COLUMBIA | GS
School of General Studies

PREMEDICAL HANDBOOK

FOR

GS UNDERGRADUATE STUDENTS

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Contents

Introduction

This handbook is designed for School of General Studies undergraduate students (including those enrolled in joint- and dual-degree programs) considering premedical studies in preparation to apply to medical, dental, or veterinary school or education in another health profession. Please note that we generally refer throughout this handbook to "premedical" and "medical school" because the vast majority of our students interested in a health profession do plan to enter a medical school program. Much of what we say here, however, applies to significant (albeit varying) degrees to those preparing to pursue educations to become dentists and veterinarians, and much of it also pertains to the planning and preparation of future physician assistants, physical therapists, podiatrists, and nurses, among other allied health professions. We recommend this handbook be used as a complement to individualized advising from the staff of the GS Premedical Office.

Undergraduate Premedical Curriculum

Medical schools in the United States require students to complete a fairly standard course of study before applying for admission. The Medical College Admission Test (MCAT) is designed on the assumption that students sitting for the examination have completed this preparation. Therefore, you must carefully plan your curriculum to ensure that you complete the proper science coursework for your application.

Columbia offers you a strong advantage in completing this coursework. Medical schools view Columbia students as strong applicants because they recognize how thoroughly our students are prepared in the sciences. This is especially true of biology. Medical schools highly value the fact that Columbia students are taught the most contemporary topics in molecular and cellular biology and study with faculty actively engaged in research. As a group, Columbia students score two to three points higher than the national average on the MCAT. And Columbia alumni currently in medical school frequently remark how much better prepared they are for the rigor of the medical school curriculum because of how biology is taught here.

The medical school admissions process has always been competitive, and with each passing year seems to become more so. For this reason, it is extremely important for premedical students to receive a rigorous grounding in the premedical sciences and earn excellent grades and MCAT scores. It is impossible, of course, to detail every contingency here, but what follows gives you a good deal of crucial information about the curriculum.

To be considered for admission to medical school, students must complete certain undergraduate courses in the arts and sciences. There are some slight variations in these requirements from medical school to medical school and from state to state. To prepare students as fully as possible, and to assure that they will be in a position to apply to the greatest range of schools, the GS Premedical Committee prescribes the following premedical curriculum for students seeking its support of their medical school applications:

- One year of college **English**.
- One year of **Mathematics**, including one semester of *Calculus* and one semester of *Statistics*.
- One year of **General Physics**, including laboratory.

- One year of **General Chemistry**, including laboratory.
- One year of **Organic Chemistry**, including laboratory.
- One year of **Biology**, including laboratory, and with an emphasis on molecular and cellular biology.

The worksheet at the end of this handbook indicates the bulletin numbers of these courses at Columbia.

Coursework in the Social Sciences and the MCAT
The Medical College Admissions Test (MCAT), the standardized admission test taken by applicants to American medical schools, includes a section devoted to the psychological, social, and biological foundations of behavior. (For more information, please consult the Association of American Medical Colleges (AAMC) website.) The GS Premedical Committee does not require premeds to take psychology and sociology since coursework in these subjects is not generally required by the medical schools themselves. We do, however, recommend that students who have not yet taken a college-level introductory psychology course plan to take The Science of Psychology (PSYCH UN1001), the course at Columbia providing the most comprehensive introduction to pertinent topics on the MCAT. While we certainly encourage GS premeds to take sociology courses, there is no one course that we recommend. Furthermore, the MCAT puts greater emphasis on psychology than on sociology (in a proportion of roughly 80 percent to 20 percent). Many premeds may find they can learn the key sociology concepts through self-study.

Biochemistry
A number of medical schools require a semester of biochemistry and others will likely add it as a requirement in the future. Although Introductory Biology I (BIOL UN2005), the first semester of Columbia's introductory biology sequence, covers many of the foundational concepts of biochemistry (and therefore is sufficient preparation for the MCAT),[1] we cannot guarantee that all medical schools will accept this in fulfillment of a biochemistry course prerequisite, and therefore recommend that GS premeds take a biochemistry course (it does not necessarily have to be taken before applying).

Science Electives
For some students, our premedical curriculum represents only the minimum program to be completed**.** In consultation with advisors, premed students may consider taking additional coursework in biology and biochemistry. Biochemistry is a course all premeds should consider taking because a number of medical (as well as dental and veterinary) schools require it (see above). While medical schools value a student's background in the humanities and social sciences, and do not necessarily require premedical students to major in the sciences, most students in medical school either completed science majors or took additional coursework in the sciences. One reason GS premed students are successful in gaining admission to medical school is their willingness to continue their preparation beyond the minimum requirements.

[1] Please note, the introductory biology course sequence at Barnard does not cover biochemistry in any detail. Students who elect to take biology at Barnard should consider taking a semester of biochemistry before taking the MCAT.

General Program Information
Take **all** premedical courses for letter grades. No premedical course in which a P is earned satisfies a requirement.[2] We recommend that premeds take all math and science courses, including electives, for letter grades.

Advanced Placement (AP) work will **not** fulfill the premedical requirements, even if your previous college or Columbia has awarded you credit for such work. Most medical schools expect you to complete letter-graded university courses, and this remains an eligibility requirement for support from GS's Premedical Committee (discussed on page 16). High school work, however advanced, cannot be equated with college courses. If you are eligible for advanced placement in calculus, you can satisfy the premedical requirement of a semester of calculus with Calculus II (MATH UN1102) or III (MATH UN1201) or Honors Math (MATH UN1207), depending on your AP score. If you are eligible for advanced credit in statistics, you will still need to take a statistics course (unless you plan to take two semesters of calculus). If you are eligible for advanced standing credit in biology, you should still plan to take Columbia's introductory biology sequence (BIOL UN2005-2006 and 2501), unless an advisor in the Department of Biological Sciences approves a different course of study. If you are eligible for advanced placement in chemistry, you will still need to complete at least four semesters of chemistry at Columbia to be eligible for committee support (one of those semesters can be biochemistry). Please see the section on AP Credit on the General Studies website under "Academic Policies."

Required courses are offered at various times of the day, and frequently in the evening. For course descriptions, please see the Columbia University School of General Studies website. Many of the courses have course websites as well. These should be consulted before you register to assess the demands of the courses in both difficulty and time.

Placement tests in mathematics and chemistry are optional. Students who are not sure which math or chemistry class to begin with are strongly encouraged to take the appropriate diagnostic placement exam to determine the best placement. You are, of course, welcome to consult your advisor if you have any questions about this. If you prefer to begin with Preparation for College Chemistry ("Chem Prep") and/or Precalculus, there is no need to take placement tests.

