEM 2493	008/99410	T 1:10pm - 5:00pm 202a Havemeyer Hall	Raymundo Pantoja, Talha Siddiqui	0	20/24
CHEM 2493	009/99409	T 6:10pm - 10:00pm 202a Havemeyer Hall	Raymundo Pantoja, Talha Siddiqui	0	30/34
CHEM 2493	010/99408	W 1:10pm - 5:00pm 202a Havemeyer Hall	Anna Ghurbanyan	0	23/34
CHEM 2493	011/99407	Th 1:10pm - 5:00pm 202a Havemeyer Hall	Anna Ghurbanyan	0	30/34
CHEM 2493	012/99406	F 1:10pm - 5:00pm 202a Havemeyer Hall	Anna Ghurbanyan	0	22/34

CHEM UN2494 Organic Chemistry Laboratory II (Synthesis). 1.5 point.

Lab Fee: \$62.00

Prerequisites: (CHEM UN1403 and CHEM UN1404) and CHEM UN1500 and CHEM UN2493

Corequisites: CHEM UN2444

Please note that you must complete CHEM UN2493, or the equivalent, before you register for CHEM UN2494. This lab introduces students to experimental design and trains students in the execution and evaluation of scientific data. The technique experiments in the first half of the course (CHEM UN2493) teach students to develop and master the required experimental skills to perform the challenging synthesis experiments in the second semester. The learning outcomes for this lab are the knowledge and experimental skills associated with the most important synthetic routes widely used in industrial and research environments. Attendance at the first lab lecture and laboratory session is mandatory. Please note that CHEM UN2494 is the second part of a full year organic chemistry laboratory course. Students must register for the lab lecture section (CHEM UN2496) which corresponds to their lab section. Students must attend ONE lab lecture and ONE lab section every other week. Please contact your advisers for further information.

Spring 2020: CHEM UN2494

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
CHEM 2494	001/11637	M 1:10pm - 5:00pm 202a Havemeyer Hall	Talha Siddiqui	1.5	9/24
CHEM 2494	002/11638	T 1:10pm - 5:00pm 202a Havemeyer Hall	Talha Siddiqui	1.5	11/24
CHEM 2494	003/11639	T 6:10pm - 10:00pm 202a Havemeyer Hall	Talha Siddiqui	1.5	20/34
CHEM 2494	004/11640	W 1:10pm - 5:00pm 202a Havemeyer Hall	Anna Ghurbanyan	1.5	35/34
CHEM 2494	005/11641	Th 1:10pm - 5:00pm 202a Havemeyer Hall	Anna Ghurbanyan	1.5	32/34
CHEM 2494	006/11642	F 1:10pm - 5:00pm 202a Havemeyer Hall	Anna Ghurbanyan	1.5	34/34
CHEM 2494	007/11643	M 1:10pm - 5:00pm 202a Havemeyer Hall	Talha Siddiqui	1.5	10/24
CHEM 2494	008/11644	T 1:10pm - 5:00pm 202a Havemeyer Hall	Talha Siddiqui	1.5	17/24
CHEM 2494	009/11645	T 6:10pm - 10:00pm 202a Havemeyer Hall	Talha Siddiqui	1.5	26/34

CHEM 2494	010/11646	W 1:10pm - 5:00pm 202a Havemeyer Hall	Anna Ghurbanyan	1.5	34/34
CHEM 2494	011/11647	Th 1:10pm - 5:00pm 202a Havemeyer Hall	Anna Ghurbanyan	1.5	31/34
CHEM 2494	012/11648	F 1:10pm - 5:00pm 202a Havemeyer Hall	Anna Ghurbanyan	1.5	25/34

PHYSICS

Students are required to complete one year (6 points) of general physics and one year (2 points) of general physics laboratory. Physics is a course sequence that students may begin in the fall or spring term. Students who enroll in Physics I in the spring should plan to take the twelve-week Physics II course in the summer as it is not offered in the fall. Calculus is a corequisite for Physics I; however, students who have never taken calculus before are advised to complete it before undertaking Physics.

Courses**PHYS UN1201 General Physics I. 3 points.**

CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: some basic background in calculus or be concurrently taking MATH UN1101 Calculus I., The accompanying laboratory is PHYS UN1291-UN1292. The course will use elementary concepts from calculus. The accompanying laboratory is *PHYS UN1291 - UN1292*. Basic introduction to the study of mechanics, fluids, thermodynamics, electricity, magnetism, optics, special relativity, quantum mechanics, atomic physics, and nuclear physics.

Fall 2019: PHYS UN1201

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
PHYS 1201	001/47032	M W 10:10am - 11:25am 301 Pupin Laboratories	Michael Shaevitz	3	161/160
PHYS 1201	002/47033	M W 10:10am - 11:25am 428 Pupin Laboratories	Thomas Humensky	3	78/130
PHYS 1201	003/47034	T Th 6:10pm - 7:25pm 428 Pupin Laboratories	Burton Budick	3	45/130

Spring 2020: PHYS UN1201

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
PHYS 1201	001/15888	M W 5:40pm - 6:55pm 428 Pupin Laboratories	P. Michael Tuts	3	75/130

PHYS UN1291 General Physics Laboratory. 1 point.Same course as *PHYS W1291x*, but given off-sequence.

Corequisites: PHYS UN1201

This course is the laboratory for the corequisite lecture course and can be taken only during the same term as the corresponding lecture.

Fall 2019: PHYS UN1291

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
PHYS 1291 001/47054		M 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	13/15
PHYS 1291 002/47055		M 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	14/15
PHYS 1291 003/47056		M 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	11/15
PHYS 1291 004/47057		M 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	14/15
PHYS 1291 005/47058		M 7:30pm - 10:30pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	9/15
PHYS 1291 007/47060		T 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	9/15
PHYS 1291 008/47061		T 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	13/15
PHYS 1291 009/47062		T 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	15/15
PHYS 1291 010/47063		T 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	9/15
PHYS 1291 011/47064		T 7:30pm - 10:30pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	11/15
PHYS 1291 013/47066		W 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	13/15
PHYS 1291 014/47067		W 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	15/15
PHYS 1291 015/47068		W 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	12/15
PHYS 1291 016/47069		W 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	15/15
PHYS 1291 017/47070		W 7:30pm - 10:30pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	8/15
PHYS 1291 019/47072		Th 1:00pm - 4:00pm	Giuseppina Cambareri	1	15/15

PHYS 1291 020/47073		5th Flr Pupin Laboratories Th 1:00pm - 4:00pm	Giuseppina Cambareri	1	13/15
PHYS 1291 021/47074		5th Flr Pupin Laboratories Th 4:10pm - 7:10pm	Giuseppina Cambareri	1	8/15
PHYS 1291 022/47075		5th Flr Pupin Laboratories Th 4:10pm - 7:10pm	Giuseppina Cambareri	1	10/15
PHYS 1291 025/47078		5th Flr Pupin Laboratories F 1:00pm - 4:00pm	Giuseppina Cambareri	1	13/15
PHYS 1291 026/47079		5th Flr Pupin Laboratories F 1:00pm - 4:00pm	Giuseppina Cambareri	1	13/15

Spring 2020: PHYS UN1291

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
PHYS 1291 001/15923		M 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	15/15
PHYS 1291 002/15924		M 7:30pm - 10:30pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	10/15
PHYS 1291 003/15927		T 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	11/15
PHYS 1291 004/15928		T 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	9/15
PHYS 1291 005/15929		W 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	15/15
PHYS 1291 006/15931		W 7:30pm - 10:30pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	2/15
PHYS 1291 007/15932		Th 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	6/15
PHYS 1291 008/15933		Th 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	6/15

PHYS UN1292 General Physics Laboratory II. 1 point.

Corequisites: PHYS UN1201, PHYS UN1202

This course is the laboratory for the corequisite lecture course (*PHYS UN1201 - PHYS UN1202*) and can be taken only during the same term as the corresponding lecture.

Spring 2020: PHYS UN1292

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
PHYS 1292 001/15936		M 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina Cambareri	1	15/15

PHYS 1292 002/15937	M 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 003/15938	M 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 004/15939	M 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 005/15940	M 7:30pm - 10:30pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 007/15941	T 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 008/15942	T 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 009/15943	T 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 010/15944	T 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 011/15945	T 7:30pm - 10:30pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	8/15
PHYS 1292 013/15946	W 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 014/15947	W 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 015/15948	W 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	10/15
PHYS 1292 016/15949	W 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	4/15
PHYS 1292 017/15951	W 7:30pm - 10:30pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	6/15
PHYS 1292 018/15953	Th 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	12/15
PHYS 1292 019/15954	Th 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	15/15
PHYS 1292 020/15955	Th 4:10pm - 7:10pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	4/15
PHYS 1292 022/15957	Th 7:30pm - 10:30pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	7/15

PHYS 1292 023/15956	F 1:00pm - 4:00pm 5th Flr Pupin Laboratories	Giuseppina 1 Cambareri	10/15
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PSYCHOLOGY (RECOMMENDED)

Premeds who have not previously studied psychology at the college level should consider enrolling in The Science of Psychology (PSYC UN1001) in order to be fully prepared for the MCAT.

Courses

PSYC UN1001 The Science of Psychology. 3 points.

CC/GS: Partial Fulfillment of Science Requirement

Enrollment may be limited. Attendance at the first two class periods is mandatory.

Prerequisites: **BLOCKED CLASS. EVERYONE MUST JOIN WAITLIST TO BE ADMITTED**

Broad survey of psychological science including: sensation and perception; learning, memory, intelligence, language, and cognition; emotions and motivation; development, personality, health and illness, and social behavior. Discusses relations between the brain, behavior, and experience. Emphasizes science as a process of discovering both new ideas and new empirical results. *PSYC UN1001* serves as a prerequisite for further psychology courses and should be completed by the sophomore year.

Fall 2019: PSYC UN1001

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
PSYC 1001	001/99690	T Th 1:10pm - 2:25pm 501 Schermerhorn Hall	Patricia Lindemann	3	211/225
PSYC 1001	002/99689	T Th 8:40am - 9:55am 501 Schermerhorn Hall	Karyn Gunnet-Shoval	3	146/189
PSYC 1001	003/51819	M W 1:10pm - 2:25pm 501 Schermerhorn Hall	Tina Kao	3	117/189

Spring 2020: PSYC UN1001

Course Number	Section/Call Number	Times/Location	Instructor	Points	Enrollment
PSYC 1001	001/11768	T Th 1:10pm - 2:25pm Room TBA	Patricia Lindemann	3	198/225
PSYC 1001	002/11769	M W 1:10pm - 2:25pm Room TBA	Svetlana Rosis	3	178/189

SOCIOLOGY (RECOMMENDED)

Given the MCAT Exam's increased emphasis on social sciences, students who have not previously taken a college-level sociology course are encouraged to prepare for the exam through self-study. The completion of a sociology course is not a prerequisite for medical school.

SAMPLE SCHEDULE

The premedical academic program can be tailored to meet the needs of the individual student. The tables in this section illustrate several options: a traditional sequence (p.), a part-time sequence (p.), and, for those students who are prepared to begin General Chemistry and Physics, an accelerated sequence (p.).

Information is also given on summer enrollment for students who may need to begin their studies in the summer before their first fall enrollment to prepare for mathematics, chemistry, and/or physics.

ACCELERATED SEQUENCE

An accelerated 18-month premedical program, beginning with January enrollment, is available for those students who are prepared academically to begin Calculus, General Chemistry, and Physics.

The following is an example of an accelerated sequence, and **should not replace an informed and comprehensive conversation with an academic advisor.**

Program planning decisions may vary depending on the student's prior academic record, preparation, and circumstances. These should be made in consultation with an academic advisor.

FIRST YEAR

First Year

Spring	Summer	Fall
General Chemistry: CHEM UN	CHEM S14 ⁴	CHEM UN2443 Organic Chemistry I:
General Chemistry Lab:	CHEM S15 ⁴	CHEM UN Organic Chemistry Lab I:
General Physics: PHYS UN1:	PHYS S120:	Contemporary Biology I: BIOL UN2 ⁴
General Physics Lab: PHYS UN1:	PHYS S129:	Contemporary Biology Lab: BIOL UN2 ⁵
Calculus I (if needed): MATH UN	Introduction to Statistics: STAT S1111	

SECOND YEAR

Second Year

Spring	Summer	Fall
Organic Chemistry II:	Take MCAT	Glide Year:
CHEM UN	Begin medical school application process	Deepen exposure to science coursework, research, or clinical work
Organic Chemistry Lab II:		
CHEM UN		
Contemporary Biology II:		
BIOL UN2 ⁴		
Contemporary Biology Lab:		
BIOL UN2 ⁵		

NOTE:

- * CHEM S1500X General Chemistry Laboratory should be taken concurrently with or subsequent to General Chemistry II.
- ** BIOL UN2501 Contemporary Biology Laboratory should be taken concurrently with **either BIOL UN2401 Contemporary Biology I: Biochemistry, Genetics & Molecular Biology or BIOL UN2402 Contemporary Biology II: Cell Biology, Development & Physiology.**

PART-TIME SEQUENCE

A Postbac Premed student beginning part time with the most basic courses might take the following program. Until the third summer, the student could continue to work a full-time job.

The academic program and schedule may be designed to meet each student's needs. **The following is an example of a part-time sequence.** Decisions regarding course selection and program sequencing may vary depending on the student's prior academic record and preparation. These decisions should be made in consultation with an academic advisor.

FIRST YEAR

First Year

Fall	Spring	Summer
College Algebra: MATH UN	Calculus I: MATH UN	Basic Physics: PHYS S006 ¹

SECOND YEAR

Second Year

Fall	Spring	Summer
General Physics: PHYS UN1: PHYS UN1291	PHYS UN1: PHYS UN1:	Preparation for College Chemistry: CHEM S00 ²
General Physics Lab:		

THIRD YEAR

Third Year

Fall	Spring	Summer
General Chemistry: CHEM UN	CHEM UN	General Chemistry Lab: CHEM S15 ³
		Intro to Statistics: STAT S1101

FOURTH YEAR

Fourth Year

Fall	Spring	Summer
Organic Chemistry: CHEM UN	CHEM UN	Take MCAT Begin medical school applications
Organic Chemistry Lab: CHEM UN	CHEM W2 ⁴	
Contemporary Biology: BIOL UN2 ⁴	BIOL UN2 ⁴	
Contemporary Biology Lab: BIOL UN2 ⁵	Contemporary Biology Lab: BIOL UN2 ⁵	

Fifth Year

Fall	Spring	Summer
Glide Year: Deepen exposure to science coursework, research or clinical work	Glide Year: Deepen exposure to science coursework, research or clinical work	Glide Year: Deepen exposure to science coursework, research or clinical work

NOTE:

- * General Chemistry Laboratory (CHEM S1500X) should be taken concurrently with or subsequent to General Chemistry II.
- ** BIOL UN2501 Contemporary Biology Laboratory should be taken concurrently with **either** BIOL UN2401 Contemporary Biology I: Biochemistry, Genetics & Molecular Biology or BIOL UN2402 Contemporary Biology II: Cell Biology, Development & Physiology.

TRADITIONAL PROGRAM SEQUENCE

Academic programs and schedules can be designed in many ways to best meet individual needs. **The following is an example of a traditional program sequence.**

Course selection and program sequencing will vary based on the student's prior academic record and preparation. Decisions about the academic program should be made in consultation with an academic advisor.

FIRST YEAR

First Year

Fall	Spring	Summer
General Chemistry: CHEM UN	CHEM UN	Intro to Statistics: STAT S1101
General Physics: PHYS UN1:	General Chemistry Lab CHEM UN1500	Science of Psychology: PSYC S1001
General Physics Lab: PHYS UN1:		
Calculus: MATH UN	PHYS UN1202	
	PHYS UN1292	

SECOND YEAR

Second Year

Fall	Spring	Summer
Organic Chemistry: CHEM UN	CHEM UN	Take MCAT Begin medical school applications
Organic Chemistry Lab: CHEM UN	CHEM UN	
Contemporary Biology: BIOL UN2 ⁴	BIOL UN2 ⁴	
Contemporary Biology Lab: BIOL UN2 ⁵	BIOL UN2 ⁵	

THIRD YEAR

Third Year

Fall	Spring	Summer
Glide Year: Deepen exposure to science coursework, research, or clinical work	Glide Year: Deepen exposure to science coursework, research, or clinical work	Glide Year: Deepen exposure to science coursework, research, or clinical work

Note:

- * CHEM UN1500 General Chemistry Laboratory should be taken concurrently with or subsequent to CHEM UN1404 General Chemistry II (Lecture).
- ** BIOL UN2501 Contemporary Biology Laboratory should be taken concurrently with **either** BIOL UN2401 Contemporary Biology I: Biochemistry, Genetics & Molecular Biology or BIOL UN2402 Contemporary Biology II: Cell Biology, Development & Physiology.

PREPARATORY COURSEWORK

For students who are not prepared to go directly into the required science courses, Columbia offers courses in pre-physics, pre-chemistry, and pre-calculus.

CHEMISTRY

CHEM UN0001 Preparation for College Chemistry; Pass/Fail; offered in the fall.

CHEM S0001D Preparation for College Chemistry; Pass/Fail; offered in the summer.

MATHEMATICS

MATH S0065 Basic Mathematics: Pass/Fail; offered in the summer.

MATH UN1003 College Algebra and Analytic Geometry; May be taken for a letter grade or Pass/D/Fail; offered in the fall and spring.

MATH S1003D College Algebra and Analytic Geometry; May be taken for a letter grade or Pass/D/Fail; offered in the summer.

MATH S1003Q College Algebra and Analytic Geometry; May be taken for a letter grade or Pass/D/Fail; offered in the summer.

PHYSICS

PHYS S0065Q Basic Physics; Pass/Fail; offered in the summer only. MATH UN1003 is the recommended prerequisite for this course.

PLACEMENT EXAMS

Placement Exams (<https://gs.columbia.edu/content/placement-exams/>) and the counsel of a Postbac Premed advisor can help students decide whether preparatory courses are needed.

PREVIOUSLY COMPLETED COURSEWORK

ADMITTED STUDENTS

Some Postbac Premed students may have completed one or more of the prerequisite courses before matriculating in the Program. Depending on when such coursework was completed, and the grade(s) received, students may be advised to repeat the course or to take an advanced-level science course in order to be more competitive applicants to medical school. It should be noted that quarter-term courses may not be equivalent to semester courses and therefore may not be used to satisfy requirements.

Advisors typically have discussions with students about repeating coursework after a student has been admitted and attended a Postbac Planning Session.

CURRENT STUDENTS

Once a student matriculates into the program, all subsequent required courses must be completed at Columbia University, unless an exception is made based on a petition submitted to the Premedical Committee.

