Fall 2007

Dear Life Sciences Pre-Professional Student,

Welcome to Washington University and the Life Sciences Professions program in the College of Arts and Sciences. The following pages have information that will help you pursue a broad liberal arts education and, at the same time, identify the course requirements for your professional goals. Many of you using this handout are students seeking to become physicians, but a growing number of you are planning to enter into other health professions such as dentistry, osteopathic medicine, occupational therapy, public health, veterinary science, physical therapy, podiatry, chiropractic medicine, optometry, pharmacy, social work, public policy, and health administration.

Your academic advisor will help you select your courses and explore with you what academic area you wish to study. We encourage you to pursue whatever academic area most interests you: medical schools and other professional health schools welcome students with a variety of backgrounds and academic majors into their programs. Remember that pre-medical course requirements are just that – a set of course requirements, not a major.

We hope that you will take advantage of all the resources the University has to offer. The departments of biology, chemistry, English, mathematics, and physics offer support systems for students enrolled in their courses ranging from math and chemistry study groups in the dorms to the English department's Writing Center in Eads Hall. There are also resources available in Cornerstone, located on the ground level of Gregg Hall at the north end of the building. Most of your science courses will include small recitation sections that complement the large lecture courses. The faculty in each of these departments have worked hard to develop programs that will make you a successful student and give you the strong foundation you will need to achieve your professional goals. Please take advantage of all these opportunities.

The College of Arts & Sciences sponsors a variety of programs throughout the year. If you have not yet registered as a life sciences student through your advisor, please do so with Ms. Kirsten Smith by e-mail, **lifesci@artsci.wustl.edu**, if you are interested in the health professions so that we can send you e-mail messages for announcements of events. The life sciences website is: **http://artsci.wustl.edu/~college/Preprofessional_Programs/Life_Sciences.** The life sciences student organizations also offer programs throughout the year, and they have their own websites. Look for Alpha Epsilon Delta, Black Pre-Medical Society, the Pre-Dental Society, the Pre-Medical Society, the Pre-OT/PT Society, the Pre-Veterinary and Zoologic Science Society, and SHAC, the student health organziation. They welcome your membership.

Sincerely,

Sharon Stahl
Associate Dean
Director, Life Sciences
Professions Program

Handbook for

Pre-Professional Life Sciences Students

2007 - 2008

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The Life Sciences Professions Program in the College of Arts & Sciences

Over the next four years, you have the opportunity to acquire a broad liberal arts education. Mastering basic science is critical to the study of a life sciences profession; however, the arts, languages, politics, economics, philosophy, and an appreciation for cultural diversity also are essential and should be viewed as integral components of your education and preparation for professional school.

As you select your coursework over the next four years, give it breadth and depth. Explore areas that you may never again have the opportunity to study in a structured and mentored environment. Careful planning enables students to take advantage of many wonderful academic opportunities. We hope you will pursue the research opportunities that are available in many disciplines such as anthropology, art history, biology, mathematics, economics, psychology, history, women's studies, and many others. You may choose to study abroad, and we encourage you in that endeavor; a growing number of our life sciences pre-professional students are including it as an essential part of their education.

You also will be able to shape the life of the University community through your participation in the Congress of the South Forty, Student Union, and the Council of Students of Arts and Sciences. Many of you will enrich your college experience by participating in varsity and intramural athletics, and performing/fine arts. You will have unlimited opportunities to serve. You can volunteer in the many programs of the Campus Y, in the hospitals affiliated with the School of Medicine, and through the numerous religious and cultural organizations within our community. All of these organizations are committed both to the campus community and to the larger St. Louis community. Students also choose to become active in Peace Corps, Teach for America, Americorps, and other national and international service organizations.

An exciting and enviable four years lay ahead of you. Take ownership of your education and put all of your energy and talents into whatever you choose to do while you are part of this community. Your goal of becoming a health professional is a noble one, and noble goals are not easily achieved. You will spend long hours studying and will be faced with hard choices — just as you will be when you enter your chosen profession. We will do everything that we can to support you in achieving your professional goals. Our primary commitment is to provide you the opportunity to acquire the finest liberal arts education available — that we can do. The rest is up to you.

Successful Application to Life Sciences Professional Programs

Many factors contribute to a successful application to professional school. Although the specific requirements of professional schools vary, most professional programs look for the following:

1) Students who will be successful in their demanding graduate programs. Strong grade point averages, both overall and in science coursework, indicate that you will perform well in more advanced coursework.

