The Health Professions Advising Office supports students in the discovery and pursuit of their health career goals. Our mission is situated within the greater university context of commitment to active engagement, critical thinking, and life-long learning. Villanova offers students an outstanding academic preparation, as well as an array of extracurricular opportunities to provide personal, spiritual, ethical, and social growth. Our students are highly successful applicants, and have matriculated at schools around the country. Many of our alumni are leaders in their fields.

Health Professions Advising is open to all Villanovans. We do not screen students for services. Our goal is to assist students in finding their career “fit,” and to ensure they have the information they need to become the strongest applicants possible. This goes beyond selecting courses, to developing an understanding of what it means to choose and prepare for a health care profession. To this end we offer students:

- Personalized, one-on-one appointments
- Information sessions on topics of importance, relevant to class standing, profession of intent, and different parts of the preparation and application process
- Speakers’ series, including admissions representatives from professional schools, alumni panels, speakers on financial aid and scholarships, and more
- An extensive Blackboard resource center with a range of information including preparation guides for each of the professions
- A wide selection of active pre-professional student clubs
- A full committee letter process for professional school application
- A listserv with announcements of events and opportunities of interest on and off campus
- Multiple portals for information about events and opportunities, including campus e-newsletters, monitors, social media

**Health Professions Advising Office Staff:**

Dr. Louise Russo  
Director of Health Professions Advising  
Primary advisor for juniors, seniors, and alumni  
Mendel 143

Ms. Ann Trail  
Health Professions Advisor  
Primary advisor for freshmen and sophomores  
SAC 125

Ms. Christine Gadonas  
Administrative Assistant  
Mendel 143
**Healthcare Professions**: Health care has developed into a multibillion dollar industry and is currently the largest employer in the United States. Health care provided 14.3 million jobs in 2008 and is estimated to generate an additional 3.2 million wage and salary jobs between 2008 and 2018 (Introduction to the Health Professions, Stanfield, Cross, and Hui, 6th edition). This is more projected growth than in any other industry and reflects needs related to an expanding population of elderly and the impacts of the Affordable Care Act which will expand services to millions of formerly uninsured citizens. Job opportunities will exist in a wide range of professions and within diverse care settings including:

- Hospitals and other in-patient facilities
- Nursing homes and community-based care facilities
- Rehabilitation Centers
- Outpatient facilities
- Government agencies
- Private practice
- Industry

The health field offers a wide-range of opportunities to match diverse interests. If you enjoy working with people, like to work with your hands, have interest in working with machines, and enjoy problem solving you may want to consider exploring a health care-related career. If you do not like to work around or with sick people, don’t have a liking for science or math, and do not want to stay in school for an extended period of time then this kind of path will likely not be a good fit for you.

One drawback to this professional path is that most careers require completion of a graduate level degree which extends time to terminal degree by a minimum of two years for many disciplines to four years for the most advanced (and likely highest paying) positions.

This guide will provide some practical information for you on a range of professional degree programs and career areas including general listings of course pre-requisites. **PLEASE NOTE** that what is included may not address needs specific to every program that you eventually want to apply to as course pre-requisites can vary from one school to another. Therefore YOU will have to do some additional research to investigate those specific differences BEFORE you are ready to apply so you don’t miss a critical requirement for the program of your dreams.
# Table of Contents

**Selected Health Professions:**  
Audiology.................................................................................................................. 4  
Chiropractic.............................................................................................................. 6  
Dentistry.................................................................................................................... 8  
Medicine................................................................................................................... 11  
Naturopathic Medicine............................................................................................. 15  
Occupational Therapy.............................................................................................. 17  
Optometry.................................................................................................................. 19  
Pharmacy.................................................................................................................. 21  
Physical Therapy .................................................................................................... 23  
Physician Assistant.................................................................................................. 25  
Podiatry.................................................................................................................... 27  
Public Health........................................................................................................... 29  
Speech-Language Pathology.................................................................................... 31  
Veterinary Medicine................................................................................................. 33

**Building a strong portfolio as a pre-health student**  
Student-run organizations......................................................................................... 36  
Making use of HPA Office Resources....................................................................... 38

**MCAT Content and Knowledge Base for Medical School Admission**  
MCAT Basics............................................................................................................ 39  
MCAT Foundational Concepts............................................................................... 39  
General Curricular Concerns and Course Planning for Pre-Medical Students........ 42  
Villanova Courses Designated to Cover MCAT Foundational Concepts.................. 45

**Frequently Asked Questions**................................................................................ 47
Audiology

**Things to Consider:**
1. Most programs are four years, some are three years to receive the Aud. D. degree
2. Audiologists are licensed in all 50 states; some states regulate the practice of audiology and the dispensing of hearing aids separately requiring an additional Hearing Aid Dispenser license.
3. Audiologists can practice in hospitals, in private practice/physician groups, or school settings.
4. Excellent job opportunities are expected.

**Work Description**
Audiologists evaluate, diagnose, treat and manage individuals of all ages with hearing and balance disorders. They implement a variety of technologies in assessment of function and often coordinate with physicians in patient care and remediation. Treatment plans may include fitting of hearing aids and other hearing assistance devices. When working with children with hearing disorders they may confer with speech language pathologists, teachers, and school administrators in order to meet the needs of the child in the classroom setting. Approximately 50% of audiologists work in general outpatient settings, 30% work in hospital/in-patient care settings and approximately 20% work in schools.

**Basic Pre-Audiology Curriculum**
The following courses are required by most audiology programs in the United States as the minimum background needed for acceptance. Applicants seeking admission to an Aud. D. program should contact the schools they are interested in attending for information on specific prerequisites and admission requirements. Students may also refer to the Academy of Speech-Language-Hearing Association web site at http://www.asha.org/students/ for specific requirements at the programs in which they are interested.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Courses Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>2 courses with lab (BIO 2105 &amp; BIO 2106)</td>
</tr>
<tr>
<td>Anat &amp; Physiology</td>
<td>2 courses with lab (BIO 1205 &amp; BIO 1206 or BIO 3155 &amp; BIO 3055)</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Physics</td>
<td>2 courses with lab (PHY 1100/1101, 1102/1103 or 2410/2411 &amp; 2412/2413 or 2414/2415); <strong>NOTE</strong> at least one semester of college level calculus is required to take Physics at Villanova</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1 course depending on the school (MAT 1312 or MAT 1500 recommended)</td>
</tr>
<tr>
<td>Psychology</td>
<td>1-2 courses (Human Development (Developmental Psychology) is recommended)</td>
</tr>
<tr>
<td>Statistics</td>
<td>1 course (may be a MAT course or a course within your major such as biostatistics, psychology or business based statistics)</td>
</tr>
</tbody>
</table>

**Major selection**
Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses and taken the application exam (GRE) if required. Application is highly competitive and therefore students should have a strong overall GPA (>3.0) and perform well (“C” or better) in pre-requisite courses to be in consideration.

**GRE**
Most schools require students to take the Graduate Record Examination (GRE) which is a standardized test to gauge a student’s ability to do well in a graduate program. The GRE is given year-round at computer-based test centers in the U.S., Canada, and many other countries. Appointments to take the test are scheduled...
on a first-come, first-served basis. For more information about the GRE visit their website at http://www.gre.org

**Applying to Programs in Audiology**
Most audiology schools participate in the Communication Sciences Disorders Centralized Application Service (CSDCAS) which allows students to use a single web-based application and one set of materials to apply to multiple programs. Go to http://www.capcsd.org/csdcas/ for more information.

**Pre-Audiology Advising**
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in audiology to provide additional support in compilation of a strong portfolio for admission consideration.
Chiropractic

**Things to Consider:**
1. Programs grant the doctoral (D.C.) degree after four years of study and training
2. Formal education and training focuses on musculoskeletal anatomy, spinal adjustment, manipulation, and radiology
3. Post-graduation professionals may pursue specialty diplomas in ten practice areas including orthopedics and acupuncture
4. Chiropractors are licensed in all 50 states
5. Job outlook is excellent

**Work Description**
Chiropractors diagnose and treat patients with disorders of the musculoskeletal system. Practice is based on the principle that spine misalignments affect the nervous system leading to increased susceptibility to disease and other aspects of diminished health. As such chiropractors emphasize patient wellness through spine and neck adjustments. Chiropractors take patient histories and order tests including X-rays and other diagnostic imaging and may use a range of therapeutic techniques such as heat, water, light, massage, ultrasound, electric currents, and acupuncture. They may not prescribe medications or perform major surgery. Most chiropractors work in outpatient facilities and many in their own practice.

**Basic Pre-Chiropractic Curriculum**
The following courses are required by most chiropractic programs in the United States as the minimum background needed for acceptance. Applicants seeking admission to a D.C. program should contact the schools they are interested in attending for information on specific prerequisites and admission requirements. Students may consult the Association of Chiropractic Colleges website at [http://www.chirocolleges.org/prospective_students.html](http://www.chirocolleges.org/prospective_students.html) to find programs and to research specific requirements of the schools to which they plan to apply.

- **Anat & Physiology**: 2 courses with lab (BIO 1205 & BIO 1206 or BIO 3155 & BIO 3055)
- **General Chemistry**: 2 courses with lab (CHM 1151/1103, 1152/1104)
- **Organic Chemistry**: 2 courses with lab (CHM 2211/2201, 2212/2202)
- **Physics**: 2 courses with lab (PHY 1100/1101, 1102/1103 or 2410/2411 & 2412/2413 or 2414/2415); **NOTE**: at least one semester of college level calculus is required to take Physics at Villanova
- **Mathematics**: 1 calculus course (MAT 1312 or MAT 1500 recommended)
- **Social Sciences**: 2-3 courses (Psychology or Sociology areas preferred)
- **Statistics**: 1 course (may be a MAT course or a course within your major such as biostatistics, psychology or business based statistics)

Other courses that may be required are **Biochemistry** (CHM 4611 or CHM 4621), and **two semesters of English or Communication area courses** (ACS 1000 may be accepted as a substitute for a second ENG course).

**Major selection**
Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses. Application is highly competitive and therefore students should have a strong overall GPA (>3.0) and perform well (“C” or better) in pre-requisite courses to be in consideration.
**Applying to Programs in Chiropractic**
Most schools participate in the Chiropractic Centralized Application Service (ChiroCAS) which allows students to use a single web-based application and one set of materials to apply to multiple programs. Go to [https://portal.chirocas.org/](https://portal.chirocas.org/) for more information.

**Pre-Chiropractic Advising**
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in chiropractic to provide additional support in compilation of a strong portfolio for admission consideration.
Dentistry

Things to Consider:
1. Formal education and training typically requires 4 years of dental school, pursuit of some specializations may necessitate additional training
2. Approximately 3 out of 4 dentists are solo practitioners
3. Job opportunities are expected to be very good in most areas reflecting, in part, the need to replace a large number of dentists expected to retire within the next decade

Work Description
Dentistry requires diagnostic ability and manual skills. Dentists diagnose and treat problems with teeth and tissues in the mouth. They provide preventive as well as reparative care, instructions on all aspects of dental care, and complete tooth extractions and surgeries to correct dental problems and disfigurements. They should have good visual memory and spatial judgment, as well as a high degree of manual dexterity. Most dentists are general practitioners however there are a range of specialty areas including orthodontics, oral and maxillofacial surgeons, periodontists, endodontists, prostodontists, and oral pathologists. In all states and the District of Columbia dentists must be licensed.

Basic Pre-Dental Curriculum
The following courses are required by the majority of U.S. dental schools as the minimum preparation for consideration of acceptance.