As there are some variations in requirements from school to school and state to state, students are advised to consult individual medical schools and healthcare programs for specific prerequisites to complete in addition to the basic premedical curriculum. Students coming from professionally-focused undergraduate schools (e.g., engineering, culinary, visual or performing arts, nursing, business, etc.) who may lack sufficient grounding in liberal arts are advised to address this deficiency through additional non-science coursework in order to be competitive candidates for medical school.

CERTIFICATE IN PREMEDICAL SCIENCES

Students who complete the premedical or prehealth curriculum while enrolled in the Postbac Premed Program may be eligible for a Certificate in Premedical or Prehealth Sciences, if they have taken at least twenty points of science courses at Columbia. The Certificate is not required by medical schools or other programs of study in the health professions; however, it does signify that a student has satisfactorily completed a rigorous premedical/prehealth curriculum as recognized by Columbia University and the State of New York. Certificates in Premedical and Prehealth Sciences are officially conferred on three different dates (in May, October, and February).

ELIGIBILITY

Students should consult with their advisor concerning eligibility for the Certificate. Generally, students are eligible to receive a Certificate in Premedical or Prehealth Sciences from Columbia University if they:

- Complete the program within five years of matriculation
- Earn a minimum of 20 points of the required premedical math and science curriculum while enrolled in the Postbac Premed Program, including concurrent completion of the organic chemistry and biology course sequences (or an approved advanced-level equivalent) with satisfactory grades and a minimum cumulative grade point average of 2.75

Students who begin their studies in the Premedical Sciences at Columbia but, after completing 20 or more points, go elsewhere to complete any remaining requirements, are ineligible for the Certificate.

APPLYING

In order for the Certificate to be conferred, eligible students must file an application with the Postbac Premed Program

Office by the following deadlines, as set by the Office of the Registrar:

August 1: for October certificates

November 1: for February certificates

February 14: for May certificates

ACADEMIC POLICIES

Academic policies are set by the Faculty of Arts and Sciences and the academic administration of individual schools within the Arts and Sciences.

Students in the School of General Studies are expected to familiarize themselves with GS policies. Students seeking clarity on academic policies relevant to or beyond those stated on the GS website should consult with their GS advisors.

The Joint Committee on Instruction (COI) for GS and Columbia College reviews and sets curriculum and academic policies, while the GS Committee on Academic Standing (CAS) ensures that all students comply with the academic and administrative policies of the School. See the School Governance (<https://gs.columbia.edu/content/leadership/>) page for further information.

ACADEMIC HONORS UNDERGRADUATE

Dean's List

Undergraduates who complete the fall or spring terms with a 3.6 GPA or higher are named to the Dean's List, provided they have completed at least three courses (nine or more points) for a letter grade. Disciplinary probation, as well as marks of W, INC, AR, F, or D, disqualify a student from consideration. Students who have been found responsible by the Office of Student Conduct and Community Standards for a violation of academic integrity are not eligible for the Dean's List during the term of the sanction. There is no Dean's List for the summer term.

Honor Society

The Honor Society of the School of General Studies was formed to celebrate exceptional GS undergraduates committed to intellectual discovery and academic excellence. The only group of its kind at the University, the Honor Society provides a unique opportunity for students to interact with other members, faculty associates, and alumni at events during the year. Criteria for membership include a GPA of at least 3.8, a minimum of 30 completed Columbia points, and a minimum of 60 total completed points. Students may not apply for membership. A ceremony of induction is held each semester, and members continue to be part of the Society after graduation.

School (Latin) Honors

The designations *cum laude*, *magna cum laude*, and *summa cum laude* are academic honors determined by an undergraduate student's cumulative GPA at the time of graduation based on coursework completed exclusively at Columbia University once a student has matriculated within the School of General Studies. To be eligible for school honors, a student must have completed at least 64 points of coursework at General Studies. For *cum laude*, a student must have a minimum cumulative GPA of 3.5; for *magna cum laude*, a minimum of 3.67; for *summa cum laude*, a minimum of 3.9 is required. The honor is noted on a student's diploma and transcript.

Beginning with the conferral of degrees in February 2021, the School of General Studies will award Latin Honors in the following way: the top five percent of the graduating class by GPA will receive *summa cum laude*, the next ten percent will receive *magna cum laude*, and the next ten percent will receive *cum laude*. No more than 25% of the graduating class overall will receive Latin Honors. Latin Honors are noted on a student's diploma and transcript, and students will be notified if they have received Latin Honors a few weeks following degree conferral.

Departmental Honors

Many departments award honors to undergraduate majors who complete their major requirements with distinction. Eligibility for departmental honors varies among departments; students should consult individual departments for further information. Departmental honors are noted on a student's transcript but not on the diploma. Departmental honors are not given for concentrations.

Phi Beta Kappa

By action of the Senate of the United Chapters of Phi Beta Kappa in March 1952, degree candidates in the School of General Studies are eligible for election to Phi Beta Kappa and membership in the Columbia (Delta) Chapter. The selection of this group (up to ten percent of the graduating class) is based not only on academic achievement, but also on evidence of intellectual promise, character, and achievement outside the classroom. Academic achievement is measured by strength and rigor of program as well as grades and faculty recommendations. Students may not apply for Phi Beta Kappa.

As with school prizes, October and February graduates are considered along with students graduating in May. Election to Phi Beta Kappa is noted on a student's transcript.

The General Studies Section of the Delta Chapter of Phi Beta Kappa annually presents the Phi Beta Kappa Award to a GS senior elected to Phi Beta Kappa who, during his or her academic career, has best exemplified intellectual integrity, tolerance for others' views, and a broad range of academic interests.

School Prizes

Each year the School of General Studies awards prizes for academic excellence as well as outstanding leadership. Current prizes include the following:

- The Albert E. Gollin Prize, awarded to a junior with promising talent in sociology, media, or journalism
- The Medaglia D'Oro Prize for excellence in Italian studies
- The John Angus Burrell Memorial Prize for distinction in English and comparative literature
- The Arthur Ross Foundation Award for excellence in political science
- The Benedetto Marraro Prize for distinction in Italian studies
- The Antonio G. Mier Prize for excellence in Spanish
- The Stacy M. and Russell D. Paul Prize for excellence in the study of psychology
- The Jennifer A. Pack Prize for excellence in the study of psychology
- The Lillian L. Hacker Prize for excellence in the study of sociology
- The Judith Lee Stronach Memorial Prize for outstanding contributions in art history or archaeology
- The Dean's Citation for leadership and outstanding service to the School (for graduating seniors only)
- The Alumni Key Award for academic achievement and outstanding service to the School (for graduating seniors only)
- The Dean's Prize in Economics for excellence in the study of economics
- The Dean's Prize in Anthropology for excellence in the study of anthropology
- The Dean's Prize in Creative Writing for excellence in the study of creative writing
- The Herbert H. Lehman Prize for Excellence in history, given to a student with an outstanding record of accomplishment in history courses at Columbia (preference is given to those with substantial coursework in U.S. History)
- The Phi Beta Kappa Award for outstanding scholarship

POSTBAC PREMED

Dean's List

Students who complete the fall or spring terms with a 3.6 G.P.A. or higher are named to the Dean's List, provided they have completed at least 7.5 points of required premedical course work for letter grades and have earned no grade below a B. Disciplinary probation, as well as a mark of AR, W, F, or D disqualify a student from consideration. Students who have been found responsible by the Office of Student Conduct and Community Standards for a violation of academic integrity are not eligible for the Dean's List during the term of the sanction. There is no Dean's List for the summer term.

ACADEMIC INTEGRITY AND COMMUNITY STANDARDS

All University faculty, students, and staff are responsible for compliance with the Rules of University Conduct. Copies of the full text are available in Essential Policies for the Columbia Community (<http://www.essential-policies.columbia.edu/>) and at the Office of the University Senate, 406 Low Memorial Library.

Students in the School of General Studies are part of a wider intellectual and social community that holds itself to the highest standards of tolerance, respect, integrity, and civility. Students who violate the standards of the University community, in academic or social behavior, are subject to disciplinary action. The continuance of each student upon the rolls of the University, the receipt of academic points, graduation, and the conferring of any degree or the granting of any certificate are strictly subject to the disciplinary powers of the University.

Disciplinary authority of the University is vested by the Trustees in the President and Provost and, subject to their reserved powers, in the dean of each faculty. The dean and her staff are given full responsibility for establishing the standards of behavior for all General Studies students beyond the regulations included in the Rules of University Conduct and for defining procedures by which discipline will be administered.

CIVIL BEHAVIOR AND COMMUNITY STANDARDS

It is expected that in and out of the classroom, on and off campus, each student in the School of General Studies will act in an honest way and will respect the rights of others. Freedom of expression is an essential part of University life, but it does not include intimidation, threats of violence, or the inducement of others to engage in violence or in conduct which harasses others. Conduct which threatens or harasses

others because of their race, sex, religion, disability, sexual orientation, or for any other reason is unacceptable and will be dealt with very severely. For all to benefit from the diversity to be found at Columbia, all must live up to these standards.

HONOR CODE AND HONOR PLEDGE

In 2013 the student councils of the undergraduate schools of Columbia University, on behalf of the whole student body, created an Honor Code to uphold the maintenance of academic integrity as a fundamental and jointly held responsibility for all students. The councils also created an Honor Pledge (p. 434), which all students recite and affirm when they matriculate as Columbia students.

ACADEMIC INTEGRITY

It is essential to the academic integrity and vitality of this community that individuals do their own work and properly acknowledge the circumstances, ideas, sources, and assistance upon which that work is based. Academic honesty in class assignments, term papers, examinations, laboratory reports, and computer projects is expected of all students.

Because intellectual integrity is the hallmark of educational institutions, academic dishonesty is one of the most serious offenses that a student can commit at Columbia. It may be punishable by suspension or dismissal from the School of General Studies.

Students who are unsure about the proper presentation of their own independent work should consult with their instructor or academic advisor.

Academic dishonesty includes but is not limited to the following:

1. **Plagiarism:** Failure to cite or otherwise acknowledge ideas or phrases used in any paper, exercise, or project submitted in a course but gained from another source, such as a published text, another person's work, or materials on the Web.
2. **Self-plagiarism:** The submission of one piece of work in more than one course without the explicit permission of the instructors involved.
3. **Misrepresentation of authorship:** The submission of work as one's own which has been prepared by or purchased from another.
4. **Cheating on examinations or tests:** To give or receive assistance from written material, another person, his or her paper, or any other source during an examination or test, to hire or attempt to hire someone to take your exam for you.
5. **Falsification or misrepresentation of information** in coursework or lab work, on any application, petition, or forms submitted to the school.

6. **Fabrication of credentials**, in materials submitted as part of an admissions application or materials submitted to the University for administrative or academic review.
7. **Violating the limits of acceptable collaboration** in coursework set by a faculty member or department.
8. **Removing, hiding, or altering library materials** in order to hinder the research of other students.
9. **Facilitating academic dishonesty** by enabling another to engage in such behavior.
10. **Lying to a faculty member, dean, or advisor** about circumstances related to your academic work or failure to complete academic work.

Ignorance of the School's policy concerning academic dishonesty shall not be a defense in any disciplinary proceedings. The School of General Studies holds each member of the community responsible for understanding these principles and for abiding by them.

DISCIPLINARY CHARGES

Students, faculty members, or Columbia staff who have concerns or complaints about a student's behavior, including issues pertaining to academic integrity, are asked to contact the Dean of Students or the Office of Student Conduct and Community Standards (SCCS) to discuss the concern. Based on the conversation with the complainant, the Dean of Students, in consultation with the SCCS, will determine whether or not the complaint warrants an informal meeting with the student or a formal disciplinary hearing. If a formal disciplinary hearing is to be held, the Dean of Students will forward the complaint to the SCCS who will in turn contact the student, explain the procedure, and set up an appropriate time and place for the disciplinary hearing.

DISCIPLINARY HEARING

A disciplinary hearing is held to discuss the allegations with the student and, when necessary, to determine appropriate sanctions. Present at the hearing are the charged student, the student's advisor (typically in academic integrity cases only), a member of SCCS, and a dean from the School of General Studies, the latter two of whom will serve as the adjudicating officers. On the strength of the evidence and the student's response, the SCCS representative and the dean from the School of General Studies will reach a determination and notify the student of their decision after the hearing has concluded.

SANCTIONS

For students found guilty of academic dishonesty or misconduct, the sanctions may range from warning to probation, suspension, or dismissal. Because an objective of the SCCS is to ensure that the disciplinary procedure is also an educational process, every effort is made to refer students to appropriate resources and support services that will help them learn from the experience. In cases of academic dishonesty, the disciplinary response is deliberately separate from the decision

an instructor shall make concerning how the breach of the academic contract might impact a student's grade. In cases that have been referred for disciplinary action through the Dean's Discipline process, a student may not drop or withdraw from the course in question. If a student is found guilty of a second violation of University regulations, academic dishonesty, or inappropriate behavior, that student is, in most cases, dismissed. Students have the right to appeal the decision of the disciplinary committee. Appeals must be submitted in writing within the deadline given in the letter informing the student of the disciplinary action taken. Appeals must be addressed to the Dean of the School.

CONFIDENTIALITY

In general, under University policy and federal law, information about dean's disciplinary proceedings against a student is confidential and may not be disclosed to others.

SEXUAL ASSAULT, SEXUAL HARASSMENT, AND GENDER-BASED HARASSMENT POLICIES

For information on the procedures for handling such complaints, please refer to the Sexual Respect website (<https://sexualrespect.columbia.edu/university-policy/>).

If the alleged misconduct involves sexual discrimination, the complaint should be filed with the Associate Provost for Equal Opportunity and Affirmative Action. To report an incident involving sexual assault, sexual harassment, or gender-based harassment, students should complete this form (https://cm.maxient.com/reportingform.php?ColumbiaUniv&layout_id=5/) or contact the Gender-Based Misconduct Office at 212-854-1717.

INFORMAL COMPLAINTS CONCERNING MISCONDUCT

Any instructor, officer, staff member, or student who chooses not to put a complaint in writing can instead make an informal complaint. In these cases, the GS advisor usually discusses the matter with the student, though it is possible the advisor will be required to report the complaint to additional campus offices. In these situations, the student may receive a formal warning, which will be noted in the student's educational file, along with any recommendations made to the student. Such warnings will be taken into account if and when similar complaints are made in the future, and a pattern of informal complaints can lead to formal disciplinary action.

ACADEMIC COMPLAINTS AND GRIEVANCE PROCEDURES

Occasionally students experience dissatisfaction with specific courses or instructors, find themselves in an untenable situation in a course due to an interaction with an instructor, or have an academic grievance. Columbia faculty hold themselves

to the highest professional standards. The rights, duties, and obligations are delineated in the University Statutes and in the Faculty Handbook and can be found online (<http://www.columbia.edu/cu/vpaa/handbook/obligations.html>).

Consistent with those duties and obligations, conduct that is grievable includes:

- Failure to show appropriate respect in an instructional setting for the rights of others to hold opinions differing from their own
- Misuse of faculty authority to promote a political or social cause within an instructional setting
- Conduct in the classroom or another instructional setting that adversely affects the learning environment

In such cases, students are advised to discuss their grievances with their GS advisors. Depending on the nature of the complaint, a student may be counseled to discuss the matter directly with the instructor, or with the director of undergraduate studies or chair of a given department or program. The School will direct a student to the appropriate office if the University has specific university-wide procedures that govern the matter. Links to those offices, resources and procedures are provided below. Students should raise any concerns not later than thirty days after the end of the semester in which the alleged misconduct took place. The School will make every effort to consider and address the student's complaint quickly, ordinarily within thirty days.

Advisors recognize and respect a student's need for confidentiality when discussing certain kinds of complaints, so students should make sure to bring up any concerns about confidentiality when speaking with their advisors about grievances. While advisors within the Office of the Dean of Students counsel students on appropriate avenues for addressing or resolving their complaints, and often can help to facilitate a resolution, students should understand that advisors are not in a position to arbitrate grievances. The Ombuds Office is an additional and alternative confidential source available to students to advise on various avenues of redress and can mediate a dispute, if both parties agree. Ombuds officers, however, do not have authority to adjudicate any complaint.

While resolutions are most often reached informally, formal procedures for addressing grievances do exist and in some cases may be the only way to adjudicate a particular complaint. Grievances related to faculty members outside the Arts & Sciences will be referred to the appropriate division or school within the University. Resolutions to complaints about academic assessments or grade disputes are usually handled informally (see Grade Appeals and Grade Changes; formal grievances about academic assessments are handled by the faculty within the appropriate department or program.

If a student believes that a faculty member has acted in an unprofessional manner, he or she should first speak with his or her advising dean, who will work with the student to review

the claim, establish the substance of the complaint, and come to a decision about how best to address the concerns raised by the student. If appropriate, the advising dean will refer the student to the GS Dean of Academic Affairs who, working with relevant faculty, will investigate the case fully and attempt to resolve the matter. The dean will work with the student and the faculty to determine whether there has been a procedural breach and, if so, take immediate steps to formulate a remedy in consultation with the Dean of the School of General Studies.

The grievance procedures available through the office of the Vice President for Arts and Sciences are intended to complement, not substitute for, the procedures available in each of the Schools, and they concern a considerably more limited range of issues. They are designed to address only those cases involving professional misconduct by a faculty member of Arts and Sciences in an instructional setting in which there were significant irregularities or errors in applying School procedures. Information on this process can be found on the website of the Office of the Executive Vice President for Arts and Sciences. If the instructor is not a member of the Arts and Sciences faculty, the advising dean will assist the student to identify the appropriate faculty and the right procedures. Each school has its own grievance procedures and they are posted on individual schools' websites.

If at any time a student believes the process is not working in a constructive or timely fashion, the student may always contact the Dean of the School of General Studies.

The University has alternative procedures to address other specific concerns:

- In situations involving allegations of discrimination and/or harassment, the complainant should consult the Student Policies and Procedures on Discrimination and Harassment (<http://www.essential-policies.columbia.edu/student-policies-and-procedures-discrimination-and-harassment/>).
- In situations involving gender-based and sexual misconduct, students should consult the Gender-Based Misconduct Policies for Students (<http://www.columbia.edu/cu/dpsa/>)
- In situations involving concern about scientific or scholarly misconduct, students should consult the Columbia University Institutional Policy on Misconduct in Research (<http://www.columbia.edu/cu/vpaa/handbook/appendixc.html>)
- The policy on romantic relationships is outlined in the Consensual Romantic and Sexual Relationship Policies (<http://www.essential-policies.columbia.edu/student-policies-and-procedures-discrimination-and-harassment/#romantic%20relationship>).