Chem Prep, the course you must take if you are not ready for General Chemistry I, is offered in the summer and fall. Students pay for two points of tuition, but the course carries no degree credit. There is no placement test for physics; however, students who have had no significant prior exposure to physics may wish to consider taking Basic Physics to prepare for the required course sequence. Basic Physics is offered in the summer only. Again, students pay for two points of tuition, but the course carries no degree credit. (Note: Chem Prep and Basic Physics are graded Pass/Fail only.)

Please be reassured that that many GS students who began their premedical studies with these preparatory courses have gone on to gain admission to medical school.

Curriculum Planning

To plan your course of premedical studies at Columbia, you have several important resources. Your first resource is your undergraduate advisor in the Dean of Students Office, who will guide you in your course selection to ensure that you meet all of your degree requirements. Secondly, your GS

[2] Students who took courses in the spring 2020, at the onset of the pandemic, may have received pass-fail grades by mandate of the school they attended. This may be an exception to the normal requirement of letter grades.

premedical advisor will work with you and your advisor to plan your course of premedical study and to guide you through the application process. Students in the Joint Program with List College are also urged to consult with their JTS advisor about how best to fit the premedical requirements into the curriculum requirements of the Joint Program.

Once you have decided to begin pursuing the premedical or prehealth course of studies, you should notify your undergraduate advisor who will help you to identify your premed advisor and to schedule an appointment with them. It is advisable to meet with a premed advisor before confirming any schedule involving required premed courses. Your premedical advisor will arrange for you to receive the weekly premedical e-mail newsletter and will review your academic records, including courses taken outside Columbia, to determine which premedical requirements, if any, you may have already satisfied.

Thoughtful program planning is crucial, especially in the early stages of the premedical curriculum when you are learning how to study science, getting used to taking courses graded on a curve, and refining your time management skills.

When you are nearing completion of the required courses and are readying to take the MCAT exam, perhaps as early as the spring of your junior year, you will begin to work closely with your premedical advisor who will guide you in preparing your medical school applications. Keep an eye open for notices in the premedical newsletter about mandatory general advising meetings to attend, and next steps to take and when to take them.

Note: *Medical schools do not require you to major in science. You should select a major of interest to you as you are more likely to do well in it. Admissions committees look for academic diversity when admitting a class in order to bring together a variety of opinions and perspectives.*

Doubling up: Although it is not a requirement, we strongly recommend that premeds who are not science majors take at least two science lecture courses concurrently in at least two semesters. By doubling up on science lecture courses and earning strong grades you will provide admissions committees with a powerful demonstration of your capacity to manage the academic demands of medical school.

The transition from college to medical school: The medical school application process takes about a year. It may be possible for an undergraduate premed to matriculate at a medical school more or less directly after graduation, if they completed the academic prerequisites for medical school by May of junior year, take the MCAT immediately thereafter, and submit their applications before beginning their senior year. This timetable, however, may not be realistic for many students. Over the last decade, it has become more common for undergraduates to apply at the end of senior year and having a "gap" while their application is in progress. Graduates sometimes defer their applications for a year after graduating. In all cases, it is desirable to remain active in areas of clinical healthcare, community service, and research.

Transfer Credit

Some students matriculate at the School of General Studies having already completed premedical coursework at another institution. The Premedical Committee routinely reviews such coursework and, at its discretion, may accept some or all of it in satisfaction of premedical requirements. A number of considerations enter into the review of such coursework: Where were the courses taken? How long ago were they taken? What grades were earned in them? Will they count toward your major at Columbia? Have they prepared you to take upper level courses at Columbia? To receive the

support of the Premedical Committee when you apply to medical school, you must complete at least fifteen points of premedical study at Columbia (excluding English, psychology, and all preparatory coursework). (See Premedical Committee Letter: Eligibility Requirements for more on the eligibility requirements for support.)

If you earned strong grades in the entire premedical curriculum prior to matriculation at Columbia, you will (with rare exceptions) need to take introductory biology at Columbia and then complete at least another seven points of upper-level lecture courses in order to have the committee's support. Typically, a student in this situation would do so by majoring in biology or biochemistry. This approach is more likely to be successful the more there is consistency between the grades earned before Columbia and those earned at Columbia.

A Note to Students in the Joint Program with List College

Completion of the premedical curriculum poses special challenges for undergraduates in the Joint Program with List College for several reasons. First, these students are working to complete two degrees concurrently, toward which end they must complete two majors, as well as other general degree requirements. Secondly, they are less likely than their GS peers to matriculate having completed any of the premedical requirements. In addition, there is work involved in completing the application to the Premedical Committee, preparing for the MCAT, and applying to medical school.

Completing the premedical requirements on top of the requirements for the two degrees, though difficult, can be done successfully, but it requires careful program planning, consultation with advisors, and use of the Academic Resource Center and other forms of academic support whenever appropriate. Joint Program students will need to consult their JTS dean, in addition to their GS advisor and premed advisor, regarding how to reasonably schedule JTS, GS, and premedical requirements. The availability of spring/summer course sequences in General Physics and General Chemistry may offer greater flexibility in planning their programs. In some cases, it may be advisable to allow themselves additional semesters so that they can excel in their work.

A Note to Students in the Dual and Joint Programs with Sciences Po, Trinity College, City U, and Tel Aviv University

Students in the dual and joint degree programs with Sciences Po, Trinity College, CityU, and TAU face some special challenges in completing premedical studies at GS. In particular, they won't be able to use any science coursework completed abroad to satisfy the requirements of the premedical curriculum. Consequently, it may not be feasible to complete all degree and premedical requirements within a two-year period. Students with a strong commitment to becoming physicians might consider requesting an additional semester to complete their requirements. We recommend that such students inform their advisors of their aspiration for medicine, dentistry, or veterinary medicine as early as possible to allow time for thoughtful planning. Those joint and dual degree students who are international students should also read the following note.

A Note to International Students

International students who must maintain an F1 Visa are required to register for a full-time course load of at least 12 points. This full-time status must be maintained in the fall and spring semesters, though not in summer.

International students are also advised that most U.S. medical schools give preference in admissions to applicants from their own states or regions. It is therefore very difficult for an international student to gain admission to a U.S. medical school, unless he or she becomes a U.S. citizen or permanent resident. According to the American Association of Medical Colleges, a total of 55,188

applicants sought admission to medical school for the entering class of 2023 and a total of 22,712 matriculated (about 41% of applicants). Of these matriculants, only 153 were neither U.S. citizens nor permanent residents.