<table>
<thead>
<tr>
<th>Course</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>2 courses with lab (BIO 2105 &amp; BIO 2106); AP Bio credits are acceptable but you must still complete two Bio lab courses in college at a minimum in order to be admitted to dental school</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>2 courses with lab (CHM 2211/2201, 2212/2202)</td>
</tr>
<tr>
<td>Physics</td>
<td>2 courses with lab (PHY 1100/1101, 1102/1103 or 2410/2411 &amp; 2412/2413 or 2414/2415); Note that at least one semester of college level calculus is required to take Physics at Villanova.</td>
</tr>
<tr>
<td>English</td>
<td>1 course</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>1 course (CHM 4611 or CHM 4621) Note that the CHM 4611 is a Survey course that covers a breadth of Biochemistry content while CHM 4621 (Biochem 1) will cover a subset of topics in more depth than the Survey course; either course requires Organic I and II as pre-requisites</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1-2 courses (including MAT 1312 or MAT 1500; statistics is highly recommended)</td>
</tr>
</tbody>
</table>

Some schools also require Microbiology (BIO 3595). Applicants must investigate the specific requirements of each school to which they expect to apply in order to be confident that their background preparation is complete. For more information as a pre-dental student visit the American Dental Education Association (A DEA) website at [http://www.adea.org/GoDental/Future_Dentists.aspx](http://www.adea.org/GoDental/Future_Dentists.aspx)

Major selection
Any undergraduate major is acceptable provided that you have completed the required prerequisite courses and taken the application exam (DAT). The majority of applicants come from the sciences, however you do not need to major in the sciences to apply to dental school. Students are accepted at comparable rates from all majors. The best major is a subject you enjoy and in which you excel. Dental schools appreciate students
who have a breadth of academic knowledge and reasoning skills. Science majors should be sure to explore coursework beyond the required core curriculum courses in the humanities and social sciences, while humanities and social science majors should demonstrate an ability to carry a heavy science load and be academically successful. Non-science majors may face some challenges when registering for a science class that is required for science majors as part of their standard curriculum. Any inquiries or requests for access to a course must be made through the department office which manages that course, not the Health Professions Advising Office.

The Dental Application Test (DAT)
Most schools require applicants to take the DAT. The DAT is designed to assess general academic ability, comprehensions of scientific information, and perceptual ability. The DAT is administered nearly every day of the year at Thomson Prometric Test Centers. The exam includes the following sections:

- **Reading comprehension** – dental and basic sciences
- **Natural sciences** – biology, general, and organic chemistry
- **Perceptual ability** – two and three dimensional problem solving
- **Quantitative reasoning** – math problems in algebra, numerical calculations, conversions, etc.


Applying to Dental School
Admission is increasingly competitive. Successful applicants should demonstrate knowledge of the profession through shadowing/volunteer activities and have supportive letters of recommendation (at least 2 from science professors/professionals). Admissions committees are looking for well-rounded individuals with evidence of extracurricular activities and academic enrichment that reflects a willingness to challenge oneself so as to stretch from your comfort zone and gain a real life understanding of cultural circumstances and diversity issues that will impact all healthcare providers. Maturity, professionalism, and leadership potential are all important factors that contribute to a strong application.

The American Association of Dental Schools Application Services (AADSAS)
Students applying into dental school should submit application materials through AADSAS. ([https://portal.aadsasweb.org/](https://portal.aadsasweb.org/)). Students who are from Texas and wish to apply to any public dental school within the state will need to complete an application in TMDSAS (Texas Medical and Dental School Application Service). Application packets must include transcripts for each U.S., U.S. territorial or Canadian college, university, junior college, or graduate school attended which must be sent by the Registrar of each institution.

Pre-Dental Advising
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in dentistry. The Director of HPA prepares a core letter for each applicant that is submitted with the packet for consideration by the admissions committee at the time of application. All schools expect this “committee” letter for students applying as a rising senior or recent graduate from an undergraduate institution. It serves as an institutional letter of support placing each applicant within the context of the broader pool of candidates from that institution. It provides critical information about the applicant’s
disciplinary record and places their academic and personal competencies within context thus further enhancing the dimensions of each candidate for interview and admission consideration.

Information sessions about the committee letter process at Villanova are hosted by the Director of HPA each fall semester. Submission of mandatory materials for committee review starts in late fall. Committee letter appointments begin in early spring semester. ANY student who wants access to the committee letter must meet the mandatory timeline for the process. If a student contacts the HPA Office after the deadline for submission of the pre-committee letter meeting materials, they will need to wait until the following year to start the process. Students are advised to move along the timeline that best suits their desired application and admission process and therefore should monitor critical communications from the HPA Office in early fall semester of their junior year so as to stay on track for a committee letter meeting.
Things to Consider:
1. Formal education and training requires 4 years of medical school, and 3 – 8 years of internship/residency training
2. Allopathic (M.D.) conferring schools and Osteopathic (D.O.) conferring schools have similar requirements for admission; licensed practitioners from both programs have access to residency slots in all sub-specialties and can prescribe medications
3. Many physicians work long and/or irregular hours
4. Acceptance to medical degree programs is highly competitive
5. Job opportunities are excellent, particularly if you are interested in primary care where the need will be the greatest.

Work Description
Physicians (M.D., D.O.) diagnose illnesses and prescribe and administer treatment for people suffering from injury or disease. Physicians examine patients, obtain medical histories, and order/perform diagnostic tests to ascertain the root cause of the illness. In addition to treatment of acute or chronic diseases, they may also practice preventive care. Most of the distinctions between osteopathic and allopathic physicians have disappeared over the last 50 years. Historically osteopathic physicians focus more on preventive medicine and holistic treatment including musculoskeletal manipulation (Osteopathic Musculoskeletal Manipulation). D.O.s often pursue careers in primary care or in rural or underserved communities.

Nearly 50% of practicing physicians are in primary care in areas such as family medicine, pediatrics, internal medicine, obstetrics and gynecology and 50% are specialists in a wide range of areas including surgery, emergency medicine, anesthesiology, psychiatry among others. To practice medicine in all states, the District of Columbia, and U.S. territories, physicians must be licensed by passing the United States Medical Licensing Exam (USMLE) or the Comprehensive Osteopathic Medical Licensing Exam (COMLEX).

For a list of medical schools and residency programs, as well as general information on premedical education, financial aid, and medicine as a career visit the Association of American Medical Colleges website at http://www.aamc.org or the American Association of Colleges of Osteopathic Medicine website at https://www.aacom.org/.

Basic Pre-Med Curriculum
With the rollout of a new MCAT exam in April 2015, many medical schools are altering their course requirements for application to their program. Some have switched to a competency based approach to review of an academic record meaning they want to see evidence of exposure to content within particular areas and therefore they no longer advertise a specific course “checklist.” Others have stayed with a more “traditional” set of courses and have tweaked that to include something new (i.e. Biochemistry or statistics or both). Therefore in light of this transition in medical school transcript review and assessment of academic readiness for admission these are the best courses to add to your curriculum in order to meet preparation standards for the new MCAT exam and for application to the vast majority of medical schools.
You are also URGED to access and review the more detailed *MCAT and Pre-Medical Curriculum Advising Guide*:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>2-3 courses with lab (BIO 2105 &amp; BIO 2106 plus at least one additional course); AP Bio credits are acceptable but you must still complete two Bio lab courses in college at a minimum in order to be admitted to medical school</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>2 courses with lab (CHM 2211/2201, 2212/2202)</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>1 course (CHM 4611 or CHM 4621); Note that the CHM 4611 is a Survey course that covers a breadth of Biochemistry content and will be the most acceptable option to prepare for the new MCAT. CHM 4621 (Biochem I) may not cover the full breadth of topics but will cover a subset in more depth than the Survey course; either course requires Organic I and II as pre-requisites</td>
</tr>
<tr>
<td>Physics</td>
<td>2 courses with lab (PHY 1100/1101, 1102/1103 or 2410/2411 &amp; 2412/2413 or 2414/2415); <strong>Note</strong> that at least one semester of college level calculus is required to take physics at Villanova.</td>
</tr>
<tr>
<td>Social Sci/Humanities</td>
<td>3 courses (suggested 1 course in Psychology and 1 in Sociology, plus an additional course - refer to the MCAT Advising Guide for options)</td>
</tr>
<tr>
<td>Statistics</td>
<td>1 course (may be a MAT course or a course within your major such as Biostatistics, psychology or business based statistics)</td>
</tr>
<tr>
<td>English</td>
<td>1 course (many schools want two ENG courses…. ACS 1000 may be an acceptable substitute for a second ENG course)</td>
</tr>
</tbody>
</table>

**Major selection**

Any undergraduate major is acceptable provided that you have completed the required prerequisite courses and taken the application exam (MCAT). The majority of applicants come from the sciences, however you do not need to major in the sciences to apply to medical school. Students are accepted at comparable rates from all majors. The best major is a subject you enjoy and in which you excel. Medical schools appreciate students who have a breadth of academic knowledge and reasoning skills. Science majors should be sure to explore coursework beyond the required core curriculum courses in the humanities and social sciences, while humanities and social science majors should demonstrate an ability to carry a heavy science load and be academically successful. Non-science majors may face some challenges when registering for a science class that is required for science majors as part of their standard curriculum. Any inquiries or requests for access to a course must be made through the department office which manages that course, not the Health Professions Advising Office.

**The Medical College Application Test (MCAT)**

Most schools require applicants to take the MCAT. Refer to the separate publication entitled *MCAT and Pre-Medical Curriculum Advising Guide* for details. At present the following main sections are included in the exam:

1. Biological and Biochemical Foundations of Living Systems
2. Chemical and Physical Foundations of Biological Systems
3. Psychological, Social and Biological Foundations of Behavior
4. Critical Analysis and Reasoning Skills

The MCAT is administered many times a year. Typically students take the MCAT in spring of their junior year or early summer after junior year to be on target for application timing with the option to
enter medical school the summer after graduation. Some students find it helpful to take an MCAT preparation course. Go to http://www.aamc.org/students/mcat/ for more information.

**Applying to Medical School**

Admission is very competitive. Accepted students nationally for allopathic (M.D.) programs have an overall GPA of 3.5 or above with strong MCAT scores (70-80th percentile or better; 508 or above in the new MCAT exam).

Successful applicants are also those who have knowledge of the profession through shadowing/volunteer activities, demonstrate evidence of humanitarian instincts, altruism, and passion for working with people through quality service, volunteer, or work experiences, and have supportive letters of recommendation (at least 2 from science professors/professionals). Admission committees are looking for well-rounded individuals with a breadth of extracurricular activities and academic enrichment that reflect a willingness to challenge oneself so as to stretch from your comfort zone and gain a real life understanding of cultural circumstances and diversity issues that will impact all healthcare providers. Evidence of maturity, professionalism, altruism, and leadership skills is essential for a strong application.

**Centralized Application Services (AMCAS, AACOMAS, and TMDSAS)**

Students applying into medical school must submit application materials through AMCAS (American Medical College Application Service) for allopathic programs and AACOMAS (American Association of Colleges of Osteopathic Medicine Application Service) for osteopathic programs. Students who are from Texas and wish to apply to any public medical school within the state will need to complete an application in TMDSAS (Texas Medical and Dental School Application Service). Application packets must include transcripts for each U.S., U.S. territorial or Canadian college, university, junior college, or graduate school attended which must be sent by the Registrar of each institution directly to the application service. For more information on AMCAS visit http://aamc.org/students/amcas/, for AACOMAS visit http://www.aacom.org/become-a-doctor/applying/aacomas, and for TMDSAS visit https://www.tmdsas.com/.

**Pre-Med Advising**

Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in medicine. The Director of Health Professions Advising prepares a letter for each applicant that is submitted with the packet for consideration by the admissions committee at the time of application. Medical schools expect this “committee” letter for students applying as a rising senior or recent graduate from an undergraduate institution. It serves as an institutional letter of support placing each applicant within the context of the broader pool of candidates from that institution. It provides critical information about the applicant’s disciplinary record and places their academic and personal competencies within context thus further enhancing the dimensions of each candidate for interview and admission consideration.