2) Candidates who are very likely to complete a professional program. The most attractive applicants establish that they are making an informed decision based on pre-professional exploration activities such as research experiences with members of a chosen profession, shadowing experiences, informational interviews, and internships. **NOTE:** Most medical school admissions committees only seriously consider those students who have significant exposure to the hospital setting.

3) Individuals with a strong ethic of service. On-going community service that originates in a genuine desire to make a contribution to the world around you demonstrates that you are a good fit for your chosen profession.

4) Students who are mature, personable, and committed. Compelling letters of recommendation from mentors and professors who know both your work and your character assure schools that you are the sort of student they hope to enroll.

5) Candidates who score well on pre-professional admissions tests such as the Medical College Admissions Test (MCAT), the Dental Admissions Test (DAT), or the Graduate Record Exam (GRE). Note: Students interested in attending veterinary school need to check requirements for individual schools. Vet schools will require the MCAT or the GRE. These tests are an indicator for the professional schools that you retained the information you studied in prerequisite courses and will be successful on the board examinations that are required for licensure. Professional schools want to ensure that the students they admit will have a high rate of success on licensing exams.

To become a competitive candidate, you will, over the next four years, build an application portfolio that includes excellent grades in the humanities and sciences, career exploration activities, and genuine community service. You should also consider how you will successfully build relationships with mentors and professors so that they are in a position to write strong letters of reference for you. Finally, you should determine well in advance how best to schedule and prepare for your professional school admission exam. This handbook will give you additional information to help with each of these tasks. Please register (if you have not already done so through your advisor) with the College of Arts & Sciences as a life sciences pre-professional student so that we can notify you of programming throughout the year that will also provide additional information to help you achieve your goals. E-mail Ms. Kirsten Smith at **lifesci@artsci.wustl.edu** to register.

Academic Success

Life sciences professional schools welcome students with any major. Choose your major (and minor if you elect one) because you find the coursework engaging and exciting, not because you think it will impress a professional school. You are far more likely to end up with strong grades in courses you love!

Grade Point Average

Regardless of your major, both your overall GPA and your science GPA should be strong. Many courses have help-sessions, office hours and tutoring. Avail yourself of these opportunities to get some additional insight into the course material **before** you are having difficulty in the course. Above all, **do not let yourself get behind**! Keeping up with assignments and reviewing notes regularly are essential for success. An occasional withdrawal (W) or repeated course (R) on your transcript will not bar you from entrance to medical school; however, a pattern of having to withdraw from or repeat courses in two or more semesters may cause professional schools to question whether you can succeed in their demanding curricula. If you find that you need to withdraw or repeat a course, take stock *immediately*. Determine what you could have done differently to be successful, and then *start doing it!* See Appendix A for specific resources.

To be accepted to medical school, if that is where you are headed, you must work very, very hard! Last year 38,000 students applied for 19,000 places in medical school. The national mean GPA for accepted students is 3.6. For the top tier of medical schools, it is 3.7+.

Academic Integrity Issues

The rigors of the life sciences pre-professional curriculum and the competitive climate for entry into professional school at present can sometimes pressure students to consider compromising their ethical standards. Students need to ponder these issues seriously and avoid errors in judgment. There is a question on the American Association of Medical Colleges Application Service (AAMCAS) application, which most American medical colleges use, that reads as follows: *Were you ever the recipient of any action by any college or medical school for: (1) unacceptable academic performance (i.e. dismissal, disqualification, suspension, etc.) or (2) conduct violations? If "YES", explain fully.* You do not want to be in the position of having to "explain fully."

Planning Your Courses

We believe that planning is essential for any successful student. Outlined on the next page is the coursework that pre-professional students take to meet the general requirements set by most American medical, dental, veterinary, and osteopathic schools. These requirements will usually meet those set by other health professional programs as well. **Requirements for entry into a specific program may vary, and students are urged to check individual schools.**

The specific requirements listed below are compatible with any major. Life sciences professional schools are interested in students whose education has both breadth across disciplines and depth within a discipline. Your total undergraduate educational experience includes both formal coursework and informal learning opportunities such as extracurricular involvement, work, and internships. The sum of these experiences should demonstrate:

- a facility with written and oral communication,
- proficiency at developing equations from known physical relationships and constructing and interpreting graphic representations of data and functions,
- an appreciation of the social and cultural facets of diverse individual and community approaches to health and disease,
- a genuine desire to serve.

In Appendix B, you will find various four-year plans for humanities, social sciences, and science majors. They are suggestions, possible configurations, not mandates: *individual plans should be devised in consultation with your four-year advisor and your major advisor at the time you select a major*. Listed below are the general requirements.

