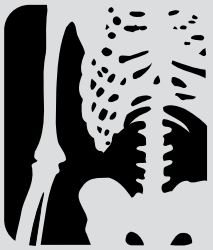
Pre-Health Professional Program

College of Natural Sciences and Mathematics



PROGRAM DESCRIPTION

Students planning to attend medical (allopathic or osteopathic), dental, pharmacy, veterinary, or optometry school are not required to complete a particular undergraduate major. In fact, most health professional schools state that students can be admitted after completing 90 semester units of college credit that includes a set of specified courses. However, the reality is that most students who are accepted to health professional schools earn a bachelor's degree prior to admission. A majority of students applying to health professional schools major in biological sciences or chemistry. However, the most important criterion in selecting a major is that you have a real interest in the field.

Contact Information

Juanita Barrena, Biological Sciences
Humboldt Hall 211A, (916) 278-6519

Brett Holland, Biological Sciences
Sequoia Hall 120C, (916) 278-7678

Winston Lancaster, Biological Sciences
Humboldt Hall 211D, (916) 278-6360

Melanie Loo, Biological Sciences
Sequoia Hall 414, (916) 278-6573

Jennifer Lundmark, Biological Sciences
Humboldt Hall 211C, (916) 278-7235

Hao Nguyen, Biological Sciences
Humboldt Hall 211D, (916) 278-6569

Adam Rechs, Biological Sciences
Sequoia Hall 120B, (916) 278-6244

Mary Ann Reihman, Biological Sciences
Sequoia Hall 120C, (916) 278-7678

James Ritchey, Chemistry
Sequoia Hall 426C, (916) 278-7654

Linda Roberts, Chemistry
Sequoia Hall 548C, (916) 278-3892

Mary McCarthy-Hintz, Chemistry
Sequoia Hall 550C, (916) 278-4534

Gary Shoemaker, Physics
Sequoia Hall 230, (916) 278-6518

The pre-health professional advising patterns described in this section are not majors. For example, Sacramento State does not offer a "Pre-med major." Instead, the advising patterns identify the set of courses that must be completed before admission to particular types of health professional schools. In the case of some majors (e.g., Biological Sciences and Chemistry) there is considerable overlap in course requirements. However, the courses can be taken along with any major (e.g., English, Philosophy, Psychology, etc.) and used to satisfy General Education or elective requirements for the baccalaureate degree.

The common set of courses recommended for all of the medical-related professional schools covered in this section are listed below. Additional requirements for specific health professional schools follow the list of recommended core curriculum. It is important to note that requirements for a particular type of professional school (e.g., Dental School) may differ from one university to another, and that requirements are subject to change. The requirements listed in this section are those identified by most universities offering the identified professional program. Therefore, the lists may include courses that are not required by a particular university and may omit a course that is required by another university. It is strongly recommended that students interested in applying to professional schools contact one of the advisors listed in this section for assistance in planning their programs. It is also strongly recommended that students visit the websites of the universities they plan to apply to in order to be sure that they meet all requirements.

All health professional schools require strong academic ability and a good foundation in the sciences. In addition, good problem solving ability, effective oral and written communication skills, an awareness of interpersonal dynamics, an appreciation for cultural diversity, and an understanding of health care issues are important. Therefore, in addition to science courses, pre-health professional students should take general education courses that will enrich their non-science preparation in these areas.

It is also crucial that students have volunteer experience related to their professional goals. Such experience will provide more insight into how well suited you are to the work setting you are considering. Academic credit may be received for volunteer work by seeing an advisor and registering for BIO 195.

Recommended Core Curriculum

Units required: 46

Core courses should be taken by all students who plan to attend a medically related professional school, regardless of major

Courses in parentheses are prerequisites.

(5)	BIO 1	Biodiversity, Evolution and Ecology
(5)	BIO 2	Cells, Molecules and Genes (BIO 1 and CHEM 1A)
(5)	CHEM 1A	General Chemistry I (High school algebra [two years] and high school chemistry; or equivalent)
(5)	CHEM 1B	General Chemistry II (CHEM 1A)
(3)	CHEM 24*	Organic Chemistry Lecture I (CHEM 1B)
(3)	CHEM 25*	Organic Chemistry Lab (CHEM 24, CHEM 124 may be taken concurrently)
(3)	CHEM 124*	Organic Chemistry Lecture II (CHEM 24, or instructor permission; concurrent enrollment in CHEM 25 recommended.)
(3)	ENGL 1A	College Composition (EPT score of 149 or above, or completion of ENGL 1)
(3)	ENGL 20	College Composition II. (Grade of C- or better in ENGL 1A or equivalent)
(4)	PHYS 5A	General Physics: Mechanics, Heat, Sound (Recently completed three years of high school algebra and geometry; and a college course in algebra and trigonometry [MATH 9 recommended] for those having an inadequate mathematics background)
(4)	PHYS 5B	General Physics: Light, Electricity and Magnetism, Modern Physics (PHYS 5A or instructor permission)
(3)	PSYC 1	Introductory Psychology: Basic Processes