OMBUDS OFFICE

Students are also encouraged to seek advice regarding handling academic complaints at the Ombuds Office, a neutral and confidential resource for informal conflict resolution. For further information, contact the

Ombuds Office, 660 Schermerhorn Extension; (212) 854-1234; ombuds@columbia.edu.

ACADEMIC REVIEW

At the end of each term the Committee on Academic Standing reviews the records of all students enrolled in the School of General Studies to determine whether academic progress is being made. Students who are making satisfactory academic progress are considered to be in good standing, whereas those in academic difficulty are subject to academic discipline. Students ending the term with more than two incompletes are not usually permitted to enroll in the next semester without the explicit permission of the Committee on Academic Standing. Students with one or more incompletes are typically not permitted to enroll in summer session or study abroad. Students who withdraw from a semester after the eleventh week of classes cannot return for the following semester without the approval of the Committee on Academic Standing.

UNDERGRADUATE

Good Standing

To be considered in good standing, undergraduates must maintain semester and cumulative grade point averages of 2.0 or higher, have no marks of UW (Unofficial Withdrawal) or AR (Administrative Referral), no unauthorized incompletes, incur no failing grades, and make satisfactory academic progress (see "Failure to Make Academic Progress" below). Students with multiple withdrawals, or who are placed on probation or required to withdraw for either academic or disciplinary reasons, are not in good standing. Only students in good standing are eligible for study away from Columbia, study abroad, or to hold officer positions within the GS Student Council.

Failure to Make Academic Progress

Consequences for failing to make academic progress range from academic warning to dismissal, depending on the severity of academic failure and the recurrence of unsatisfactory progress. Students placed on academic probation or who are returning on probation after a leave of absence from the School are required to complete a probation contract in consultation with their respective GS advisors prior to their next term of enrollment.

Undergraduates within General Studies fail to make academic progress for any of the following reasons:

1. Failure to complete the American Language Program (ALP) requirements within the required time frame
2. Falling below a 2.0 semester grade point average
3. Receiving a grade of F
4. Failure to make satisfactory academic progress toward the degree (such as having a major or cumulative grade point average below a 2.0)

Administrative Warning

Administrative warnings are issued by the Committee on Academic Standing whenever necessary (e.g., failure to comply with an administrative policy or deadline). Students receive such a warning only once; failure to comply with the warning may lead to more serious consequences (such as registration hold).

Academic Warning

Academic warnings are issued by the Committee on Academic Standing whenever necessary (e.g., failure to declare a major before completing 90 credits toward the degree). Students receive such a warning only once; failure to comply with the warning may lead to probation and registration hold.

Academic Probation

Academic probation is a serious warning that immediate and significant improvement is needed, as a second consecutive unsatisfactory semester may lead to suspension or dismissal from the School. Students are placed on probation when they receive the mark of F, have unsatisfactory grade point averages, or have not heeded an earlier warning.

A student is removed from probation upon attaining a satisfactory academic record the following term (including summer), based upon at least 6 points taken for a letter grade.

Academic Suspension

Students with two consecutive unsatisfactory semesters are normally suspended from the School for up to one year. A student can also be suspended from the School by the Committee on Academic Standing after one unsatisfactory semester, especially in those cases where a student meets more than one of the criteria for academic probation or fails to make any academic progress in a given term. A student with multiple unsatisfactory semesters or multiple withdrawals is subject to a period of suspension. Suspension from the School is also a possible consequence of academic dishonesty.

Students suspended for academic reasons may appeal their suspension to the Dean of the School of General Studies within two weeks of the official suspension notification.

A student who has been required to withdraw from the School must petition the Committee on Academic Standing for re-enrollment within three years of the suspension. See the Leaves of Absence and Withdrawals (<http://bulletin.columbia.edu/general-studies/academic-policies/leaves-absence-withdrawals/>) page for information on re-enrollment.

Academic Dismissal

A student who fails to make any academic progress in a given term, who has completed two or more terms with a cumulative GPA below 2.0, who fails to fulfill the criteria of probationary status, or who returns from a period of academic suspension and fails to make satisfactory progress is eligible for dismissal

from the School. A student can also be summarily dismissed from the School for academic failure or academic dishonesty. Ties with GS are permanently severed for students who are dismissed from the School.

Students dismissed for academic or disciplinary reasons may appeal their dismissal to the Dean of the School of General Studies within two weeks of the official notification of dismissal.

Premedical Undergraduate Academic Review

Students who have identified themselves as interested in pursuing a premedical track will have their academic performance in premedical coursework reviewed by the Premedical Committee at the end of each term. Students whose grades in premedical coursework indicate academic difficulty will be contacted by their premedical advisors.

POSTBAC PREMED

Acceptance to medical school and to other health professional schools is extremely competitive. According to national statistics compiled by the Association of American Medical Colleges, students admitted to medical school in recent years have a mean grade point average of 3.7 in science courses. For this reason, Postbac Premed students are expected to maintain a competitive GPA and make steady progress in fulfilling the premedical sciences curriculum in the sequence prescribed by the Program.

Policies concerning registration, class attendance, academic progress, adding or dropping courses, grades, incompletes, academic integrity, academic grievances, leaves of absence, withdrawals, and medical leaves are found in the Academic Policies section of the Postbac Premed website. Students are expected to familiarize themselves with these policies and procedures and to adhere to the requirements, policies, and deadlines published therein. The Postbaccalaureate Premedical Committee on Academic Standing ("the Premedical Committee") considers appeals and reviews petitions from students for incompletes, re-enrollment, and exceptions to Postbac Premed Program policies.

Academic Review

The Premedical Committee conducts an academic review of all students in the Program at the end of each term, including the summer session, and takes appropriate academic action as required. For the purpose of its review, the Premedical Committee generally does not factor in non-science courses, but does include science elective courses. When a course is taken and repeated at Columbia, the Premedical Committee will average together both courses to determine the GPA.

At the end of the fall, spring, and summer terms, the Premedical Committee reviews the academic performance of all students, and either the advisor or a representative of the

Committee will reach out to any student experiencing academic difficulty to discuss strategies for greater academic success.

All current students undergo formal academic review each semester after having attempted 15 points of required premedical coursework in the Program. Because students with GPAs below 2.75 in premedical coursework are highly unlikely to gain admission to medical school, students whose cumulative GPA in the Program falls below 2.75 at any point after having attempted 15 points may be dismissed from the Program. A student may also be dismissed from the Program for academic failure or academic dishonesty. Ties with GS are permanently severed with students who are dismissed from the Program. Students may appeal their dismissal to the Dean of the School of General Studies within two weeks of the official notification of dismissal.

ACADEMIC STANDARDS

Undergraduates within the School of General Studies are expected to make reasonable progress in fulfilling degree requirements, which includes:

- Completing the writing requirement within the first year at GS
- Initiating foreign language study no later than the second year at GS, and making steady progress toward this requirement in each subsequent semester
- Satisfactorily completing at least one core requirement each semester
- Declaring a major before completing 90 points toward the degree
- Making satisfactory progress each year toward the major, once declared
- Maintaining a semester and cumulative grade point average of at least 2.0

GS academic advisors help students plan their schedules so that these requirements are met within the expected time frame.

AP CREDIT

***Language Courses:** The course used toward AP credit in language must be for at least 3 points of credit and be taught in that language. Courses taught in English may not be used for AP credit in language.

Subject	AP Score	Advanced Credit	Requirement or Placement Status
Biology	5	3	Placement determined by department*
Chemistry	4 or 5	3	Requires completion of CHEM UN1604 with a grade of C or better

Chemistry 4 or 5 6 Requires completion of CHEM UN3045 - CHEM UN3046 with a grade of C or better

* See Department for Placement Status (<http://www.columbia.edu/cu/biology/>)

Subject	AP Score	Advanced Credit	Requirement or Placement Status
Computer Science A	4 or 5	3	Exemption from COMS W1004
Computer Science AB	4 or 5	3	Exemption from COMS W1004

Note: Students may receive credit for only one computer science sequence.

Subject	AP Score	Advanced Credit	Requirement or Placement Status
Economics	4 and 5	4	Exemption from ECON UN1105

Note: Tests must be taken in both microeconomics and macroeconomics, with a score of 5 on one test and at least a 4 on the other.

Subject	AP Score	Advanced Credit	Requirement or Placement Status
English Language and Composition	5	3	No exemption
English Literature and Composition	5	3	No exemption
French Language	5	3	Satisfies foreign language requirement*
	4	0	Satisfies foreign language requirement
French Literature	5	3	Satisfies foreign language requirement*
	4	0	Satisfies foreign language requirement
German Language	5	3	Satisfies foreign language requirement*
	4	0	Satisfies foreign language requirement
Government and Politics: United States	5	3	Exemption from POLS UN1201
Government and Politics: Comparative	5	3	Exemption from POLS UN1201

History: United States 5 3 No exemption

History: European	5	3	No exemption
Italian Literature	4	0	Satisfies foreign language requirement
	4	0	Satisfies foreign language requirement*

Latin: Vergil 5 3 Satisfies foreign language requirement

4 0 Satisfies foreign language requirement

Latin: Literature 5 3 Satisfies foreign language requirement

4 0 Satisfies foreign language requirement

Mathematics Calculus AB 4 or 5 3 Requires completion of MATH UN1102 or MATH UN1201 with a grade of C or better (No AP credit is awarded if MATH UN1101 is taken).

Mathematics Calculus BC 4 3 Requires completion of MATH UN1102 OR MATH UN1201 (No AP credit is awarded if MATH UN1101 is taken).

5 6 Requires completion of MATH UN1201 OR MATH UN1207 (No AP credit is awarded if MATH UN1101 or MATH UN1102 is taken).

* Credit awarded upon successful completion of a 3000-level (or higher) course with a grade of B or higher.

Note: Students may receive credit for only one calculus sequence.

Subject	AP Score	Advanced Credit	Requirement or Placement Status
Music: Theory	5	3	Exemption from MUSI UN1002; Exemption from MUSI UN2318-MUSI UN2319 determined by departmental exam
Music: Theory	4	3	No exemption

Physics 1 AND 2	4 or 5	6	No exemption from science requirement
Physics C/ MECH	4 or 5	3	No exemption from science requirement
Physics C/ E&M	4 or 5	3	No exemption from science requirement

Note: Students may earn a maximum of 6 points in physics.

Subject	AP Score	Advanced Credit	Requirement or Placement Status
Spanish: Language	5	3	Satisfies foreign language requirement*
Spanish: Language	4	0	Satisfies foreign language requirement
Spanish: Literature	5	3	Satisfies foreign language requirement*
Spanish: Literature	4	0	Satisfies foreign language requirement
Statistics	5	3	Students required to take STAT UN1111 or STAT UN1001 for their major should check with their major adviser to determine if this credit provides exemption from these courses

* Credit awarded upon successful completion of a 3000-level (or higher) course with a grade of B or higher.

ATHLETICS AND ACADEMIC ABSENCE

It is Columbia University policy that student-athletes who miss classes and/or exams as a result of representing the University at an approved athletics contest may be permitted to make up the work and/or take the exam at another time or location.

To be accommodated in this way, students must first gain the approval of the team Head Coach as well as the Department of Intercollegiate Athletics and Physical Education before presenting the approved form to instructors as soon as the relevant team's schedule is established.

Intercollegiate Athletics Absence Notification Form

Contact

Students must submit the completed form to Jacqueline Blackett, Senior Associate Athletics Director, 433 Dodge Physical Fitness Center.

ATTENDANCE

Students are expected to attend all classes including discussion sections and laboratory periods for each course.

In general, absenteeism from a course will lead to a lower grade and may even result in failure. Students are held accountable for absences owing to late enrollment. Students who must miss class due to religious holidays should inform their instructors in advance and make appropriate arrangements to make up missed work. (See below for the University's policy on religious holidays.)

When an instructor judges a student's absences to be excessive, the instructor may report this to the Office of the Dean of Students for appropriate action.

Absences or Falling Behind in Class

Students who find themselves unable to attend classes or complete academic work at any time during the semester should contact their GS academic advisors immediately. In consultation with the advisor and the instructor, a student may be able to make arrangements for extensions on work within the timeframe of the semester or, under more serious circumstances, may be advised to withdraw from a course or from the semester. Students who miss more than two weeks of classes are urged to give serious consideration to withdrawing from the semester in progress.

Religious Holidays

It is the policy of the University to respect its members' religious beliefs. In compliance with New York State law, no student may be penalized for absences due to religious beliefs.

Students are required to inform their instructors of their plans to observe a religious holiday at the beginning of the semester, so that instructor and student have plenty of time to plan for any necessary alternative arrangements. It is important for students to understand that, no matter what absences might be accommodated, they will still be responsible for all course requirements, which may include in-class participation or other assignments that will need to be made up in some alternative way.

If a suitable arrangement cannot be made between the student and the instructor, students should consult the appropriate department chair, dean or director. If an additional appeal is needed, it may be taken to the Provost whose determination is final.

Dates and definitions of religious holidays can be found on the Interfaith Calendar (<http://www.interfaith-calendar.org/>).

Any instructor who would like guidance on a particular religious holiday or form of observance may seek

guidance from University Chaplain Jewelnel Davis (chaplain@columbia.edu).

Any instructor who has concerns regarding the academic implications of a student's religious observance should contact Victoria Rosner (vpr4@columbia.edu), Dean of Academic Affairs, School of General Studies.

CLASS STANDING

Class status for undergraduates within the School of General Studies is based on the satisfactory completion of the following number of points:

Class Standing	Points
Sophomore	24
Junior	56
Senior	90

DROPPING COURSES

Before dropping a course, Undergraduate and Postbac Premed students should consult with their GS academic advisors.

Dropping courses not only affects a student's academic progress, but may also have consequences for financial aid, housing eligibility, visa status, or health insurance. There is no refund of tuition for individual courses dropped after the last day of the change of program period.

Note for Postbac Premed students: dropping a course could compromise eligibility for committee support for the imminent application cycle.

A student has three opportunities within a semester to officially drop a course, but different consequences apply at each stage. In no case may a student drop a course later than the Monday before the last day of classes for the semester, unless withdrawing from an entire program. Students should consult the GS Academic Calendar for the exact dates of each deadline. Students are responsible for following the appropriate add/drop process by the relevant deadline. Registration Adjustment forms, if needed, are available in the Office of the Dean of Students and online.

PLEASE NOTE:

- Ceasing to attend classes or simply notifying the instructor does not constitute dropping a course.
- Students dropping the last or only class in which they are enrolled in a given semester should notify their advisors that they would like to withdraw for the term.
- Joint Program students cannot drop their full course load at Columbia (even if it is only one course) without special permission jointly approved by their respective GS and JTS advisors.

- In cases that have been referred for disciplinary action through the Dean's Discipline process, a student may not drop or withdraw from the course in question.

Dropping a Course During the Change of Program Period

A student may drop a course within the first two weeks of classes, which is the officially designated change of program period. Courses may be dropped online through SSOL (<https://ssol.columbia.edu/>). Courses dropped within this period do not appear on a student's permanent transcript and incur no tuition charges. Students dropping their entire course load will not be allowed to do so online but must consult with their advisors about the semester withdrawal process.

Dropping a Course After the Change of Program Period

After the close of the change of program period, students may drop a course by the **late drop deadline**, which falls after the fifth week of classes. Courses dropped after the change of program date, but prior to the late drop deadline, will not appear on a student's permanent transcript and students will be charged full tuition for the course. Students must submit a course drop request via SSOL in order to receive advisor approval. Once they have received approval via SSOL, they must complete the course drop request in SSOL by the specified deadline to finalize processing.

Withdrawing from a Course After the Late Drop Deadline

After the late drop deadline, students may drop from a course by the **final withdrawal deadline**. Courses dropped after the late drop deadline, and by the Monday prior to the last day of classes each semester, will be recorded on the transcript with the notation "W" (withdrawal). The W is a permanent mark and will remain on the transcript even if the student repeats the course. Students are charged full tuition for individual courses from which they withdraw. The Registration Adjustment form must be completed by the student and signed by his or her GS advisor by the specified final withdrawal deadline.

EDUCATIONAL RECORDS

GS, in conjunction with the Registrar's Office, maintains the educational records of students who matriculate at the School. The maintenance and oversight of these records comply with the Federal Family Educational Rights and Privacy Act of 1974 (FERPA), which regulates a wide range of privacy-related activities including management of student records maintained by the University, regulations regarding who has access to student records, and for what purposes access to student records is granted. The act guarantees students access to their records

and allows them to restrict such access to others. Students wishing access to their records must complete a request form available from the Registrar's Office; similar request forms are available from the Registrar's Office if a student wishes to withhold information or reverse a previous request to restrict access. For additional information regarding access to student records, please consult Essential Policies for the Columbia Community (<http://www.essential-policies.columbia.edu/policy-access-student-records-ferpa/>).

Questions about the University's interpretation of the FERPA guidelines should be referred to the University's General Counsel in 412 Low Library. For more information on FERPA, consult the Department of Education website (<http://www.ed.gov/>).

Note: Educational files maintained by the School of General Studies are archived for five years after a student has graduated. Files of students who withdrew or took a leave from GS are accessible for up to ten years from the last semester of attendance. In all cases, individual requests for student files needing to be recalled from archives should be made directly to the student's advisor. Such files will be ready for review within three weeks of the initial request.

ELIGIBILITY FOR ATHLETICS

A GS student in good standing pursuing the undergraduate program or a combined program toward a first degree may be eligible for intercollegiate athletics.

Eligibility requires that a student be a candidate for a bachelor's degree and have attended the University for no more than eight terms. The student must also be registered for at least 12 points, be in good standing with the School, and make appropriate progress toward the degree as defined by the NCAA, the Ivy League, and Columbia University.

These criteria are monitored by the Committee on Athletic Eligibility and certified by the Office of the Registrar. Furthermore, students must comply with any NCAA or Ivy League requirements that may apply.

Questions about eligibility should be referred to the appropriate academic advisor or the compliance office in the Department of Physical Education and Intercollegiate Athletics.

ENROLLMENT AND COURSELOAD

UNDERGRADUATE POSTBAC PREMED

While there is no academic or program requirement for full-time enrollment, some students may need to maintain full-time status because of visa requirements, for insurance, or to remain eligible for University Housing.

FULL-TIME ENROLLMENT

Option One

Full-time status in the Postbaccalaureate Premedical Program is defined as registration for 12 or more points per term. This enrollment status is required for all international students.

Certification

Certification for this option is provided by the University Registrar.

Option Two

A postbac student who is registered for fewer than 12 points may be regarded as equivalent to full-time if enrolled in at least 9 points and participating in unpaid, volunteer work in a health care setting for at least three hours per week and 42 hours per semester. If the position is paid or a stipend is awarded, students will not qualify for full-time status. This option is not available to international students.