Information sessions about the committee letter process at Villanova are hosted by the Director of HPA each fall semester. Submission of mandatory materials for committee review starts in late fall. Committee letter appointments begin in early spring semester. ANY student who wants access to the committee letter must meet the mandatory timeline for the process. If a student contacts the HPA Office
after the deadline for submission of the pre-committee letter meeting materials, they will need to wait until the following year to start the process. Students are advised to move along the timeline that best suits their desired application and admission process and therefore should monitor critical communications from the HPA Office in early fall semester of their junior year so as to stay on track for a committee letter meeting.
Naturopathic Medicine

Things to Consider:
1. Formal education and training requires 4 years of Naturopathic Medical School to receive the N.D. degree which is required for practice in the U.S.
2. Naturopaths emphasize disease prevention and wellness; they work in private practices or clinics as primary care practitioners
3. Naturopathic education includes exposure to clinical nutrition, botanical and homeopathic medicine, acupuncture, and counseling
4. Naturopathic physicians are currently licensed in only 17 states and a few U.S. territories and Canadian provinces

Work Description
Naturopaths specialize in natural and holistic (non-toxic) approaches to health and wellness working primarily as primary care practitioners counseling patients. Naturopathic physicians take into account individual physical, mental, emotional, genetic, environmental, social, and other factors that affect wellness and emphasize the prevention of disease as educators assessing risk factors and counseling patients to become responsible for their health. Naturopathic practice includes the following diagnostic and therapeutic modalities: clinical and laboratory diagnostic testing, nutritional medicine, botanical medicine, naturopathic physical medicine (including naturopathic manipulative therapy), public health measures, hygiene, counseling, minor surgery, homeopathy, acupuncture, prescription medication, intravenous and injection therapy, and naturopathic obstetrics (natural childbirth).

Currently, 17 states, the District of Columbia, and the United States territories of Puerto Rico and the United States Virgin Islands have licensing or regulation laws for naturopathic doctors. In these states, naturopathic doctors are required to graduate from an accredited four-year residential naturopathic medical school and pass an extensive postdoctoral board examination (NPLEX) in order to receive a license. For a list of states where N.D.s are licensed visit http://www.naturopathic.org/

Basic Pre-Naturopathic Medicine Curriculum
The following courses are required by most naturopathic programs in the United States as the minimum background needed for acceptance. Applicants seeking admission to an N.D. program should contact the schools they are interested in attending for information on specific prerequisites and admission requirements. Students may also refer to the American Association of Naturopathic Medical Colleges web site at http://www.naturopathic.org/education for specific requirements at the programs in which they are interested.

<table>
<thead>
<tr>
<th>Course</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>2 courses with lab (BIO 2105 &amp; BIO 2106)</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>2 courses with lab (CHM 2211/2201, 2212/2202)</td>
</tr>
<tr>
<td>Physics</td>
<td>1-22 courses with lab (PHY 1100/1101, 1102/1103 or 2410/2411 &amp; 2412/2413 or 2414/2415); NOTE at least one semester of college level calculus is required to take Physics at Villanova</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1 course (MAT 1312 or MAT 1500 recommended to take Physics at VU)</td>
</tr>
</tbody>
</table>
Some schools may require English or coursework in communications (Public Speaking) and bioethics. A course in Biochemistry (CHM 4611) is also recommended. Applicants must investigate the specific requirements of each school to which they expect to apply in order to be confident that their background preparation is complete. For more information as a pre-naturopathic medicine student visit the American Association of Naturopathic Medicine website at https://aanme.org/naturopathic-schools/academic-prerequisites/

**Major selection**

Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses and taken the application exam (GRE) if required. Application is highly competitive and therefore students should have a strong overall GPA (>3.0) and perform well (“C” or better) in pre-requisite courses to be in consideration.

**Applying to Programs in Naturopathic Medicine**

Some Naturopathic Medical schools participate in the Naturopathic Doctor Centralized Application Service (NDCAS) which allows students to use a single web-based application and one set of materials to apply to multiple programs. Go to https://portal.ndcas.org/ for more information.

**Pre-Naturopathic Medicine Advising**

Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in naturopathic medicine to provide additional support in compilation of a strong portfolio for admission consideration.
Occupational Therapy

Things to Consider:
1. Formal education and training typically requires 2 – 4 years of OT school; therapists may practice with a Master’s level degree
2. Therapists can practice in the hospital/in-patient setting or in private practice/physician groups, home health visits, or school settings
3. Occupational therapists must enjoy working with people with disabilities
4. Job growth overall is exceptional

Work Description
Occupational Therapists treat people with mental, physical, developmental or emotional disabilities. They employ a variety of techniques which are designed to help individuals to develop or improve daily living skills intended to allow patients to function within their homes. They also counsel patients and their family members on how to cope with the physical and emotional effects of their disability. The OT’s goal is to help clients establish a lifestyle of independence which allows them to be productive and as happy as possible in light of their limitations. OTs work in hospital or other in-patient facilities such as rehabilitation centers where they are central to the discharge planning process working closely with nurses, case managers, physical therapists, and speech language pathologists. They may also work in schools, private practices, or as independent practitioners who participate in at-home care for clients. Approximately 24% work in the hospital setting, 23% in outpatient settings, 13% in schools, and 10% in nursing homes. The OT career provides flexibility of work structure with approximately 30% working part-time. In all states, the District of Columbia, Puerto Rico and Guam OT practice is regulated. OTs must be licensed to practice which includes passing a certification exam.

Basic Pre-Occupational Therapy Curriculum
The following courses are required by most occupational therapy schools in the United States as the minimum background needed for acceptance. Pre-occupational therapy courses vary by school. Applicants seeking admission to a occupational therapy program should contact the schools they are interested in attending for information on specific prerequisites and admission requirements. Students may also refer to the American Occupational Therapy Association web site at http://www.aota.org/ for specific requirements for the programs in which they are interested.

<table>
<thead>
<tr>
<th>Course</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Anat &amp; Physiology</td>
<td>2 courses with lab (BIO 1205 &amp; BIO 1206)</td>
</tr>
<tr>
<td>Statistics</td>
<td>1 course</td>
</tr>
<tr>
<td>Psychology</td>
<td>2-3 courses (including Human Developmental Psychology at most schools)</td>
</tr>
</tbody>
</table>

Some programs may require additional coursework including Biology (BIO 2105, 2106) and/or Physics (PHY 1100/1101, 1102/1103). Students should consult individual program websites to obtain information on all prerequisites. Visit the following page on the American Occupational Therapy Association website to find programs in the United States http://www.aota.org/Students/Schools.aspx. Admission to an Occupational Therapy program generally requires 40 or more hours of shadowing/volunteer experience working with an OT. Some schools require evaluations/recommendations from an OT for admission.
Major selection
Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses and taken the application exam (GRE) if required. Application is competitive and therefore students should have a strong overall GPA (>3.0) and perform well (“B” or better) in pre-requisite courses to be in consideration. Note that Villanova does offer a one semester Intro to OT course (BIO 1057; offered fall and spring semesters) which is an independent study experience intended to get students field related experiences as well as complete reflective writing to better understand the profession and the role of OT in the human experience. Interested students should contact Dr. Louise Russo, Director of Health Professions Advising, to register for the course.

GRE
Most schools require students to take the Graduate Record Examination (GRE) which is a standardized test to gauge a student’s ability to do well in a graduate program. The GRE is given year-round at computer-based test centers in the U.S., Canada, and many other countries. Appointments to take the test are scheduled on a first-come, first-served basis. For more information about the GRE visit their website at http://www.gre.org

Applying to Occupational Therapy School
Most Occupational Therapy schools participate in the Occupational Therapist Centralized Application Service (OTCAS) which allows students to use a single web-based application and one set of materials to apply to multiple OT programs. Go to https://portal.otcas.org/ for more information.

Pre-OT Advising
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in occupational therapy to provide additional support in compilation of a strong portfolio for admission consideration.
### Optometry

**Things to Consider:**
1. Formal education and training requires 4 years of optometry school to receive the O.D. degree
2. Optometrists can prescribe medications in most states but are prohibited from performing surgery in all but a few (though more states each year are changing standards to expand the scope of practice to include surgery options)
3. Most optometrists work in solo practice
4. Job outlook is excellent

**Work Description**
Optometrists (Doctors of Optometry or O.D.s) are the main providers of vision care. They examine people’s eyes to diagnose vision problems and prescribe corrective lenses or other treatments to alleviate vision disorders. They also diagnose debilitating diseases such as glaucoma or macular degeneration and vision changes related to diabetes and high blood pressure. They prescribe medication to treat diseases and can provide preoperative or postoperative care to cataract patients as well as patients who have had corrective laser surgery. Most optometrists are general practitioners though some do pursue specialization such as pediatrics. Most are in private practice and therefore they must handle business decisions, marketing plans, billing, etc. Optometrists should not be confused with Ophthalmologists who are physicians (M.D. or D.O.) that specialize in treatment of eye disorders including eye surgery. All states and the District of Columbia require that optometrists be licensed.

**Pre-Optometry Program Requirements**
Admissions requirements may vary from school to school. Students should consult school websites for updated information on specific requirements for the schools to which they plan to apply. Below is a list of courses that are required by most schools.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>2 courses with lab (BIO 2105, 2106)</td>
</tr>
<tr>
<td>Microbiology</td>
<td>1 course with lab (BIO 3595)</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>2 courses with lab (CHM 2211/2201, 2212/2202)</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>1 course with lab (CHM 4611 or CHM 4621) Note that CHM 4611 is a Survey course that covers a breadth of Biochemistry content while CHM 4621(Biochem I) will cover a subset of topics in more depth than the Survey course; either course requires Organic I and II as pre-requisites</td>
</tr>
<tr>
<td>Physics</td>
<td>2 courses with lab (PHY 1100/1101, 1102/1103 or 2410/2411 &amp; 2412/2413 or 2414/2415); <em>NOTE</em> at least one semester of college level calculus is required to take Physics at Villanova</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1 course (MAT 1312 or MAT 1500 recommended)</td>
</tr>
<tr>
<td>Statistics</td>
<td>1 course</td>
</tr>
<tr>
<td>English</td>
<td>2 courses (at least one ENG course, an additional compositional writing course from another topic area; ACS 1000 may be an acceptable substitution for the second English requirement at most schools)</td>
</tr>
<tr>
<td>Psychology</td>
<td>2 courses (including Developmental Psychology at many schools)</td>
</tr>
<tr>
<td>Social Science</td>
<td>2 courses in any area (Psychology, Sociology, PJ)</td>
</tr>
</tbody>
</table>
Additional course requirements vary among schools or colleges. Students are urged to explore requirements at individual programs via the Association of Schools and Colleges of Optometry at http://www.opted.org/i4a/pages/index.cfm?pageid=3600

**Major selection**
Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses and taken the application exam (OAT). Considering the number of science pre-requisite courses, pursuit of a science major is strongly recommended.

**Optometry Admission Test (OAT)**
Optometry programs require students take the Optometry Admissions Test (OAT), a standardized examination which is comprised of six components: quantitative reasoning, reading comprehension, general biology, general physics, general chemistry and organic chemistry. The exam is multiple-choice. The OAT is scored on a 200 to 400 scale in increments of ten. The national average for the test is usually between 300 and 310.

**Applying to Optometry School**
Most Optometry schools participate in the Optometry Centralized Application Service (OPTOMCAS) which allows students to use a single web-based application and one set of materials to apply to multiple Optometry programs. Go to http://www.optomcas.org/ for more information.

**Pre-Optometry Advising**
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in optometry. Some optometry programs want applicants to obtain a committee letter as a critical component of their application portfolio. This “committee” letter is most likely an element in the application materials for students applying as a rising senior or a recent graduate from an undergraduate institution. It serves as an institutional letter of support placing each applicant within the context of the broader pool of candidates from that institution. It provides critical information about the applicant’s disciplinary record and places their academic and personal competencies within context thus further enhancing the dimensions of each candidate for interview and admission consideration.

