

ADVISING FOR THE HEALTH PROFESSIONS

Audiology/speech pathology

Dentistry

Medicine

Nursing/ Nurse Practitioner/ Nurse Anesthetist

Occupational Therapy

Optometry

Pharmacy

Physical Therapy

Physician Assistant

Veterinary Medicine



ADVISING FOR THE HEALTH PROFESSIONS

Author: [Name]

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Department of [Department Name]

University of [University Name]

Address: [Address]

Phone: [Phone Number]

Email: [Email Address]

Website: [Website URL]

GENERAL INFORMATION FOR ADVISING THE PREHEALTH STUDENT

All prehealth students should visit the **Health Professions web page**. Here they will find the name of the **appropriate pre-health advisor** (there are advisors who specialize in assisting students in preparing for careers in each of the health professions). Here they will also be able to **sign up for the pre-health professions listserv**, which will keep them up to date on relevant and important programming.

All pre-health student will receive a **Health Professions Student Handbook** which contains details about how to prepare for each of the various types of health professions programs. The students should read the handbook now. Waiting until the junior year often means the student is unaware of all of the necessary prerequisite course work and other experiences necessary for a timely application.

Generally, it is not recommended that students take more than one laboratory science in the first semester. Most often, that course is CHM111.

Possible course plans to prepare students for many of the prehealth programs are listed on the following pages.

Many pre-health programs are very competitive. This includes not only medicine, but dentistry, veterinary science, physical therapy and physician assistant programs. The importance of a competitive grade point starting with the first semester needs to be stressed.

There are many other expectations besides a high grade point average and test scores for many of the pre-health programs. This includes volunteer work and shadowing. Students should begin to investigate these possibilities during their first year.

AUDIOLOGY/SPEECH PATHOLOGY

It is possible to earn either a MS or PhD in speech pathology, or a doctorate in audiology (Au.D.). The MS degree is required for national certification, and enables one to practice as a speech pathologist. The PhD generally leads to an academic career, which may involve research in the field.

Required courses. Requirements vary by program. But many programs require the following:

- Communications
- Linguistics
- Biology
- Chemistry
- Physics
- Human Anatomy and Physiology
- Developmental Psychology
- Statistics

Wake Forest offers a minor in linguistics. Linguistics is the scientific study of human language, how words are formed and organized, and their meanings. Any student wishing to study speech pathology should consider the linguistics minor. The minor requires 15 hours. Courses include:

- LIN 150 Introduction to Linguistics
- LIN 301 Semantics and Language in Communication
- LIN 301 Introduction to Psycholinguistics and Language Acquisition
- LIN 350 Topics in Linguistics (sometimes includes phonetics)

Also recommended: Courses in Math, Counseling and Education

Graduate Record Exam (GRE): The general test is required.

Years of post-graduate education required: The MS program in speech pathology is generally 2-3 years. The PhD program is another 2-3 years.

DENTISTRY

All pre-dental students should have received and should read the Health Professions Handbook! They should also stay apprised of health professions-related programming by visiting the Health Professions web page (<http://college.wfu.edu/prehealth/>) and by signing up for the health professions listerv.

If a student is interested in dentistry, it is very important that he or she maintain a high GPA. A competitive GPA would be 3.5 or higher. The science GPA is also very important. Students who take two laboratory sciences during their first semester tend to struggle with the combination of the heavy workload and adjustment to college. It is recommended that students take only one lab course, CHM111, during fall of the first semester. CHM 111 is recommended because it is only offered during the fall semester. If a student insists on taking two laboratory sciences, he or she should be encourage to take only four courses and HES.

Most students apply to dental school in the summer between their third and undergraduate fourth years. It does not matter what major they choose; only that they complete the prerequisite courses.

During the third year, the pre-dental student must initiate the Health Professions Committee application.