Certification

Certification is provided by the Postbaccalaureate Premedical Office. In order to receive a certification letter from the Postbac Premed Office, students must provide a letter to their Postbac Premed advisor from their volunteer supervisor stating that they are working in a volunteer and unpaid capacity for a minimum of three hours per week, with a minimum commitment of 42 hours during the 14-week semester. This letter must be on letterhead, dated, and signed by the volunteer supervisor. Students should allow one week between the submission of the letter from their volunteer supervisor and the availability of a letter of certification from the Postbac Premed Office.

INTERNATIONAL STUDENT ENROLLMENT: APPLICATION/ GLIDE YEAR

During the application year, international students with F-1 (or J-1) non-immigrant status who wish to remain in the United States must either be enrolled in a program of full-time study or be on optional practical training (OPT) if F-1 status or

academic training (AT) if J-1 status, authorized by the United States Citizenship and Immigration Services (USCIS).

In planning the application year, it is advisable for students with F-1 or J-1 status to consult with the International Students and Scholars Office (ISSO), as well as with their premedical advisors, early in their final semester of study to ensure compliance with U.S. immigration laws.

SUMMER ENROLLMENT

Preparatory Courses

Some Postbac Premed students may need to begin their studies in the summer to prepare for fall courses in mathematics, chemistry, and/or physics. Some preparatory coursework is also offered throughout the academic year.

With very few exceptions, the only summer session courses admitted students will be allowed to take are Preparation for College Chemistry, Basic Physics, English, Psychology, or a mathematics course. Please see the grading policy for Preparation for College Chemistry, Basic Physics, Basic Math, and College Algebra & Analytic Geometry.

Required Courses

Medical schools generally prefer that coursework be completed during the regular terms of enrollment; the Postbaccalaureate Premedical Program does not permit students to enroll in science classes in the summer, except to take preparatory courses, math, laboratory courses, and the twelve-week Physics II and General Chemistry II courses. The reason for this restriction is a concern that the compressed schedule of summer classes is a less effective way to learn and leaves students ill-prepared for subsequent courses and for the MCAT.

Registration for Summer Courses

Summer courses are administered by the Columbia University School of Professional Studies. For courses offered during the summer semester that fulfill requirements of the Postbac Premed Program, please visit the Premed section of the SPS website. Please note that courses offered in a six-week format do not fulfill the Postbac Premed Program requirements (with the exception of lab, math, and English courses).

GRADES

All grades are based solely on work completed during the term a course is offered, except in the case of a grade issued to replace an incomplete, as authorized by the General Studies Committee on Academic Standing or the Postbac Premedical Committee.

Letter Grades

The letter grading system within Columbia's undergraduate colleges is as follows: A, excellent; B, good; C, fair; D, poor but passing; F, failure (a final grade, not subject to reexamination).

Plus and minus grades are also used, except with grades of D or F. No work with a grade of D will be credited toward the major unless otherwise noted by a department in its official policies.

Grade Point Average (GPA)

The Registrar calculates semester as well as cumulative grade point averages based on the number of points per class. The GPA is used to assess a student's academic progress as well as to determine a student's eligibility for certain honors such as the Dean's List or the Honor Society. The GPA is printed on all official Columbia transcripts. GPAs are computed on the following scale:

A+ = 4.33	B+ = 3.33	C+ = 2.33	D = 1.00
A = 4.00	B = 3.00	C = 2.00	F = 0.00
A- = 3.67	B- = 2.67	C- = 1.67	

When the Registrar calculates the GPA, courses are weighted by the number of points they carry. Courses that cannot be credited toward the degree are not included in the GPA. For repeated courses, only the grade earned for the first attempt will be calculated into the grade point average. In cases where the first attempt was an F, both grades will be factored into the grade point average.

Note for Postbac Premed students: Where a Postbac has repeated a required course, the Postbac Premed Program averages in both attempts when it conducts its academic review; however, it excludes courses outside math and science. Postbacs should consult the bulletin sections on Academic Review (p. 425) for a statement about GPA requirements for continued enrollment in the Postbac Program. Similarly, the sections on the requirements for the Certificate in the Premedical Sciences (p. 420) and eligibility requirements for linkage all include statements concerning the GPA.

Grade Appeals and Grade Changes

Assessment of a student's performance in a course is solely at the instructor's discretion. When a student feels a grade appeal is warranted, the student should first speak with the instructor of the course in order to understand how the evaluation was derived or to clarify other specific concerns. If dissatisfied with the explanation or uncomfortable broaching this matter with the instructor, the student should speak with the director of undergraduate studies or, if appropriate, the chair of the relevant department.

Deans and GS advisors can counsel a student on whether and how to approach an instructor about a grade appeal; however, they do not arbitrate grade disputes. Students should keep their GS advisors informed of any pending grade disputes or appeals, as the Office of the Dean of Students can help to expedite a response from a faculty member or department.

If the student is unable to resolve the matter to his or her satisfaction and believes that a procedural issue is involved, the student should bring the matter to the attention of the

GS Dean of Academic Affairs who will work with the student and the faculty member to determine whether there has been a procedural breach and, if so, take immediate steps to remedy the matter. If relevant faculty other than the instructor, in consultation with GS Academic Affairs, decide that the grade or other academic evaluation was appropriate, given class assignments and circumstances, the student will be informed and the decision will be final.

The statute of limitations on final grade appeals is three months from the end of the semester in which the course was taken.

PASS/D/FAIL OPTION

The purpose of the Pass/D/Fail (P/D/F) option is to encourage undergraduate students to take courses outside their fields of specialization without concern for the grade. Beginning with the Spring 2008 term, undergraduate students may choose the P/D/F option for only one course per term, including the summer term. Courses given only on a P/F basis will not count toward the six-course limit. Apart from those courses offered only on a P/F basis, Postbac Premed students cannot choose the P/D/F option for math and science courses with the sole exception of Math W1003 (College Algebra & Analytic Geometry).

Electing a Course for Pass/D/Fail

- Undergraduates within the School of General Studies may elect the Pass/D/Fail (P/D/F) option for up to six courses, for a total of 18 points, but no more than one course per semester may be selected for this option.
- The grading option for students who register for a course P/D/F when they have exceeded the number of allowable P/D/F will revert to the letter-grade option.
- When the P/D/F option is elected for a particular course, grades of C- or above are converted to a Pass.

The P/D/F option cannot be elected for the following specific courses, and/or courses administered by the Committee on the Core, whether or not they are taken to fulfill GS core requirements:

- Art Humanities: UN1121
- Contemporary Civilization: CC/GS1101-CC/GS1102
- Foreign language courses (rare exceptions may apply; consult with your advisor)
- Foundations of Science: UN1212
- Frontiers of Science: CC1000
- Literature Humanities: CC/GS1001-CC/GS1002
- Music Humanities: UN1123
- University Writing: ENGL GS1010 or ENGL GS1014

When considering the P/D/F option, students should be aware that courses with the mark of P:

- cannot be used to satisfy a GS Core requirement;
- cannot be used to satisfy a major or concentration requirement, including related courses, unless otherwise noted by the department in its written policies;
- cannot be used to satisfy science or math courses in fulfillment of premedical requirements;
- are not taken into account when calculating a student's GPA; the grades of D and F will be so used.

Students may elect the P/D/F option during registration. Students may change a P/D/F course to a letter-graded course or a letter-graded course to a P/D/F course by clicking the relevant link in SSOL by the eleventh week of the term.

The P/D/F option, including the opportunity to uncover a Pass, is only available to undergraduate students in the School of General Studies and not to students in the Postbaccalaureate Premedical Program.

Uncovering the Mark of Pass

Beginning with courses taken in the Fall 2007 semester, students are allowed to uncover a grade of Pass within two weeks of the start of the semester immediately following the term in which the grade of Pass was received. Students have until the end of the change of program period of the following term to uncover the grade of Pass in SSOL. In all cases, GS students must finalize such requests by the time they apply for graduation. GS Seniors graduating in May who wish to uncover the mark of Pass for their spring-term courses must do so by the Friday of Commencement week.

An uncovered grade may be used to satisfy a core requirement with the exception of courses administered by the Committee on the Core, and/or other restricted courses.

In consultation with the major department, an uncovered grade may be used to satisfy a major requirement.

Note: Whether or not a student uncovers the P, the P/D/F option may only be chosen six times.

Note: Once a student has chosen to uncover a grade, the Pass cannot be reinstated.

WITHDRAWALS AND ADMINISTRATIVE REFERRAL

Unofficial Withdrawal (UW)

As of Spring 2014, this grading option is no longer available for School of General Studies students.

Withdrawal (W)

Students are not permitted to have a course deleted from their academic record after the drop deadline (the fifth week of classes). If a student withdraws from a course after the drop deadline, and no later than the Monday prior to the last day of classes each semester, the transcript will show a mark of W for

that course. This is a permanent mark and will remain on the transcript even if the student repeats the course. Students may not drop or withdraw from any course after this deadline.

Administrative Referral (AR)

The mark of AR (Administrative Referral) is a temporary grade awarded by a faculty member when a final letter grade cannot be assigned. Following the designation of the AR mark, the student's academic advisor will follow up with the instructor to outline the requisite steps to determine an appropriate final grade. AR is not a permanent grade.

In the event that the student has been approved through petition to the General Studies Committee on Academic Standing or (for postbacs) to the Premedical Committee to receive an Incomplete in a course, the mark of "IN" will then be submitted by the academic advisor. Please note that ultimately the assignment of the final letter grade is at the instructor's discretion.

INCOMPLETE (IN)

Written Work and Exams

Students must complete all coursework by the last day of exams in a given semester. For students who cannot complete their coursework or are unable to take a final examination, an incomplete for a course in progress may be granted by the General Studies Committee on Academic Standing (CAS) or the Premedical Committee. Faculty members, while consulted for approval of specific extensions, are not authorized to grant incompletes beyond the end of term. Students should contact their advisors first when an exam or deadline is missed. Petitions for official incompletes at the end of term should be based on unexpected circumstances that arise only within the last two weeks of the course which may prevent a student from timely completion of the final coursework or exam.

The only reasons for which an IN will be granted are incapacitating illness, as certified by the University Health Services or a personal physician, serious family emergency, or circumstances of comparable gravity. Students who wish to receive the mark of IN must, in consultation with their GS or Postbac advisor, petition the CAS or the Premedical Committee in writing. To be granted an IN, it is expected that students will have completed all work in the class with the exception of the final paper or exam. Students who are granted an IN are assigned a deadline for completion of the overdue work or a date by which a deferred examination must be taken. Those who fail to meet the assigned deadline or miss the deferred examination will receive the contingency grade provided by the instructor.

Students with more than two incompletes usually cannot enroll in the following semester without the explicit permission of the CAS or the Premedical Committee. When allowed to enroll, students with more than two incompletes will usually be advised to enroll part-time. Undergraduate students with

one or more incompletes in the spring term are typically not allowed to enroll in the summer term or study abroad.

Incomplete Written Work

Students must submit a formal petition for an incomplete on written work, typically the final paper, by the last day of classes. The petition must be accompanied by the syllabus and/or appropriate confirmation of the due date for the assignment. This deadline is set as written work is typically due during the last week of classes. If a deadline for written work other than a final exam is set for later than reading week, the student has one day from the missed deadline to submit a petition for an incomplete. Students are advised to submit a draft of their written assignment to the faculty member while the petition for an incomplete is being considered by the CAS or the Premedical Committee.

Incomplete Exams

Typically, unless there are serious documented circumstances, students may not request an incomplete for a final exam in advance of the final examination period. In situations in which an incapacitating illness prevents a student from sitting for a final exam, the student should contact his or her advisor *immediately* about the missed examination, and must provide—within seventy-two hours of the missed exam—certification of the illness by University Health Services, a personal physician, or an emergency room. If circumstances warrant a make-up exam, the student will be permitted to sit for the exam on one of the official deferred exam dates published in the GS Academic Calendar. Students cannot pick the date, but they will be notified of the date, time, and place of the exam.

GRADUATION

ELIGIBILITY AND APPLICATION FOR DIPLOMAS AND CERTIFICATES

Bachelor's degrees are conferred three times a year: February, May, and October. Students must file an application for the degree in consultation with their advisor by the deadlines specified below.

Deadline	Graduation Date
March 15	for May degrees
March 15	for October degrees (if participating in preceding May graduation ceremony)
August 1	for October degrees (if not participating in preceding May graduation ceremony)
November 1	for February degrees

APPLY FOR GRADUATION

To apply for graduation, students should meet with their GS advisor no later than six months prior to the anticipated completion of the degree. Students who are unable to earn the degree or certificate by the conferral date for which they have applied must file another application for a later conferral date.

Graduation Application Months are as follows:

February – May, October (participating in May)

July – October (not participating in May)

October – February

October candidates who wish to participate in May ceremonies must obtain special permission from their advising dean.

Students in the Joint Program with List College of the Jewish Theological Seminary will be allowed to graduate when they have completed the requirements for both degrees.

Verifying Your Graduation Application Status

After completing a graduation candidacy review with his or her GS advisor, and applying to graduate in February, May, or October, students can confirm the status of their application through SSOL.

To verify that their graduation application has been processed, students should follow these steps:

1. Log in to SSOL (<https://ssol.columbia.edu/>).
2. Under "Academic Records," click on "Degree Application Status."
3. Confirm your expected date of graduation (month and year), as well as the status of your application submission.
 - Note: "Submitted" status confirms that your application was processed; this will be noted only by your academic program(s) of study.
4. If your application status is "Not Submitted" or there are errors in the information listed, email gsgraduation@columbia.edu.

Degree Ceremonies

A University-wide commencement ceremony is held once a year in May. Before Columbia Commencement, the School of General Studies hosts its own graduation ceremony known as Class Day, during which each student receives a certificate from the President of the University and the Dean of the School of General Studies. Students who received their degrees in October, February, or May of a given academic year are entitled to participate in Class Day and Commencement ceremonies in May of that academic year.

Students completing degree work in the summer are welcome to participate in the May ceremonies preceding completion of their degree. Students may do so by a) applying for the October

degree by March 1, or b) registering in April for the summer courses needed to complete their degree requirements.

Diplomas

There is no charge for the preparation and conferral of an original diploma or certificate. The name of the graduating student will be printed exactly as it appears on his or her transcript. Students are responsible for checking their transcripts and reporting any errors to the Registrar in 205 Kent before they file their degree or certificate applications. A student who wishes to change his or her name officially must submit the Name Change Affidavit available from the Registrar's Office. The affidavit must be notarized and filed by the application deadline. If a diploma or certificate is lost or damaged, there will be a charge of \$100 for its replacement. Note that replacement diplomas or certificates carry the signatures of current University officials.

Columbia diplomas will be produced and mailed within three weeks after Commencement (<https://gs.columbia.edu/commencement/>), and are mailed to the student's Diploma Address, as listed in SSOL (<http://ssol.columbia.edu/>). Students should confirm their address information on their SSOL profile. If a student's address needs to be updated, it should be done through SSOL **before the Monday prior to Commencement**

Please be sure to complete the Diploma Address option. Diplomas cannot be mailed to students who do not have a Diploma Address listed in SSOL.

Diplomas for February and October graduates will be mailed to the address on file in SSOL (<https://ssol.columbia.edu/>) up to two months after the degree conferral date.

Note: Graduates who have not resolved any financial or library holds preventing the release of their diplomas must proactively notify the Registrar's Office that their last hold has been removed. In the case of holds preventing release, the Registrar's Office will not mail student diplomas without notification that all hold(s) have been removed.

CONTACT

Applications for replacement diplomas and certificates may be requested by calling the Office of the Registrar, Graduation, Degree Audit, and Diploma Division at 212-854-1454.

HONOR PLEDGE

The General Studies Student Council, on behalf of the whole student body, has resolved that maintaining academic integrity is the preserve of all members of our intellectual community—including and especially students. As a consequence, all General Studies students make the following pledge at Orientation:

We, the undergraduate students of Columbia University, hereby pledge to value the integrity of our ideas and the ideas of others

by honestly presenting our work, respecting authorship, and striving not simply for answers but for understanding in the pursuit of our common scholastic goals. In this way, we seek to build an academic community governed by our collective efforts, diligence, and Code of Honor.

In addition, all General Studies students are committed to the following honor code:

I affirm that I will not plagiarize, use unauthorized materials, or give or receive illegitimate help on assignments, papers, or examinations. I will also uphold equity and honesty in the evaluation of my work and the work of others. I do so to sustain a community built around this Code of Honor.

INDEPENDENT STUDY AND RESEARCH

Independent Study

Independent study and research provides an opportunity for students to work one-on-one with a faculty member through directed reading or supervised research. Normally independent study is reserved for students at an advanced level within their majors. Students should consult with their respective major or departmental advisors about requirements and limits for independent study, which vary from department to department.

Students are advised to approach faculty members about independent study as early as possible, since many instructors limit the number of students they will supervise in a given semester or year. Some departments require that the Director of Undergraduate Studies approve the independent study. As part of the proposal and approval process, students must specify, in consultation with the faculty supervisor, the number of points to be earned for the independent study. Students must designate the number of points to be earned when registering for independent study.

Students may count no more than 12 points of independent study toward the degree, and may register for no more than one independent study per term. If a student wishes to undertake an independent study program involving more points than the number permitted, he or she must have the approval of the Director of Undergraduate Studies and the GS Committee on Academic Affairs.

Independent Research: Human Subjects

Any research that involves people can be considered human subjects research in a broad sense. Students who are interested in conducting independent research that will involve participants answering questions, completing surveys, filling out forms, following instructions, and/or being observed, or that involves receiving data about identifiable individuals, may need special approval.

All universities have an Institutional Review Board (IRB), which reviews research proposals involving humans and assesses whether or not the research can be approved. The approval is dependent upon the risk of harm to the research subjects.

This risk of harm can be physical, psychological, legal, or social and it is the job of the Columbia IRB to protect those who have voluntarily donated their time (even if they are compensated) in order to take part in any research that is conducted by a member of Columbia University.

Taking seriously the well-being of research participants is part of what makes a good researcher and a good research project.

Requesting IRB Approval

Students submitting proposed research for approval by the Institutional Review Board must:

- Complete the online Human Subjects Protection Training (<https://www.rascal.columbia.edu/servlet/edu.columbia.rascal.presentation.tc.servlets.TCMainServlet/>). [Instructions (https://gs.columbia.edu/sites/default/files/content/Documents/academic-affairs-human_subjects_training_instructions.pdf)]
- Identify a CU faculty member as a Principal Investigator.
- Complete the Undergraduate Study IRB Approval Request Form (<https://gs.columbia.edu/sites/default/files/content/Documents/columbia-gs-academic-affairs-IRB-request-form.pdf>).
- Create a consent form. (Samples are available on the Columbia IRB website (<http://www.columbia.edu/cu/irb/policies/>).
- File a Conflict of Interests Disclosure Statement (<https://www.rascal.columbia.edu/servlet/edu.columbia.rascal.presentation.annualcoi.servlets.CoiAnnualMainServlet>).
- Create a research protocol in RASCAL (<https://www.rascal.columbia.edu/>). [Instructions (<https://gs.columbia.edu/sites/default/files/content/Documents/academic-affairs-creating-protocol-rascal.pdf>)]
- Attach to your RASCAL protocol your completed approval request form and any necessary supplemental documentation (for example, research instrument and consent form).