Information sessions about the committee letter process at Villanova are hosted by the Director of HPA each fall semester. Submission of mandatory materials for committee review starts in late fall. Committee letter appointments begin in early spring semester. ANY student who wants access to the committee letter must meet the mandatory timeline for the process. If a student contacts the HPA Office after the deadline for submission of the pre-committee letter meeting materials, they will need to wait until the following year to start the process. Students are advised to move along the timeline that best suits their desired application and admission process and therefore should monitor critical communications from the HPA Office in early fall semester of their junior year so as to stay on track for a committee letter meeting.
Pharmacy

Things to Consider:
1. Formal education and training requires 4 years of pharmacy school to receive the Pharm.D. degree
2. Pharmacists, depending upon job setting, may have to work holidays, weekends, and nights
3. One to two year postgraduate residencies are required for pharmacists who wish to work in clinical settings
4. Excellent job opportunities are expected

Work Description
Pharmacists advise health professionals and the public on the proper selection and use of medicines. They have detailed knowledge of side effects of medications and drug interactions that may be dangerous if used in combination. Pharmacists also dispense drugs prescribed by health care professionals and some specialize in areas such as radiopharmacy or nuclear pharmacy where they prepare and dispense radioactive pharmaceuticals for diagnosis or therapy. Pharmacists must be licensed in all states, the District of Columbia, and U.S. territories pharmacists by passing the North American Pharmacist Licensure Exam (NAPLEX). Approximately 55% of pharmacists work in retail settings, 27% work in hospitals, 10% in other outpatient settings and 3% in industry.

Basic Pre-Pharmacy Curriculum
The following courses are required by most pharmacy schools in the United States as the minimum background needed for acceptance into pharmacy school. Pre-Pharmacy courses vary by school. Students need to research which additional courses may be required by contacting the schools they are considering and visiting their websites. The PharmCAS website has links to pharmacy schools and the prerequisites: [http://www.pharmcas.org/](http://www.pharmcas.org/)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>2 courses with lab (BIO 2105 &amp; BIO 2106)</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>2 courses with lab (CHM 2211/2201, 2212/2202)</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>1 course (CHM 4611 or CHM 4621); Note that the CHM 4611 is a Survey course that covers a breadth of Biochemistry content while CHM 4621(Biochem I) will cover a subset of topics in more depth than the Survey course; either course requires Organic I and II as pre-requisites</td>
</tr>
<tr>
<td>Anat &amp; Physiology</td>
<td>2 courses with lab (BIO 1205 &amp; BIO 1206)</td>
</tr>
<tr>
<td>Microbiology</td>
<td>1 course (BIO 3595)</td>
</tr>
</tbody>
</table>
| Physics          | 2 courses (PHY 1100/1101, 1102/1103 or 2410/2411 & 2412/2413 or 2414/2415); \[NOTE at least one semester of college level calculus is required to take Physics at Villanova]
| English          | 2 courses (at least one ENG course, an additional compositional writing course from such as ACS 1000 may be an acceptable substitution for the second English requirement at most schools) |
| Mathematics      | 1-2 courses (MAT 1312 or MAT 1500 plus an additional course; statistics is highly recommended) |
Some schools require a Public Speaking course and some will require a social science course (Psychology or Sociology). Applicants must investigate the specific requirements of each school to which they expect to apply in order to be confident that their background preparation is complete.

**Major selection**
Any undergraduate major is acceptable, however considering the depth and extent of science prerequisite courses, the best options will be science majors (Chemistry, Biochemistry, Comprehensive Science are the most likely options).

**PCAT**
Most schools require students to take The Pharmacy College Admission Test (PCAT) which is a standardized test with multiple choice questions and an essay measuring general academic ability and scientific knowledge. The test is offered three times a year. The application deadline to take the test is usually six weeks before the examination date. For more information about the PCAT, visit their web site at [http://PCAT.web.info](http://PCAT.web.info)

**The Pharmacy College Application Service (PharmCAS)**
PharmCAS is a centralized service which allows applicants to use a single application process to apply to multiple pharmacy programs. Not all schools participate in PharmCAS. It is the responsibility of the applicant to determine which schools participate and send individual applications to those that do not participate. A complete set of official transcripts for each U.S., U.S. territorial or Canadian college, university, junior college, or graduate school attended should be forwarded directly to PharmCAS by the registrar of the institution(s) attended. For more information about PharmCAS, visit their web site at: [www.pharmcas.org](http://www.pharmcas.org).

**Pre-Pharmacy Advising**
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in pharmacy. Some pharmacy programs want applicants to obtain a committee letter as a critical component of their application portfolio. This “committee” letter is most likely an element in the application materials for students applying as a rising senior or a recent graduate from an undergraduate institution. It serves as an institutional letter of support placing each applicant within the context of the broader pool of candidates from that institution. It provides critical information about the applicant’s disciplinary record and places their academic and personal competencies within context thus further enhancing the dimensions of each candidate for interview and admission consideration.

Information sessions about the committee letter process at Villanova are hosted by the Director of HPA each fall semester. Submission of mandatory materials for committee review starts in late fall. Committee letter appointments begin in early spring semester. ANY student who wants access to the committee letter must meet the mandatory timeline for the process. If a student contacts the HPA Office after the deadline for submission of the pre-committee letter meeting materials, they will need to wait until the following year to start the process. Students are advised to move along the timeline that best suits their desired application and admission process and therefore should monitor critical communications from the HPA Office in early fall semester of their junior year so as to stay on track for a committee letter meeting.
Things to Consider:
1. Formal education and training typically requires 3 years of PT school to achieve the required D.P.T. degree
2. Therapists can practice in the hospital setting or in private practice/physician groups, home health visits, or school settings
3. PT jobs can be physically demanding requiring mobility and strength
4. Excellent job growth is expected

Work Description
Physical therapists provide services that help restore function, improve mobility, relieve pain, and prevent or limit physical disabilities. They may also promote physical conditioning and promote overall fitness particularly for accident victims, individuals suffering from back/neck pain, joint discomfort (arthritis), head injuries, and developmental physical limitations (e.g. cerebral palsy). PTs examine patients, measure strength and range of motion, and develop conditioning/treatment plans to produce an anticipated outcome. PTs may be confused with physiatrists who are physicians (M.D. or D.O.) who specialize in physical rehabilitation. PTs and physiatrists often work together in patient care. Approximately 60% of PTs work in hospital/in-patient care settings or in PT offices, 11% work in home health and 7% in nursing homes. Approximately 27% of PTs work part-time. All states regulate the practice of physical therapy through a variety of measures (which vary by state) including passing the national Physical Therapy Examination.

Basic Pre-Physical Therapy Curriculum
The following courses are required by most physical therapy schools in the United States as the minimum background needed for acceptance. Pre-physical therapy courses vary by school. Applicants seeking admission to a physical therapy program should contact the schools they are interested in attending for information on specific prerequisites and admission requirements. Students may also refer to the American Physical Therapy Association web site at http://www.apta.org/ProspectiveStudents/ for specific requirements at the programs in which they are interested.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>2 courses with lab (BIO 2105 &amp; BIO 2106)</td>
</tr>
<tr>
<td>Anat &amp; Physiology</td>
<td>2 courses with lab (BIO 1205 &amp; BIO 1206 or BIO 3155 &amp; BIO 3055)</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Physics</td>
<td>2 courses with lab (PHY 1100/1101, 1102/1103 or 2410/2411 &amp; 2412/2413 or 2414/2415); <strong>NOTE</strong> at least one semester of college level calculus is required to take Physics at Villanova</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1 course depending on the school (MAT 1312 or MAT 1500 recommended)</td>
</tr>
<tr>
<td>Psychology</td>
<td>1-2 courses (including Human Developmental Psychology at most schools)</td>
</tr>
</tbody>
</table>

Admission to a physical therapy program generally requires 50 to 150 hours of volunteer or paid experience in a health care setting. Some schools require volunteer hours from at least two physical therapy practice settings.
**Major selection**
Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses and taken the application exam (GRE) if required. Application is highly competitive and therefore students should have a strong overall GPA (>3.0) and perform well (“B” or better) in pre-requisite courses to be in consideration.

**GRE**
Most schools require students to take the Graduate Record Examination (GRE) which is a standardized test to gauge a student’s ability to do well in a graduate program. The GRE is given year-round at computer-based test centers in the U.S., Canada, and many other countries. Appointments to take the test are scheduled on a first-come, first-served basis. For more information about the GRE visit their website at [http://www.gre.org](http://www.gre.org)

**Applying to Physical Therapy School**
Most Physical Therapy schools participate in the Physical Therapist Centralized Application Service (PTCAS) which allows students to use a single web-based application and one set of materials to apply to multiple PT programs. Go to [http://www.ptcas.org/home.aspx](http://www.ptcas.org/home.aspx) for more information.

**Pre-PT Advising**
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in physical therapy to provide additional support in compilation of a strong portfolio for admission consideration.
Physician Assistant

Things to Consider:

1. Formal education and training typically requires 2 years of physician assistant school; some PAs pursue additional education in specialty areas such as surgery, neonatology, or emergency medicine.
2. Acceptance is highly competitive and most schools require extensive direct patient care hours prior to admission (as high as 1,000 hours).
3. PAs can perform most of the duties of a physician but they must do so under the supervision of a physician; supervision will vary from daily to one or two meetings each week depending upon the practice setting.
4. PAs can prescribe medications in all 50 states but some require co-signature of a physician for controlled substances.
5. Employment opportunities are expected to be excellent related, in part, to the increased need for primary care practitioners in underserved areas.

Work Description

Physician assistants are trained to provide routine diagnostic, therapeutic, and preventive healthcare services under the direction and supervision of a physician. They complete basic medical histories, patient examinations, and order diagnostic tests and procedures necessary for treatment. They can complete minor injury treatment (suturing, splinting and casting) and prescribe medication (in all 50 states). PAs may work in the hospital setting or in physician offices or clinics. The leading medical specialties which employ high numbers of PAs include family/general practice, pediatrics, internal medicine, geriatrics, general surgery, emergency medicine, orthopedic surgery, and thoracic surgery. Surgical PAs assist surgeons during procedures and suture wounds but do not perform surgery themselves. PAs must pass the Physician Assistant National Certification of Physician Assistants (NCCPA) licensing exam in order to practice in all states and the District of Columbia. Approximately 55% of PAs work in physician offices, 23% in hospitals, and 10% in other outpatient settings.

Physician Assistant Program Requirements

Admissions requirements vary widely from school to school. Students are encouraged to choose any major they are interested in pursuing. Below is a list of courses that may be required:

- **General Biology**: 2 courses with lab (BIO 2105 & BIO 2106)
- **Anatomy & Physiology**: 2 courses with lab (BIO 1205 & BIO 1206)
- **General Chemistry**: 2 courses with lab (CHM 1151/1103, 1152/1104)
- **Microbiology**: 1 course with lab (BIO 3595)
- **English**: 2 courses (at least one ENG course, an additional compositional writing course such as ACS 1000 may be an acceptable substitution for the second English requirement at most schools)
- **Social Science**: 2 courses (typically Developmental Psychology is required)
- **Statistics**: 1 course (MAT statistics or a stats course within one’s major such as Biostatistics, Psychology or Business statistics are appropriate options)

Other courses that may be required are **Organic Chemistry** (CHM 2211/2201, 2212/2202), **Biochemistry** (CHM 4611 or CHM 4621), **Genetics** (BIO 3351), and **Medical Terminology** (not offered at VU – can be taken as an
online course). Students should consult the Physician Assistant Education Association (PAEA) website at http://www.paeaonline.org/ to find programs and to research the specific requirements of the schools to which they plan to apply.

Below is a list of the types of direct patient-care experience that have been found to be acceptable to meet minimum program requirements. However, it is not exhaustive and students should contact each school to find out what kind of experience is acceptable. NOTE physician or P.A. shadowing does NOT qualify as direct patient care experience.

<table>
<thead>
<tr>
<th>Paramedic</th>
<th>Dietician</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse or nurse’s aide</td>
<td>EMT</td>
</tr>
<tr>
<td>Orderly</td>
<td>Home health aide</td>
</tr>
<tr>
<td>Phlebotomist</td>
<td>Radiation technologist</td>
</tr>
<tr>
<td>Ophthalmologic technician</td>
<td>EKG/monitor technician</td>
</tr>
<tr>
<td>Medical office assistant</td>
<td>Veterinary technician</td>
</tr>
</tbody>
</table>

**Major selection**

Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses and taken the application exam (GRE) if required. Application is highly competitive and therefore students should have a strong overall GPA (≥3.0) and perform well (“C” or better) in pre-requisite courses to be in consideration.