This number reflects several circumstances. For example, many public institutions may limit admission to state residents, and private institutions may require international applicants to pay the entire cost of their medical education up front (or place the funds in escrow). We therefore encourage every international student pursuing a course of study in premedicine at the School of General Studies to consider seeking permanent residence and eventually citizenship to improve their chances of admission to an American medical college. In any case, we urge you to be as informed as possible about the application process, admissions constraints, and alternative routes to medical school.

Further Program Planning Tips

General

- Do not feel that you must adhere to an artificial or self-imposed timeline to complete the required courses. You should take the courses when you are academically ready for them. Many GS graduates currently in medical school started with Pre-Calculus and/or Preparation for College Chemistry.

Calculus

- You cannot begin Physics unless you have taken Calculus or are taking it as a co-requisite. If you have never taken Calculus or Physics before, it may be a good idea to complete Calculus before you start Physics.

- If you are not in Calculus while taking the first semester of the General Chemistry sequence, you should be enrolled in it by the time you take the second semester of the course.

General Chemistry

- You cannot take Organic Chemistry or Biology at Columbia until you have successfully completed General Chemistry.

- Columbia offers General Chemistry I and II during the summer in six-week sessions. We strongly advise against taking these courses in this summer session format. If you are thinking of taking either or both of them, you should discuss this with your prehealth advisor.

- General Chemistry I is offered in both the fall and spring semesters. If you take General Chemistry I in the spring, you should take the 12-week summer session General Chemistry II.

- The one-semester, 3-credit General Chemistry Lab course can be take alongside the second semester of the General Chemistry lecture course sequence or afterward. (It is offered during summer session in both a six-week and a twelve-week format—either is acceptable.)

Physics

- Physics I is offered in both the fall and spring semesters. If you take Physics I in the spring, you should take the 12-week summer session Physics II.

- Columbia offers Physics I and II during the summer in six-week sessions. We strongly advise against taking these courses in this summer session format. If you are thinking of taking either or both of them, you should discuss this with your prehealth advisor.

- If you are new to Calculus and Physics, we recommend that you complete the former before taking the latter.

- Physics labs ought to be taken concurrently with physics lecture courses.

Biology

- Columbia's Biology I is offered only in the fall semester and its Biology II course is offered only in the spring semester.[3]

- The one-semester, 3-credit Contemporary Biology Lab course can be taken alongside either semester of Contemporary Biology. It is also sometimes offered during summer session.

- EEEB majors may take Environmental Biology I (EEEB UN2001) to satisfy the first half of the biology sequence; they should plan to take BIOL UN2006 to complete the sequence. A semester of biochemistry is also recommended.

- While there is no placement test for biology, a prep course in biology, Foundations of Biology (BIOL UN1004), is offered in the spring semester. It is a good way to hone the problem-solving skills required for BIOL 2005-2006. The course carries two credits of tuition and can be taken either for a letter grade or P/D/F; however, course credits cannot be applied toward the bachelor's degree.

Organic chemistry

- Columbia does not usually offer Organic Chem I in the spring and does not offer Organic Chem II in the fall.[4]

- Columbia does offer Organic Chem I and II during the first and second six-week summer sessions respectively. Each is just six weeks long. We strongly advise against taking these courses in this condensed summer session format. If you are thinking of taking either or both of them, you should discuss this with your prehealth advisor.

- Organic chemistry lab is offered during the summer as a single course taught in a six-week format. If you completed organic chemistry during the prior academic year and still need to take the lab, it is acceptable to take the lab in the summer.

[3] But see below concerning Barnard College course offerings.
[4] But see below concerning Barnard College course offerings.

Barnard College courses

- Barnard College courses in biology and organic chemistry may be used to satisfy GS premedical requirements; however, access to these courses may be limited. Premeds who choose to take biology at Barnard are advised to take a separate biochemistry course to prepare for the MCAT.

- GS premeds should not take general chemistry at Barnard, since the curriculum for that course is incompatible with Columbia's other premedical requirements.

- The contents of Barnard College's two-semester course sequences in biology and organic chemistry begin in the spring and end in the fall.

- Barnard College courses in biology and organic chemistry do not count toward the majors in Columbia's Departments of Chemistry and Biological Sciences. Students planning to major in the sciences should plan to complete all their premedical prerequisites at Columbia.

Summer session courses

Premedical students may take required courses during the summer. Some required courses are offered in the summer session in both 12-week and 6-week formats. Students may take required *lab* courses in either the 12-week or the 6-week format, but students are generally advised to take required *lecture* courses in the 12-week format only. The reason for this recommendation is that taking required lecture courses in the 6-week format is extremely demanding for even the most well-prepared students because of the fast pace of instruction. For most premedical students, required lecture courses offered in the 12-week format are more appropriate. Premedical students must have the approval of their advisor if they wish to enroll in a required lecture course in the 6-week format.

Although course offerings vary from year to year, courses typically offered in the 12-week summer format are PHYS 1202 (General Physics II), CHEM 1404 (General Chemistry II), PHYS 1292 (Physics II lab), and CHEM 1500/1501 (General Chemistry lab and lab-lecture).

Students may also take preparatory courses in the summer to prepare for required courses in chemistry, physics, or calculus that are offered in fall or spring. These preparatory courses are CHEM S0001 (Preparation for College Chemistry), PHYS S0065 (Basic Physics), and MATH S1003 (College Algebra & Analytic Geometry). The courses are typically offered in a 6-week format.

A final note on summer coursework: medical schools generally feel more confident assessing an applicant's aptitude in the sciences when they have taken their science courses alongside other coursework satisfying degree requirements. We therefore recommend that undergraduate premeds limit the number of science courses they take in the summer to no more than one or two in total.

G.P.A.

In general, successful applicants to medical school present an overall cumulative grade point average that is at least 3.5 and a science cumulative average that is at least 3.3. Preferably, both would be higher. According to the Association of American Medical Colleges, the mean science grade point average of a 2024 medical school matriculant was 3.54; the mean non-science grade point average was 3.78.

Course workloads

Use the course look-up tool to research course workloads before registration. Many students who decide to drop a course, typically a lab, lament that they did not realize in advance how much work was involved. All of the premedical courses have websites; please consult them carefully before meeting with your advisor.