INTERNSHIP CREDIT

Internships can be a valuable experience for students seeking exposure to a range of professional cultures and experiences. However, Columbia College, the School of General Studies, and the Fu Foundation School of Engineering and Applied Science—as at our peer institutions nationally—do not offer registration credit (R credit) on the academic transcript for internships. Companies are expected to appropriately compensate students for work performed during an internship. The Columbia University Center for Career Education (CCE)

has posted some helpful guidelines and procedures (<https://www.careereducation.columbia.edu/employers/guidelines-procedures/>) for employers regarding unpaid internships.

Support will be maintained for student participation in internships for which students are properly compensated (when required), and letters of support for internships will be provided upon request.

Visit CCE to learn more about job and internship (<https://www.careereducation.columbia.edu/jobs-internships/>) opportunities.

LEAVES OF ABSENCE AND WITHDRAWALS

Students of considerable ability sometimes perform below their capacities because of burdensome personal or family problems. In such cases, taking a leave of absence or withdrawing can have a salutary effect on a student's academic performance. Students who wish to withdraw from a term in progress, cancel registration for an upcoming term for which they have already registered, or take a planned leave of absence must consult with their respective academic advisors and submit a leave of absence form or withdrawal form. Failure to do so in a timely fashion can have financial as well as academic consequences.

Depending on the date of a student's withdrawal, loan funds already received by the student may need to be returned to the lender. Federal grant awards such as the FSEOG, Pell Grant, and GS scholarships may also be decreased. Students who withdraw should contact the GS Office of Educational Financing (<https://gs.columbia.edu/content/educational-financing-advising/>) for more information about possible required adjustments to their federal and/or institutional aid, or if they have questions about their student account.

Leaves of absence for up to three years are granted to undergraduate students who anticipate returning to Columbia to complete their studies. Leaves of absence for up to one year are granted to Postbac Premed students who anticipate returning to Columbia to complete their studies. Students who intend to take a leave of absence must submit a leave of absence form (<https://forms.gs.columbia.edu/withdrawal-leave-request-form/>) at least one week prior to the start of the term of their intended leave. Failure to follow this procedure can have academic as well as financial consequences and may lead to being dropped from the rolls of the School.

To re-enroll after a leave of absence, students must complete the re-enrollment process by the required deadline.

Note: An undergraduate student whose absence from the School of General Studies exceeds three years must formally reapply to the School through the GS Office of Admissions. A Postbac Premed student whose absence from the Postbac

Premed Program exceeds one year must formally reapply to the Program through the GS Office of Admissions.

LEAVE OF ABSENCE GUIDELINES

All correspondence from the University sent to students via U.S. mail goes to the address on file with Student Information Services which may be viewed via Student Services Online (SSOL). Students are responsible for making changes to that address by following the instructions on SSOL for a change of address.

Financial Aid

- Students who borrowed under a federal or Columbia student loan program will need to complete an Exit Loan Counseling Interview, and will be notified by email of their exit counseling responsibilities.
- Students who were awarded any federal financial aid (Title IV aid) that has not disbursed to their student account and wish to know if they are eligible for a late disbursement of this aid must contact a counselor at the GS Office of Educational Financing.
- Students will receive an email communication from the GS Office of Educational Financing which will identify any required revisions to their financial aid per federal regulations and/or GS policy.
- It is recommended that students contact the GS Office of Educational Financing in March for information regarding forms and deadlines for financial aid applications for the upcoming academic year.
- Students with a credit on their student account should contact the GS Office of Educational Financing to request a refund. Students with financial aid must wait until their aid has been recalculated to request a refund (<https://gs.columbia.edu/student-account-refunds/>).
- Depending on the date of withdrawal, the student's tuition and other charges will be recalculated based on the Withdrawal Schedule established by the Trustees and published on the University Registrar website (<http://registrar.columbia.edu/content/refund-rate-withdrawals/>).

Health Insurance

Students who withdraw from a term in progress will no longer be eligible to receive Student Health insurance. Students withdrawing for medical reasons must notify their GS advisors immediately to request a continuance of their student health insurance plan. For more questions on the impact of a withdrawal or leave on student health insurance, please refer to the [Columbia Student Health](http://www.health.columbia.edu/student-insurance/about-columbia-insurance-plan/) (<http://www.health.columbia.edu/student-insurance/about-columbia-insurance-plan/>) Insurance Plan (<http://www.health.columbia.edu/student-insurance/about-columbia-insurance-plan/>).

Dining Services and Flexdollars

Meals and Dining Dollars are non-refundable and non-transferable, even for non-used balances. Refunds are permitted only upon official academic withdrawal from Columbia University. For students withdrawing from a term in progress, a refund is possible for the unused portion of the plan or dining dollars, if students immediately notify Dining Services of their withdrawal and have this confirmed by their GS advisor. Refunds may be requested at the Dining Services (<http://dining.columbia.edu/>) located at 125 Wallach Hall.

University Housing

Eligibility for housing (<http://facilities.columbia.edu/housing/>) is limited to students enrolled at GS full-time. Students have 30 days to vacate their unit, and must contact University Apartment Housing (UAH) to terminate their lease.

Refunds

If you have a credit on your student account, contact Student Financial Services to request a refund. Students with financial aid must wait until after their exit interview and their aid has been recalculated to request a refund.

University Privileges

- E-mail accounts are kept active from six to nine months for students who take a leave or withdraw; however, e-mail accounts are deactivated within a week for students who are suspended or dismissed, or who transfer or permanently withdraw from the School.
- Swipe access to University buildings is suspended during a student's leave or period of withdrawal from the School.
- Library privileges are normally suspended during a student's leave or period of withdrawal from the School.
- Access to Dodge Physical Fitness is suspended during a student's leave or period of withdrawal, except in those cases where a student chooses to pay a membership fee to continue receiving access to these facilities.
- Students on leave or withdrawal from a term in progress and/or suspended from GS are not allowed to enroll in another Columbia school during this period without written permission from the Dean of Students.

WITHDRAWAL FROM A SEMESTER IN PROGRESS

Circumstances occasionally require that a student withdraw from a semester in progress. Withdrawal means dropping all courses in a given term, as opposed to dropping a portion of the program. Withdrawal from a term in progress may have serious financial and academic consequences, and thus students should meet with their advisors so that they can make an informed decision. All withdrawals are noted on a student's transcript. Multiple withdrawals may lead to suspension from the School for failure to make academic progress.

Students who wish to withdraw must submit the withdrawal form (<https://forms.gs.columbia.edu/withdrawal-leave-request-form/>); notifying instructors or failing to attend classes does not constitute formal withdrawal. A student's tuition may be prorated depending on the date of the written notification of the withdrawal.

Additional Facts and Policies for Students Withdrawing from a Term in Progress

- Students withdrawing from a term in progress are charged a \$75 administrative processing fee.
- Depending on the date of a student's withdrawal, tuition and other charges will be recalculated based on the Withdrawal Schedule established by the Trustees and published in the Student Fees booklet.

INVOLUNTARY LEAVE OF ABSENCE

The Dean of Students, or his or her designee, may place a student on an Involuntary Leave of Absence for reasons of personal or community safety. This process will be undertaken only in extraordinary circumstances when there is compelling information to suggest that the student is engaging in or is at heightened risk of engaging in behavior that could lead to serious injury to others, including as a result of physical or psychological illness. In addition, the Involuntary Leave process may be initiated if, based on an individualized assessment, it is determined that there is a significant risk that the student will harm him/herself, and that the risk cannot be eliminated or reduced to an acceptable level through reasonable and realistic accommodations and/or on-campus supports.

Involuntary Leave of Absence Policy

This policy provides students with general information regarding an Involuntary Leave of Absence. For more specific information regarding the circumstances and processes for an Involuntary Leave of Absence, as well as conditions relevant to returning from Leave, students should refer to the Academic Policies or speak with the Dean of Students. Students are responsible for understanding the implications of an Involuntary Leave of Absence for housing, financial aid, health insurance, and progress toward the degree.

This policy will not be used in lieu of disciplinary actions to address violations of Columbia University rules, regulations, or policies. A student who has engaged in behavior that may violate rules, regulations, or policies of the University community may be subject to the dean's Discipline Process of his or her particular school. A student may be required to participate in the disciplinary process coincident with being placed on an Involuntary Leave of Absence. A student who is placed on an Involuntary Leave of Absence while on academic and/or disciplinary status will return on that same status.

Before an Involuntary Leave is considered, efforts may be made to encourage the student to take a Voluntary Leave of Absence. These procedures are described in the Voluntary Leave

of Absence Policy. A readmission process may still be required of a student electing a Voluntary Leave to determine his or her readiness to return to school (e.g., whether returning to school may increase the risk of self-harm and/or harm to others).

When requesting a leave or withdrawing from GS, international students must also notify the International Students & Scholars Office (ISSO) immediately.

When safety is an immediate concern, the DOS (or his or her designee) may remove a student from the campus pending final decision on Involuntary Leave. If this action is deemed necessary, the student will be given notice of the removal. An opportunity to be heard by the DOS and, if desired, to appeal the final decision will be provided at a later time.

For more information, students should visit the Essential Policies (<http://www.essential-policies.columbia.edu/involuntary-leave-absence-policy/>) or consult their respective advisors in the Dean of Students Office.

MEDICAL LEAVES AND MEDICAL WITHDRAWALS

When students are faced with health issues that have a negative impact on study habits, course attendance, or class preparation, they are urged to consult with their advisors to discuss taking a medical leave of absence from the university. Students who are hospitalized during an academic term or who miss class for more than two weeks due to health issues are advised to take a medical withdrawal from the term in progress. Doctors at University Health Services (UHS) as well as counselors at the Office of Counseling and Psychological Services (CPS) can also help students evaluate whether a medical leave is advisable.

Medical Leaves and Medical Withdrawals Policy

Students must provide medical documentation to support their requests for medical leaves or medical withdrawals. As part of the re-enrollment process, students will also be required to supply current medical documentation, and to be evaluated by the relevant branch of the University's Health Services.

In exceptional cases, when there is sufficient information to suggest that as a result of physical or psychological illness, a student is engaging in or is likely to engage in behavior that could lead to injury to self or others, the Dean of Students, in consultation with UHS, CPS, and the Office of Public Safety, may place a student on an involuntary leave of absence for reasons of personal or community safety.

Students who withdraw from their studies after the eleventh week of the semester or for medical reasons are not allowed to return for at least four months (a minimum of one semester), to allow time to address the situation that led to the withdrawal.

LEAVE FOR MILITARY DUTY

Under the Higher Education Opportunity Act of 2008 (HEOA), institutions are required to readmit an individual who left school or did not accept an offer of admission in order to perform military service. The following sections explain the eligibility and readmission requirements of this policy.

Eligibility

This policy applies only to U.S. military veterans seeking readmission to the program that they previously attended; it does not apply to individuals seeking admission to a different school at Columbia. Veterans are eligible if they began their leave of absence on or after August 14, 2008.

Students are eligible for readmission under this provision if, during their leave, they performed or will perform voluntary or involuntary active duty service in the U.S. armed forces, including active duty for training and National Guard or Reserve service under federal authority, for a period of more than 30 consecutive days, and received a discharge other than dishonorable or bad conduct. In general, the cumulative length of absence and all previous absences for military service (service time only) must not exceed five years.

Requirement of Notice

If a student is planning to take a leave for military service, he or she must give advance written or verbal notice of military service to the Dean of Students, unless such notice is precluded by military necessity. To be readmitted, students must give notice (written or verbal) of their intent to re-enroll to the Dean of Students no later than three years after the completion of the period of their service. If a student is recovering from a service-related injury or illness, he or she must notify the school no later than two years after their recovery.

A student who does not submit a timely notification of intent or provide an attestation within the designated time limits may not be eligible for the benefits outlined herein.

Tuition and Fees

For the first academic year in which the student returns, he or she must be readmitted with the same tuition and fees charges the student was or would have been assessed for the academic year when the student left, unless there are sufficient veterans' educational benefits or institutional aid to pay the increased amount of tuition and fees. For subsequent academic years, the student may be charged the same tuition and fees as other students in the program.

Readmission Requirements

The school must allow the student to re-enroll in the next class or classes in the same program, with the same enrollment status, number of points, and academic standing as when he or she was last in attendance at Columbia. The student may also request a later date of admission or, if unusual circumstances require it, the institution may admit the student at a later

date. If the school determines that the student is not prepared to resume the program where he or she left off, the school must make reasonable efforts at no extra cost to the student to enable the student to resume and complete the program. Such reasonable efforts include, but are not limited to, providing a refresher course and allowing the student to retake a pretest, as long as they do not place an undue hardship on the school. If reasonable efforts are unsuccessful or the school determines that there are no reasonable efforts that the school can take, the school is not required to readmit the student.

If the program to which the student was admitted is no longer offered, the student must be admitted to the program that is most similar, unless the student requests or agrees to admission to a different program.

RE-ENROLLMENT

Undergraduate students must apply for re-enrollment through the Dean of Students Office within three years from their last semester of enrollment at GS. Leaves of absence for up to one year are granted to Postbac Premed students who anticipate returning to Columbia to complete their studies. Students granted re-enrollment must return to Columbia the following semester and complete that term to maintain their academic status at GS. Students who desire to return after a withdrawal are required to submit a re-enrollment form (<https://admissions.gs.columbia.edu/register/?id=5088bac4-6ff8-4d6f-be2c-cc163cda5f14/>) including a personal statement addressing the circumstances that caused them to withdraw. Students must submit this petition to their respective advisors by the date specified on the form relevant to the term in which they wish to return. Petitions for re-enrollment are reviewed by the Committee on Academic Standing. All students who take a leave or withdraw for medical reasons must have their physician or other health care provider support their readiness to resume their studies. Students returning from a medical withdrawal or medical leave will be required to be evaluated by the relevant branch of University Health Services to complete the re-enrollment process.

Note: An Undergraduate student whose absence from the School of General Studies exceeds three years must formally reapply to the School through the GS Office of Admissions. A Postbac Premed student whose absence from the Postbac Premed Program exceeds one year must formally reapply to the Program.

Re-enrollment Deadlines

It is a student's responsibility to ensure that the re-enrollment petitions (<https://admissions.gs.columbia.edu/register/?id=5088bac4-6ff8-4d6f-be2c-cc163cda5f14/>) (including the petition statement and medical documentation, if applicable) is received by the relevant deadline. Late and incomplete petitions will not be considered.

Withdrawal/Leave of Absence:

Return Term	Deadline
Fall	August 15
Spring	December 15
Summer	May 1

Medical Withdrawal/Leave of Absence:

Return Term	Deadline
Fall	July 15
Spring	November 15
Summer	April 15

Regular Withdrawal Checklist

1. Review and resolve any registration holds with appropriate offices (Student Financial Services for financial holds; Health Services for health holds, etc.)
2. Send finalized re-enrollment petition and supporting documentation to GS advisor
3. International students must also contact ISSO for re-enrollment
4. Upon approval of re-enrollment petition, schedule a re-enrollment appointment with GS advisor

Medical Withdrawal Checklist

1. Review and resolve any registration holds with appropriate offices (Student Financial Services for financial holds; Health Services for health hold, etc.)
2. Send finalized re-enrollment petition and supporting documentation to GS advisor
3. International students must also contact ISSO for re-enrollment
4. Send appropriate medical documentation to be evaluated by relevant branch of University Health Services to GS advisor
5. Upon approval of re-enrollment petition, schedule a re-enrollment appointment with GS advisor

TUITION REFUND SCHEDULE

For the complete tuition refund schedule, please refer to the University Registrar website (<http://registrar.columbia.edu/content/refund-rate-withdrawals/>).

MIDTERM AND FINAL EXAMS

MIDTERM EXAMINATIONS FINAL EXAMINATIONS

Final examinations are given at the end of each term. The Master Exam Schedule can be found on the University Registrar's website (<http://registrar.columbia.edu/students/grades-and-exams/>) and provides a tentative guide to

final examinations. Students are urged to consult the final examination schedule section in SSOL during the early weeks of each term for the most accurate information. Students are expected to be present for the exam period and should plan their schedules to accommodate the set exam times. Examinations will not be rescheduled to accommodate travel, work, or family plans.

Three or More Final Exams Scheduled for the Same Day

If a student has three examinations scheduled during one calendar day, as certified by the Registrar, an arrangement may be made with one of the student's instructors to take that examination at another mutually convenient time during the final examination period. It is the student's responsibility to get the appropriate documentation from the Registrar's Office in a timely manner and to negotiate with instructors an alternative time to take the exam during the official examination period. GS advisors can be helpful to students negotiating such arrangements.

Deferred Final Examinations

In cases of incapacitating illness or family emergencies, the GS Committee on Academic Standing (CAS) will consider petitions for a deferred exam. If the exam is to be taken after the end of the semester, such deferrals can only be granted by the CAS, not by the instructor of the course. When an incapacitating illness prevents a student from sitting for a final exam, the student should contact his or her GS advisor on the day of the exam, and, within three days, must provide certification to the GS advisor of the illness by University Health Services or a personal physician. Similarly, in cases of family emergency which may prevent a student from sitting for a final exam, the student should immediately contact his or her GS advisor, who will review the situation and options with the student. The student's GS advisor will notify the instructor of the student's absence from the exam. Deferred exams cannot be considered without appropriate documentation, which students must provide to their GS advisors.

Deferred exams approved by the CAS are scheduled on two fixed dates for the spring and fall terms as specified by the Office of the Dean of Students; make-up exams cannot be deferred beyond these specified dates. There are no additional make-up opportunities. Students who miss the deferred examinations will receive a grade of zero for that examination. GS students registered for Summer Term classes must abide by this same policy and process for exams missed during the summer.

Examinations for Students with Disabilities

Students with disabilities must be registered with the Office of Disability Services (<http://health.columbia.edu/disability-services/>) to avail themselves of approved accommodations and other important services. Students with disabilities are expected to take exams with or at the same time as the rest of the class.

However, some students may need special accommodations for exams depending on their disabilities. Each term the Office of Disability Services requests that students provide them with complete and advance information about their examination schedule so that appropriate accommodations can be made if disability-related modifications are needed.