**GRE**

Most schools require students to take the Graduate Record Examination (GRE) which is a standardized test to gauge a student’s ability to perform in a graduate program. The General Test is given year-round at computer-based test centers in the U.S., Canada, and many other countries. For more information about the GRE visit their website at [http://www.gre.org](http://www.gre.org).

**Central Application Service for Physician Assistants (CASPA)**

CASPA is a centralized service which allows applicants to use a single application process to apply to multiple PA programs. Not all schools participate in CASPA. It is the responsibility of the applicant to perform which schools participate and send individual applications to those schools that do not participate. For more information about CASPA, visit their website at: [https://portal.caspaonline.org/](https://portal.caspaonline.org/)

**Pre-PA Advising**

Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career as a physician assistant to provide additional support in compilation of a strong portfolio for admission consideration.
Podiatry

Things to Consider:
1. Formal education and training requires 4 years of podiatry school to receive the Doctor of Podiatric Medicine (D.P.M.) degree
2. Many podiatrists specialize in areas such as sports medicine or pediatrics
3. Excellent job opportunities are expected

Work Description
Podiatrists are the primary providers of foot and ankle care and perform many of the same duties as physicians including performing surgery. Approximately 92% of podiatrists opt to complete two to four year residency programs to receive advanced medical training including an option to become board certified in surgery. The demand for podiatric medical services is expanding related to the increased societal emphasis of physical fitness leading to injuries related to recreational activities. Foot health deteriorates with many chronic illnesses requiring specialty treatment for patients with diabetes and atherosclerosis. Almost all podiatrists work in private practice.

Basic Pre-Podiatry Curriculum
The following courses are required by most podiatry programs in the United States as the minimum background needed for acceptance. Applicants seeking admission to a D.P.M. program should contact the schools they are interested in attending for information on specific prerequisites and admission requirements. Students may also refer to the American Association of Colleges of Podiatric Medicine (AACPM) website at http://www.aacpm.org for specific requirements at the programs in which they are interested.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>2 courses with lab (BIO 2105 &amp; BIO 2106)</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>2 courses with lab (CHM 2211/2201, 2212/2202)</td>
</tr>
<tr>
<td>Physics</td>
<td>2 courses with lab (PHY 1100/1101, 1102/1103 or 2410/2411 &amp; 2412/2413 or 2414/2415); <strong>NOTE</strong> at least one semester of college level calculus is required to take Physics at Villanova</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1 course depending on the school (MAT 1312 or MAT 1500 recommended)</td>
</tr>
<tr>
<td>Statistics</td>
<td>1 course (may be a MAT course or a course within your major such as biostatistics, psychology or business based statistics)</td>
</tr>
</tbody>
</table>

Major selection
Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses and taken the application exam (MCAT or in some cases the DAT). Application is highly competitive and therefore students should have a strong overall GPA (>3.0) and perform well (“C” or better) in pre-requisite courses to be in consideration.

Applying to Programs in Podiatry
Most podiatry schools participate in the American Association of Colleges of Podiatric Medicine Application Service (AACPMAS) which allows students to use a single web-based application and one set of materials to apply to multiple programs. Go to https://aacpmas.liaisoncas.com for more information.
**Pre-Podiatry Advising**

Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in podiatry to provide additional support in compilation of a strong portfolio for admission consideration. Most podiatry programs want applicants to obtain a committee letter as a critical component of their application portfolio. This “committee” letter is most likely an element in the application materials for students applying as a rising senior or a recent graduate from an undergraduate institution. It serves as an institutional letter of support placing each applicant within the context of the broader pool of candidates from that institution. It provides critical information about the applicant’s disciplinary record and places their academic and personal competencies within context thus further enhancing the dimensions of each candidate for interview and admission consideration.

Information sessions about the committee letter process at Villanova are hosted by the Director of HPA each fall semester. Submission of mandatory materials for committee review starts in late fall. Committee letter appointments begin in early spring semester. ANY student who wants access to the committee letter must meet the mandatory timeline for the process. If a student contacts the HPA Office after the deadline for submission of the pre-committee letter meeting materials, they will need to wait until the following year to start the process. Students are advised to move along the timeline that best suits their desired application and admission process and therefore should monitor critical communications from the HPA Office in early fall semester of their junior year so as to stay on track for a committee letter meeting.
Public Health

Things to Consider:
1. Formal education and training requires 2 - 4 years of graduate education with the MPH as the typical credential in this field
2. Licensure and certification requirements will vary by field
3. Public Health is a multi-disciplinary field involving many different types of professionals; specialty areas include biostatistics, health services administration, epidemiology, environmental health, international public health, nutrition, maternal and child health, and occupational health and safety
4. Excellent job opportunities are expected in light of increasing threats to human health

Work Description
Public Health is a diverse area that encompasses professionals who work to improve community health, identify and work to control or eliminate health threats, and study patterns of disease spread. The field is extremely varied with respect to career focus and therefore any pre-Public Health student will need to investigate the range of options provided through study at Programs of Public Health and Schools of Public Health. What is most important to understand about careers in this area is that they are focused on community or population level problems/well-being as opposed to physicians who are most typically focused on the well-being of individuals. Visit the website www.whatispublichealth.org for more information on career options within this field.

Pre-Public Health Preparation
There is no specific curriculum to follow as a pre-Public Health student. Application does not require science lab intensive study at the undergraduate level. It is not necessary to choose a particular major however, if your interest is in biostatistics it is advised that a math or statistics minor or, completion of coursework as necessary to take Biostatistics (BIO 3105), to demonstrate aptitude in statistics. If you are interested in health services administration, a business or political science minor or major may be helpful. For those who may want to pursue environmental health, a biology minor/major is recommended with Environment and Human Health (BIO 3661) as an elective. For many areas within public health a social science background is helpful. If you are interested in epidemiology, consider taking the Epidemiology course (NUR 7084). If you have an international health interest, consider the Global Health Minor offered through the Center for Global and Public Health within the College of Nursing.

GRE
Most schools require students to take the Graduate Record Examination (GRE) which is a standardized test to gauge a student’s ability to do well in a graduate program. The GRE is given year-round at computer-based test centers in the U.S., Canada, and many other countries. Appointments to take the test are scheduled on a first-come, first-served basis. For more information about the GRE visit their website at http://www.gre.org. Some schools will accept the MCAT, DAT, or LSAT as an option.

Applying to Programs in Public Health
Most schools participate in the Schools of Public Health Application Service (SOPHAS) which allows students to use a single web-based application and one set of materials to apply to multiple programs. Go to http://www.sophas.org for more information.
Pre-Public Health Advising
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in public health to provide additional support in compilation of a strong portfolio for admission consideration.
Speech-Language Pathology

Things to Consider:
1. Formal education includes 2-3 years of Speech Language graduate school to receive the Master’s degree required for licensure and practice in most states in the U.S.
2. Speech-language pathologists work with people who cannot produce speech sounds, those with cognitive communication impairments, and those with difficulty swallowing
3. Excellent job opportunities are expected

Work Description
Speech-language pathologists evaluate, diagnose, treat and assist individuals of all ages with speech and swallowing disorders. Communication disorders include the inability to produce proper sounds, struggles with stuttering, problems with speech fluency, a desire to modify an accent or memory and other cognitive disorders that affect control of the muscles of vocalization. Approximately 50% of speech-language pathologists work in schools, 16% in general outpatient facilities, 11% in hospitals and 4% in nursing homes.

Basic Pre-SLP Curriculum
The basic course requirements for admission to SLP graduate programs are very specific and vary by program. For students who do not have undergraduate degrees in Speech and Hearing Sciences or Communication Sciences and Disorders (CSD), graduate programs determine (often on a case-by-case basis) what additional pre-requisites must be met for admission. Some programs require an undergraduate CSD degree. Villanova students interested in SLP should explore programs using the EdFind website http://www.asha.org/edfind/search.aspx of the American Speech-Language-Hearing Association (ASHA). If you receive a Bachelor’s degree from VU you may need to complete a glide program (~ 1 year) in which you can complete the mandated pre-requisite courses for entry to graduate programs in SLP. This coursework may be integrated into your graduate program, taken online before starting the program, or transferred from another institution. Students should consult with the graduate program director at the schools they are applying to, in order to determine the specific requirements for each program.

Considering the nature of CSD degree coursework and that of the graduate SLP degree, these courses are recommended as preparation for the SLP pathway while you are an undergraduate at VU. Some courses may fulfill pre-requisites needed for graduate school, depending on the program (relevant topic areas are indicated below for courses on speech and language):

<table>
<thead>
<tr>
<th>Subject</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Science</td>
<td>1 course (CGS 5910 [Language Processes]—psycholinguistics; language development; neurobiology of language)</td>
</tr>
<tr>
<td>MSE</td>
<td>1 course with lab (MSE 2701 [Sounds of Human Language]—acoustics; speech science; phonetics; Note: B.S. students will need permission of the instructor to enroll in this course)</td>
</tr>
<tr>
<td>Linguistics</td>
<td>1 course (RLL 4160 [Linguistics as a Science]—not currently offered)</td>
</tr>
<tr>
<td>Biology</td>
<td>2 courses with lab (BIO 2105 &amp; BIO 2106)</td>
</tr>
<tr>
<td>Anat &amp; Physiology</td>
<td>2 courses with lab (BIO 1205 &amp; BIO 1206 or BIO 3155 &amp; BIO 3055)</td>
</tr>
<tr>
<td>General Chemistry*</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Psychology</td>
<td>3 courses (PSY 1000 [General Psychology]; PSY 2200 [Developmental Psychology]; PSY 3300 [Perception]—hearing science; audition)</td>
</tr>
</tbody>
</table>
Statistics 1 course (may be a MAT course or a course within your major such as biostatistics, psychology or business based statistics)

* Most programs require 1-2 courses in the physical sciences, which also includes Physics.

**Major selection**
Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses and taken the application exam (GRE) if required. Application is highly competitive and therefore students should have a strong overall GPA (>3.0) and perform well (“C” or better) in pre-requisite courses to be in consideration.

**GRE**
Most schools require students to take the Graduate Record Examination (GRE) which is a standardized test to gauge a student’s ability to do well in a graduate program. The GRE is given year-round at computer-based test centers in the U.S., Canada, and many other countries. Appointments to take the test are scheduled on a first-come, first-served basis. For more information about the GRE visit their website at [http://www.gre.org](http://www.gre.org)

**Applying to Programs in Speech-Language Pathology**
Most schools participate in the Communication Sciences Disorders Centralized Application Service (CSDCAS) which allows students to use a single web-based application and one set of materials to apply to multiple programs. Go to [http://www.capcsd.org/csdcas/](http://www.capcsd.org/csdcas/) for more information.

**Pre-SLP Advising**
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in speech-language pathology to provide additional support in compilation of a strong portfolio for admission consideration.
Veterinary Medicine

Things to Consider:
1. Formal education requires 4 years of veterinary school for the D.V.M. or V.M.D. (unique to U. Penn) degree
2. Veterinarians should not only love working with animals but also their owners
3. Most veterinarians work in private practice; many work long hours
4. Employment opportunities are expected to be excellent

Work Description
Veterinarians diagnose and treat diseases and dysfunctions of animals including pets, livestock, exotic animals (zoos), racetrack animals, and laboratory animals. They examine, vaccinate, and medicate animals and treat wounds, set fractures, perform surgeries, and advise owners/pet keepers about animal feeding, behavior, and breeding. Approximately 77% of veterinarians work in private practice where the focus is on dogs and cats, with lesser emphasis on reptiles, birds, rodents, and other animals that are common pets. Approximately 16% work in mixed practices where in addition to common pets they treat livestock and some wild animals. A small number of veterinarians focus on equine medicine. Some veterinarians are involved in food safety and inspection related to livestock and other animals used for food production (chickens and other birds). All states and the District of Columbia require that veterinarians be licensed including passing the North American Veterinary Licensing Exam.