Core Requirements

Nearly all life sciences professional programs require the following:

Subject	**Coursework Required**	**Washington University Courses**
Biology	Two semesters with laboratory	Bio I, Bio II and Bio III Note: Although only two semesters with laboratory are required, the content in Bio III is critical to performing well on the MCAT.
General Chemistry	Two semesters with laboratory	Chem 111A + 151 (lab) and Chem 112A + 152 (lab)
Organic Chemistry	Two semesters with laboratory	Chem 251 and 252 + 257 (lab)
Mathematics	Two semesters of college math Note: This requirement varies from school to school. For the broadest range of schools, and to fullfill the biology major, students should complete Calculus I and II. Some schools have no formal math requirement.	Math 131 and 132 for all students majoring in the sciences and economics Math 127 and 128 for non-science majors is sufficient Math 320, statistics, is recommended but not required
Physics	Two semesters with laboratory	Phys 117A and 118A or Phys 197-98
English	Two semesters, one of composition	Writing 1 and a second English course Note: Some schools accept any writing-intensive course as the second English course; a few insist on two courses from the English department. Two courses labeled English on your transcript will ensure the broadest range of options. Your English requirement does not need to be completed before you apply, just prior to matriculation.

The required core should be completed prior to taking your pre-professional entrance examination (*i.e.* MCAT, DAT, GRE, etc.) Many students take the exam in the spring of the junior year. It is common to be enrolled in a core requirement course (*i.e.*, second-semester physics) in the semester that you take the pre-professional exam. These exams are offered on-line and frequently.

As you plan your schedule, remember that Calculus 131 is a co-requisite for physics and that general chemistry and organic chemistry should be taken in sequence. You must begin the chemistry sequence before the biology sequence, and the first semester of organic chemistry is required for Biology III.

Variable Requirements

Programs differ as to whether they encourage or require students to pursue specific courses outside of the core listed above. Students who complete the courses listed below have the widest range of options available to them in applying to life sciences professional schools. Students who do not plan on enrolling in the following courses should carefully review the admissions criteria of the five programs, at a minimum, that most interest them to be sure that their choices will not be limited by a course deficiency.

In addition, you should always review your curricular plan with your major and four-year advisors. Although, for instance, some medical schools do not require calculus, many majors do require calculus. Omitting coursework in a fundamental discipline such as math will severely limit the majors you can pursue and will preclude your application at some medical schools.

Subject	**Coursework Recommended**
Math	Many schools recommend or require statistics. Most schools recommend or require one semester of calculus; top tier medical schools require a year of calculus. Some schools recommend computer science courses.
Social Sciences	Many schools recommend a strong background in the social and behavioral sciences.
Biochemistry	Many schools recommend and a few require one semester. At least one requires biochemistry with laboratory.
Molecular Biology/Genetics	Some schools recommend and a few require one semester.
Humanities	Most schools recommend a solid foundation in the humanities.

Advanced Placement Credit

Some medical schools will not accept AP or CLEP credit in lieu of the required core courses listed above. Other medical schools are a little more flexible and require that upper-level coursework in the same discipline be completed if some of the required core is satisfied by AP credit. Only a few medical schools seem to welcome AP credit. Our advice is NOT to skip any required core courses, even if you could receive AP credit for them.

MD/PhD Programs

MD/PhD or Medical Scientist Training Programs (MSTP) train physician-scientists to become leaders in biomedical research. Students who pursue this option obtain both an MD and a PhD degree with in-depth training in modern biomedical research and clinical medicine. The typical MD/PhD career combines patient care and biomedical research but often leans toward research. It is an excellent choice for students who are passionate about research and are certain that research will be an important dimension of their careers.

Since they are completing two graduate degrees, MD/PhD students spend a longer period of time in graduate training. Generally, however, your tuition is paid by federal or institutional grants, and you receive a stipend. So, even though the time to degree (and practice) is longer, you may graduate debt-free. Federally funded MST programs are not open to non-citizens, but many top-tier research institutions (including Washington University School of Medicine) fund some MD/PhD positions through private sources and welcome international students to apply for those seats.

For undergraduate students interested in biomedical research, the MD/PhD programs offer an excellent opportunity. These programs are very competitive and highly selective, and few students are admitted. For example, at Duke University, in an entering MD class of one hundred students, fewer than ten are MD/PhD students. Washington University Medical School has one of the largest programs in the country with about 25 MD/PhD students in a class of 120.