An Alternative Route to Medical School
The FlexMed Program at the Icahn School of Medicine at Mount Sinai is an option some GS undergraduates may wish to explore. This is an early assurance program to which interested students apply by October 1 of their sophomore year. It is intended to encourage undergraduates to pursue study in areas of interest to them without the medical school application process casting its long shadow over their undergraduate years. If accepted into this program, the premed goes on to complete an abridged form of the premedical curriculum, but also takes courses in medical ethics, health policy, public health, and translational medicine. If you are interested in this program, we recommend you discuss this with your premedical advisor early on. Be advised, however, that admission to this program is highly competitive. For more information, visit the FlexMed page.

Healthcare Experience

Strong grades in science courses are not enough to make one a competitive applicant to medical school. Medical schools are also interested in what students do to help others and to learn about the day-to-day workings of medicine. Most institutions deem actual medically related experience imperative; some see it as one of many ways to demonstrate a caring attitude, good interpersonal skills, and sincere motivation for a career in medicine. For information on specific schools' requirements, students should visit their websites or contact their admissions offices. Generally, volunteer work is definitely a plus and even more so if it involves patient contact. All medical schools agree that it is critically important that applicants know what they are getting into, and have tested their aptitude for a career in medicine before they apply. Health care work, usually as a volunteer, helps to address these concerns. Many students also find that service as a volunteer helps them keep their goal in sight while their attention is focused on the immediate demands of the premedical curriculum. All premedical students at GS are required to have significant health care experience that runs over an extended period of time, since medical schools will look for evidence of your preparedness to maintain a commitment. To be eligible for committee support, you will need to complete at least 120 hours of service in an appropriate volunteer or paid clinical health care capacity. Upon completion of your service, or at least by the time you are about to apply to medical school, you should have your supervisor or the hospital's volunteer coordinator verify the sum total of your hours of work. The Premedical Office has a form available for this purpose; however, a brief statement on the hospital's letterhead stationery is also acceptable.

Volunteering in the Emergency Room
Often, the most readily available opportunity is to serve as a volunteer in a hospital emergency room. Most hospitals look for a commitment of three or four hours (but sometimes more) each week. All students should begin volunteering as early as possible in their programs of study; a sudden flurry of hours in your final semester may appear insincere. Volunteering in the private practice of a family member will look equally suspect, if it represents the majority of your

experience. Please consult the *Postbac Premed Weekly* (a weekly email newsletter for GS prehealth students) and the Postbac Premed Program website for current opportunities and listings of local hospitals with the contact information for their volunteer offices. Listings are also available for prevets and predents. You are encouraged to seek your premed advisor's opinion of any health care work opportunity you have been offered.

Clinical Research
It is certainly possible to find opportunities beyond the emergency room setting. Be sure to consult the weekly *Postbac Premed Weekly* newsletter, which frequently contains notices of such openings. Most commonly, students find clinical research volunteer positions, whether in an emergency room or elsewhere in the hospital, where they help physicians conduct research by recruiting eligible patients for research studies.

Wet Lab Research
Opportunities in basic science medical research (wet lab) are more limited**.** Wet lab research is valued highly by the most competitive medical schools, which, not surprisingly, are often those with large research enterprises located within major medical centers. Admissions deans at some top-tier schools report that applicants are more competitive if they have completed wet lab research by the time they file their applications. Please be aware, however, that many premeds matriculate at medical schools without wet lab experience.

Undergraduates majoring in the sciences can frequently get some exposure to research in advanced courses in their majors, through summer research fellowships, or as volunteer research assistants. With so many medical schools in New York City, many opportunities are available, although it may require some effort to find them. The Columbia University web site has an Undergraduate Research Opportunities Platform through which students can search for available positions. The Premedical Office will post many available openings in the *Postbac Premed Weekly* newsletter. Because of their positive experiences with GS premeds in the past, many researchers post their openings exclusively through the GS Premedical Office. Another good source are the human resources web pages at major medical centers where openings may be listed as "technician" or "laboratory technician" positions. Leads from fellow students may be especially fruitful. Because of the nature of research work, students are usually asked to commit ten to twelve hours each week as a volunteer research assistant for one year, and sometimes longer. An added benefit of volunteering as a research assistant is that it sometimes leads to full-time paid employment as a research assistant during the application year.

Wet lab experience is something we recommend that every premed consider; however, we do not recommend you undertake such work, unless you are positively interested in, or very curious about, it. Admission to medical school does not depend upon working in a wet lab.

Medical Volunteering Abroad
Many GS premeds are eager to volunteer in health care settings outside of the United States, where access to medical care may be extremely limited and avidly sought. We are all for helping others in need wherever in the world they may be. Be advised, however, that such work does not necessarily make an applicant to medical, dental, or veterinary school more competitive. There are several reasons admissions committees may be inclined to regard such work with skepticism; these include: the excessive cost of participating, which makes it prohibitive for many capable students, and the generally short duration of such volunteer commitments (one or two weeks is typical). Also, medical schools often feel they can make a better assessment of an applicant's commitment to the difficult profession of medicine on the basis of work undertaken in unglamorous settings in the United States

rather than work done in an exotic locale. Premedical students who wish to do service abroad should regard it as a supplement to the clinical and research work they complete domestically.

Students who pursue opportunities abroad should ensure that the tasks they assume are commensurate with their experience and training and that the work is conducted under the supervision of a health care professional.

Students who arrange work abroad during their enrollment at GS should notify their advisor beforehand and register with International SOS, an emergency services insurance program that provides worldwide assistance in the event of an emergency.

Prior to volunteering abroad, students are also encouraged to review the AAMC reference Guidelines for Premedical and Medical Students Providing Patient Care During Clinical Experiences Abroad. Predents should review Guidelines for Predental Students Providing Patient Care During Clinical Experiences Abroad. The information in these documents is general enough in nature that prevets and allied health pre-professionals are also encouraged to consult them.

Shadowing
Many students are interested in shadowing physicians, and we think it's a great thing to do. Students who shadow often have opportunities to observe interactions and procedures that volunteers may not see. Some medical schools may even expect viable applicants to have done some shadowing. Even so, the majority of your work ought to be in a service-oriented role.[5] Part of the purpose of volunteering is to enable you to show your commitment to service. As an admissions dean put it during a medical school admissions panel held at Columbia several years ago, "shadowing is for you; volunteering is for others."

Important Note on GS Postings
Please be advised that jobs and volunteer positions in healthcare posted on the GS website and sent via the premed mailing list have not been screened by anyone at the School of General Studies. The posting of a position does not constitute an endorsement or recommendation by the School of General Studies. Investigate all opportunities before committing.