* Some Dental Schools and Optometry Schools require only one semester of Organic Chemistry with lab. This can be satisfied by taking CHEM 20 (Organic Chemistry Lecture Brief Course) (3 units) and CHEM 20L (Introductory Organic Chemistry Laboratory) (1 unit) instead of CHEM 24, CHEM 25 and CHEM 124.

Note: In addition to the courses listed above, most health professional schools require that students complete 6-12 units of humanities course work and 6-12 units of course work in the social and behavioral sciences. Courses included in areas C and D, respectively, of the Sacramento State General Education program satisfy these requirements. A few schools specifically require an English literature course as one of the humanities courses, and a few schools specifically require Sociology (SOC 1) as one of the courses from the social and behavioral sciences.

Recommended Field Specific Curricula

Allopathic Medical Schools

When most people use the term "Medical School," they are usually referring to Allopathic Medical Schools that grant the M.D. (Doctor of Medicine) degree. There is, however, another type of Medical School, called Osteopathic Medical School (described below) that grants the D.O. (Doctor of Osteopathic Medicine) degree. Both M.D.'s and D.O.'s are eligible for licensure to practice medicine as physicians and surgeons in the State of California.

Applicants do not need a 4.0 GPA to get into an allopathic medical school. However, GPA is a reflection of your ability to handle university work and is an important part of your application. A successful applicant must be able to offer more than a good GPA. The attributes of motivation, social concern, communication skills and maturity are given great weight in the selection process.

All students applying to allopathic medical schools must complete the recommended course requirements listed above. In addition to the common courses, most allopathic medical schools require one semester to one year of college mathematics. In general, the mathematics requirement can be satisfied by taking a full year of calculus. However, some medical schools specify that one of the courses must be statistics. Therefore, if you want to be sure that you have completed the math requirement for the greatest number of medical schools, you should take the following courses (9-11 total units):

(3-4)	MATH 26A	Calculus I for Social and Life Sciences (MATH 11 or three years of high school math which includes two years of algebra and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test) **OR**
	MATH 30	Calculus I (MATH 29 or four years of high school math which includes two years of algebra, one year of geometry, and one year of mathematical analysis; completion of ELM requirement and Pre-Calculus Diagnostic Test)
(3-4)	MATH 26B	Calculus II for the Social and Life Sciences (MATH 26A or appropriate high school based AP credit) **OR**
	MATH 31	Calculus II (MATH 30 or appropriate high school based AP credit)
(3)	STAT 1	Introduction to Statistics (MATH 9 or three years of high school mathematics which includes two years of algebra and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test)

It should be noted that there are variations in medical school admission requirements. For example, some schools also require or recommend one or more of the following courses: embryology (BIO 127), genetics (BIO 184), cellular or molecular biology (BIO 121 or BIO 180) biochemistry (CHEM 161), and/or one year of a foreign language. For information on requirements for specific schools, contact your pre-health advisor or visit the website of the school you are interested in attending.

Applicants must take the Medical College Admissions Test (MCAT). The test should be taken after completing the recommended core curriculum. You should allow at least 10 months between taking the exam and the date of planned matriculation. The schedule for the MCAT is currently under review. It is expected that beginning January 2007, the MCAT will become computer based and will be offered two to four times per year. For more information about dates, students should go to: *www.aamc.org*. To ensure timely submission of all application materials (including letters of recommendation), students are strongly advised to take the exam no later than April of the year preceding planned matriculation. Your MCAT scores, especially your verbal reasoning score, are an important part of your application.