In order to be competitive for admission after three years, a student would want to follow this plan:

Fall year 1	Spring year 1	Fall year 2	Spring year 2	Fall year 3	Spring year 3	Summer Year 3	Fall year 4	Spring Year 4
CHM 111/L	CHM 122/L	CHM 223/L	CHM 280/L	PHY 113/L	PHY 114/L	Apply to dental school	Complete divisionals and major	Complete divisionals and major
MTH 111?	BIO 114/L	BIO 213/L	BIO 214/L		Prepare for DAT			

Although dental school require only two semesters of biology, the Biology Department has a four course introductory sequence, three semesters of which must be taken in order to cover all of the material covered on the DAT exam. The fourth semester, BIO 113, should be taken only if the student is planning to be a biology major, or would like to use it as an elective course. It can also be used to complete a biology minor (16 hours), however, other courses may be substituted for completion of the minor as well.

MEDICINE

All pre-medical students should have received and should read the Health Professions Handbook! They should also stay apprised of health professions-related programming by visiting the Health Professions web page (<http://college.wfu.edu/prehealth/>) and by signing up for the health professions listerv.

If a student is interested in medicine, it is very important that he or she maintain a high GPA. A competitive GPA would be 3.6-3.7. The science GPA is also very important. Students who take two laboratory sciences during their first semester tend to struggle with the combination of the heavy workload and adjustment to college. It is recommended that students take only one lab course, CHM111, during fall of the first semester. CHM 111 is recommended because it is only offered during the fall semester. If a student insists on taking two laboratory sciences, he or she should be encourage to take only four courses and HES.

It is possible for the pre-medical student to study abroad. In fact, it is one of the things that is looked favorably on by medical school admissions committees. See below for possible course plans that include a study abroad option.

These are the courses required by most medical schools:

1. Four semester of chemistry. At Wake Forest those courses are CHM 111 (general chemistry 1), CHM 122 or 123 (organic chemistry 1), CHM 223 (organic chemistry 2) and CHM 280 (general chemistry 2). Most students take the courses in that order; in other words, general chemistry 2 is the last course taken. Please be aware that these courses are only offered in one semester of each academic year, so if a student skips a semester, he or she will need to either take the course in the summer, or wait a year to take it.
2. Two semesters of biology. At Wake Forest, the introductory biology sequence is actually four semesters long. The first course, Bio 113, is required for the biology major but not recommended for pre-medical students. The remaining three courses are Bio 114 (Comparative Physiology), Bio 213 (Genetics and Molecular Biology), and Bio 214 (Cell Biology). Bio 114 is a pre-requisite for many other courses. Students are not required to take both Bio 213 and 214, but it is highly recommended that they do so, in order to cover all of the material that will be on the MCAT exam. These courses are offered every semester, but not every summer.
3. Two semesters of physics. The physics offered at Wake Forest is calculus-based. Some medical schools recommend calculus, and since it is a pre-requisite for PHY 113 and 114, the student should plan to take it if he or she does not have AP credit for it.
4. Social science. At least one social science, such as psychology, anthropology, or sociology is recommended. More would be better.

5. **Biochemistry.** This course can be taken through either the Biology or Chemistry Departments as BIO 370 or CHM 370. The student can use the credits for both the Biology and Chemistry majors and minors (it counts towards both).

Many prestigious schools have designed pre-medical programs that use the full four years of college to prepare their students for admission to medical school. These include Duke, Davidson, and Princeton. Other schools also recommend that students complete college before applying. These students take a "gap year" between graduation and matriculation to medical school.

What are the advantages of applying to medical school at the end of four years, as opposed to three? Medical schools are looking for students that have demonstrated that not only are they good students, but that they are committed to service, and have a breadth of life experiences. Advantages to the four year plan:

- The student does not have to squeeze all of the prerequisite courses into three years. Many of the prerequisite courses are very challenging, and if he or she does not try to take them all at once, they are likely to do better in them. The GPA is an important factor in consideration by medical schools.
- The senior year grades will be included in the consideration for medical school. In the fourth year students will be taking mostly courses in major and elective courses, in which they generally do very well. This is an opportunity to maximize the GPA.
- The student will have the opportunity to study abroad. Study abroad is one of the greatest growth experiences that one can have as an undergraduate. Where one chooses to study abroad, how the time is used, and the resulting insights are assets when writing a personal statement for or interviewing for medical school.
- The student has more time for service activities and shadowing, also important considerations for admission.
- If one uses the gap year wisely, he or she will be engaged in an activity which enhances competitiveness for medical school and that can help a student "rise to the top" in the interviewing process.
- Not trying to do it all at once allows the student to take advantage of all of the amazing opportunities that college offers. **Medical schools are not simply looking for the best students. They are looking for the best people (who happen to be good students).** With the movement towards a more holistic view of admissions and medical education, that final year in college gives a student the opportunity to develop more as a person.