A Note on the Application Process

A key function of the premedical advising program at the School of General Studies is to guide and support GS premeds through the complex and lengthy application process. Generally speaking, in the fall semester before applying to medical school over the following summer, premeds should attend a group advising session devoted to the application process. Thereafter they should become acquainted with the documents on the Postbac Program website describing the essays and other materials prehealth students must upload to their Prehealth Portfolios and with the timeline for submission of the portfolio and the common application, and for the taking of the standardized admissions test (MCAT or DAT).

Premedical advisors want to do more than explain what applicants must do. They want to help you understand why the things you are required to do matter and provide some guidance in how to finesse them. Moreover, because the writing of the essays for your portfolio is such an important part of your preparation to apply, the premedical advisors want to encourage undergraduates to

[5] In distinguishing between volunteering and shadowing, we are well aware that many volunteer positions include a significant amount of shadowing. This is perfectly acceptable and need not be debited from your hours. We recommend that you be less concerned with whether the Premedical Committee will audit your health care experience (we won't) than whether that experience makes you as compelling an applicant as you can be.

speak with them, if any questions arise as they are writing them. While grades in science courses and standardized test scores are an important part of a premed's application, the bulk of it is a written account of the applicant's life experiences and motivations for a career in medicine. Understanding why such information weighs so heavily in the thinking of admissions committees will help you write the essays with greater confidence. It is also our hope that if you begin working on these essays early on, your reflections on yourself and your life experiences to date will help to vivify your current experiences.

Letters of Recommendation

Medical schools will attach great weight to the recommendations submitted in support of your candidacy for admission. There are three principal kinds of recommendations: faculty recommendations, recommendations from employers or from volunteer activities, especially (though not exclusively) those related to medicine and health care, and the recommendation of the Premedical Committee (discussed separately below). Admissions committees are interested in letters only from people under whom you have studied or worked. With rare exceptions, character references or letters from family physicians and the like are not appropriate.

Note to Prevets: The process for compiling letters of recommendation is very different from that described here. It is recommended that you consult with your premedical advisor regarding this matter before proceeding to request letters.

Faculty Recommendations
The medical school admissions process seeks to determine whether you possess the academic ability to succeed in medical school. For this reason, substantial weight is placed on the recommendations of your instructors. Most medical schools expect several references from science faculty; we recommend that these be distributed across the premedical science curriculum, if possible.

Request three letters of recommendation from Columbia science faculty. While we require two such letters to complete the Committee Letter, it is advantageous for the committee to have letters to choose from. Also, requesting an additional letter or two may ensure you have back up, in case one of your referees falls behind. Request letters from science faculty immediately upon the completion of each course. Requesting letters of recommendation at the last minute will reflect poorly on you, needlessly inconvenience your referees, and possibly delay your medical school application. Be advised, however, that some faculty may prefer to wait until you are entering the application process before submitting a letter for your file. As in other aspects of the application process, be flexible in your expectations.

Some faculty members have specific requirements about letters. For example, they may not write for you if you earned less than an A, or they may want you to submit a resume. Identify these requirements early so you can meet them.

Request at least one letter of recommendation from a faculty member not in the sciences, preferably from your major (if outside the sciences).

Request any letters from former faculty at your previous college early in the process. Any letter that is received will be held in your file until you apply.

Other Recommendations
Request at least one letter of recommendation from someone who has supervised your service as a volunteer (whether in a clinical or research setting).

Request a letter of recommendation from each of your previous employers in the field of medicine or health care.

If you have substantial work experience outside of the field of medicine or health care, request letters of recommendation from your employers, past and present.

If you have competed in organized sports or were active in one of the performing arts, you should consider requesting a letter from a former coach, teacher, director, or conductor.

If you intend to apply to MD/PhD programs, you should have letters of recommendation from each of the scientists under whom you have conducted research.

Requesting Recommendations
Begin to seek recommendations as early as possible. Failure to request letters of recommendation in a timely fashion is one of the greatest causes of delay in students' applications. When requesting letters from former employers and from instructors at previous schools, be sure to let them know what and how well you have done at Columbia to demonstrate the seriousness with which you are pursuing your premedical preparation.

It is important that your referees mention in their letters that they are writing specifically *in support of your candidacy for admission to medical school* (or, as the case may be, for *veterinary* or *dental school*). Health professional schools want to know that when a letter was composed the writer knew exactly for what purpose his or her support was being solicited. That said, you should tell your referees that they are not expected to comment upon your potential either for medical study or for professional success as a physician. It is sufficient for them to say simply what work you did for them and how well you did it, and that it is on that basis that they are recommending you for admission. Of course, if your referees are able to add further information based on their personal knowledge of you and their knowledge of medicine, admissions committees will be happy to have it.

Make sure your referees understand that they should address their letters generically "To the Admissions Committee," rather than to an advisor or a specific medical school. Be especially clear on this point with referees outside Columbia, who sometimes confuse the fact that you are a premedical student here with the idea that you may be applying to Columbia University's medical school (or, even, to Columbia's Postbaccalaureate Premedical Program!). Letters of recommendation addressed to the Columbia School of Medicine will be returned to your referee for correction—a time-consuming process with an uncertain outcome.

If you have a dossier of recommendation letters at another institution you should have it forwarded to the GS Premedical Office. If the letters in your dossier were not originally written for medical school applications, you should ask your referees to write new letters specifically mentioning that they are recommending you for medical school.

In general, you should request letters from those who know you well. Obviously, it would be best if each of your faculty referees knew you personally; but medical schools also recognize the reality of large lecture classes. Therefore, the expectation is that letters from science faculty will speak to the rigor of the course and your rank in the class. For example, an ideal letter from an undergraduate

instructor would come from someone from whom you took more than one course, or under whom you completed a substantive research project or thesis. Many times in large lectures it will be difficult to get to know the instructor, even if you seek additional help with the course material during office hours. In addition to expanding on the course requirements and the meaning of the grade, faculty will add personal observations when they can, sometimes relying on input from teaching assistants. In any case, the decision of whether to provide a reference, and with what enthusiasm, is exclusively the referee's prerogative. If you have not been in contact with instructors from your previous schools, you can refresh their memories with a letter, a resume, a photo, a copy of a paper completed for their class and, if feasible, a personal visit.

Inform your referees that recommendations should be typed on the referee's institutional letterhead, signed, and dated.
Institutional letterhead and a signature help to authenticate the letter.
Make sure to send along a recommendation waiver form (see below).