Pre-Veterinarian Program Requirements
Veterinary schools have different requirements. Students may consult with the Veterinary Medical School Admissions Requirements in the United States and Canada (VMSAR) book for updated information on specific requirements for the schools to which they plan to apply. Go to aavmc.org for more information.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>2 courses with lab (BIO 2105, 2106)</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>2 courses with lab (CHM 1151/1103, 1152/1104)</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>2 courses with lab (CHM 2211/2201, 2212/2202)</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>1 course (CHM 4611 or CHM 4621); Note that the CHM 4611 is a Survey course that covers a breadth of Biochemistry content while CHM 4621 (Biochem I) will cover a subset of topics in more depth than the Survey course; either course requires Organic I and II as pre-requisites</td>
</tr>
<tr>
<td>Physics</td>
<td>2 courses with lab (PHY 1100/1101, 1102/1103 or 2410/2411 &amp; 2412/2413 or 2414/2415); <strong>NOTE</strong> at least one semester of college level calculus is required to take Physics at Villanova</td>
</tr>
<tr>
<td>English</td>
<td>2 courses (at least one ENG course, an additional compositional writing course from another topic area such as ACS 1000 may be an acceptable substitute for the second English requirement at most schools)</td>
</tr>
<tr>
<td>Mathematics</td>
<td>2 courses (including one semester of calculus MAT 1312 or MAT 1500; statistics is recommended as the second course)</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>2 courses</td>
</tr>
</tbody>
</table>

Additional courses that may be required at some programs include **Genetics** (BIO 3351) and **Microbiology** (BIO 3595). Admission to veterinary schools is highly competitive. Successful students should have a
cumulative GPA of 3.5 or above, competitive GRE scores (60th percentile or above), a wide variety of animal experience in both large and small animals, and 400-600 hours of work experience in a veterinary practice or animal shelter.

**Major selection**
Any undergraduate major is acceptable provided that you have completed the required pre-requisite courses and have the appropriate field experience. Considering the number of science pre-requisite courses, pursuit of a science major is strongly recommended.

**Standardized Tests**
Most veterinary schools require students to take at least one standardized test. The majority of schools require the Graduate Record Examination (GRE); students need to contact the schools to find out which tests are required for admission. For more information about the GRE, visit their website at: [http://www.gre.org](http://www.gre.org)

**The Veterinary Medical College Application Service (VMCAS)**
VMCAS is a centralized service which allows applicants to use a single application process to apply to multiple veterinary programs. Three of the veterinarian schools do not participate in VMCAS. It is the responsibility of the applicant to find out which schools participate and send individual applications to those that do not participate. For more information about VMCAS, visit their website at: [http://www.aavmc.org/](http://www.aavmc.org/)

**Pre-Veterinary Advising**
Students must regularly meet with their academic advisor in the major and are also encouraged to meet with a Health Professions Advisor (HPA) as they move forward with plans to pursue a career in veterinary medicine. Some veterinary programs want applicants to obtain a committee letter as a critical component of their application portfolio. This “committee” letter is most likely an element in the application materials for students applying as a rising senior or a recent graduate from an undergraduate institution. It serves as an institutional letter of support placing each applicant within the context of the broader pool of candidates from that institution. It provides critical information about the applicant’s disciplinary record and places their academic and personal competencies within context thus further enhancing the dimensions of each candidate for interview and admission consideration.

Information sessions about the committee letter process at Villanova are hosted by the Director of HPA each fall semester. Submission of mandatory materials for committee review starts in late fall. Committee letter appointments begin in early spring semester. ANY student who wants access to the committee letter must meet the mandatory timeline for the process. If a student contacts the HPA Office after the deadline for submission of the pre-committee letter meeting materials, they will need to wait until the following year to start the process. Students are advised to move along the timeline that best suits their desired application and admission process and therefore should monitor critical communications from the HPA Office in early fall semester of their junior year so as to stay on track for a committee letter meeting.
Building a strong portfolio as a pre-health student

Successful applicants for a health professional graduate program are those who have built a strong portfolio of experiences that promote maturity and cultural competency as a future healthcare provider. Professional schools now emphasize maturity and experience as essential for the development of critical inter- and intra- personal competencies for the successful professional school candidate.

Inter-personal competencies are those attributes that demonstrate altruism and readiness to engage in robust human contact with diverse individuals. As outlined on the AAMC website (https://www.aamc.org/initiatives/admissionsinitiative/competencies/), these are some important core inter-personal competencies:
- Service orientation
- Social skills
- Cultural competence
- Commitment to teamwork
- Oral communication skills

Intra-personal competencies are attributes that reflect one’s integrity and moral character and include:
- Ethical responsibility to self and others
- Reliability and dependability
- Resilience and adaptability
- Capacity for improvement

In order to build evidence of these competencies, students must engage in extra-curricular activities that place one in contact with people different from themselves and their peers, pursue commitments that involve teamwork and the potential for leadership opportunities, and a willingness to challenge themselves to build confidence in speaking both in one-on-one interactions and larger group settings. Interactions in and out of the classroom create connections and relationships that lay the foundation for strong letters of recommendation from faculty, club advisors, and work supervisors from whom you will eventually seek a letter of support as an applicant to professional school. It’s not enough to be quietly brilliant. Holistic application review now focuses upon the full resume portfolio to identify the right candidates for healthcare training and clinical practice. Villanova provides many opportunities for personal growth, community engagement, and professional development.

Student-run Campus Organizations

There are more than 150 student-run organizations on campus providing a wide array of options for pre-health students. These include pre-health organizations that students may join as early as the first few weeks of the freshman year:
- Pre-Medical Club
- Pre-Dental Student Association
- Pre-Veterinary Club
- Pre-Optometry Club
- Pre-Physician Assistant Club
- SPOTS (Speech, Physical, and Occupational Therapy Society)
- MAPS (Minority Association of Pre-Medical Students)
- Scientista Foundation
Some of these organizations have peer mentoring programs that will connect freshman and sophomore students with upperclassmen. All clubs run programming that will build understanding of the profession, provide networking with alumni and other regional professionals, provide options for shadowing, volunteer, or service experiences.

In addition to pre-professional student organizations, there are a plethora of *culturally focused clubs* that are open to all interested students including:

- African and Caribbean Villanovans (ACV)
- Portuguese Club
- Spanish Club
- Hispanic Society
- Vietnamese Students Association
- Villanova Japanese Club
- Villanova University Korean Students Association
- Black Cultural Society
- Irish Culture Society
- Middle Eastern Students Association
- Chinese Students and Scholars Association
- South Asian Multicultural Organized Student Association (SAMOSA)

If you would like to get involved in *organizations that provide off-campus service experiences*, especially with culturally diverse individuals, consider these options:

- Back on my Feet
- RUIBAL (must join as a freshman)
- Rays of Sunshine
- Villanova invisible Children Club
- STAND – Anti-Genocide Coalition
- Villanovans against Domestic Abuse
- Habitat for Humanity
- Student-run Emergency Housing Unit of Philadelphia (SREUHP)
- FIMRC (Foundation for International Medical Relief of Children)

If you are interested in obtaining a position in *organizations that run campus tours and train Villanovans as ambassadors* for campus visitors, consider these options:

- Blue Key Society
- New Student Orientation Program
- Villanova Ambassadors

These are *organizations focused on social issues* and raise awareness through both on- and off-campus activities:

- American Sign Language Club
- Food Recovery Network
- LeVeL
- NOVAdance
- St. Thomas of Villanova Day of Service
- Villanova ALS Awareness Club
- Villanova Community Gardens
- Villanova Students against Breast Cancer
- Oasis (LGBTQ outreach)
- POWER
- Hunger and Homelessness Awareness Week
- Martin Luther King Jr. Day of Service
- Relay for Life
- Special Olympics Committee
- Villanova Buddies
- Villanova Sexual Violence Awareness
- Gay-Straight Coalition
For more information on these organizations and many others (dance clubs, social clubs focused on common interests, discipline-specific pursuits related to business, engineering, nursing, and other majors, honor societies, service fraternities, etc.) visit the Office of Student Involvement website at [https://vugroups.collegiatelink.net/organizations](https://vugroups.collegiatelink.net/organizations), the Peace and Justice Program website at [http://www1.villanova.edu/villanova/studentlife/lifeatvu/organizations/peacejustice.html](http://www1.villanova.edu/villanova/studentlife/lifeatvu/organizations/peacejustice.html), and the Campus Ministry website at [https://www1.villanova.edu/villanova/mission/campusministry/service/volunteer.html](https://www1.villanova.edu/villanova/mission/campusministry/service/volunteer.html).

Make connections with club officers and organization representatives during the fall campus activities fair held in Connelly Center. Find an organization or two that speaks to your interests and through which your commitment will build the inter- and intra- personal competencies that professional schools seek in applicants accepted to their programs. The longer your commitment, the more likely you will be to step up to serve in leadership roles. If you have an idea for a new organization and can build a population of interested peers, the Office for Student Involvement is very willing to establish a new club!

**Making Use of HPA Office Resources**

Don’t miss out! To be a strong candidate requires a commitment of time and planning. Procrastination is not a strategy for success as a future applicant for competitive graduate programs in the health professions. The most successful applicants are those with evidence of academic and cultural readiness for the clinical experience and passion for their future profession. This kind of portfolio can only be built over time through participation and real-world engagements.

**HPA Office Semester Information Sessions:** There are many events throughout the year, some sponsored by the Health Professions Advising Office, some sponsored by one of the many student clubs (Pre-Medical Club, Pre-Physician Assistant Club, Pre-Optometry Club, Pre-Dental Student Association, AED Premedical Honor Society, MAPS, SPOTS, Pre-Vet Club), and some sponsored by groups with overlapping interest, such as the Bridge Society career networking events sponsored by the College of Liberal Arts and Sciences. The HPA Office runs a speakers’ series that includes admissions officers from professional schools, as well as information sessions on such pertinent topics as interviewing, writing the personal statement, assessing readiness to apply, and gathering letters of recommendation. Student clubs tap into our alumni database to bring professionals to campus to build understanding of professions and pathways and to share their wisdom with current students. Clubs also sponsor activities to build student exposure to enrichment experience options such as study abroad and research. These events are advertised through the announcements page on the HPA Blackboard site. Many are also advertised in the campus e-newsletter, “The Wire,” on monitors in buildings, and through social media (HPA Office Facebook and Twitter accounts).

**Alumni Shadowing Contact Compendium:** The HPA Office has a shadow and alumni contact resource collection that is available every day the office is open for student reference. The compendium contains information for more than 170 alumni professionals in the Philadelphia region and beyond who are open for contact by current students for information about their professional area, professional school attended and more (such as armed services scholarships and off-shore professional school experiences). Many of these alumni are open to taking students for shadowing.
**The HPA Blackboard site:** This site is the central information resource center for pre-health students and alumni. In addition to essential handouts and links to explore a full range of health professions (and their application requirements), it is the place where students sign-up for a scheduled appointment with a Health Professions Advisor, and contains information about local organizations and locations for volunteer work as well as domestic and international volunteer programs that may be pursued over summer and other extended academic breaks. Keep scrolling down the content page to review the full inventory of available information and resources!

**HPA Office Newsletter:** The *Care Chronicles* newsletter produced once a semester by the HPA Office features pre-health student club activities, campus events, alumni profiles, and current student special experience stories that are intended to build exposure to the plethora of opportunities available to Villanova pre-health students.
MCAT Content and Knowledge Base for Medical School Admission

I. **MCAT basics:**
The exam includes the following major sections (overview explanations of content in each section are included below and can be found in the *Official MCAT Guide* that can be accessed via the AAMC website at [https://www.aamc.org/students/applying/mcat](https://www.aamc.org/students/applying/mcat).

1. Biological and Biochemical Foundations of Living Systems
2. Chemical and Physical Foundations of Biological Systems
3. Psychological, Social and Biological Foundations of Behavior
4. Critical Analysis and Reasoning Skills

*Sections (1) and (2)* assess knowledge of introductory biology, general and organic chemistry and physics concepts. Question content will target basic research methodologies and statistical measures and emphasize critical reasoning and problem solving therefore students must be prepared to manage knowledge application questions. You will need to have a strong foundation in hypothesis driven investigation through research-designated laboratory courses or independent research experiences.