Below are some possible four year plans for completing the course prerequisites for medical school.

This plan would be *for students who DO NOT plan to major in biology, chemistry, or physics*. Students do not double up on science lab courses until the sophomore year.

Fall year 1	Spring year 1	Fall year 2	Spring year 2	Fall year 3	Spring year 3	Fall year 4	Spring year 4	Right after graduation
CHM 111/L	CHM 122/L MTH 111?	CHM 223/L Bio 114	CHM 280/L *Bio 214	Study abroad?	Biochem *Bio 213	PHY 113/L	PHY 114/L Prepare for MCAT exam	Apply to medical school

-OR-

Fall year 1	Spring year 1	Fall year 2	Spring year 2	Fall year 3	Spring year 3	Fall year 4	Spring year 4	Right after graduation
CHM 111/L	CHM 122/L	CHM 223/L MTH 111	CHM 280/L Bio 114	Study abroad?	Biochem *Bio 213	PHY 113/L *Bio 214	PHY 114/L Prepare for MCAT exam	Apply to medical school

Basic and divisional courses and courses in the major can be easily worked into this schedule. Study abroad can be done on either fall or spring of the junior year. *Please note that Bio 213 and 214 can be taken in any order.

Below are some suggested course plans for student who plan to apply to medical school. There is, of course, considerable flexibility.

COURSE PLAN FOR A STUDENT WHO PLANS TO MAJOR IN BIOLOGY

If a student is considering **majoring in biology**, he or she would want to consider the following plan. As a major in any of the sciences, there will be numerous semesters in which the student will be taking two science lab courses, and three science courses. But if he or she plans to major in biology, science is their strength, so that should not be a problem. Plus, the first years of medical school are very science-heavy, so this is a good warm up!

Fall year 1	Spring year 1	Fall year 2	Spring year 2	Fall year 3	Spring year 3	Fall year 4	Spring year 4	Right after graduation
CHM 111/L	CHM 122/L Bio 114	CHM 223/L *Bio 214	CHM 280/L *Bio 213	Study abroad?	Biochem	PHY 113/L	PHY 114/L Prepare for MCAT exam	Apply to medical school!

*Bio 213 and 214 can be taken in any order.

COURSE PLAN FOR A PRE-MEDICAL STUDENT PLANNING TO MAJOR IN PHYSICS

Once again, if a student is strong in science and is considering a major in physics, multiple labs in one semester will play to their strengths.

Fall year 1	Spring year 1	Fall year 2	Spring year 2	Fall year 3	Spring year 3	Fall year 4	Spring year 4	Right after graduation
CHM 111/L	CHM 122/L	CHM 223/L	CHM 280/L	Study abroad?	Bio 213/L	Bio 214/L	Biochem	Apply to medical school!
MTH 111	PHY 113/L	PHY 114/L	Bio 114/L				Prepare for MCAT exam	

There is of course the option of the three year plan. Remember, with this plan the student has to double up on lab sciences more often, will not have time to study abroad during the academic year unless physics is taken during the summer, and will have less time for service, shadowing, and other experiences that will make one a more competitive applicant.