Letters can be transmitted to the GS Premedical Office in several ways:

- A scanned copy of the signed and dated letter, accompanied by the waiver form, may be e-mailed to gs-letters@columbia.edu.
- The letter and waiver form may be mailed to the GS Premedical Office (the mailing address is on the waiver form). Some Columbia faculty members prefer to hand-deliver it, and that is also acceptable. Please provide referees with stamped envelopes preaddressed to our office to facilitate the mailing of their letters to us.
- Once you have established your Prehealth Portfolio, you will be able to make entries for referees. When you do so, the system will send each referee an e-mail with a unique link at which to upload their letter. We encourage you to use this system; however, it is advisable to communicate with your referees about your desire for their letters before entering them into your portfolio. You will be able to track online the arrival of those letters submitted directly to your portfolio.

N.B. You must not function as the courier for your letters. We will discard any letters received from you, whether by hand, US Mail, or e-mail.

Thank-yous: We encourage you to send your referees a brief note to thank them for writing on your behalf. Referees will also be delighted to learn where you plan to matriculate. Please consider letting them know.

Waivers
The Federal Family Education Rights and Privacy Act of 1974, as amended (the "Buckley amendment"), provides students with the right of access to educational records. In the case of recommendations, the law provides that students, if they choose, may waive that right. You should determine for yourself whether your interests will be best served by recommendations that are accessible to you. Confidential recommendations will be written and submitted by faculty and others with the explicit understanding that they will be read only by the Premedical Committee and medical school admissions committees. The presumption is that letters to which you have waived your right of access are more candid assessments of your ability and potential as a medical student. For this reason, if you do not trust that a reference will be satisfactory, you would probably do better not to request it, rather than to retain your right to review it.

Whether you choose to waive your right of access or not, your decision must apply consistently to all your letters. Your decision to waive or not to waive your right of access also extends to your

Premedical Committee Letter. In other words, you cannot waive access to individual letters of recommendation, but retain it for the Committee Letter, or vice versa.

Every recommendation you request should be accompanied by a statement of its status as a confidential or non-confidential evaluation. These waivers forms are available on the Postbac Program website (https://gs.columbia.edu/content/applying-medical-school). You should supply one to each of your referees when you request their support. (However, if you are arranging for letters to be submitted online, the waiver statement will be incorporated into the system-generated e-mail sent to your referees.)

Premedical Committee Letter: Eligibility Requirements

Most medical schools expect applicants to have the support of the Premedical Committee of the institution at which they completed their premedical requirements. At the School of General Studies, the Premedical Committee, comprising the four premedical advisors, provides its support in the form of a "Committee Letter." To be eligible for a Premedical Committee Letter, you must meet the following conditions:

- Completion of the premedical curriculum, including one year of English; at least 15 points of premedical science coursework should be completed while enrolled at GS.

- All of the premedical courses must be completed by the end of the spring semester just prior to the submission of the application. An exception will be made for either biology lab or organic chemistry lab (which would need to be completed at Columbia over the summer in which the application is submitted). Permission to take any other premed courses over the summer must be requested by petition to the Premedical Committee.

- You must be in good academic standing. (N.B. For the purpose of eligibility, GS students placed on Conditional Disciplinary Probation are ineligible for support notwithstanding their good disciplinary standing because they have been found responsible for prohibited behavior.)

- To satisfy a course requirement, you must earn a grade of at least C.

- Completion of a minimum of two semesters at GS.

- Documented completion of at least 120 hours of appropriate work (volunteer or paid) in a health care setting.

- Written support of at least two Columbia faculty members, or instructors, from the premedical sciences and mathematics departments. Toward this end, we urge you to request at least three such letters of recommendation.

- Timely completion and submission of the online prehealth portfolio (in effect, your application for committee support), along with all the other materials required by the committee (letters of recommendations, certification of volunteer work, a copy of your submitted common application, etc.)

- An interview with a member of the Premedical Committee (Portfolio Review)

GS does not provide Committee Letters for students who, having begun studies at Columbia, subsequently complete required premedical coursework elsewhere. Once you have completed the academic prerequisites for committee support, you retain your eligibility for a committee letter for four years under the following conditions:

- You have met the eligibility requirements for a committee letter
- You meet the internal deadlines for a committee letter

If you do postpone application to medical school after completing your undergraduate degree, you are advised to keep active in a health-related field and remain in touch with your GS prehealth advisor.

Reapplication: The four-year eligibility period encompasses reapplications. Reapplicants are required to submit additional materials to the Premedical Committee by the published deadlines. This includes a brief supplement to your portfolio, verification of additional hours of health care work, additional letters of recommendation, and a copy of the submitted common application for the new application cycle. Please see the Postbac Premed website for details or consult with your premed advisor.

The Premedical Community at GS

In addition to the undergraduate premeds, the School of General Studies is home to more than three hundred Postbaccalaureate Premedical Program students who take the same premedical courses as their undergraduate peers through a non-degree program. These students give shape and energy to the premedical community at GS and are represented by their own student organization, the Postbac Premed Student Council (PPSC). While you, as an undergraduate, are not eligible to run for office in the PPSC, you will receive invitations to all kinds of events the PPSC sponsors throughout the year. We urge you to attend as many as appeal to you. The social events give you a chance to meet other premedical students who, like you, are facing the challenges of completing premedical preparation while leading independent lives.

Workshops and Information Sessions

Throughout the academic year, the GS Premedical Office offers workshops and information sessions to augment students' classroom experience and the support they receive from their premedical advisor. Workshops and information sessions are held on a variety of topics including application preparation, personal statement writing, interviewing skills, and glide year planning.

Events such as the Medical School Fair Deans' Panel give you a chance to hear from medical school admissions deans, while the MCAT Panel, the Application Year Panel, and similar events allow you to learn about aspects of the premedical experience from the perspective of current and former students who are further along in the process.

Dates and additional information on these workshops and information sessions may be found in the weekly *Postbac Premed Weekly* newsletter and on the Postbac Premed calendar.

Premedical Communications

As a premedical student, you will be added to the premedical e-mailing list, which will provide:

- Crucial information about deadlines, medical school visits, changes in the medical school admissions process and events of interest to premeds

- Notices of group advising meetings, panels on the MCAT, workshops on interviewing, etc.

- Postings of clinical and research opportunities, both paid and volunteer, to help you acquire direct experience of medicine and patient care.