Undergraduates interested in an MD/PhD program will need to establish an outstanding academic record and a genuine commitment to doing research. Most successful applicants are science majors and have been in the laboratory at least since their sophomore year in college. Students who are interested in this program and wish to major in the humanities or the social sciences should also plan to pursue a second major in one of the sciences.

Career Exploration

Professional programs place the highest importance on the entering student's ability to complete the curricula and pursue a professional practice. Students who are not well-informed about either what the training for a particular profession is really like or what the practice of that profession is really like are more at risk for dropping out. Successful applicants demonstrate to admissions committees that they have thoroughly investigated their chosen profession and have thoughtfully considered how they will handle the drawbacks that it presents.

The Career Center, located in Umrath Hall across from Graham Chapel, can be most useful in helping a student to think about areas of academic interest and career choices. It is also the place to search for summer internships, year-round job opportunities, and alumni contacts for informational interviewing.

Clinical Exposure

Your first semester on campus is not too early to organize career investigation activities such as shadowing practitioners and conducting informational interviews. If you already have contacts in the professions that interest you (your personal physician or dentist, your pet's veterinarian, or a relative practicing in the health care field, for example), you may be able to arrange appointments for winter break or other times when you will be at home. The Career Center is an excellent source of contacts.

Exploring the Training Process

Consider informational interviews with individuals at every stage of the career you are considering. The perspectives of senior students at Washington University who are in the midst of the application process as well as the views of accepted students at professional schools will be important in ascertaining whether the training process is one you will enjoy and wish to complete. There will be programming throughout the year, sponsored by both the College Office and the pre-professional student organizations, that will enable you to access WU students and alums who can answer questions about application to professional school and professional school itself.

Research as a Part of Medicine

Research experiences in laboratories on the Danforth Campus or at the WU Medical Campus can be an invaluable source of career-planning information. Many students learn unexpected things about what sorts of daily activities they like and dislike through research experiences. Washington University is a research institution; research is part of our culture. Whether or not you "see" yourself as a researcher in the future, you miss an important part of what this institution has to offer if you elect not to explore an undergraduate research experience. In addition, students who are able to work with a science faculty member in the research laboratory have a real advantage in seeking strong letters of recommendation.

There are many opportunities to do laboratory or field research in all the science and some social science departments on the Danforth campus: anthropology, biology, chemistry, earth and planetary sciences, mathematics, physics, and psychology. Additionally, many faculty members at the medical school, in both the basic science and the clinical departments, welcome undergraduates into their laboratories. You may do independent research, usually not begun before the sophomore year, leading to an honors thesis. Many freshmen begin in the laboratory through their work-study jobs. If a student comes to us with significant research experience, joining a lab in the freshman year may be possible.

Some students begin their research as early as the pre-freshman summer; for others, September of the junior year is an excellent time to begin research. Visit the website **www.nslc.wustl.edu/courses/Bio500/bio500.html** for more information about research opportunities in the Division of Biological and Biomedical Sciences. There are several Fellowship programs in the Biology Department and in the Division of Biological and Biomedical Sciences that support summer research. Application deadlines for these programs usually are in January or February; contact the Professor Kathryn Miller in the Biology Department (935-6860) for details about the applications.

Research opportunities are available in all disciplines. For example, students do laboratory research as well as field research in archeology and in environmental studies.

Economists, physicists, and biophysicists do computer modeling in their research, and traditional library research and primary document research provide invaluable skills for students no matter what professional goals they may have. Many of our students do independent research in the humanities and the social sciences, and many of our life sciences pre-professional students who choose to major in the humanities or the social sciences complete honors theses in these disciplines. Please contact Dean Henry Biggs who directs the Office of Undergraduate Research, Umrath Hall, 935-6519.

Community Service

It is important to demonstrate a commitment to service and to the community. Get involved in volunteer activities that are meaningful to you and stay involved. You do not have to restrict your volunteering to clinical settings. You can tutor through the Campus Y or be involved in Habitat for Humanity or any other community service project. The Hillel Foundation, the Newman Center, the Muslim Student Association, and many Protestant religious groups on campus offer a variety of volunteer opportunities. The Greek fraternities and sororities all sponsor philanthropic endeavors; multicultural organizations such as Ashoka, the Asian Student Association, the Association of Black Students (ABS), the Hispanic Student Association (ALAS), and the Korean Student Association, among others, also offer a myriad of volunteer opportunities.

A Warning

Make sure your service is its own reward. Pursuing community service just to improve your application can backfire. Admissions committees are very wary of being manipulated by students. It is extremely difficult to sound sincerely passionate about something that is actually just another chore to complete.