THREE YEAR PLAN FOR THE EXCEPTIONAL STUDENT

Fall year 1	Spring year 1	Fall year 2	Spring year 2	Fall year 3	Spring year 3	Summer Year 3	Fall year 4	Spring Year 4
CHM 111/L	CHM 122/L	CHM 223/L	CHM 280/L	PHY 113/L	PHY 114/L	Apply to medical school	Complete divisionals and major	Complete divisionals and major
MTH 111?	BIO 114/L	BIO 213/L	BIO 214/L	Biochem	Prepare for MCAT			

NURSING

If a student has earned a liberal arts bachelor's degree and wish to pursue a nursing degree, there are programs that lead to the Second Degree BSN (Bachelor of Science in Nursing) that allow the student to earn a second bachelor's degree, in nursing, in one-two years. The BSN degree is a prerequisite for advanced nursing degrees that lead to careers as Clinical Nurse Practitioner or Nurse Anesthetist. Schools that offer the Second Degree BSN can be found at <http://www.bestnursingdegree.com/programs/accelerated-bsn/>.

Required courses:

- Human Anatomy
- Human Physiology
- Microbiology
- Statistics
- Psychology
- Sociology

Also recommended: Nutrition, Developmental Psychology

Graduate Record Exam (GRE): Most programs require the GRE general test.

Years of post-graduate education required: One –two years

Nurse Practitioner or Clinical Nurse Specialist:

The Nurse Practitioner provides medical care services similar to those of a Physician Assistant. The NP also specializes in areas such as psychiatry or oncology or geriatric care. He or she works closely with physicians and other health care providers in providing primary care to patients. The NP may take patient histories, evaluate the patient, prescribe medications, and make referrals. They may serve as educators, working towards disease prevention. NPs most often work in hospitals, clinics, and physician's offices.

Both the Nurse Practitioner and Clinical Nurse Specialist are master's level nursing positions. A clinical nurse specialist (CNS) specializes in a particular area, such as oncology, emergency room care, or neonatal care. The CNS can practice in a variety of settings, including hospitals, long term care facilities, and clinics, or may even be in private practice. The CNS works with other nurses and health care providers to maximize patient outcomes. In many states, the CNS is able to prescribe medications. The CNS often allows one to move into management-level positions.

Requirements for Nurse Practitioner/Clinical Nurse Specialist:

Programs that prepare nurses to become NPs or CNSs require that one first earn a bachelor's degree in nursing. The Bachelor of Nursing degree can be obtained in 1-2 years after completion of a liberal arts bachelor's program.

Years of post-graduate education required:

Two years of training beyond the bachelor's degree in nursing, plus additional clinical experience

Nurse Anesthetist

The nurse anesthetist is the primary source of delivery of analgesia in many surgeries of all types, and are in particular demand in rural hospitals and the armed forces.

Requirements:

To become a certified registered nurse anesthetist (CRNA), one must successfully complete a master's program a minimum in nurse anesthesiology. In addition, of one year of acute care experience is required, For more information about the nurse anesthesia profession and its requirements, please refer to

<http://www.aana.com/ceandeducation/becomeacrna/Pages/default.aspx>.

Years of post-graduate education required: Two years of training beyond the bachelor's degree in nursing, plus additional clinical experience

NUTRITION

Required courses. Requirements vary by program. But many programs require the following:

- Chemistry - two semesters
- Organic chemistry – two semesters
- Biology- two semesters (BIO 114 and 213 or 214)
- Human Physiology
- Nutrition

Also recommended: Biochemistry

Graduate Record Exam (GRE): The General test is required by most programs. However, some programs accept either the MCAT or GRE.

Years of post-graduate education required: The MS degree is a one-two year program. The PhD generally takes 2-3 years beyond the MS degree.

Occupational Therapy

Required courses. Requirements vary by program. But most programs require the following:

- Human anatomy with lab
- Human physiology with lab
- General biology (Bio 114 and Bio 213 or 214)
- Developmental Psychology
- Abnormal Behavior
- Statistics
- Sociology/Anthropology

Additional experience:

Many programs require relevant observational or volunteer experience. To obtain such an experience, contact an occupational therapist at a hospital, nursing home, rehabilitation center, or school either locally or near home.

Graduate Record Exam (GRE).
The General Test is required.

Years of post-graduate education required: Both the OTD and MSOT programs are typically of 2-3 years duration.

