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/sample-schedule/#Traditional%20Sequence), part-time (http://bulletin.columbia.edu/general-studies/postbaccalaureate-premedical-program/sample-schedule/#Part-time%20Sequence), or accelerated (http://bulletin.columbia.edu/general-studies/postbaccalaureate-premedical-program/sample-schedule/#Accelerated%20Sequence). 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. 3.00 points.
Prerequisites: (see Courses for First-Year Students). Functions, limits, derivatives, introduction to integrals, or an understanding of pre-calculus will be assumed. (SC)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Section/Call Number</th>
<th>Times/Location</th>
<th>Instructor</th>
<th>Points</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1101</td>
<td>002/11292</td>
<td>M W 10:10am - 11:25am Online Only</td>
<td>Daniele Alessandrini</td>
<td>3.00</td>
<td>16/116</td>
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<td>MATH 1101</td>
<td>003/11293</td>
<td>M W 11:40am - 12:55pm Online Only</td>
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<td>MATH 1101</td>
<td>004/11294</td>
<td>M W 1:10pm - 2:25pm Online Only</td>
<td>Akash Sengupta</td>
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<td>005/11295</td>
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<tr>
<td>MATH 1101</td>
<td>006/11296</td>
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<td>Chung Hang Kwan</td>
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<td>MATH 1101</td>
<td>007/11297</td>
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<td>Robin Zhang</td>
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<td>Panagiota Daskalopoulos</td>
<td>3.00</td>
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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)

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<tr>
<th>Course Number</th>
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<th>Instructor</th>
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<th>Enrollment</th>
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<tr>
<td>MATH 1102</td>
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<td>Maithreya Sitaraman</td>
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<td>42/100</td>
</tr>
<tr>
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<td>Elliott Stein</td>
<td>3</td>
<td>20/45</td>
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<tr>
<td>MATH 1102</td>
<td>007/21402</td>
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<td>Renata Picciotto</td>
<td>3</td>
<td>9/30</td>
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STAT UN1101 Introduction to Statistics. 3 points.

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.

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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

BIOI 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

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BIOI 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

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BIOI 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/

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

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.

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.

**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.

**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.

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.

**CHEM UN2444 Organic Chemistry II (Lecture). 4 points.**
Prerequisites: CHEM UN1404 or CHEM UN1604 and CHEM UN 500 and CHEM UN2443
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.

**CHEM UN2493 Organic Chemistry Laboratory I (Techniques). 0 points.**
Lab Fee: $63.00
Prerequisites: (CHEM UN1403 and CHEM UN1404) or (CHEM UN1604) and (CHEM UN 500 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 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.

**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.

**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 lab 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.

<table>
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<th>Section/Call Number</th>
<th>Times/Location</th>
<th>Instructor</th>
<th>Points</th>
<th>Enrollment</th>
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<tr>
<td>PHYS 1201 001/13409</td>
<td>M W 10:10am - 11:25am</td>
<td>Online Only</td>
<td>Michael Shaevitz</td>
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<th>Spring 2021: PHYS UN1201 Course Number</th>
<th>Section/Call Number</th>
<th>Times/Location</th>
<th>Instructor</th>
<th>Points</th>
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<td>P. Michael Tuts</td>
<td>3</td>
<td>0/200</td>
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</table>
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.

PHYS 1291
This course is the laboratory for the corequisite lecture course and can be taken only during the same term as the corresponding lecture.

Spring 2021: PHYS UN1292
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
PHYS 1292 | 001/10199 | M 1:00pm - 4:00pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 003/10200 | M 4:10pm - 7:10pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 005/10201 | M 7:30pm - 10:30pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 007/10202 | T 1:00pm - 4:00pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 009/10203 | T 4:10pm - 7:10pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 011/10204 | T 7:30pm - 10:30pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 013/10205 | W 1:00pm - 4:00pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 015/10206 | W 4:10pm - 7:10pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 017/10207 | W 7:30pm - 10:30pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 018/10208 | Th 1:00pm - 4:00pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 020/10209 | Th 4:10pm - 7:10pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 022/10210 | Th 7:30pm - 10:30pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15
PHYS 1292 | 023/10211 | F 1:00pm - 4:00pm Room TBA | Giuseppina Cambareri | 15/15 | 0/15

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.

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.