Letters of Recommendation

Compelling letters of recommendation are a cornerstone of your application portfolio. How do you obtain such letters? Above all, the author must be someone who really knows you, which means that she or he knows the calibre of your work and your work habits, as well as something about your personality.

Recommendations from Science Faculty

Many professional programs insist that two of your recommenders be science faculty. If your major is one of the sciences, you should cultivate a good relationship with your advisor and at least one other science faculty member. Often, the best way to develop a strong relationship with a faculty member is to work in his or her research lab. The longer the period of ongoing association between you and your recommender, the stronger the recommendation can be. Students who join a research lab as sophomores and continue to work in the same lab through the time when they seek recommendations have a real advantage over students without this experience. Another option for a few students who are majoring in the sciences is to serve as a teaching assistant for a lab course.

Students who are not majoring in the sciences need to give the subject of science faculty recommendations special attention. Some strategies that non-science majors can adopt to lay the groundwork for asking for letters of reference include:

- Take upper-level science coursework. If you particularly enjoyed an instructor for an introductory course in which you did well, try to take an additional course with the same instructor. Go regularly to the professor's help-sessions and office hours, and bring questions about the course material or very closely related subjects with you. If you consistently and actively participate in small-group settings such as office hours, and you earn a good grade in the course, the professor may be favorably disposed toward providing you a strong letter of recommendation.

- Ask your four-year advisor if he or she teaches you in a science course. They will have the advantage of knowing you both as an advisee and as a science student.

- Consider joining a science research lab, either on campus or at the medical school. If you take Bio 200 (or the equivalent in another department), it is clear that your research mentor is also one of your instructors. This may turn out to be more fun and more interesting than upper-level coursework in an area which you are not enthusiastic about. *Note:* Some schools do not accept letters from lab mentors in lieu of a recommender who has taught you in a classroom setting.

Recommendations from Practitioners

Many students receive outstanding letters from practictioners of their chosen profession, and a few of the life sciences professional schools (i.e. dentistry, veterinary medicine, and osteopathic medicine) may insist that you have a letter from a practitioner. If you start shadowing a practitioner early in your undergraduate career and continue periodically observing that same person until you apply to professional school, you are in an excellent position to receive a letter from someone who has known you for several years and has seen

you mature both intellectually and socially, as well as in terms of career goals. Practitioners associated with volunteer programs in which you are involved over a significant period of time are also a good source of meaningful letters of recommendation.

Requesting Letters of Recommendation

If you have done quality work under several faculty members and mentors, strong letters of recommendation should result. However, it is essential that you request letters skillfully and that you listen carefully to your potential referees' responses to your requests.

Be considerate. Make your request far enough in advance that the recommender will have plenty of time (at least four weeks) to fulfill it. It is wise to email instructors or to leave a note in their boxes stating that you will be contacting them in person to request the recommendation. Make an appointment to see your mentor; a phone conversation may have to suffice for out-of-town requests. Although your request should be verbal whenever possible, have a written request and a pre-addressed (and stamped, if off-campus) envelope ready to hand to a mentor who agrees to write a recommendation for you. The written request serves as a reminder and should include a current resume and unofficial transcripts. Include a photo if you have not worked with the person recently. Offer to schedule a time for your recommender to meet with you and discuss your goals and plans. Not all recommenders will want or need to schedule such a meeting, but you should be available at their convenience if it will help them craft strong letters for you.

Think about how to phrase your request. It is far better to say, "Are you comfortable writing a letter that provides strong support for my application?" than to say, "Will you please write a letter of recommendation for me?" Listen attentively to the response your request elicits. If you hear, "I would be happy to write the letter, but I don't know your work that well," or "Yes, but you would probably receive a better letter from someone who has known you longer," you should assume that you will not receive a letter of recommendation from this individual that will make you competitive. Thank the person for his or her honesty, and seek a recommendation elsewhere.

Be cordial. Acknowledge that the instructor's time is limited, and communicate that you deeply appreciate his or her willingness to write on your behalf. Once your letter has been received in the College Office, please write a thank-you note to the person who wrote the letter. Not only is this common courtesy, but it will also create enormous good will for students who follow you. Consider writing another thank-you when you are accepted. Your professors are interested in what happens to the students they recommend. It is very rewarding to know that a letter you wrote for someone made a difference.