OPTOMETRY

Required courses:

Courses required for admission to a School of Optometry vary widely. However, the following courses are required by most programs:

Calculus, 1-2 semesters
Anatomy with lab
Physiology with lab
Physics, 2 semesters
Organic chemistry, 1-2 semesters
Biochemistry
Microbiology with lab
Statistics
Psychology

PHARMACY

Required courses. Requirements vary by program. The list here includes courses required by most programs. Requirements for specific Pharm.D. programs can be found at <http://www.aacp.org/resources/student/pharmacyforyou/admissions/pages/PSAR.aspx>

Biology (two semesters, with lab)
Chemistry (two semesters, with lab)
Organic chemistry (two semesters, with lab)
Calculus
Physics (one semester)
Anatomy and Physiology
Biochemistry
Microbiology

Also recommended:

Sociology
Psychology
Ethics
Communications

Additional requirements: About two-thirds of pharmacy programs require the Pharmacy College Admission test. For information on this test, visit <http://www.pcatweb.info/>. Other schools require the general GRE test

Years of post-graduate education required: It generally takes four years to earn the Pharm.D. degree, two years for the MS, and four-five years for a PhD. Some pharmacy programs allow students to transfer in after their sophomore year of college.

Physical Therapy

Required courses: The courses required for admission vary by program, but in general, they include:

Biology (two semesters, but some schools require an additional upper division course)
Chemistry (one to two semesters. The second semester can be general chemistry II or organic I.)
Physics (two semesters)
Human Physiology
Human Anatomy
Psychology – some schools require an additional psych course, abnormal psychology
Statistics

Additional recommended courses:

Exercise physiology
Communication

Other useful courses:

Biomechanics
Nutrition

To see a list of required courses by program, visit this web site:

<http://www.ptcas.org/ProgramPrereqs/>

Additional requirements

GRE general test required
to apply. To learn more about the PTCAS, visit <http://www.ptcas.org/home.aspx>.

Years of post-graduate education required:

Three years

Physician Assistant

Physician Assistant programs are very competitive – about as competitive as medical school. They also have more prerequisites than medical school. So students should not consider this as an easier option if they are not competitive for medical school.

All pre-PA students should have received and should read the Health Professions Handbook! They should also stay apprised of health professions-related programming by visiting the Health Professions web page (<http://college.wfu.edu/prehealth/>) and by signing up for the health professions listerv.

If a student is interested in becoming a Physician Assistant, it is very important that he or she maintain a high GPA. A competitive GPA would be in the 3.5 range. The science GPA is also very important. Students who take two laboratory sciences during their first semester tend to struggle with the combination of the heavy workload and adjustment to college. It is recommended that students take only one lab course, CHM111, during fall of the first semester. CHM 111 is recommended because it is only offered during the fall semester. If a student insists on taking two laboratory sciences, he or she should be encourage to take only four courses and HES.

It is possible for the pre-PA student to study abroad. See possible course plans below.

Required courses:

Course requirements vary from program to program, but the following courses are required by most:

Chemistry – varies with the program. Almost all require a minimum of two semesters of chemistry, which can be general chemistry I and II, or one semester of general chemistry and one semester of organic. Some schools have a requirement for a third course, either an organic or biochemistry course. The Wake Forest PA program is one of those that requires a course in biochemistry.

Human anatomy or comparative/vertebrate anatomy with lab

Human physiology with lab (Bio 114 is a prerequisite)

Microbiology with lab

Two additional upper level biology courses (Bio 213 and 214)

Psychology (developmental psychology is often recommended)

Required by SOME programs

Medical terminology (not offered at WF but can be taken online)

Biochemistry

Statistics (required by most good programs. Can be taken in math, psychology, HES, sociology or biology departments)

Also recommended:

- Genetics
- Cell biology
- Molecular biology



These are covered by Bio 213 and 214

Possible Course Plan

Students do not double up on science lab courses until the sophomore year.

