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, part-time, or accelerated. While enrolled in the program, students must fulfill all requirements with courses offered by Columbia’s Faculty of Arts & Sciences. It is possible to complete some requirements with Barnard College course offerings, but students considering this option should discuss it with their advisors and understand the implications of this choice (see below under Biology and Organic Chemistry). All students 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.

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 coursework 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>Times/Location</th>
<th>Instructor</th>
<th>Points</th>
<th>Enrollment</th>
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<tr>
<td>MATH 1101</td>
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<td>Lindsay Piechnik</td>
<td>3.00</td>
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<td>Xi Shen</td>
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<td>Hung Chiang</td>
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<td>Jingze Zhu</td>
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<tr>
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<td>Michael Thaddeus</td>
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<td>Amadou Bah</td>
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<tr>
<td>MATH 1101</td>
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<td>Gerhardt Hinkle</td>
<td>3.00</td>
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<tr>
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<td>Lindsay Piechnik</td>
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<tr>
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<td>T Th 2:40pm - 3:55pm 825 Seeley W. Mudd Building</td>
<td>3.00</td>
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MATH UN1102 CALCULUS II. 3.00 points.
Prerequisites: MATH UN1101 or the equivalent.
Prerequisites: MATH UN1101 or the equivalent. Methods of integration, applications of the integral, Taylor's theorem, infinite series. (SC)

Spring 2022: MATH UN1102

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<tr>
<th>Course Number</th>
<th>Section/Call Number</th>
<th>Times/Location</th>
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<td>Panagiotis Daskalopoulos</td>
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<td>George Dragomir</td>
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<td>Evan Warner, George Dragomir</td>
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Fall 2022: MATH UN1102

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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.

Spring 2022: STAT UN1101

<table>
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<tr>
<th>Course Number</th>
<th>Section/Call Number</th>
<th>Times/Location</th>
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<td>001/13783</td>
<td>T Th 6:10pm - 7:25pm 602 Hamilton Hall</td>
<td>Ha Nguyen</td>
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<td>STAT 1101</td>
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<td>T Th 10:10am - 11:25am 702 Hamilton Hall</td>
<td>David Rios</td>
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<tr>
<td>STAT 1101</td>
<td>003/13790</td>
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Fall 2022: STAT UN1101

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<td>M W 8:40am - 9:55am 517 Hamilton Hall</td>
<td>Alexander Clark</td>
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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.

Notes about Barnard College's biology courses: Students considering taking the biology course sequence at Barnard College (BIOL X1500-1502) are advised that enrollment in it is subject to the availability of space. Further, enrollment in Barnard's biology courses disqualifies postbacs for linkage. While the Barnard course generally covers the same subject matter as the corresponding Columbia sequence, it does not emphasize biochemistry. Also, content corresponding to Columbia's fall semester course is offered at Barnard in the spring; and content corresponding to Columbia's spring semester course is offered at Barnard in the fall. These courses can be taken in either order. Barnard's biology lab is a two-semester sequence of 2-credit lab courses; however, students who take the Barnard biology lecture sequence are welcome to complete the lab requirement with the Columbia lab course.
Courses

**BIOL UN2401 CONTEMPORARY BIOLOGY I. 3.00 points.**
Prerequisites: a course in college chemistry or the written permission of either the instructor or the premedical adviser.
Prerequisites: one year of college chemistry or the written permission of either the instructor or the premedical adviser is required. 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/index.html). 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](http://registrar.columbia.edu/sites/default/files/content/reg-adjustment.pdf)

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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>BIOL 2401</td>
<td>001/10763</td>
<td>T Th 10:10am - 11:25am 417 International Affairs Bldg</td>
<td>Michelle Attner, Marko Jovanovic</td>
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<tr>
<td>BIOL 2401</td>
<td>002/10764</td>
<td>T Th 4:10pm - 5:25pm 309 Havemeyer Hall</td>
<td>Michelle Attner, Marko Jovanovic</td>
<td>3.00</td>
<td>29/200</td>
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**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](http://registrar.columbia.edu/sites/default/files/content/reg-adjustment.pdf)

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<td>M 1:10pm - 5:00pm 922 Schermerhorn Hall</td>
<td>Claire Hazen</td>
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<td>BIOL 2501</td>
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<td>T 1:10pm - 5:00pm 922 Schermerhorn Hall</td>
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<td>BIOL 2501</td>
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<td>Claire Hazen</td>
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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/.

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 2022: BIOL UN2402
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
BIOL 2402 | 001/14024 | T Th 10:10am - 11:25am 417 International Affairs Bldg | Alice Heicklen, Mary Ann Price, Jellert Gaublomme | 3 | 47/400

BIOL 2402 | 002/14025 | T Th 4:10pm - 5:25pm 309 Havemeyer Hall | Alice Heicklen, Mary Ann Price, Jellert Gaublomme | 3 | 19/400

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 2022: BIOC UN3300
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
BIOC 3300 | 001/14004 | T 7:00pm - 9:30pm 420 Pupin Laboratories | Danny Ho | 3 | 30/60

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 Columbia’s Biology or Organic Chemistry courses. 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.