Most Allopathic Medical Schools subscribe to an application service called The Association of Medical Colleges Application Service (AMCAS). What this means is that you will have to complete a single (but very lengthy and complicated) initial application and submit a single set of transcripts and MCAT scores to AMCAS. In turn, AMCAS, for a fee, will distribute the materials to the medical schools you identify on the application. The AMCAS application is usually available in June of the year preceding the year you wish to matriculate. For example, the AMCAS application for admission in fall 2007 is available in June 2006. Participating medical schools set their own deadlines for receipt of application materials from AMCAS. The earliest deadline is usually November 1 of the year preceding planned admission. It is strongly recommended that you complete your AMCAS application soon after it becomes available, even if you plan to take the August MCAT.

The medical schools will review your AMCAS application and MCAT scores. After this review, the school will either reject your application or invite you to submit a school specific secondary application and letters of recommendation. Following a review of these materials, the school will either reject your application or invite you for an interview.

Osteopathic Medical School

Doctors of Osteopathic Medicine (D.O.'s) are "complete physicians." This means that they are fully trained and licensed to diagnose illness, prescribe medication, and perform surgery. D.O.'s and allopathic physicians (M.D.'s) are the only two types of complete physicians in the United States. In California, as in most other states, the law accords holders of the D.O. and M.D. equal professional status and privileges as licensed physicians and surgeons. D.O.'s may practice all branches of medicine, including specialties like Pediatrics, Obstetrics and Gynecology, and Emergency Medicine.

To become a D.O., you must attend a School/College of Osteopathic Medicine. At the time this catalog was written, 19 schools/colleges offered programs leading to the D.O. degree. The main difference between the training of osteopathic and allopathic physicians is that osteopathic medical students must take additional training in osteopathic manipulative medicine. To learn more about osteopathic medicine, students should visit the website of The American Association of Colleges of Osteopathic Medicine (AACOM).

To be admitted to a School/College of Osteopathic Medicine, a student must complete the recommended core curriculum listed above. As is the case for most health professional schools, students may be admitted without a baccalaureate degree. However, 97% of students enrolled in Osteopathic Medical Schools hold at least a baccalaureate degree. Most osteopathic medical schools do not specify a college mathematics requirement. However, it is recommended that students complete the same math courses that are required for admission to an allopathic medical school. In addition, like allopathic medical schools, some osteopathic medical schools also recommend or require upper division courses in biology and biochemistry.

Students seeking admission to osteopathic medical school must also take the Medical College Admissions Test (MCAT). Most osteopathic medical schools subscribe to an application service called The American Association of Colleges of Osteopathic Medicine Application Service (AACOMAS). Therefore, applicants file one application, a single set of transcripts, and one set of MCAT scores to AACOMAS, and the service distributes these materials to each of the colleges designated on the application.

Like allopathic medical schools, osteopathic medical schools require letters of recommendation at some stage in the process. However, it is important to note that one of the letters must be from a practicing doctor of osteopathic medicine. Therefore, students thinking about applying to osteopathic medical school should try to make contact with a D.O. early in their undergraduate studies.

Dental Schools

To become a dentist, students must complete a program leading to the D.D.S. (Doctor of Dental Surgery) or D.M.D. (Doctor of Dental Medicine) degree. Most dental school programs are four-year programs. However, a few dental schools (e.g., University of the Pacific) offer a three-year program. To be admitted to dental school, students must complete the recommended core curriculum listed above. In addition, many dental schools recommend or require that students complete one or more of the following courses: anatomy (BIO 22), physiology (BIO 131), genetics (BIO 184), embryology (BIO 127), biochemistry (CHEM 161) and statistics (STAT 1).

Dental school applicants must take the Dental Aptitude Test (DAT) which is given year-round by appointment on computers. The test should be taken at least 10 months prior to matriculation.

Most dental schools subscribe to an application service called the Associated American Dental Schools Application Service (AADSAS). Therefore, students applying to participating schools must complete a single initial application and submit a single set of transcripts and DAT scores to AADSAS. However, after reviewing a students AADSAS application and DAT scores, most participating dental schools will require that students submit secondary applications and letters of recommendation.