*Section (3)* tests concepts in psychology and as well as bridge topics linking the social sciences and biology as necessary to understand complex behavioral and socio-cultural aspects of health. As in sections (1) and (2), research methods and statistics and critical reasoning skills through knowledge application will be emphasized.

*Section (4)* focuses on analysis and reasoning skills through critical passage reading. Questions will examine how well the student can extrapolate, comprehend, and apply information. However, passage content will also include ethical, philosophical, cross-cultural, and public health issues and therefore cover a wide range of areas within the social sciences and humanities disciplines.

II. **MCAT Foundational Concepts**

**Section 1: Biological and Biochemical Foundations of Living Systems**
*Foundational Concept 1:* Biomolecules have unique properties that determine how they contribute to the structure and function of cells and how they participate in the processes necessary to maintain life.

The content categories for this foundational concept include:
- 1A. Structure and function of proteins and their constituent amino acids
- 1B. Transmission of genetic information from the gene to the protein
- 1C. Transmission of heritable information from generation to generation and the processes that increase genetic diversity
- 1D. Principles of bioenergetics and fuel molecule metabolism

*Foundational Concept 2:* Highly-organized assemblies of molecules, cells, and organs interact to carry out the functions of living organisms.

The content categories for this foundational concept include:
- 2A. Assemblies of molecules, cells, and groups of cells within multicellular organisms
- 2B. Structure, growth, physiology, and genetics of prokaryotes and viruses
- 2C. Processes of cell division, differentiation, and specialization
Foundational Concept 3: Complex systems of tissues and organs sense the internal and external environments of multicellular organisms and, through integrated functioning, maintain a stable internal environment within an ever-changing external environment.

The content categories for this foundational concept include:
3A. Structure and functions of the nervous and endocrine systems and ways in which these systems coordinate the organ systems
3B. Structure and integrative functions of the main organ systems

Section 2: Chemical and Physical Foundations of Biological Systems

Foundational Concept 4: Complex living organisms transport materials, sense their environment, process signals, and respond to changes using processes understood in terms of physical principles.

The content categories for this foundational concept include:
4A. Translational motion, forces, work, energy, and equilibrium in living systems
4B. Importance of fluids for the circulation of blood, gas movement, and gas exchange
4C. Electrochemistry and electrical circuits and their elements
4D. How light and sound interact with matter
4E. Atoms, nuclear decay, electronic structure, and atomic chemical behavior

Foundational Concept 5: The principles that govern chemical interactions and reactions form the basis for a broader understanding of the molecular dynamics of living systems.

The content categories for this foundational concept include:
5A. Unique nature of water and its solutions
5B. Nature of molecules and intermolecular interactions
5C. Separation and purification methods
5D. Structure, function, and reactivity of biologically-relevant molecules
5E. Principles of chemical thermodynamics and kinetics

Section 3: Psychological, Social and Biological Foundations of Behavior

Foundational Concept 6: Biological, psychological, and socio-cultural factors influence the ways that individuals perceive, think about, and react to the world.

The content categories for this foundational concept include:
6A. Sensing the environment
6B. Making sense of the environment
6C. Responding to the world

Foundational Concept 7: Biological, psychological, and socio-cultural factors influence behavior and behavior change.

The content categories for this foundational concept include:
7A. Individual influences on behavior
7B. Social processes that influence human behavior
7C. Attitude and behavior change

Foundational Concept 8: Biological, psychological, and socio-cultural factors influence how we think about ourselves and others.

The content categories for this foundational concept include:
8A. Self-identity
8B. Social thinking
8C. Social interactions

Foundational Concept 9: Social and cultural differences influence well-being.

The content categories for this foundational concept include:
9A. Understanding social structure
9B. Demographic characteristics and processes

Foundational Concept 10: Social stratification affects access to resources and well-being.

The content category for this foundational concept includes:
10A. Social inequality
Section 4: Scientific Inquiry and Reasoning Skills
Four scientific inquiry and reasoning skills are tested on the natural, social and behavioral sciences sections. They are:

**Skill 1: Knowledge of Scientific Concepts and Principles**
Skill 1 focuses on your ability to recognize, recall, define, relate and apply fundamental concepts and principles specified in the natural and social sciences in order to derive answers — something natural and social scientists do every day in their work. It is through a solid understanding of the scientific concepts and principles that explain natural phenomena, and the ability to recognize conditions of application that answers are found.

Your ability to use mathematics and data displays to find the answers while in the process of working with scientific concepts and principles is also assessed. Demonstrating these abilities may require the use and interpretation of information provided in a variety of forms, such as words, pictures, graphs, tables, formulas, and diagrams.

**Skill 2: Scientific Reasoning and Evidence-based Problem Solving**
Natural and social scientists use scientific principles, models, and theories to describe and explain natural phenomena, make predictions about those phenomena, and develop new research questions. Scientific principles, models, and theories can come in variety of forms including words, pictures, graphs, tables, formulas, and diagrams.

Scientists also use knowledge of principles, models, and theories to reason about interconnections among natural phenomena, evaluate arguments and explanations of causes and consequences, and draw evidence-based conclusions. They also use integrated theories in combination with evidence to solve problems and broaden scientific knowledge and understanding.

Evidence-based reasoning is used by scientists to test and refine their theories and models. It is important that they recognize the importance of considering multiple scientific perspectives, arguments, and sources of evidence when working to solve a problem. Before drawing a conclusion, scientists identify key assumptions and evaluate evidence relative to their claim. This is considered a critical part of the validation process.

**Skill 3: Reasoning about the Design and Execution of Research**
Scientists differ in many ways — from the phenomena they study to how they do their work. However, all scientists have one thing in common: they all engage in the design and execution of research.

Natural and social scientists test scientific questions using quantitative and qualitative research methods. This means that both experimental and non-experimental designs are drawn upon to gather data and test hypotheses. Scientists develop research designs in order to define the variables they need to examine. When designing and conducting research, scientists adhere to ethical guidelines designed to protect the rights of research participants, the integrity of the work, and the interests of research consumers.

Data collection is done in ways that allow scientists to measure associations between variables, test causal relationships between variables, or make predictions about them. Sampling is one method of data collection in which scientists sometimes engage.

Sampling is the act of selecting a subset of individual units from a target population, and using information gathered about the subset to draw conclusions about the target population as a whole.

**Skill 4: Data-based and Statistical Reasoning**
Natural and social scientists use data-based and statistical reasoning to: describe and explain phenomena in the natural world, explain relationships between variables, test hypotheses, and solve problems. Data-based reasoning allows for an understanding of interconnections among natural phenomena, evaluation of evidence...
for scientific theories, drawing evidence-based conclusions, and refinement or extension of existing scientific knowledge.

Scientists describe and analyze the research data they collect using a variety of descriptive statistics. These may include frequency distributions, measures of central tendency and dispersion, and graphical representations of the relationships among variables, such as scatter plots and measures of association.

Inferential statistics are used to test whether existing data patterns from research samples generalize to named populations. Scientists use significance tests to judge the certainty of inferences about differences between samples and populations.

Natural and social scientists must be able to read and interpret results using tables, graphs, and charts. This is a necessary skill that allows for conclusions to be reached and arguments to be made based on the evidence.

III. General Curricular Concerns and Course Planning for Pre-Medical Students

Medical schools are evaluating academic pre-requisites and many are adjusting their expectations moving away from standard course check lists. Some schools however, are still holding to their long standing science lab course checklists. As such medical school applicants are advised to explore individual school websites to ascertain their approach to assessing academic preparedness for admission and adjust their course plan so their transcript will reflect the proper competencies to qualify for admission to the schools in which they are most interested.

This basic guide is focused solely on advisement for course selection to prepare for the MCAT exam. It does not provide an exact course listing that will suffice for this purpose or one that would meet academic competencies that will eventually be the standard for admission to all medical schools. The best advice is to review the MCAT foundational concepts, read the *Official MCAT Guide* and select a series of courses that will provide content coverage for each foundational concept. This will be the best approach to prepare for application until a more defined set of criteria are provided as to “academic competencies” and what the actual transcript should reflect to be on track for admission.

*NOTE that this is a general guide for making curricular decisions and not an absolute standard for all students moving along the pre-medical path.* There are other options not profiled here based upon AP credit assessment as well as plans for summer classes that can have an impact on the timing of course additions to the schedule as early as freshmen year. Transfer students, students who change majors, and students who decide late to pursue the pre-medical path will face a more difficult process to make everything fit to stay on the typical timeline. This means that such students are more likely to face an extended timeline which guarantees them at least one gap year between completion of college and transition to medical school.

**Biology:**

The new exam covers the same basic biology-centered material as the previous exam. However additional depth has been added in the area of cell/molecular biology/genetics as well as organ system physiology including detailed information on the nervous and endocrine systems related to their regulatory roles in function of the human organism (biological and psychological). Therefore in addition to the General Biology course (parts I and II), that has long been the standard for biology content preparation, pre-medical students are encouraged to add depth in one or more of the following
areas to increase exposure to core content: cell/molecular biology, genetics, microbiology, physiology/endocrinology. Please refer to the Table at the end of this document to see how specific courses map to the various MCAT foundational concepts.

**Most basic recommendation** (*i.e.* minimal recommended course additions for content preparation): General Biology I and II (BIO 2105, 2106) plus at least one additional course from the following options: Animal Physiology (BIO 3055), Genetics (BIO 3351), Cell Biology (BIO 4205), Molecular Biology (BIO 4505), Comparative Endocrinology (BIO 4251) or Human Anatomy and Physiology I and II (BIO 1205, 1206).

**Chemistry:**
The new exam covers biochemistry as a major content area in addition to General (Inorganic) and Organic Chemistry. At Villanova, students will be required to complete two semesters of General Chemistry and two semesters of Organic Chemistry prior to enrolling in the Survey of Biochemistry course (CHM 4611) which is the course that will provide the most breadth of topics (*NOTE* that students may opt to take the second semester of Organic Chemistry concurrent with Survey of Biochemistry if necessary). Students may also opt to take Biochemistry I (CHM 4621) as an option. This course requires Organic Chemistry I and II as pre-requisites however, it may not cover the same breadth of content as the Survey of Biochemistry course. If a student expects to take the MCAT exam by the end of their junior year (or the following summer), they will need to add General Chemistry to their schedules as a freshman in order to stay on track to complete Biochemistry prior to the MCAT exam date. If students opt to take Organic Chemistry II concurrent with Biochemistry, then they do not have to add General Chemistry to the freshmen year schedule, they could take Organic Chemistry II and Biochemistry in the same semester in the junior year.

**Most basic recommendation** (*i.e.* minimal recommended course additions for content preparation): General Chemistry I and II with labs (CHM 1151/1103, 1152/1104), Organic Chemistry I and II with labs (CHM 2211/2201, 2212/2202) plus at least one semester of Biochemistry (CHM 4611 Survey of Biochemistry or CHM 4621: Biochemistry I).

**Physics:**
Students are encouraged to complete two semesters of General Physics so as to cover a breadth of topics that may be included in the exam. This is a better option than to take two semesters of University Physics since those two courses will not cover the same breadth of Physics content. If your major requires that you take all three University Physics courses (Thermodynamics, Electricity and Magnetism, and Mechanics) then that depth of material will meet the expected topic coverage. Please refer to the Table at the end of this document to see how specific courses map to the various MCAT foundational concepts.

**Most basic recommendation** (*i.e.* minimal recommended course additions for content preparation): General Physics I and II with labs (PHY 1100/1101, 1102/1103).

**Mathematics:**
The new exam will cover basic statistical principles. Therefore students should consider taking a basic Math Statistics course to meet content expectations however, students may also obtain basic (and
applied) statistics knowledge by taking required or elective courses within particular majors. Such is the

case with Psychology in which all majors are required to complete an applied statistics course or

Biology where majors (and others who qualify) may take Biostatistics and Experimental Design as an

elective course.