The primary vehicle for this information is the weekly *Postbac Premed Weekly* newsletter. We urge you to read it regularly. We also recommend you look at the Postbac website; please do not be put off by the term "Postbac": much of the information applies to undergraduate premeds also.

Some Advice about Advising

The premedical path is a difficult one to follow; however, if you are sincerely interested in a career in medicine, we encourage you to pursue it. Every premed comes to the task with different experiences and different strengths. It is good to know what yours are. We encourage you to proceed on the assumption—one that we make—that you can do it. From there it is all a matter of strategy, planning, hard work, and the exercise of good sense. This is where your advisor can be helpful. We encourage you to speak with your advisor to discuss a workable plan of action. We also ask you to consider carefully your advisor's advice.

Accessing Academic Help

Prepared by the Postbac Premed Student Council (PPSC)

Welcome to the Premedical Program at Columbia. There are many resources available for guidance and assistance in your class work and we urge you to use them.

Peers

You are each other's best resource. Do not feel shy about approaching your classmates for help, to form a study group, or just to ask advice. Everybody has different academic strengths and weaknesses, so it's a good idea to pool your knowledge—everyone learns more that way. If you have no academic weaknesses (lucky you), it's still to your benefit to help others. The best way to test your knowledge is to teach someone else. Your peers are also your best source for information about course requirements, professors' teaching styles, and scheduling.

Professors and Teaching Assistants (TAs)

Professors and TAs have office hours to answer questions or clarify material. Some people feel more comfortable approaching TAs, while some like speaking with professors. Both are useful sources of information. TAs and professors are generally very accommodating; if you can't meet them during office hours (due to work, etc.), call or email them for an appointment. TAs will also hold recitation (an hour-long review of lecture material and homework) at least weekly, and it is a mandatory part of most courses. For many students, this is an extremely useful supplement to attending lecture.

Departmental Help Rooms

The physics, math, and statistics departments have **free** help rooms. The hours vary, but your professors will announce them at the beginning of the semester. They are staffed by graduate students who are willing to answer all your questions.

Academic Resource Center (ARC)

The Academic Resource Center offers **free** academic support in all premedical subjects, including tutor-led study groups, a weekly premed work room, and traditional tutoring appointments. These resources are designed to help students at all levels of mastery: whether you're struggling with an entire subject or trying to turn an A to an A+, the ARC can help!

In addition to tutoring services, the ARC also offers support consultations on study skills, test taking strategies, time management, critical reading skills, optimizing your study group, and more. Services are constantly evolving based on student needs and requests—so if there's something you'd like to see that isn't offered, your input is always welcome.

Paid Tutors

You can find a paid tutor in two ways. First, look around for advertisements on campus. Alternatively, department offices will provide you with a list of graduate students who tutor for a fee. The tutors from the biology, chemistry, and math departments have departmental approval. Many tutors offer group rates.

Study Guidelines

By Professor Deborah Mowshowitz

[*Professor Deborah Mowshowitz wrote the following guidelines for Introductory Biology (BIOL 2005/2006), a course she taught at Columbia's for many years. We believe they can be applied to any course.*]

1. *Come to class*. In some courses all you have to do is read the book, but that is not the case here. There is too much stuff in the book, and the lecture will key you in to what is important and what isn't; it will also provide a framework to stuff all the facts into. If you have to miss a class, get the notes from a fellow student. Get the phone number of at least one other student now, so that you'll have someone to call if necessary.

2. *Take notes*. Everything that really matters will be discussed in the class; the book is really just for back up (this may not make sense, but this is how we do it). There are many styles of taking notes—some people prefer to get all down word-for-word and some people prefer to just write down the critical points. Either way is fine, but be sure you get the point (if you are concentrating on transcribing every word) and be sure you understand the necessary details (if you are concentrating on the point). Taping is permitted, but the transcribing of tapes is very time consuming and we don't recommend it. You are probably better off forming a study group and going over notes together to fill in the holes. We do not give out notes because we believe you learn more from taking your own.

3. *Form a study group or partnership*. Don't try to do it alone. (If you are too shy to ask anyone, we will help you find a partner.) Study groups are generally good because they help you go over the material (see above), give you an opportunity to practice explaining your answers (see below), and provide moral support.

4. *Do the problems*. Seriously and carefully. This is probably the most important thing. All the other advice is just to get you in shape to do this. Do the unstarred problems first and leave the starred ones for later (to test yourself). Go over the unstarred problems until you feel confident with the material; go over them more than once if necessary, but don't do the starred ones until you understand the others. Once you feel on top of the material, do the starred ones as if it were a test—write out the answers and write out the explanations of how you got your answers.

5. *Make pictures, diagrams, summary charts, concept maps, etc*. The ones in the book (and the ones we hand out in class) may be good, but for best results, you should make your own. Don't copy over your notes or outline the book word-for-word; digest each section of the notes or text first and write your own, private, condensed version (in whatever form you prefer—use diagrams, charts, etc.).

6. *Keep up*. The current material is always based on what came before, so once you get behind it is very difficult to catch up.

7. *Read one of the texts before class if the material is new to you.* It is very hard to follow the lecture if every word and concept is unfamiliar. It probably does not pay to spend too much time on the text(s), as explained above in point 2, but some people learn better from books than they do from lectures.

8. *Ask questions*. If you don't understand something, **ask**. That is what the TAs are here for and that is how the lecturer finds out if he or she is going at the right pace. Don't wait for the class bigmouth to speak up—do it yourself. Don't be afraid of looking stupid—looking dumb before the exam is a lot smarter than looking dumb afterwards. To get the most out of recitations and office hours, go through the problems and/or notes first and come prepared with a list of questions. The more effort you put into asking questions, the more you will get out of the answers.

9. *Master the vocabulary*. The stress in this course may be on using the vocabulary, but you won't get anywhere until you learn it first. So, try to master all the new terms as fast as possible. Be especially careful about words that seem similar, but mean different (often related) things (such as peptide/protein, chromosome/chromatic, gene/allele, etc.). Once you get the vocabulary down pat, you will find it much easier to follow the lectures and do the problems.

10. *A word or two about grades*. The two most common complaints about grades heard in this class are "the exam grade doesn't reflect my knowledge of the material" and "my grade doesn't reflect the amount of time and effort I put into this course." Sometimes these complaints are justified, but often they mean the student does not understand what is expected of him or her, or is concentrating on (and spending too much time on) the wrong things. In this course you have to know how to use the material, not just repeat it. If you think your performance on the exam does not reflect your knowledge, it often means you have memorized the facts but have not practiced enough at selecting the right ones and applying them to whatever problem is presented to you.