Pharmacy Schools

To become a pharmacist, students must complete a program leading to the Doctor of Pharmacy (Pharm.D.) degree. Some, but not all, schools require the Pharmacy College Admission Test (PCAT). Prerequisite course work also varies by school. Therefore, you should check with your pre-health advisor and the school's website for information about standardized test and course requirements. Completion of the recommended core curriculum plus the following courses will satisfy course requirements for most pharmacy schools (24-26 total units):

(4)	BIO 22	Introductory Human Anatomy (BIO 1, BIO 2, BIO 10, or BIO 20)
(4)	BIO 131	Systemic Physiology (One year of College Chemistry and BIO 1, BIO 2, BIO 10, BIO 20, or BIO 22)
(4)	BIO 139	General Microbiology (BIO 10 or BIO 20 or both BIO 1 and BIO 2; CHEM 6B, CHEM 20 or CHEM 24)
(3)	COMS 4	Introduction to Public Speaking
(3)	ECON 1A	Introduction to Macroeconomic Analysis
(3-4)	MATH 26A*	Calculus I for Social and Life Sciences (MATH 11 or three years of high school math which includes two years of algebra

		and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test) **OR**
	MATH 30	Calculus I (MATH 29 or four years of high school math which includes two years of algebra, one year of geometry, and one year of mathematical analysis; completion of ELM requirement and Pre-Calculus Diagnostic Test)
(3-4)	MATH 26B	Calculus II for Social and Life Sciences (MATH 26A or appropriate high school based AP credit) **OR**
	MATH 31	Calculus II (MATH 30 or appropriate high school based AP credit)

*Some schools require only one semester of calculus (MATH 26A or MATH 30).

Veterinary Schools

To become a veterinarian, students must complete a program of study leading to the Doctor of Veterinary Medicine (D.V.M.) degree. Although it is becoming less difficult to gain admission to any U.S. veterinary school without being a resident of the state in which the school is located, residents of California most often attend the School of Veterinary Medicine at UC Davis. Applicants to the UC Davis Veterinary School must take the Graduate Record Examination (GRE) General Aptitude Test. The GRE must be taken no later than October 1 of the year preceding planned matriculation. Applicants to other veterinary schools are usually required to take the Veterinary College Admission Test (VCAT). Applicants to veterinary school must have formal animal/veterinary experience.

In addition to the recommended core curriculum listed above, students planning to attend the School of Veterinary Medicine at UC Davis should take the following courses (21 total units):

(4)	BIO 127	Vertebrate Embryology (BIO 11, or both BIO 1 and BIO 2)
(4)	BIO 131	Systemic Physiology (One year of College Chemistry and BIO 1, BIO 2, BIO 10, BIO 20, or BIO 22)
(3)	BIO 184	General Genetics (BIO 10, BIO 11 and BIO 12 or both BIO 1 and BIO 2; BIO 139)
(3)	CHEM 161	General Biochemistry (CHEM 20 or CHEM 124)
(3)	STAT 1	Introduction to Statistics (MATH 9 or three years of high school mathematics which includes two years of algebra and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test)

Optometry Schools

To become an optometrist, students must complete a program of study leading to the Doctor of Optometry (O.D.) degree. Applicants must take the Optometry Admissions Test (OAT). The OAT is administered twice a year, once in October and once in once in February. The test should be taken no later than the fall of the year preceding the intended date of matriculation (e.g., in fall 2008 for admission in fall 2009). Prerequisite course requirements vary by school. However, completion of the recommended core curriculum plus the following courses will satisfy course requirements for most optometry schools (24-26 total units):

(4)	BIO 22	Introductory Human Anatomy (BIO 1, BIO 2, BIO 10, or BIO 20)
(4)	BIO 131	Systemic Physiology (One year of College Chemistry and BIO 1, BIO 2, BIO 10, BIO 20, or BIO 22)
(4)	BIO 139	General Microbiology (BIO 10 or BIO 20 or both BIO 1 and BIO 2; CHEM 6B, CHEM 20 or CHEM 24)
(3)	CHEM 161	General Biochemistry (CHEM 20 or CHEM 124)
(3-4)	MATH 26A*	Calculus I for Social and Life Sciences (MATH 11 or three years of high school math which includes two years of algebra and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test) **OR**
	MATH 30	Calculus I (MATH 29 or four years of high school math which includes two years of algebra, one year of geometry, and one year of mathematical analysis; completion of ELM requirement and Pre-Calculus Diagnostic Test)
(3-4)	MATH 26B	Calculus II for the Social and Life Sciences (MATH 26A or appropriate high school based AP credit) **OR**
	MATH 31	Calculus II (MATH 30 or appropriate high school based AP credit)
(3)	STAT 1	Introduction to Statistics (MATH 9 or three years of high school mathematics which includes two years of algebra and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test)

*Some schools require only one semester of calculus (MATH 26A or MATH 30)