Recommendation Letters for Graduate School

Some of you will apply for a graduate program such as public health, biology, chemistry, etc., concurrently with your professional school application. You really need separate sets of recommendation letters for professional school and graduate school. If you have a strong enough relationship with a mentor, he or she may be willing to write outstanding letters for both. However, be very clear with the recommender about which you are requesting (professional school, graduate school, or both), and give extra attention to whether the recommender is comfortable writing equally strong letters for both programs.

Pre-Professional Examinations

Most professional programs give considerable weight to some type of pre-professional entrance exam in their admissions decisions. The MCAT, DAT, and GRE, are, in large measure, content-specific exams much like you could expect in a difficult course. **You should study extensively for the exam.** Practice tests and other preparation materials are available from the organizations that sponsor the examinations. A plethora of commercial preparation materials are also available. Everyone studies and learns differently; select materials that you think will be useful to you. More important than the specific review materials that you choose are the planning and commitment with which you approach studying for your entrance exam.

Most students take these exams, specifically the MCAT, in the spring of the junior year; students usually sit for the GRE in the beginning of the senior year. In the spring of your junior year, you have completed most of the core coursework that is covered on the exams. You are probably enrolled in upper-level electives in at least one of the areas covered on the tests, making review for that subject easier. We recommend that you consider a reduced load in the semester that you are reviewing for and taking the exam. Simply signing up for one less course is not enough, however! You must consciously schedule specific times for exam preparation throughout the semester, and then spend that time actually studying for it!

This past year, there were 22 administrations of the computerized MCAT. These test dates were distributed across January, April, May, June, July, August and September, and results of the examination will be available within 30 days of taking the test. More frequent administrations of the MCAT make it possible for students to be much more flexible in their planning. The Life Sciences deans are happy to discuss the optimum time for you to take the MCAT. Further information about the MCAT is available at **www.aamc.org/students/mcat/**.

Study Abroad

If you plan to spend a year of study abroad (typically during your junior year), you must plan very carefully. If you have not yet begun study of the language of the country that you wish to visit, you should begin the fall of your freshman year with that language. Language proficiency at a certain level is required for nearly all Washington University overseas programs, as is a minimum overall GPA. In addition, you must carefully consider how to complete all of the core requirements that are necessary for your professional school entrance exam.

There are summer programs as well in most of the language programs. For example, if you wish to begin the study of a language, you may complete the first two semesters here in the fall and the spring and then do the third level (third semester) during the summer in a country where that language is spoken.

The biology department has an exchange program with Trinity College in Dublin, Ireland with an emphasis on genetics. This is a great opportunity to study science abroad. Please contact Professor Sarah Elgin at 935-5348 for more information.

There is one program designed for life sciences pre-professional students who are studying French. In the summer following junior year, students go to Nice on the Riviera and study French culture, the French healthcare system, and work in a French hospital. Contact Madam Collette Winn in the French department at 935-5477.

In a recent survey of our students who just completed their first year of medical school, many of them commented that being able to speak Spanish has been particularly helpful to them. We would encourage any of you who are interested in languages to pursue them. It is both personally rewarding and professionally helpful to know a second language. The experience of studying abroad is one that you will always value. There are opportunities for students with a certain level of proficiency in Spanish to volunteer at *La Clinica*, a clinic in the City of St. Louis that serves the Spanish-speaking newly-immigrated population in St. Louis. It is also important to remember that there are many opportunities abroad in English speaking countries. For more information, contact the Office of Overseas Programs in Stix International House at 935-5958.

Summer Options

Use your summers wisely and effectively. Many of you will want summer employment, and you can consider laboratory jobs, jobs in health settings, or community service-oriented positions. You can also study abroad or take summer courses to increase your options during the school year. Summer is also a great time to do an internship. Information about available internships may be found in the Career Center.

Many of you will want to do summer research, and you should apply in the early spring for the Howard Hughes Summer Research Program here and at other universities. There are other paid summer research opportunities that you will find listed on our website for the Office of Undergraduate Research **http://ur.wustl.edu/** and at the Career Center.

Summer is also a time to continue your commitment to volunteer work no matter what other option you choose to enrich your summer.

A Four Year Outline of Co-Curricular Options for the Pre-professional Student

Freshman Year	**Sophomore Year**	**Junior Year**	**Senior Year**
Academics Volunteer work (Research) Career exploration	Academics Volunteer work Career exploration (Research) Alternate plans	Academics MCAT exam Research Career exploration Alternate plans Volunteer work Fellowships Study abroad Junior Jumpstart (May 8, 2008)	Academics Interviews Alternate plans MCAT exam Financial aid Research Summer plans Volunteer work Fellowships Finances
Freshman Summer	**Sophomore Summer**	**Junior Summer**	**Senior Summer**
Internships Research Summer school Study abroad Summer job Volunteer work	Internships Research Summer school Study abroad Summer job Volunteer work	Applications MCAT exam Internships Research Volunteer work Study abroad Summer job	Alternate plans Reapplication Internships Research Study abroad Summer job Volunteer work

What if I Have a Question?