Undergraduate Premedical Frequently Asked Questions

How does GS come to recognize that I'm premed?
Once you realize you are premed, predent, or otherwise "prehealth," be sure to tell your advisor and ask that you be linked (through the GS Student Success Portal) with a prehealth advisor. You will then be able to schedule an appointment with the advisor. In anticipation of your appointment, your prehealth advisor will review transcripts of coursework you completed before Columbia (where applicable) to determine whether any requirements have been satisfied. With your permission, your prehealth advisor will also arrange to have you added to the weekly premed listserv (The Premed Weekly). We encourage you to meet periodically with your prehealth advisor to discuss your premed academic track, academic preparation, health care experiences, and medical school applications.

Who does the premed advising?
GS has an excellent premed advising staff which also advises non-degree students in the Postbaccalaureate Premedical Program, the oldest and largest of its kind in the U.S. Your premed advisor will work with you on the specific order and combination of courses to be taken to fulfill the premed requirements, guide you through the process of applying to professional schools, and, for students who qualify, provide written support in the form of a committee letter.

Can I substitute previous coursework at other schools or other courses at Columbia or Barnard for any of the premedical requirements?
Students are expected to fulfill the specified premedical course requirements at Columbia. Any substitution or equivalent coursework to be used, whether taken at Columbia or elsewhere, must be officially approved in writing by your GS premedical advisor.

What if I have completed some of these required courses elsewhere?
Premeds must complete at least fifteen points of required premedical coursework at Columbia in order to be eligible for a letter of committee support. At the same time, advisors will not require you to repeat courses without reason. If, upon review of your transcripts of coursework completed before you matriculated at Columbia, your advisor finds that you have less than fifteen credits of required premedical coursework remaining to complete, he or she may advise you to take advanced level science courses to fulfill eligibility requirements for a committee letter as well as to make you a more competitive applicant to medical school. Such decisions are made on a case-by-case basis.

What summer session courses can be taken to satisfy premedical requirements?
We recommend that GS premeds take only the following summer session courses in satisfaction of the premed requirements: the 12-week General Chemistry II course (CHEM S1404); the 12-week General Physics II course (PHYS S1202); general chemistry laboratory; general physics laboratories; organic chemistry laboratory; biology laboratory; and courses taken in fulfillment of the math-related requirement. It is also acceptable to take the Science of Psychology (PSYC S1001), a course recommended to premeds who will eventually take the MCAT. If you are thinking of taking the physics or chemistry lecture courses offered in Columbia's Summer Session in a six-week format, you should discuss with your advisor the pros and cons of doing so.

What if the premed courses are included in the requirements for my major?
Students who satisfactorily complete the premedical requirements are eligible for committee support even if some of the premed courses satisfy major requirements.

Can premedical courses count toward the fulfillment of the GS core requirements?
Yes, required premedical courses may be counted toward fulfillment of the GS science core requirement.

If I did hospital volunteer work before matriculating at GS, must I continue to volunteer?
You are required to complete at least 120 hours of health care work while enrolled at GS, volunteer or paid. Even if you have prior experience, there is always more to learn about medicine, and New York City, with its many health care facilities, is a great place to do so. By continuing to volunteer, you will demonstrate to medical schools the extent of your knowledge about, and your enthusiasm for, medicine.

What if I am interested in veterinary or dental medicine or other healthcare professions?
The basic premedical curriculum will prepare most students who are interested in going on to other kinds of healthcare professional programs. Students interested in other healthcare professions, such as veterinary medicine, should consult with their premedical advisor about additional, particular, or substitutional prerequisites for admission to other professional programs.

Additional Questions?
Please consult with your GS premed advisor.

Premedical Curriculum Worksheet

Course	Course Number	Points	Semester	Grade
English (University Writing)	ENGL GS1010	3		
Literature (in English)	ENGL 3000-level or higher	3 or 4		
Pre-Calculus*	MATH UN1003	3		
Calculus I	MATH UN1101	3		
Statistics *or* Calculus II	STAT UN1101 *or* MATH UN1102	3		
Introductory Psychology**	PSYC UN1001 *or* equivalent	3		
Pre-Chemistry*	CHEM UN0001	0		
General Chemistry I	CHEM UN1403	4		
General Chemistry I Recitation	*variously numbered*	0		
General Chemistry II	CHEM UN1404	4		
General Chemistry II Recitation	*variously numbered*	0		
General Chemistry Lab	CHEM UN1500***	3		
Basic Physics*	PHYS UN0001	0		
Physics I Lecture	PHYS UN1201	3		
Physics I recitation	PHYS UN1203	0		
Physics I Lab	PHYS UN1291	1		
Physics II Lecture	PHYS UN1202	3		
Physics II recitation	PHYS UN1204	0		
Physics II Lab	PHYS UN1292	1		
Intro Biology I◊♣	BIOL UN2005	4		
Intro Biology I recitation	BIOL UN2015	0		
Intro Biology II◊	BIOL UN2006	4		
Intro Biology II recitation	BIOL UN2016	0		
Contemporary Biology Lab◊	BIOL UN2501	3		
Organic Chemistry I◊	CHEM UN2443	4		
Organic Chemistry I Recitation	*variously numbered*	0		
Organic Chemistry II◊	CHEM UN2444	4		
Organic Chemistry II Recitation	*variously numbered*	0		
Organic Chemistry Lab I◊	CHEM UN2493§	1.5		
Organic Chemistry Lab II◊	CHEM UN2494§	1.5		

* This is a prerequisite for a required course, but not itself a requirement for medical school. Neither Preparation for College Chemistry nor Basic Physics may be taken toward the degree.
** This course is not required for premedical study, but it is recommended as preparation for the MCAT.
*** The lab course is accompanied by a zero-credit lab lecture (UN1501).
§ The lab course is accompanied by a zero-credit lab lecture (UN2495, UN2496).
◊ The biology and organic chemistry requirements may be satisfied with Barnard College coursework (subject to availability of space in the course); however, premeds who choose to take biology at Barnard are advised to take a separate biochemistry course to prepare for the MCAT. They are also advised that they should not take the Barnard College courses, if they plan to major in one of the sciences.
♣ Students who plan to major in ecology, evolution, and environmental biology may take Environmental Biology I: Elements to Organisms (EEEB UN2001) in place of BIOL UN2005; they should take BIOL UN2006 for the second semester of biology and are also advised to take a separate biochemistry course to prepare for the MCAT.