Courses
CHEM UN1403 GENERAL CHEMISTRY I-LECTU. 3.00 points.
Spring 2022: CHEM UN1403
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
CHEM 1403 | 001/11463 | T Th 6:10pm - 7:25pm 309 Havemeyer Hall | Ruben Savizky | 3.00 | 112/120

CHEM 1403 | 002/11222 | T Th 10:10am - 11:25am 309 Havemeyer Hall | Xavier Roy | 3.00 | 39/170

CHEM 1403 | 003/11225 | T Th 6:10pm - 7:25pm 309 Havemeyer Hall | Ruben Savizky | 3.00 | 26/170

CHEM 1403 | 004/11227 | M W 6:10pm - 7:25pm 203 Mathematics Building | Robert Beer | 3.00 | 6/120

Fall 2022: CHEM UN1403
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
CHEM 1403 | 001/11224 | M W 10:10am - 11:25am 309 Havemeyer Hall | Gerard Parkin | 3.00 | 47/170

CHEM 1403 | 002/11222 | T Th 10:10am - 11:25am 309 Havemeyer Hall | Xavier Roy | 3.00 | 39/170

CHEM 1403 | 003/11225 | T Th 6:10pm - 7:25pm 309 Havemeyer Hall | Ruben Savizky | 3.00 | 26/170

CHEM 1403 | 004/11227 | M W 6:10pm - 7:25pm 203 Mathematics Building | Robert Beer | 3.00 | 6/120
CHEM UN1500 GENERAL CHEMISTRY LABORATORY. 3.00 points.
CC/GS: Partial Fulfillment of Science Requirement
Lab Fee: $140.

Corequisites: CHEM UN1403, CHEM UN1404
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 UN1500 Sec 1, 2, 5, 7 and CHEM UN1501 Sec 1). Participation in voluntary

CHEM UN1404 GENERAL CHEMISTRY II-LECTURES. 4.00 points.
CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: CHEM UN1403
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 most linkage applicants, students may take a 3-point lab over a six-week summer session after completing the lecture sequence.

Notes about Barnard College’s organic chemistry courses: Students considering taking the organic chemistry course sequence at Barnard College (CHEM X3230-3231) are advised that enrollment in it is subject to the availability of space. Further, enrollment in Barnard’s organic chemistry courses disqualifies postbacs for linkage. The content corresponding to Columbia’s fall semester course is offered at Barnard in the spring; and content corresponding to Columbia’s spring semester course is offered at Barnard in the fall. Students planning to take the Barnard course sequence must begin it in the spring. Columbia students are not permitted to enroll in Barnard’s organic chemistry lab course; they must fulfill this requirement at Columbia.
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 2022: CHEM UN2443

<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>
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<tr>
<td>CHEM 2443</td>
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<td>Christopher Eckdahl</td>
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<tr>
<td>CHEM 2443</td>
<td>002/11242</td>
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<td>Christopher Eckdahl</td>
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<tr>
<td>CHEM 2443</td>
<td>003/11243</td>
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<td>Charles Doubleday</td>
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</table>

CHEM UN2444 ORGANIC CHEMISTRY II-LECTURES. 4.00 points.
Prerequisites: CHEM UN1404 or CHEM UN1604 and CHEM UN1500 and CHEM UN2443
Prerequisites: CHEM UN1404 or CHEM UN1604, CHEM UN1500 and CHEMUN2443. 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 2022: CHEM UN2444

<table>
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<tr>
<th>Course Number</th>
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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 2022: CHEM UN2493

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Section/Call Number</th>
<th>Times/Location</th>
<th>Instructor</th>
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CHEM UN2494 ORGANIC CHEM. LAB II SYNTHESIS. 0.00 points.
Lab Fee: $62.00

Prerequisites: (CHEM UN1403 and CHEM UN1404) and CHEM UN1500 and CHEM UN2493
Corequisites: CHEM UN2444
Prerequisites: CHEM W1403-CHEM W1404; CHEM W1500; CHEM W2493. Corequisites: CHEM W2444. Please note that you must complete CHEM W2493 before you register for CHEM W2494. 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 W2493) 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 W2494 is the second part of a full year organic chemistry laboratory course. Students must register for the lab lecture section (CHEM W2496) which corresponds to their lab section. Students must attend ONE lab lecture and ONE lab section every other week. Please contact your advisors for further information.

Spring 2022: CHEM UN2494

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Section/Call Number</th>
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<th>Instructor</th>
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Physics
Students are required to complete one year (6 points) of general physics and one year (2 points) of general physics laboratory. Lab courses are normally taken concurrently with the corresponding lecture course. Physics is a course sequence that students are advised to begin in the fall or spring term. Students who enroll in Physics I in the spring are advised to take the twelve-week Physics II course in the summer. (Physics II is not offered in the fall.) Calculus is a corequisite for Physics I; however, students who have never taken calculus before may be advised to complete it before undertaking Physics.
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 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.

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.

<table>
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<th>Spring 2022: PSYC UN1001</th>
<th>Times/Location</th>
<th>Instructor</th>
<th>Points</th>
<th>Enrollment</th>
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<td>T Th 1:10pm · 2:25pm</td>
<td>Patricia Lindemann</td>
<td>3</td>
<td>182/205</td>
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<tr>
<td>PSYC 1001 002/11043</td>
<td>M W 10:10am · 11:25am</td>
<td>Svetlana Rosis</td>
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