Use the website: **http://artsci.wustl.edu/~college/Preprofessional_Programs/Life_Sciences**. Refer to this handbook and the resources available in the College Office, 115 Umrath Hall and 205 South Brookings, and in Olin Library. Your peer advisor is an excellent resource, as is your academic advisor.

We are most fortunate to have a group of very dedicated undergraduates who have organized and effectively oversee the student organizations. There are three pre-medicine groups: Black Pre-Medicine Society, the Pre-Medical Society, and Alpha Epsilon Delta, an honorary for upperclassmen where membership is based on academic excellence and service to the community. In addition, students can join the Pre-OT/PT Society and the Pre-Veterinary and Zoological Science Society. Throughout the year, these organizations offer programs for life sciences pre-professional students, and they also publish a handbook and newsletters for students. We urge you to take advantage of the programs they offer and to consider membership.

Take advantage of the informational sessions sponsored by the College Office that are scheduled in the fall and spring. Check your e-mail for information of interest to pre-professional students. You may also e-mail the deans at **lifesci@artsci.wustl.edu**.

APPENDIX A
RESOURCES FOR ACADEMIC SUCCESS

1. The number one resource for academic success is **YOUR OWN ACTION. TAKING RESPONSIBILITY** is the key for success in all that you do.

2. Pay attention to **DEADLINES**. Drop/add deadlines and change of grade status along with the last date to withdraw are listed in the front of course listings. Students must take responsibility to **DETERMINE the PASSING GRADE for any PASS/FAIL** course for which they register. (Note: Students applying to professional schools need to have as few Pass/Fail courses as possible.) If the passing grade is not stated in the syllabus, ask the instructor what it is. *The passing grade is set at the discretion of the professor*.

3. The departments offer help-sessions, study groups, and tutors. Students should **READ THE SYLLABUS**. Help-sessions, due dates for papers, and exam schedules will be in the syllabus. **CLASS ATTENDANCE** is an essential part of doing well. It also means you are taking full advantage of the opportunities your family is funding.

4. **ORGANIZATION and TIME MANAGEMENT** are essential for academic success. Counselors in **The Center for Advanced Learning, i.e. Cornerstone** (935-5970), will see students by appointment, and they conduct a number of scheduled workshops early in the term. The office is located in Cornerstone, garden level of the northeast end of Gregg Hall.

5. **WRITING SKILLS**. Help is available in the Writing Center at Eads Hall for general help with papers. The help ranges from choosing a topic to editing a final draft. Help is on a walk-in basis, as the traffic permits, or by appointment. More focused help, for the student with a specific writing problem, is available at The Center for Advanced Learning in Cornerstone. Appointments should be made early in the term. Scheduling gets tighter later in the semester.

6. **FACULTY OFFICE HOURS**. Students are urged to take advantage of professors' and advisors' office hours. It is an opportunity to clarify material and to feel involved in the academic community. Pragmatically, it is also essential for someone to know you when you request that letter of recommendation.

7. **DEANS' OFFICE HOURS**. One of the Arts & Sciences Deans will be available in the College Office, 115 Umrath Hall, Monday through Thursday, 9:00-6:00, and Friday, 9:00-5:00.

8. **PEER ADVISORS**. Dean Mary Laurita and her staff of peer advisors have worked hard to put together an excellent program. Peer advisors are committed, well-trained, and eager to help. They know the resources. We urge you to take advantage of their expertise. In addition to the peer-advising program in the College, the Schools of Art, Business, and Engineering also have peer-advising programs.

9. **STUDY GROUPS**. Math study groups for Calculus 131 and 132, and chemistry study groups are available. Sign up at The Center for Advanced Learning in Cornerstone. Students are urged to form their own study groups in other areas. There is a math help desk in Cornerstone every evening.

10. **OLIN LIBRARY.** Students who learn where the library is and how to use it early in their careers have an edge. The staff is friendly and eager to help. They provide tours early in the term. Staff are always available for questions at the information desk. You may access several important medical journals and periodicals at the library. Many of them are on-line and available to you through the University network. The **Law Library** (not Olin) retains hard-copy issues of the New England Journal of Medicine.