Fall year 1	Spring year 1	Fall year 2	Spring year 2	Fall year 3	Spring year 3	Fall year 4	Spring year 4	GAP YEAR
CHM 111/L	CHM 122/L	Bio 114 (CHM 221???)	*Bio 214 HES Human Physiology	Study abroad?	*Bio 213 Micro-biology	Biochem	HES Human Anatomy	Apply to PA school

- BIO213 and 214 can be taken in any order

Additional Requirements:

In addition to required coursework, applicants to PA programs must have relevant hands-on clinical experience. The amount of clinical experience required varies, but generally is in the range of 1,000-2,000 hours. It is very difficult to acquire this experience while in college, so most candidates for PA programs have worked in the medical field for at least one year before being admitted to a program.

Graduate Record Exam (GRE): The General test is required.

Years of post-graduate education required:

The average duration of a PA program is 27 months. This includes up to 12 months of pre-clinical classwork, followed by up to 15 months of clinical training.

VETERINARY MEDICINE

All pre-veterinary students should have received and should read the Health Professions Handbook! They should also stay apprised of health professions-related programming by visiting the Health Professions web page (<http://college.wfu.edu/prehealth/>) and by signing up for the health professions listerv.

If a student is interested in Veterinary medicine, it is very important that he or she maintain a high GPA. Veterinary School is as competitive as medical school. A competitive GPA would be 3.5-3.6. The science GPA is also very important. Students who take two laboratory sciences during their first semester tend to struggle with the combination of the heavy workload and adjustment to college. It is recommended that students take only one lab course, CHM111, during fall of the first semester. CHM 111 is recommended because it is only offered during the fall semester. If a student insists on taking two laboratory sciences, he or she should be encourage to take only four courses and HES.

It is not important that one be a science major to attend veterinary school. A science major is great, but it is more important that the student do well in the courses he or she takes. It is critical, however, that all prerequisite courses be completed. The prerequisite courses can be taken as electives, while pursuing interests in art, music, history.... If a student chooses to major in a discipline that he or she really enjoys, they will most likely do better academically, and enjoy the college experience more.

Course prerequisites

Prerequisites vary by program. Check individual programs for possible additional prerequisites. A list of prerequisites by school can be found at <http://www.aavmc.org/Students-Applicants-and-Advisors/Veterinary-Medical-College-Application-Service.aspx>

General biology/genetics/cell biology (BIO 114, 213 and 214)

General chemistry

Organic chemistry

Physics

Math and/or statistics

Microbiology

Also required by some programs:

Nutrition

Communications

Additional science electives

Possible course plans

Below are two possible course plans. Because there are so many requirements for veterinary school (more than medical school!) the preparation can be very intense. It is strongly recommended that the student not take two lab science courses during your first semester unless he or she is an unusually strong student in the sciences. It is important to start out strong academically, and often the first semester in college requires some adjustment of study habits. Some schools recommend not taking two lab sciences at the same time until the sophomore year. One way to spread out the requirements is to take some of the prerequisite courses in summer school, at Wake Forest or elsewhere. But another way is to spread the requirements out over the full four years, and take a gap year to apply to veterinary school. That allows a student to devote more time to the service and shadowing that is needed to make him or her a competitive applicant, and also permits study abroad.

Hardcore option (plan A)

Fall year 1	Spring year 1	Fall year 2	Spring year 2	Fall year 3	Spring year 3	Summer Year 3	Fall year 4	Spring Year 4
CHM 111/L	CHM 122/L	CHM 223/L	CHM 280/L	PHY 113/L	PHY 114/L	Complete application Take GRE	Complete divisionals and major	Complete divisionals and major
MTH 111	BIO 114/L	*BIO 213/L	*BIO 214/L	Micro-biology	Biochem Statistics			

More reasonable plan (Plan B)

Fall year 1	Spring year 1	Fall year 2	Spring year 2	Fall year 3	Spring year 3	Fall year 4	Spring year 4	Right after graduation
CHM 111/L	CHM 122/L	CHM 223/L	CHM 280/L	Study abroad?	Biochem	PHY 113/L	PHY 114/L	Complete application
Math 111	Statistics	Bio 114	*Bio 213		*Bio 214	Micro-biology	Prepare for and take GRE	Take GRE

*Bio 213 and 214 can be taken in any order