PLACEMENT EXAMS

Quantitative Reasoning Assessment Exam

Entering GS students may take the Quantitative Reasoning (QR) Assessment Exam prior to or during Orientation week unless they have scored, within the past eight years, a minimum of 600 on the Math SAT or a minimum of a 27 on the math subsection of the ACT. The QR assessment exam lasts one hour, and students are permitted to use a calculator. A score of 20 or above on the QR assessment exam signifies that a student has fulfilled the GS quantitative reasoning requirement.

Math Placement Exam

Undergraduates needing to assess their math skills should take the Math Placement Exam administered by the GS Academic Resource Center (ARC). Contact the ARC for details.

Chemistry Placement Exam

The Chemistry Placement Exam administered by the GS Academic Resource Center places students in General Chemistry or Preparation for College Chemistry.

Language Placement Exam

GS students may fulfill the foreign language requirement or ascertain their level of language proficiency via a language placement exam within one year of matriculating at GS.

Foreign language placement exams are usually given at the beginning of each semester by departments offering foreign languages. A list of these exams is printed in the Orientation schedule. Students may also contact individual departments for information about placement exams. (Some language departments do not have regularly scheduled placement exams; students should contact these departments to arrange for a special placement examination.)

Students must demonstrate proficiency equivalent to the second semester of intermediate-level language study.

If a placement exam is not available in a language in which a student has expertise, students should notify their GS advisors during the first semester after matriculation and arrangements will be made for an appropriate assessment or placement exam.

Students who pursue language study as part of a Columbia-approved study abroad program and wish to use that language to fulfill the GS language requirement must take a placement

exam upon their return from study abroad. For language requirements see Study Abroad.

Music Humanities Exemption Exam

The Music Humanities Exemption Exam is offered on the first Friday of the fall semester by the Music Department (<http://www.music.columbia.edu/>) (621 Dodge Hall). The exemption exam must be taken within the first year of matriculation; students who begin in the fall term must take the exam in the fall; students who begin in spring semester should take the exam the following fall term. Students are not allowed to take the exemption exam after their first year of matriculation. Students may take the exam only once; if they do not pass the exam, they must enroll in a section of Music Humanities.

REGISTRATION

Registration is the systematic process that reserves seats in particular classes for eligible students. It is accomplished by following the procedures announced in advance of each term's registration period. Enrollment is the completion of the registration process and affords the full rights and privileges of student status. Enrollment is accomplished by the payment or other satisfaction of tuition and fees and by the satisfaction of other obligations to the University.

Registration alone does not guarantee enrollment, nor does registration alone guarantee the right to participate in a class. In some cases, students will need to obtain the approval of the instructor or representative of the department that offers a course. Please check this website and the registration instructions contained in the Directory of Classes (<http://www.columbia.edu/cu/bulletin/uwb/>) and/or Vergil (<https://vergil.registrar.columbia.edu/>) for all necessary approvals.

REGISTRATION

New Students

New students may register for classes only after attending an undergraduate Academic Planning Session or Postbac Planning Session. Students are expected to consult with their advisors for approval of their schedules either prior to, or shortly after, registering for courses. Additional details will be covered during the Academic Planning Sessions for students matriculating each term.

Process for All Students

Prior to meeting with their advisors about registration, students should consult the GS website in order to plan a schedule of classes. The website provides major requirements and current course descriptions for undergraduates and the prescribed prehealth curriculum for Postbac Premed students, as well as times and locations of classes. Students may also consult the Directory of Classes for detailed information. Students plan their programs with the help of their GS advisors and, for those who have declared their majors, with the additional

assistance of faculty advisors. The advisor must approve the original program as well as any subsequent changes. If a course requires permission of the instructor or department, a student is responsible for obtaining that permission. Registration for courses in divisions of the University not listed on the GS website requires permission from the Office of the Dean of Students.

After receiving the approval of the advisor on the registration form or electronically, students are permitted to register online via SSOL (<https://ssol.columbia.edu/>) during registration, the change of program period (typically, the first two weeks of each semester), designated registration weeks throughout the summer months, and/or shortly thereafter under special circumstances. The dates for these registration periods are published in the GS Academic Calendar and on the Registrar's Academic Calendar. Students will need their University Network Identification (UNI), Network Password, and all relevant course numbers and call numbers in order to complete the registration process. All students are strongly advised to participate in the early registration period for each term that allows them to reserve seats in courses for the following semester.

CANCELATIONS AND CHANGES TO REGISTRATION

Canceling Registration

Students who decide to defer their admission, take a leave of absence, or not matriculate at GS after having registered for classes must contact their GS advisor to initiate the withdrawal process required for canceling registration. Failure to complete this mandatory administrative procedure in a timely fashion will result in the student being liable for tuition and associated fees for the term in question.

Changes to Registration

Students are able to make changes to their registration online during the registration and change of program periods each semester, but all changes must be approved by the student's academic advisor.

Registration Holds

A "hold" on an account prevents a student from registering. Students may check for holds by logging on to Student Services Online (SSOL). Possible reasons for having a hold include significant debt to the University (financial hold); failure to provide evidence of required inoculations (health hold); overdue library books (library hold); or other academic, disciplinary, or administrative reasons designated by GS (dean's hold). Students with a dean's hold must contact their GS advisor.

COURSE PREREQUISITES AND INSTRUCTOR APPROVAL

Prerequisites

Prerequisites are specified in the individual course listings available in Course Offerings. Prior to registering for courses, students should ensure they have met the prerequisites for each course. If prerequisites are not specified for upper-level courses, students are advised to consult with the instructor prior to the first day of class. Students should not register for courses if they have not met the stated prerequisites. However, in exceptional cases, students may be granted permission to enroll in such courses by demonstrating to the instructor that they have competence equivalent to the prerequisites. The instructor will grant "Instructor Approval" by signing the Registration Adjustment Form. The form will then be signed by the student's GS academic advisor, who will forward the Registration form to the Registrar's Office to enroll the student in the course. Some courses, especially seminars and colloquia, require instructor permission even when students meet course prerequisites; students should consult the online directory of courses to note whether instructor approval is required.

Instructor Approval

Instructor permission may also be granted electronically via SSOL in cases where courses have an electronic wait list. Students may choose within SSOL to place themselves on course wait lists, which are of two varieties: either filled automatically on a space-available basis or filled by the course instructor based on student qualifications. Once a student is admitted to the course, the student is notified that s/he has been enrolled in the course and removed from the wait list.

Several departments that limit enrollment in their upper-level seminars and colloquia have special application processes. Priority enrollment in these seminars is often given to majors and seniors. Students are responsible for following special application or registration processes specified by individual departments for these limited-enrollment courses.

REGISTRATION DETAILS

Core Courses

Students interested in registering for Core courses or petitioning to transfer sections should consult the Core Registration and Petitions page.

Visual Arts Courses

It is not possible to register online for visual arts courses; students must follow a procedure that is different from registering for most other courses. Some visual arts courses require that students show a portfolio prior to registration. Most visual arts courses require that students attend the first two days of class to ensure their spot and then secure the written permission of the instructor. Students should take a Registration Adjustment form with them to the first meeting of

the class. Preference in visual arts classes is given to majors. For more information about registering for Visual Arts classes see Visual Arts Registration.

Dance Courses

Registration for dance classes is by permission of the instructor. GS students registering for a dance class must register for at least one point: GS students **may not** register for a zero-point dance class.

Physical Education Courses

Registration for Physical Education courses must be handled with the Registration Adjustment Form during the first week of each term.

CROSS-REGISTRATION INTO OTHER COLUMBIA DIVISIONS

Students who wish to take courses in one of Columbia's graduate or professional schools or programs must receive written approval from both GS and the appropriate graduate or professional school or program, as well as the instructor of the course, and must also submit a Cross-Registration petition (<http://bulletin.columbia.edu/general-studies/academic-policies/registration/CrossRegistrationPetition.pdf>). Undergraduate students should have completed one semester and 15 points of letter-graded Columbia coursework and be in good standing within the School to be eligible to petition for coursework in another school. Postbac Premed students must be in good academic standing within the Program and must have a compelling reason, consistent with their academic goals, for cross-registering. All work for these courses must be completed within the term in which the student is enrolled.

Note: GS students are not allowed to register for professional courses administered through the School of Professional Studies unless that course is cross-listed within an Arts & Sciences department or program offering an undergraduate major or concentration.

LIMIT ON PROFESSIONAL COURSES COUNTED TOWARD THE DEGREE

GS students are permitted 6 points of professional studies coursework toward their GS degrees. Those 6 points may be counted in transfer credits or courses completed at Columbia, or a combination thereof. Exceptions to this rule include GS students accepted into the combined or dual degree programs with Columbia's professional schools, where applicable. Courses which are cross-listed with undergraduate departments do not count toward this limit.

STUDY ABROAD

Study abroad programs provide a wonderful opportunity to enhance a Columbia education, especially given the numerous programs either sponsored or approved by Columbia in foreign countries around the world. All study abroad programs, including Columbia-led study abroad programs, must be approved by the appropriate (<https://gs.columbia.edu/content/academic-advising/>)GS Study Abroad Advisor. For study abroad-related questions, please email gsstudyabroad@columbia.edu.

ELIGIBILITY

- You must be an enrolled student in good academic and disciplinary standing with a minimum cumulative GPA of 3.0. You must maintain a 3.0 GPA during the semester before you go abroad.
- You must meet the prerequisites of your chosen program. Please be aware of any disciplinary and language requirements;
- If you are on leave or withdraw from the term in which you are applying to study abroad your application you will not be eligible to study abroad and any prior approval will be rescinded.
- All incomplete or AR grades must be resolved before departure for program
- Students can study abroad for a maximum of three semesters
- Studying abroad in your final semester requires special permission and is typically only possible for Columbia-Led programs. This will result in a delayed graduation date as your degree cannot be conferred until we have received your transcripts.

Additional Fall, Spring and Academic Year Requirements

- Students are required to have a minimum of 56 points earned toward the degree and have declared a major.
- Students must have demonstrated an academic interest in the region where they plan to go abroad. Students can show this interest through relevant language study, taking a course that focuses on the region of the host country, or taking a course in a discipline directly related to the focus of the study abroad program.
- Students must take at least one course while abroad towards their major or towards their core requirement. . Students may petition this requirement if they have completed their core and their major requirements.
- Prior to going abroad, students are expected to have begun language study and completed university writing.

Additional Summer Requirements

Students must be registered for two semester at General Studies before departing on a study abroad program.

REASONS FOR RESCINDED DECISIONS:

Study abroad approval may be automatically rescinded if a student's grade point average falls below 3.0, if a student fails to meet good academic and/or disciplinary standing, or if a student has an Incomplete in coursework the term immediately prior to departure. **Students must be registered in the program prior to departure. If the student cannot be registered in the course, their clearance may be rescinded.** Other conditions as imposed by the GS Study Abroad advisor and/or Dean of Students may apply.

COURSE APPROVAL AND LIMIT OF TRANSFER CREDITS

Credits from non-Columbia programs may be counted toward the GS degree, however, a student's total number of transfer credits may not exceed 60. Please review the UGE website for more information on Academic Credit (<https://global.undergrad.columbia.edu/studyabroad/steps/credit/>).

Transfer Credits

- To be eligible to transfer to Columbia, courses must be pre-approved by the General Studies Study Abroad advisor. Approved courses will count towards the 124 credits required for graduation. Students must complete the General Studies course approval questionnaire, located on the UGE website's online application.
- Credit is **not** granted for courses taken on a Pass/Fail basis.
- Only courses in which a grade of **C** or higher is earned are eligible for transfer credit.
- Credit is **not** granted for courses in business, education, journalism, or other subjects at Columbia's professional schools.

Major Course Approval

- If a student wishes to have courses from a particular study abroad program count toward major requirements in a department, the student must consult the relevant academic department separately for approval. Courses that are not approved by GS for transfer credit cannot be counted by a department toward major or concentration requirements.

IMPORTANT DATES:

Program application deadlines vary by program. Some program application deadlines are quite early and can be up to a year in advance of the term you will be studying abroad. You must meet both campus and program deadlines, so be sure to apply early.

Study Abroad Clearance Deadlines

Spring Semester: October 1

Fall Semester: March 1

Academic Year: March 1

Summer Semester: Please check the program's website. Most range between February 1 and May 1.

Global Core Petition Deadlines

- October 1
- March 1
- July 1

STUDYING ABROAD IN YOUR LAST SEMESTER AT GS

Seniors who elect to study abroad while completing their last semester of coursework for the degree must meet with their respective GS advisors to apply for graduation prior to going abroad. This option is typically only open for students attending Columbia-led study abroad programs. Students should note that their degree conferral date may depend on the actual completion date of the study abroad program, especially for those programs wherein the academic calendar ends later than the Columbia University Arts & Sciences Calendar.

STUDY ABROAD FEE

Students studying abroad on Columbia-Approved programs are charged an administrative fee of \$750 per semester (summer study counts as one semester.)

STUDY AWAY FROM COLUMBIA

After matriculating at General Studies, permission to take courses toward the GS degree at an accredited U.S. institution of higher education other than Columbia is granted by special petition only in exceptional cases when critical areas of study relevant to a student's undergraduate program are not available at Columbia. Such exceptional accommodations are usually granted only once during a student's degree program at GS. Students petitioning for this exception must be in good standing at Columbia. Credits from non-Columbia programs will be counted toward the GS degree as long as the maximum number of allowable transfer credits does not exceed 60.

PETITIONING TO TAKE COURSES AWAY FROM COLUMBIA

With the exception of approved study abroad programs, GS rarely approves petitions for students to have credits from another academic institution count toward the GS degree after a student has matriculated at GS. Students who believe they have exceptional reasons to submit such a petition should meet

with their respective GS advisors. Petitions to take courses away from Columbia must be made in advance of the study away program; credit will not be granted retroactively. As part of the formal petition process, students will also be required to provide departmental approval from their major departments for any courses taken away from Columbia that they wish to count towards their major requirements.

Students may not enroll concurrently at another academic institution unless such dual enrollment has been authorized by the GS Dean of Students Office; such work will not count toward the GS degree unless approved in advance.

STUDY WITHIN COLUMBIA'S GRADUATE AND PROFESSIONAL SCHOOLS

Professional Schools (p. 444) | Cross-Registration Policies (p. 445) | Limit on Courses Counted Toward Degree (p. 445) | Joint and Combined Programs (p. 445)

GRADUATE AND PROFESSIONAL SCHOOLS

A limited number of courses in Columbia's graduate and professional schools are open to undergraduates. Students may take a maximum of two courses (6 points) for elective credit in professional courses toward the 124 points necessary for their degree. Those students who wish to take a graduate or professional course and not count it toward the 124 points necessary for the undergraduate degree should review this option with their respective GS advisors. In addition, the following Columbia graduate and professional schools offer undergraduate level courses specifically designed for undergraduate students, for which no cross-registration process is needed: School of the Arts, School of Journalism, and Mailman School of Public Health.

To enroll in a course at one of Columbia's graduate or professional schools, students must have approval from GS. Students should consult their GS advisors to request a cross-registration petition form, which is required as part of the approval and registration process. Students must follow the cross-registration policies established by the various graduate and professional schools, must have permission to enroll from the instructor of the course, and in some instances must have the permission of the school in which the course is offered. A student must have completed one semester and 15 points of Columbia coursework and be in good standing within GS to be eligible to petition for coursework in another school. If a course is cross-listed within the course offerings of an undergraduate program or department, students do not need to file a special petition.

Students who enroll in graduate or professional courses with the permission of GS are still bound by GS policies regarding drops, withdrawals, Pass/D/Fail, and incompletes. Students are not permitted to hand in coursework after the official end of term, even if the graduate-level course permits or encourages extensions, unless the student has been approved for an incomplete (see G (<http://bulletin.columbia.edu/general-studies/undergraduates/academic-policies/grades/#incomplete>) in Academic Policies). All work for these courses must be completed within the term in which the student is enrolled.

In every instance of cross-registration in one of the graduate or professional schools, GS students must complete the Cross-registration Petition (<https://gs.columbia.edu/sites/default/files/content/Documents/columbia-gs-cross-registration-petition.pdf>) and be approved by the appropriate offices. Following is a list of schools that allow undergraduates to register for courses and their policies regarding enrollment of GS students. Students interested in cross-registering into a school not on this list should consult their GS advisors.

CROSS-REGISTRATION POLICIES

Barnard: Cross-registration into Barnard courses has no restrictions unless so indicated in specific programs and course descriptions. Barnard students have priority of enrollment over Columbia students in all Barnard courses.

Barnard Education Program: Courses in the Barnard Education Program are open only to students who have been admitted to the program.

The Fu Foundation School of Engineering and Applied Science: Cross-Registration into Engineering courses has no restrictions unless so indicated in specific programs or course descriptions. In such cases, a maximum of two courses may be taken on a space-available basis. This limit does not apply to students in the 3-2 Combined Plan program (<http://www.studentaffairs.columbia.edu/admissions/engineering/combined/>) or to computer science majors or concentrators.

Graduate School of Architecture, Planning, and Preservation: Lectures may be taken on a space-available basis by qualified undergraduates. Undergraduates are not allowed to enroll in any seminars or studio courses.

Graduate School of Arts & Sciences: Qualified undergraduates may take graduate-level courses in the department in which they are majoring with the permission of the instructor and the director of undergraduate studies in the department. Qualified students who wish to take graduate-level courses outside their major must have the permission of the instructor and their GS advisors, as indicated on the GS cross-registration form.

Mailman School of Public Health: Students who have been accepted into the GS/Mailman Accelerated MPH program may

cross-register for one elective course at Mailman during their senior undergraduate year. The course will count toward the undergraduate degree.

School of the Arts: Graduate courses may be taken on a space-available basis by qualified undergraduates.

School of International and Public Affairs: Normally SIPA courses may only be taken by students in one of the approved five-year combined degree programs (<http://new.sipa.columbia.edu/academics/programs/columbia-dual-degree-programs/the-five-year-program/>). In exceptional cases, other students may be allowed to enroll in a particular course, but must have signed permission from the SIPA Student Affairs office on the 6th floor of the IAB.

School of Journalism: Courses may be taken on a space-available basis, but this option is usually restricted to seniors. Students must have signed permission from the School of Journalism Office of the Associate Dean of Academic Affairs, 407E Journalism.

Teachers College: In general, GS students are not allowed to register for courses at TC. Most inquiries about course registration at TC relate to their offerings in musical instruction and conflict resolution; GS students are directed to enroll in courses offered in these fields through Columbia's Faculty of the Arts & Sciences. GS students cannot enroll in music instruction courses at TC. Petitions for other coursework at TC to count toward the GS degree must be submitted to the Committee on Academic Affairs through the student's GS advisor.