11. **RESEARCH OPPORTUNITIES.** Many students receive their strongest letter of recommendation from a science research mentor. If you opt for science research, try to join a laboratory early and stay with the same research group. Start your research when you have significant blocks of time to devote to the laboratory you join. You certainly don't want to get off to a weak start with a research mentor, and if you are overcommitted this may be the inevitable result. Many students find the summer after the sophomore year to be an ideal time to begin research although some students successfully begin research earlier. Research opportunities are also available outside of the sciences; however, you need to consider carefully whether you will have strong recommendations from science faculty if you only pursue research outside of the sciences. The Office of Undergraduate Reseach, located in Umrath Hall and directed by Henry Biggs is an excellent resource. Also, the Director of Undergraduate Studies in each of the departments can refer students to the opportunities at hand.

12. **PRE-PROFESSIONAL INFORMATION.** Bulletins for medical, dental, veterinary, and other health professions are available in Olin Library on the 2nd Floor, SW section. Deans Joan Downey, Carolyn Herman, Jennifer Romney, and Sharon Stahl advise students in the Life Sciences Professions Programs in the College of Arts and Sciences and Schools of Art, Architecture, and Business. The School of Engineering provides advising to engineering students; the contact person is Dr. Richard Brand **(rbrand@wustl.edu)**.

13. **ABSENCES AND MISSED EXAMS. IT IS IMPERATIVE TO UNDERSTAND THE POLICY OF EACH INDIVIDUAL INSTRUCTOR**. It is also essential to understand how to verify the authenticity for a particular absence. For example, some instructors will require a note from Student Health Services in the case of illness. Others make no differentiation about absences; i.e. an absence is counted as an absence no matter the reason. PLEASE NOTE: Student Health Services only issues notes in cases of hospitalization or infirmarization.

14. **ACADEMIC INTEGRITY.** This is essential to establish an atmosphere of trust and cooperation within the academic community. It is also a crucial issue when students leave the community. Nearly all graduate and professional school applications require information that verifies that a student has never compromised his or her academic integrity. Some job applications ask for this information as well. We expect exemplary behavior in this arena, and transgressions become a part of the permanent record. If you have questions about the policy, please be in touch with Dean Dirk Killen in the College Office, 935-6840.

APPENDIX B
MAJOR PROGRAMS FOR LIFE SCIENCES PROFESSIONS STUDENTS

Choice of a Major

If a student is interested in medical school, is interested in clinical medicine, and is NOT interested in biologically-related medical research, then any major is appropriate. If a student is interested in medical school, is interested in clinical medicine, AND is interested in biologically-related medical research, then a major in the biological, chemical, and/or physical sciences should be strongly considered. Independent undergraduate research is also critical for such a student. If the student also has strong interests outside of the sciences, then a science major in combination with a non-science major or minor should be considered.

Students considering an MD/PhD **must** have a science major. A double major outside the sciences is possible for MD/PhD candidates with broad interests.

The Science Major

With the exception of biology and the environmental studies natural science track, Calculus I, II, and III are required for all science majors. The math sequence begins in the first year for science majors.

- If you know that you are going to major in **biology**, you will begin the chemistry and biology sequences in the freshman year.

- As a **chemistry** major, you will begin the chemistry sequence the first year and may choose to do physics in the first or second year, or in the summer between the first and second years. You may begin the biology sequence in the first or second year. It is possible to delay physics until your third year, but it will limit your choice of courses within your chemistry major. You should discuss the options carefully with your academic advisor or with Dr. Ed Hiss (935-6521) in the chemistry department.

- If you plan to major in **earth and planetary sciences** or in the **environmental studies** natural science track, you will probably want to put chemistry and physics at the front of your schedule and pursue the biology sequence in the second half of your sophomore year and the junior year.

- As a student majoring in **mathematics,** you will begin with the calculus sequence in the freshman year and structure the remainder of the coursework as you wish within the guidelines for taking the MCAT.

- For those of you who plan to major in **physics**, you will do the math and physics sequence the first year and leave the chemistry and biology requirements for the second and third years of your undergraduate study.

The Humanities or the Social Sciences Major

Your schedule can be somewhat more flexible than the schedule for science majors for the required courses. But because you will be completing a major in another field while at the same time completing 50 units of pre-professional requirements and completing the distribution requirements, you will need to plan more carefully as well. Many of our students complete the pre-professional core, major in the social sciences or the humanities, *and* study abroad. Careful planning and time management are essential.

You should consult the individual department regarding your major's available Writing Intensive courses (must be taken the junior or senior year) as well as your major's senior capstone requirements and options.