LIMIT ON GRADUATE AND PROFESSIONAL COURSES COUNTED TOWARD THE DEGREE

GS students are permitted only 6 points of graduate or professional studies coursework toward their GS degrees. Those 6 points may be counted in transfer credits or courses completed at Columbia, or a combination thereof. Exceptions to this rule include GS students accepted into the combined programs with Columbia's Schools of Business, Law, Social Work, or International and Public Affairs.

JOINT AND COMBINED PROGRAMS

GS supports several dual-, combined-, and joint-degree programs with Columbia's graduate and professional schools. Students must be specially nominated for these programs and only highly qualified candidates will be considered. The minimum requirements for a nomination for most of these highly competitive programs include a minimum GPA of 3.5, a minimum of 60 points completed toward the degree (of which at least 30 letter-graded points must have been earned at GS), and satisfactory and relevant professional experience.

Students are normally expected to complete their core requirements and be a declared major prior to enrollment in combined programs. More information about the application process and requirements for these programs will be provided to qualified students. Following are the schools and programs to which GS may recommend highly qualified candidates for combined degrees:

- The Fu Foundation School of Engineering and Applied Science (<http://www.studentaffairs.columbia.edu/admissions/engineering/combined/>)
- Mailman School of Public Health (<https://www.mailman.columbia.edu/academics/degrees/dual-degrees/>)
- The School of International and Public Affairs (<https://sipa.columbia.edu/academics/dual-degree-programs/columbia-dual-degree-programs/>)
- The Graduate School of Arts and Sciences (<https://gsas.columbia.edu/degree-programs/admissions/bama-option/>)
- Columbia Law School (<http://www.law.columbia.edu/admissions/jd/jd-admissions-lead-program/>)

Contact

Qualified students should discuss their interest in one of these programs with their advising dean (<https://gs.columbia.edu/content/academic-advising/>) and attend the information sessions about these programs sponsored by the Dean of Students Office and the individual schools.

COLUMBIA LAW SCHOOL PROGRAMS

The Columbia Law School LEAD Fellowship Program affords highly qualified juniors and seniors from Columbia College, Barnard College, SEAS, and General Studies the opportunity to matriculate at Columbia Law School after pursuing and completing an approved, two-year commercial or non-profit venture. Prospective students will apply in their junior or senior years and, as part of the application process, describe their plan to engage in a non-profit or entrepreneurial project or venture. Once accepted, students will pursue the approved opportunity for two years following graduation, and then begin their studies at Columbia Law School. Accepted applicants will receive a grant of up to \$10,000 in support of their two-year project. LEAD Fellows can pursue other employment opportunities or graduate study in the two-year period prior to matriculating at the Law School.

Eligibility

Currently, only undergraduates enrolled at Barnard, Columbia College, SEAS, and General Studies are eligible to apply to the program. Competitive applicants will have a GPA

of 3.8 or higher and meet the admissions criteria (<http://www.law.columbia.edu/admissions/jd/apply/philosophy/>).

Application for Admission

Students should consult their advising dean and GS law school advisor as soon as they are interested in the program to discuss their candidacy. Please see below for the following application steps.

- In the fall or winter of the application year, students should attend any information sessions regarding the LEAD program
- Register with LSAC.org (<https://os.lsc.org/Logon/Access.aspx>)
- Begin application for LEAD program. Application must be completed by May 1 of application year. Updated applications and preview application can be found on the LEAD Program website (<http://www.law.columbia.edu/admissions/jd/jd-admissions-lead-program/>)
- Begin drafting Project Plan and personal statement/ essay in consultation with GS law school advisor. Please see here (<http://www.law.columbia.edu/admissions/jd/LEAD-FAQ/>) for additional information.
- Prepare resume/CV
- LSAT or GRE scores must be received by May 1 of the application year
- Obtain two faculty/academic letters of recommendation (no more than three will be considered)
- Obtain Dean's Certification from GS law school advisor

Please see the LEAD Program website for additional information (<http://www.law.columbia.edu/admissions/jd/jd-admissions-lead-program/>) regarding the application timeline, process, and requirements, as well as frequently asked questions (<http://www.law.columbia.edu/admissions/jd/LEAD-FAQ/>).

Once Admitted

Students will be notified of acceptance by July 1. They will be required to sign the LEAD Program contract (preview available (http://www.law.columbia.edu/sites/default/files/microsites/admissions/jd/files/2018/lead_contract_final_11-21-update.pdf)).

Upon accepting the offer of admission, students are obligated to enroll at Columbia Law School after the conclusion of the two-year mandatory gap period.

Accelerated Interdisciplinary Legal Education (AILE) Program

The Accelerated Interdisciplinary Legal Education (AILE) Program affords highly qualified, exceptional undergraduate student the opportunity to earn the BA and JD degrees in six years. Accepted students must have completed at least 93 credits and all core and major requirements, and are admitted after completion of their junior year. Typically, transfer students

and students who have completed less than six semesters at Columbia are not eligible for the program. Students must be nominated for consideration by their school; applications are reviewed and accepted by the Columbia Law School Admissions Committee.

Contact Information

For additional information, please contact the GS law school advisor, Tiffany Decker (td2503@columbia.edu.).

GSAS BA/MA OPTION

The Columbia Graduate School of Arts and Sciences (GSAS) affords highly qualified Columbia undergraduate students the opportunity to pursue and obtain a Masters of Arts (MA) degree in an academic discipline of their choice (<https://gsas.columbia.edu/bama-option/>). Accepted students will receive their offer of deferred admission in their junior or senior year.

Degree Offerings

The BA/MA option (<https://gsas.columbia.edu/degree-programs/admissions/bama-option/>) is available in the following academic disciplines:

- African-American Studies (<https://gsas.columbia.edu/degree-programs/ma-programs/african-american-studies/>)
- Classical Studies (<https://gsas.columbia.edu/classical-studies/>)
- Climate and Society (<https://gsas.columbia.edu/climate-and-society/>)
- East Asia: Regional Studies (<https://gsas.columbia.edu/east-asia-regional-studies/>)
- East Asian Languages and Cultures (<https://gsas.columbia.edu/degree-programs/ma-programs/east-asian-languages-and-cultures/>)
- European History, Politics and Society (<https://gsas.columbia.edu/modern-european-studies/>)
- Global Thought (<https://gsas.columbia.edu/global-thought/>)
- Human Rights Studies (<https://gsas.columbia.edu/human-rights-studies/>)
- Islamic Studies (<https://gsas.columbia.edu/islamic-studies/>)
- Jewish Studies (<https://gsas.columbia.edu/jewish-studies/>)
- Latin American and the Caribbean: Regional Studies (<https://gsas.columbia.edu/latin-america-and-caribbean-regional-studies/>)
- Latin American and Iberian Cultures (<https://gsas.columbia.edu/hispanic-cultural-studies/>)
- Oral History (<https://gsas.columbia.edu/oral-history/>)
- Philosophy (<https://gsas.columbia.edu/philosophy/>)
- Political Science (<https://gsas.columbia.edu/political-science/>)

- Quantitative Methods in the Social Sciences (<https://gsas.columbia.edu/quantitative-methods-social-sciences/>)
- Religion (<https://gsas.columbia.edu/religion/>)
- Russia, Eurasia, and Eastern Europe: Regional Studies (<https://gsas.columbia.edu/russia-eurasia-and-east-europe-regional-studies/>)
- Sociology (<https://gsas.columbia.edu/sociology/>)
- South Asian Studies (<https://gsas.columbia.edu/south-asian-studies/>)
- Statistics (<https://gsas.columbia.edu/statistics/>)

Curriculum

Upon acceptance to the BA/MA program and in consultation with the Director of Graduate Studies (DGS), accepted students may enroll in graduate level classes during the final semesters of their undergraduate studies. This coursework will apply to their MA program requirements upon completion of the BA and matriculation at GSAS. BA/MA students may be granted up to 9-12 credits of transfer credit and up to 0.50 residence units (RU) for graduate courses that exceed the 124-credit requirement for the Columbia and Barnard undergraduate degree. These courses may not be applied to fulfill requirements for the undergraduate major, concentration, or general education requirements. One quarter (.25) RU will be granted to students transferring fewer than 9 credits.

Admissions

Undergraduate students interested in the BA/MA option are advised to consult the DGS and their GS academic advisor in the earlier stages of their undergraduate degree, prior to applying. Applications should be submitted by the semester prior to the one during which students will begin taking classes that will be applied to their MA. Students will not be eligible to apply during their final semester of the senior year to the BA/MA option. At that juncture, they may apply for regular admission to the MA program of their choice using the GSAS online application (<https://apply.gsas.columbia.edu/apply/>). Applicants interested in the BA/MA option should not apply to the program using the regular admissions application found on the GSAS website.

Admission Deadlines

Please refer to the following admissions deadlines (<https://gsas.columbia.edu/degree-programs/admissions/bama-option/>).

Contact Information

For more information regarding the BA/MA option (<https://gsas.columbia.edu/degree-programs/admissions/bama-option/>), students should contact their respective undergraduate academic advisor and/or relevant DGS.

MAILMAN SCHOOL OF PUBLIC HEALTH MPH PROGRAM

MAILMAN SCHOOL OF PUBLIC HEALTH

The Columbia University Mailman School of Public Health (<http://www.mailman.columbia.edu/>) allows highly-qualified General Studies undergraduate and Postbaccalaureate Premedical students to pursue several graduate programs of study in the field of public health. Students interested in the Columbia MPH degree (<https://www.mailman.columbia.edu/people/current-students/academics/degree-requirements/mph/columbia-mph/>) may pursue one of two degree pathways depending on their interests or eligibility: either the Columbia MPH program (<https://www.mailman.columbia.edu/people/current-students/academics/degree-requirements/mph/columbia-mph/>) completed in two full academic years, or the Accelerated MPH program (<https://www.mailman.columbia.edu/people/current-students/academics/degree-requirements/mph/accelerated-mph/>) completed in three academic semesters. Applicants interested in the Accelerated MPH program (<https://www.mailman.columbia.edu/people/current-students/academics/degree-requirements/mph/accelerated-mph/>) must have at least two years of substantial health-care related work experience at the time of application.

Students interested in Environmental Health Sciences may apply to the Masters of Science degree with a track in Toxicology. (<https://www.mailman.columbia.edu/become-student/degrees/masters-programs/master-science/toxicology/>)

Additionally, GS undergraduate and postbac students may enroll in some of the courses offered at the Mailman School while they are matriculated at General Studies.

There are several advantages of applying to the available programs at the Mailman School of Public Health for GS students.

- Mailman will waive the GRE requirement for students with a minimum undergraduate GPA of 3.5.
- Mailman will waive the application fee for GS students.
- Mailman will help place accepted students in clinical and research settings with Mailman faculty prior to the start of their graduate program.
- Mailman will guarantee enrollment in the undergraduate public health courses that are part of the special concentration in public health to students who have received early acceptance to a Mailman program.

Interested applicants are strongly encouraged to attend the information sessions conducted by the Mailman School of

Public Health (<https://www.mailman.columbia.edu/>) during New Student Orientation Week and other times in the fall semester.

MAILMAN SCHOOL OF PUBLIC HEALTH MPH PROGRAM

Program Overview

The Columbia MPH program trains students to analyze and resolve public health challenges and phenomenon on the local, national, and international levels. Students gain foundational knowledge in public health history and methodology during their first year, and spend their second year honing their expertise in a particular field through departmental course work and the completion of the certificate concentration (<https://www.mailman.columbia.edu/people/current-students/academics/certificates/>). Practicum training affords students the opportunity to apply the knowledge and skills acquired in the first year to a real work setting.

Curriculum

The two-year degree program (<https://www.mailman.columbia.edu/people/current-students/academics/degree-requirements/mph/columbia-mph/>) follows a carefully constructed trajectory of six components.

Students begin the program by immersing themselves in the Mailman Core Curriculum (<https://www.mailman.columbia.edu/academics/degrees/master-public-health/core-curriculum/>), which offers grounding in the history and methods of public health, as well as foundational studies of biological and environmental determinants of health; social, behavioral, and structural determinants of health; methods for public health research and programming; and health systems.

During the summer following the completion of their first spring semesters, students participate in a practicum, during which they apply their skills and knowledge in a real world setting.

In the second year, students develop subject expertise by completing the requirements of their chosen certificate program, as well as the requisite departmental and core requirements needed to graduate. Certificate choices are typically made during the admissions application, although students may elect to defer that decision until the first semester of enrollment.

Admissions

Eligibility

Competitive applicants typically have a minimum cumulative 3.5 undergraduate GPA. Undergraduate students interested in applying in their junior year should have declared a major and completed their core requirements. Postbac students may apply at any point during their studies. Postbac applicants must attain

a minimum score of B+ for the mathematics and statistical course requirements.

Application Requirements

The following materials must be submitted as part of the required application:

- Required Application | Apply Here (<http://apply.mailman.columbia.edu/apply/?sr=aea5c491-ca84-47f8-b05a-3f2aa8f5a33b/>) | SOPHAS Application Service (<http://www.sophas.org/>)
- Application fee waived for GS students.
- GRE scores if the applicant's undergraduate GPA is less than 3.5
- 500 word personal statement describing interest in the program
- Three letters of recommendation from faculty or supervisors
- IELTS or TOEFL scores for international students only
- CV or resume
- Academic transcripts from all previous undergraduate institutions, including GS
- Students applying to the two-year Columbia MPH program can choose to identify a certificate (<https://www.mailman.columbia.edu/become-student/degrees/masters-programs/masters-public-health/columbia-mph/certificates/>) choice.

Admissions Deadlines

- Priority Deadline- December 1st
- General Deadline- January 1st
- Early Application Option: Mailman will accept early applications for qualified students from the School of General Studies in their junior year who are applying to the two-year MPH program.

Please see here (<https://www.mailman.columbia.edu/become-student/how-apply/>) for more information regarding admissions eligibility, application requirements, admissions timelines, financial aid, and tuition and fees.

Contact

For more information on the Columbia MPH Program, students should contact Juli Parker (jp3600@cumc.columbia.edu) at the Mailman School of Public Health and the GS graduate school advisor (td2503@columbia.edu).

MAILMAN SCHOOL OF PUBLIC HEALTH ACCELERATED MPH PROGRAM

Program Overview

The Accelerated MPH program is available only to students who have at least two years of substantial healthcare

experience. Qualified GS students may study for and receive a Master of Public Health (MPH) degree during the year following graduation from GS by pursuing the Mailman Accelerated MPH (<https://www.mailman.columbia.edu/become-student/degrees/masters-programs/master-public-health/accelerated-mph/>) through the General Public Health (<http://publichealth.columbia.edu/degree-programs/accelerated-mph/general-public-health/>) Program (<https://www.mailman.columbia.edu/academics/degrees/master-public-health/accelerated-mph/general-public-health/>). The General Public Health (<http://publichealth.columbia.edu/degree-programs/accelerated-mph/general-public-health/>) Program (<https://www.mailman.columbia.edu/academics/degrees/master-public-health/accelerated-mph/general-public-health/>) offers students broader participation in the field of public health as well as formal training in the methods and substantive areas of public health; moreover, it provides a superb foundation for medical education. The General Public Health (<http://publichealth.columbia.edu/degree-programs/accelerated-mph/general-public-health/>) Program (<https://www.mailman.columbia.edu/academics/degrees/master-public-health/accelerated-mph/general-public-health/>) also includes a practicum experience, which provides students with opportunities to apply their academic training within a work setting.

Curriculum

The structure of the one-year degree program (<http://publichealth.columbia.edu/degree-programs/accelerated-mph/>) includes five components, carefully timed and integrated, so that learning in one part of the program informs activities and assignments in another.

Students begin the program by immersing themselves in the Mailman Core Curriculum (<https://www.mailman.columbia.edu/academics/degrees/master-public-health/core-curriculum/>), which offers grounding in the history and methods of public health, as well as foundational studies of biological and environmental determinants of health; social, behavioral, and structural determinants of health; methods for public health research and programming; and health systems.

Rather than focus on a single discipline within public health, students in the General Public Health track (<http://publichealth.columbia.edu/degree-programs/accelerated-mph/general-public-health/>) draw their coursework from departments throughout the Mailman School.

In addition, each student is expected to develop and demonstrate improved skills in a technical area, such as research design, program evaluation, health education, health program planning, or administration, as well as select from the School's curriculum, in consultation with their academic advisor, those courses that help meet this objective.

Admissions

Eligibility

Students are eligible to apply for this program if they:

- have completed the Core curriculum, declared a major, and maintained an undergraduate cumulative GPA of at least 3.0
- have received a grade of B+ or better in University Writing (undergraduate students)
- have received a grade of B+ in mathematics and statistics courses (postbac students)
- have taken a mathematics or statistics course at Columbia
- have a minimum of two years of work experience in a health-related field

Application Requirements

The following materials must be submitted as part of the required application:

- Required Application | Apply Here
- GRE scores if the applicant's undergraduate GPA is less than 3.5
- 500 word personal statement describing interest in the program
- Three letters of recommendation from faculty or supervisors
- IELTS or TOEFL scores for international students only
- CV or resume
- Academic transcripts from all previous undergraduate institutions, including GS

Admissions Deadlines

- Priority Deadline- December 1st
- General Deadline- January 1st

Please see here (<https://www.mailman.columbia.edu/become-student/how-apply/>) for more information regarding admissions eligibility, application requirements, admissions timelines, and tuition and fees.

Contact

For more information on the Accelerated MPH Program, students should contact Juli Parker (jp3600@cumc.columbia.edu) at the Mailman School of Public Health and the GS graduate school advisor (td2503@columbia.edu).

MAILMAN SCHOOL OF PUBLIC HEALTH MS IN ENVIRONMENTAL SCIENCES- TOXICOLOGY

Program Overview

The Department of Environmental Health Sciences (<https://www.mailman.columbia.edu/become-student/departments/environmental-health-sciences-ehs/>) at the Mailman School of

Public Health (<https://www.mailman.columbia.edu/become-student/departments/environmental-health-sciences-ehs/>) offers students the opportunity to obtain the MS degree with a track in Toxicology (<https://www.mailman.columbia.edu/become-student/degrees/masters-programs/master-science/toxicology/>). The program will train students to understand and communicate the effects of exposure to toxic substances from the environment on human health, assess risk and vulnerabilities, devise strategies to minimize exposure, and develop remedies in response to exposure to environmental hazards. In addition to a robust curriculum that prepares students to address the most current topics and methods such as Computational Toxicology, students will have opportunities to gain hands-on experience during their practicum and thesis project. Students will learn laboratory methods in a semester-long lab-based course, gain quantitative skills and receive a Hazardous Waste Operations and Emergency Response (HAZWOPER) certification as part of their Industrial Hygiene course. Upon graduation from the program, students will have the knowledge and expertise to pursue careers within governmental and nongovernmental agencies, industries, and academic or research institutions.

This 12-month MS degree program in Toxicology (https://www.mailman.columbia.edu/become-student/degrees/masters-programs/master-science/toxicology?utm_medium=email&utm_source=mailchimp&utm_campaign=ny) from the Mailman School of Public Health is ideal for postbac students seeking to add valuable skills and credentials to their portfolio during their gap year. Students can enroll in an EHS course during their second year of the postbac program. (The course can count towards the MS required credits.)

Curriculum

Students in the MS Toxicology program will complete a minimum of 40 credits of course work. The requisite three-month practicum will provide students with professional experience in a real work setting, and the mandatory master's research thesis will afford students research training. Please refer to the complete list (<https://www.mailman.columbia.edu/academics/degree-requirements/ms/toxicology/>) of required courses for additional information.

Admissions

Eligibility

Competitive applicants to the MS in Toxicology program should have a strong academic foundation in chemistry and biology. Applicants typically have a strong GPA.

Application Requirements

The following materials must be submitted as part of the required application:

- Required Application | Apply Here (<http://apply.mailman.columbia.edu/apply/?sr=aea5c491-ca84-47f8-b05a-3f2aa8f5a33b/>) | (<http://>

apply.mailman.columbia.edu/apply/?sr=aea5c491-ca84-47f8-b05a-3f2aa8f5a33b/) SOPHAS Application Service (<http://www.sophas.org/>)

- GRE scores if the applicant's undergraduate GPA is less than 3.5
- 500 word personal statement describing interest in the program
- Three letters of recommendation from faculty or supervisors
- IELTS or TOEFL scores for international students only
- CV or resume
- Academic transcripts from all previous undergraduate institutions, including GS

Admissions Deadlines

The deadline for admission to the MS Program in Toxicology is June 1st for enrollment in the subsequent fall semester.

Please see here (<https://www.mailman.columbia.edu/become-student/how-apply/>) for more information regarding admissions eligibility, application requirements, admissions timelines, and tuition and fees.

Contact

Nina Kulacki (njk2128@cumc.columbia.edu) at the Mailman School of Public Health can provide program (<https://www.mailman.columbia.edu/become-student/degrees/masters-programs/master-science/toxicology/>) specific information. Students should also contact the GS graduate school advisor (td2503@columbia.edu).

MAILMAN SCHOOL OF PUBLIC HEALTH GATEWAY COURSES

GS undergraduate and postbac students will have the opportunity to enroll in courses offered at the Mailman School of Public Health while they are still matriculated at GS. These courses might include:

- POPF P8607 - Health and Human Rights Advocacy
- SOSC P8715 – Resolving Global Intractable Challenges: Frameworks, Innovations, and Change
- SOSC P6788 – Contemporary Issues & Innovations in Global Health Communication
- SOSC P8905 – Evidence and the Politics of Health Policy
- HPMN P8577 – Global Mental Health Policy

SEAS COMBINED PROGRAM

Columbia Engineering Combined Program (3-2 or 4-2 Program)

The Columbia Engineering (SEAS) combined program affords highly qualified students at Barnard, Columbia

College, General Studies, and other affiliated institutions the opportunity to obtain a BA from their undergraduate school and a BS in Engineering from SEAS. Applicants may apply in their junior (3-2 program) or senior year (4-2 program). Students will complete the requirements for the BA degree at their home undergraduate institution and then obtain a BS in Engineering from SEAS over the course of a subsequent two-year period.

Eligibility

- Students must be enrolled full-time for the past two years at their undergraduate institution (for students who began at their home school in fall 2011 or later). For students who began at their undergraduate institution in fall 2016 or later, they must be in residence for three years.
- A minimum 3.5 GPA
- A minimum 3.3 pre-engineering GPA
- Minimum grade of B or 3.0 for each engineering course in the first attempt
- Three letters of recommendation from the following: GS advising dean, math instructor, science instructor
- Successful completion of all prerequisite science and math courses for intended major at SEAS in the semester preceding the intended semester of enrollment at SEAS
- Completion of all core and major requirements for the BA at General Studies in the semester preceding the intended semester of enrollment at SEAS
- Demonstrated English language proficiency (<http://undergrad.admissions.columbia.edu/apply/combined-plan/>)
- Satisfactory disciplinary and academic standing at General Studies

Students should refer to the Curriculum Guide (<http://undergrad.admissions.columbia.edu/apply/combined-plan/>) issued for the year they began their undergraduate studies for specific curricular, admissions, and residency requirements.

Application for Admission

Interested applicants should consult with their advising deans. GS students must have completed the requirements delineated above in the semester preceding their intended first semester at SEAS. Please see the Combined Plan Program Admissions (<http://undergrad.admissions.columbia.edu/apply/combined-plan/>) for the current application and deadlines.

Contact Information

For more information about the combined program with SEAS, please contact the Dean of Students Office (<https://gs.columbia.edu/academic-advising-gs/>).

SEAS MS EXPRESS PROGRAM

The MS Express program affords highly qualified undergraduate applicants from SEAS, Columbia College, Barnard, and General Studies the opportunity to apply to any MS program in engineering at SEAS and matriculate in the semester immediately following their graduation. Interested eligible alumni of these schools may also apply within three years of graduation.

Advantages of the Program

- Eligible students may begin fulfilling the requirements for the graduate degree during their senior years, provided that these courses will not be used to fulfill the requirements for the undergraduate degree, thereby reducing the time required to complete the graduate degree.
- Advanced courses have the same prerequisites that students may have fulfilled while taking science and engineering courses as undergraduates
- During their senior year of their undergraduate program, students may save tuition by taking graduate classes while paying the undergraduate tuition rate.
- A summer project, completed during the summer semester immediately following graduation, may count towards the MS degree if the student is able to obtain the supervision and approval of a faculty/departmental advisor. This project may not be used to fulfill the requirements of the undergraduate degree.

Eligibility

Competitive candidates will have all of their core requirements, engineering course prerequisites, and all (or nearly all) of their major requirement completed by their senior year, and have a minimum cumulative GPA of 3.5.

Application for Admission

Interested applicants should consult with their advising deans. The early consideration application deadline is November 1 for beginning the graduate degree in the following fall semester. Students must complete the following application (<https://applynow.engineering.columbia.edu/security/login.aspx?a=y/>) and have the following documentation:

- Official transcripts (CU students do not have to send their transcripts)
- Personal statement
- Resume or CV
- Contact information for three references
- \$85.00 application fee (please see here for application fee waiver (<http://gradengineering.columbia.edu/application-fee-waivers/>))

Contact Information

For more information about the SEAS MS Express Program, please contact the Dean of Students Office (<https://gs.columbia.edu/academic-advising-gs/>). Additional information may also be found on the Graduate Engineering website (<https://gradengineering.columbia.edu/graduate-admissions/apply/>).

SIPA DUAL DEGREE PROGRAM

SIPA Dual Degree/5-Year Program

The Dual Degree program with the Columbia School of International and Public Affairs (SIPA) affords highly qualified undergraduate students from Barnard College, Columbia College, the School of General Studies, and the School of Engineering the opportunity to obtain their undergraduate degree and a Masters of International Affairs (MIA) or Masters of Public Administration (MPA) within five years.

Advantages of the Program

- Students complete their undergraduate and graduate degree within 5 years, as opposed to the traditional six-year trajectory.
- During the fourth year of the program, students save tuition by taking graduate classes while paying the undergraduate tuition rate.
- The GRE, application fee, and SIPA deposit are waived.

Curriculum

Accepted students will enroll in graduate level SIPA classes during their final year of undergraduate studies, in addition to any additional undergraduate classes that may be required to complete their undergraduate degrees (typically, 24 points). Most SIPA graduate level courses may be applied towards the MIA or MPA degrees. Additionally, these courses will count toward the 124 points required for the undergraduate degree. Upon matriculation at SIPA during their fifth/final year, students will complete their remaining coursework toward the 54 points needed to complete their graduate degree. Students are required to complete at least 30 credits, or two full-time semesters, in residence at SIPA, while fulfilling the requirements toward their MIA/MPA degree.

Eligibility

Competitive candidates will have all of their core requirements and major requirement completed by their third year, have a GPA that exceeds 3.5, and will not have accrued more than 100 credits. Applicants are encouraged to meet with their academic advisor as soon as they express an interest in the five-year program with SIPA to review and discuss their candidacy. Completion of considerable coursework in

economics, languages, mathematics, political science, and statistics is strongly preferred.

Application for Admission

Interested applicants must have their advising dean confirm their eligibility before they apply for the program. The application deadline is in early January, preceding the fall semester of enrollment, and early October for students interested in enrolling in the following spring semester. Students must complete the following application (<https://apply.sipa.columbia.edu/apply/>).

Contact Information

For more information, please contact the Dean of Students Office. (<https://gs.columbia.edu/academic-advising-gs/>) Additional information may also be found on the SIPA website (<https://sipa.columbia.edu/academics/dual-degree-programs/>).

TRANSFER CREDIT

TRANSFER CREDIT POLICY

All BA candidates are eligible to transfer up to 60 of the 124 points required for graduation. Admitted students may transfer credit only from the institutions listed on the application for admission at the time the application is submitted to the Office of Admissions. Coursework from institutions not listed on the application for admission will not be considered for transfer credit. Transcripts from all institutions previously attended must be listed on the application form and submitted to the School of General Studies. Failure to report and send transcripts from all schools previously attended is considered academic dishonesty and may result in disciplinary action including rescinding the offer of admissions. In all cases, all transfer credit must be finalized within six months of matriculation.

In general, the School grants transfer credit for a course that satisfies the following criteria:

- It was taken at an accredited college or university.
- It is an academic class consistent with the General Studies curriculum. (Please note: as part of the undergraduate degree program, Columbia University does not offer online courses for credit; therefore, online courses are not eligible for transfer credit.)
- It carries a grade of “C” or higher and is documented by an official transcript.
- It is not a “mini” or intersession course (however, coursework completed during a summer session *is* eligible for transfer credit evaluation).
- The course was not taken after the student matriculated at the School of General Studies. This policy does not apply to students enrolled in the Joint Program with the Jewish

Theological Seminary or students enrolled in Columbia-approved study abroad programs. In exceptional cases, as specified in Study Away from Columbia (p. 444), students may petition the Dean of Students Office to accept coursework taken at another institution after matriculation.

The Office of Admissions and the Dean of Students Office determine the award of transfer credit. The Entrance Credit Report (ECR) and the Core Requirements Checklist specify both the total number of transfer credits awarded and the core requirements to which those credits may correspond. Both the ECR and the Core Requirements Checklist are usually contained within the admissions acceptance packet or sent separately soon after notification of acceptance. As noted on the ECR at the time of admission, some pending transfer credit may require further information such as course descriptions and/or syllabi.

Coursework Completed at Other Institutions During Deferral Period

Students who defer their offers of admissions and subsequently receive credit for coursework done elsewhere (between the date of their initial offer of admission and their matriculation at Columbia) may or may not receive Columbia transfer credit for that coursework. In all cases, students must notify the Office of Admissions of their intention to complete coursework at another institution during the deferral period. Failure to do so will result in the student not receiving credit for that coursework, and may also result in the review of the student's admission status. The Office of Admission reserves the right to rescind the offer of admission based on the results of this review.

Transfer Credit Toward the Major

Credits from other institutions of higher education do not automatically count toward fulfilling the Columbia major, although they may satisfy core requirements or be counted as electives. Transfer credits toward the major are accepted at the department's discretion and are not always approved. The Director of Undergraduate Studies in each department is authorized to accept up to 12 GS-approved transfer credits toward the major. Some departments accept a different transfer credit limit; students must check individual department policies concerning transfer credits.

Physical Education

While up to 60 transfer credits may be granted, no more than two credits of physical education will be accepted in transfer toward the degree.

Professional Courses

GS students are permitted only six transfer credits of professional studies coursework toward their GS degrees. Professional studies include both pre-professional and professional courses in law, business, or journalism, as well as any other courses clearly professional in orientation.

Any professional course that is listed or cross-listed as an undergraduate course with a Columbia Arts & Sciences department or the schools of business, journalism, public health, or international and public affairs, is excluded from the six-credit limit.

Non-Degree Coursework

Of the allowed 60 transfer credits, a maximum of 15 credits may transfer from Columbia's School of Professional Studies and Special Programs or any other accredited non-degree program.

Other Columbia Divisions

SEAS and Columbia College students considering a transfer to the School of General Studies should meet with their class deans to consider the implications of such a transfer. Students currently enrolled within CC or SEAS, or students who have been away from CC or SEAS for less than three years, must have the support of their academic deans before applying for admission to the School of General Studies; transfer applications to GS from CC or SEAS students will not be accepted without the written endorsement of the relevant school dean. The appropriate academic dean from CC or SEAS should consult with the GS dean of admissions in cases where the student is returning after a break of less than three years. In cases where the student has been away from CC or SEAS for more than three years, express support from the CC/SEAS academic dean is not required, but may be helpful in the admission process. In all cases, applicants to the School of General Studies must have a break of at least one academic year to be eligible to apply for admission, or have compelling personal or professional reasons to attend on a part-time basis.

Students transferring from another division of Columbia University (Columbia College, Barnard College, or the Fu Foundation School of Engineering and Applied Science) may receive up to 94 points in transfer credit toward Columbia GS degree coursework.

For information about taking courses in another division of the University while matriculated at the School of General Studies, see Study Within Columbia's Graduate and Professional Schools (p. 444).

Students interested in transferring to other Columbia University divisions should consult the Transfers within Columbia (p. 455) policy under Academic Policies.

Online Courses

As part of the undergraduate degree program Columbia University does not offer online courses for credit; therefore, online courses are not eligible for transfer credit. Courses will be understood as "online courses" if they are fully transacted online, with no face-to-face contact with the instructor.

Repeated Courses

Students who have received credit for a course at Columbia may not receive credit toward the degree for repeating the course unless the specific course description authorizes such repetition. A course taken at another college or university may be repeated at Columbia, but transfer credit for that course will be lost.

Advanced Credit by Examination

Advanced Placement

As determined by Columbia, students who have achieved satisfactory scores on the College Entrance Examination Board tests used in the Advanced Placement Program may be granted credit or be exempted from certain courses or requirements. Any credit will be considered part of the 60-credit transfer maximum. The following conditions apply:

- The relevant departments must approve the use of these examinations.
- Credit so earned is not granted until a student has demonstrated a capacity to do satisfactory advanced work in the overall program.
- Credit awarded under the Advanced Placement Program does not constitute part of the 64 points earned at Columbia required for the GS degree.

Specific details about subject test areas, scores, advanced credit, and placement status can be found under Advanced Placement Credit (p. 426).

International Baccalaureate

International Baccalaureate (IB) exams are offered at both the Higher and Subsidiary levels. The School of General Studies awards transfer credit only for exams taken at the Higher level. Transfer credit for O-level or AS-level exams is not awarded. No transfer credit is awarded for the "Theory of Knowledge" exam.

Students are awarded the equivalent of one semester of transfer credit (typically 3 points) in the relevant discipline for any Higher level exam in which they receive a score 6 or 7. Any transfer credit received, as determined by Admissions, will appear on the student's ECR and will be considered part of the 60-credit transfer maximum. The following conditions apply:

- The relevant departments must approve the use of these examinations.
- Credit so earned is not granted until a student has demonstrated a capacity to do satisfactory advanced work in the overall program.
- Credit awarded for International Baccalaureate Exams does not constitute part of the 64 points earned at Columbia required for the GS degree.

Contact Information

Applicants seeking further information or clarification about advanced placement and credit should contact the Admissions

Office at 212-854-2772. Students who have matriculated at GS should consult their GS advisor.

TRANSFERS WITHIN COLUMBIA

No student enrolled at the School of General Studies may submit an application as a new student to Columbia College or the School of Engineering and Applied Science while still enrolled in, on leave from, or suspended from the University.

Transferring from GS to another Columbia or Affiliated Undergraduate School

Undergraduates enrolled in the School of General Studies, including Joint Program students, who are interested in transferring to another Columbia or affiliated undergraduate school (Columbia College, the Fu Foundation School of Engineering and Applied Science (SEAS), Barnard College, or List College of the Jewish Theological Seminary) should not submit a transfer application to any of those schools without prior consultation with their respective GS advisors.

Transfer applications from GS to Columbia College, SEAS, or the Joint Program with List College will not be considered by those schools without a written endorsement from the GS Dean of Students. Endorsements are limited to those students in good standing who have sound academic reasons for seeking to transfer from GS. Joint Program students who are considering submitting a transfer application to one of the Columbia undergraduate schools, including GS, should also discuss the matter with their respective GS and JTS advisors; transfer to GS is not automatic for Joint Program students and requires a new application to GS through the Office of Admissions.

Transferring from CC/SEAS to GS

SEAS and Columbia College students considering a transfer to the School of General Studies should seek advice from their Class Deans. Students currently enrolled within CC or SEAS, or students who have been away from CC or SEAS for fewer than three years, must have the support of their academic deans before applying for admission to the School of General Studies; transfer applications to GS from CC or SEAS students will not be accepted without the written endorsement of the relevant school dean. The appropriate academic deans from CC or SEAS should consult with the GS Dean of Admissions on cases where the student is returning after a break of fewer than three years. In cases where the student has been away from CC or SEAS for more than three years, express support from the CC/SEAS academic dean is not required, but may be helpful in the admission process. In all cases, applicants to the School of General Studies must have a break of at least one academic year

or have compelling personal or professional reasons for part-time attendance to be eligible to apply for admission.

Applying to Other Undergraduate Schools of Columbia University

Applicants may not simultaneously apply to the School of General Studies and to the other undergraduate divisions of Columbia University, Columbia College (CC) or the Fu Foundation School of Engineering and Applied Science (SEAS). Candidates are also ineligible to apply to the School of General Studies if in the last three years they applied to either of these divisions and were not accepted.

VETERANS BENEFITS AND TRANSITION ACT

In accordance with Title 38 US Code 3679 subsection (e), this school adopts the following additional provisions for any students using U.S. Department of Veterans Affairs (VA) Post 9/11 G.I. Bill[®] (Ch. 33) or Vocational Rehabilitation and Employment (Ch. 31) benefits, while payment to the institution is pending from the VA. This school will not:

- Prevent nor delay the student's enrollment;
- Assess a late penalty fee to the student;
- Require the student to secure alternative or additional funding;
- Deny the student access to any resources available to other students who have satisfied their tuition and fee bills to the institution, including but not limited to access to classes, libraries, or other institutional facilities.

However, to qualify for this provision, such students will be required to:

- Produce the Certificate of Eligibility by the first day of class;
- Provide written request to be certified;
- Provide additional information needed to properly certify the enrollment as described in other institutional policies, as listed in Enrollment and Courseload (<http://bulletin.columbia.edu/general-studies/academic-policies/enrollment-and-courseload/>).

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