It is important for all pre-medical students to understand that if they did not receive AP credit for at

least one calculus course they will have to take one semester (minimum) of calculus in order to be

able to register for Physics. Typical calculus courses include MAT 1312 or MAT 1500 but others

(MAT 1320, MAT 1400) will suffice. You should check the Physics course listings to be sure that you

meet the math requirement based upon the specific calculus course that you have completed.

Most basic recommendation (i.e. minimal recommended course additions for content preparation):

Calculus I (MAT 1312, MAT 1320, Mat 1313, or MAT 1500) plus one statistics course (MAT 1430,

MAT 4310) or an applied statistics course within a specific major (i.e. Psychology, Biology, Business).

Social Sciences and Humanities:

Pre-medical students should add a minimum of two courses, one in Psychology and one in Sociology,
in order to be on track to take the exam. Completion of ONLY the introductory courses in each of these
content areas may not be sufficient to have the breadth and depth appropriate to the exam. Students may
want to consider adding additional courses to be well prepared for the exam. Please refer to the Table at
the end of this document to see how specific courses map to the various MCAT foundational concepts.

Courses offered through the Core Curriculum including the Ethics 2050 course as well as advanced
ethics courses and a number of offerings in Peace and Justice will be beneficial as background
preparation for the exam. This will provide depth for the social science portion of the exam and context
for the Scientific Inquiry and Reasoning Skills section where application across disciplines will be
necessary in order to tackle complex problems. Pre-medical students are encouraged to add depth in
these areas by considering either the Ethics concentration/minor or the PJ concentration.

Most basic recommendation (i.e. minimal recommended course additions for content preparation):

General Psychology (PSY 1000) and Introductory Sociology (SOC 1000) plus at least one additional
course (more is better) with strong recommendations toward Ethics (ETH 2050), Social Psychology
(PSY 3600), Cognitive Psychology (PSY 4500), Cultural Anthropology (SOC 2100), Social Inequality
(SOC 3900), Medical Sociology (SOC 3400). There are many options in this topic area so please
consult the Table to identify options that will provide depth and breadth in the social sciences and
humanities.

Pages 45 and 46 include a listing of Villanova courses that have been designated to
cover material relevant for each foundational concept in the MCAT exam. Shaded
course titles are options that will provide the most breadth of coverage for that concept.
### Shaded course titles are options that will give broad coverage for that concept

<table>
<thead>
<tr>
<th>Concept</th>
<th>Course #</th>
<th>Course Title</th>
<th>Course #</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>BIO 2105</td>
<td>General Biology I</td>
<td>4B</td>
<td>CHM 3514</td>
</tr>
<tr>
<td>1A</td>
<td>BIO 2105</td>
<td>Cell Biology</td>
<td>4B</td>
<td>BIO 3055</td>
</tr>
<tr>
<td>1A</td>
<td>CHM 4611</td>
<td>Survey of Biochemistry</td>
<td>4B</td>
<td>BIO 1206</td>
</tr>
<tr>
<td>1A</td>
<td>CHM 4621</td>
<td>Biochemistry I</td>
<td>4C</td>
<td>PHY 1100, 1102</td>
</tr>
<tr>
<td>1B</td>
<td>BIO 2105</td>
<td>General Biology I</td>
<td>4C</td>
<td>CHM 1152</td>
</tr>
<tr>
<td>1B</td>
<td>BIO 3351</td>
<td>Genetics</td>
<td>4C</td>
<td>BIO 3055</td>
</tr>
<tr>
<td>1B</td>
<td>BIO 4505</td>
<td>Molecular Biology</td>
<td>4D</td>
<td>PHY 1100, 1102</td>
</tr>
<tr>
<td>1B</td>
<td>CHM 4611</td>
<td>Survey of Biochemistry</td>
<td>4D</td>
<td>CHM 1152</td>
</tr>
<tr>
<td>1C</td>
<td>BIO 2105</td>
<td>General Biology I</td>
<td>4E</td>
<td>CHM 1151, 1152</td>
</tr>
<tr>
<td>1C</td>
<td>BIO 3351</td>
<td>Genetics</td>
<td>4E</td>
<td>CHM 3514</td>
</tr>
<tr>
<td>1C</td>
<td>CHM 4611</td>
<td>Survey of Biochemistry</td>
<td>5A</td>
<td>CHM 1151, 1152</td>
</tr>
<tr>
<td>1C</td>
<td>CHM 4621</td>
<td>Biochemistry I</td>
<td>5A</td>
<td>CHM 3417</td>
</tr>
<tr>
<td>1D</td>
<td>BIO 2105</td>
<td>General Biology I</td>
<td>5A</td>
<td>CHM 4611</td>
</tr>
<tr>
<td>1D</td>
<td>CHM 4611</td>
<td>Survey of Biochemistry</td>
<td>5A</td>
<td>CHM 4621</td>
</tr>
<tr>
<td>1D</td>
<td>CHM 4622</td>
<td>Biochemistry II</td>
<td>5B</td>
<td>CHM 1151</td>
</tr>
<tr>
<td>2A</td>
<td>BIO 2105</td>
<td>General Biology I</td>
<td>5B</td>
<td>CHM 4611</td>
</tr>
<tr>
<td>2A</td>
<td>BIO 4205</td>
<td>Cell Biology</td>
<td>5B</td>
<td>CHM 4621</td>
</tr>
<tr>
<td>2A</td>
<td>BIO 3455</td>
<td>Histology</td>
<td>5C</td>
<td>CHM 2221, 2212</td>
</tr>
<tr>
<td>2B</td>
<td>BIO 2105</td>
<td>General Biology I</td>
<td>5C</td>
<td>CHM 4611</td>
</tr>
<tr>
<td>2B</td>
<td>BIO 3595</td>
<td>General Microbiology</td>
<td>5C</td>
<td>CHM 4621</td>
</tr>
<tr>
<td>2B</td>
<td>BIO 4105</td>
<td>Bacterial Pathogens</td>
<td>5C</td>
<td>CHM 4603</td>
</tr>
<tr>
<td>2C</td>
<td>BIO 2105</td>
<td>General Biology I and II</td>
<td>5D</td>
<td>CHM 2211, 2212</td>
</tr>
<tr>
<td>2C</td>
<td>BIO 4265</td>
<td>Developmental Biology</td>
<td>5D</td>
<td>CHM 4611</td>
</tr>
<tr>
<td>2C</td>
<td>BIO 4205</td>
<td>Cell Biology</td>
<td>5D</td>
<td>CHM 4611</td>
</tr>
<tr>
<td>2C</td>
<td>BIO 4505</td>
<td>Molecular Biology</td>
<td>5E</td>
<td>CHM 4621</td>
</tr>
<tr>
<td>3A</td>
<td>BIO 2106</td>
<td>General Biology II</td>
<td>5E</td>
<td>CHM 1151, 1152</td>
</tr>
<tr>
<td>3A</td>
<td>BIO 3055</td>
<td>Animal Physiology</td>
<td>5E</td>
<td>CHM 2211, 2212</td>
</tr>
<tr>
<td>3A</td>
<td>BIO 4605</td>
<td>Neurobiology</td>
<td>5E</td>
<td>CHM 4611</td>
</tr>
<tr>
<td>3A</td>
<td>BIO 4205</td>
<td>Cell Biology</td>
<td>5E</td>
<td>CHM 3417</td>
</tr>
<tr>
<td>3A</td>
<td>BIO 3155</td>
<td>Comparative Anatomy</td>
<td>5E</td>
<td>CHM 4621</td>
</tr>
<tr>
<td>3A</td>
<td>BIO 4251</td>
<td>Comparative Endocrinology</td>
<td>6A</td>
<td>BIO 2106</td>
</tr>
<tr>
<td>3A</td>
<td>BIO 3555</td>
<td>Lower Vertebrates</td>
<td>6A</td>
<td>BIO 3055</td>
</tr>
<tr>
<td>3A</td>
<td>BIO 3405</td>
<td>Higher Vertebrates</td>
<td>6A</td>
<td>BIO 3555</td>
</tr>
<tr>
<td>3A</td>
<td>BIO 1205</td>
<td>Human Anat and Phys I and II</td>
<td>6A</td>
<td>BIO 1205, 1205</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 2106</td>
<td>General Biology II</td>
<td>6A</td>
<td>BIO 4605</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 3055</td>
<td>Animal Physiology</td>
<td>6A</td>
<td>BIO 1205, 1205</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 4251</td>
<td>Comparative Endocrinology</td>
<td>6A</td>
<td>PSY 4200</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 3405</td>
<td>Higher Vertebrates</td>
<td>6A</td>
<td>PSY 3300</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 1205</td>
<td>Human Anat and Phys I and II</td>
<td>6B</td>
<td>PSY 1000</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 1205</td>
<td>Biophysical Chemistry</td>
<td>6B</td>
<td>PSY 3600</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 1205</td>
<td>Biophysical Chemistry</td>
<td>6B</td>
<td>PSY 3500</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 1205</td>
<td>General Physics I and II</td>
<td>6B</td>
<td>PSY 3200</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 1205</td>
<td>General Physics I and II</td>
<td>6B</td>
<td>PSY 4500</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 1205</td>
<td>General Physics I and II</td>
<td>6B</td>
<td>PSY 3200</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 1205</td>
<td>General Physics I and II</td>
<td>6B</td>
<td>PSY 4500</td>
</tr>
<tr>
<td>3B</td>
<td>BIO 1205</td>
<td>General Physics I and II</td>
<td>6B</td>
<td>PSY 3500</td>
</tr>
<tr>
<td>4A</td>
<td>CHM 3417</td>
<td>Biophysical Chemistry</td>
<td>6B</td>
<td>PSY 3600</td>
</tr>
<tr>
<td>4A</td>
<td>PHY 1100</td>
<td>General Physics I and II</td>
<td>6B</td>
<td>PSY 3500</td>
</tr>
<tr>
<td>4B</td>
<td>CHM 1152</td>
<td>General Chemistry II</td>
<td>6B</td>
<td>PSY 3200</td>
</tr>
<tr>
<td>4B</td>
<td>PHY 1100</td>
<td>General Physics I and II</td>
<td>6B</td>
<td>PSY 4500</td>
</tr>
<tr>
<td>Concept</td>
<td>Course #</td>
<td>Course Title</td>
<td>Concept</td>
<td>Course #</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>------------------------------------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>6C</td>
<td>PSY 1000</td>
<td>General Psychology</td>
<td>8C</td>
<td>PSY 4200</td>
</tr>
<tr>
<td>6C</td>
<td>PSY 3600</td>
<td>Social Psychology</td>
<td>8C</td>
<td>SOC 1000</td>
</tr>
<tr>
<td>6C</td>
<td>PSY 3500</td>
<td>Psychology of Personality</td>
<td>8C</td>
<td>SOC 3500</td>
</tr>
<tr>
<td>6C</td>
<td>PSY 3300</td>
<td>Perception</td>
<td>8C</td>
<td>SOC 3600</td>
</tr>
<tr>
<td>6C</td>
<td>PSY 4500</td>
<td>Cognitive Psychology</td>
<td>8C</td>
<td>SOC 3900</td>
</tr>
<tr>
<td>6C</td>
<td>PSY 4200</td>
<td>Biopsychology</td>
<td>8C</td>
<td>ETH 2050</td>
</tr>
<tr>
<td>7A</td>
<td>BIO 2106</td>
<td>General Biology II</td>
<td>8C</td>
<td>PJ 5100</td>
</tr>
<tr>
<td>7A</td>
<td>BIO 3055</td>
<td>Animal Physiology</td>
<td>9A</td>
<td>PSY 1000</td>
</tr>
<tr>
<td>7A</td>
<td>BIO 3405</td>
<td>Higher Vertebrates</td>
<td>9A</td>
<td>PSY 3600</td>
</tr>
<tr>
<td>7A</td>
<td>BIO 4605</td>
<td>Neurobiology</td>
<td>9A</td>
<td>PSY 3200</td>
</tr>
<tr>
<td>7A</td>
<td>BIO 1205</td>
<td>Human Anat and Phys I and II</td>
<td>9A</td>
<td>SOC 1000</td>
</tr>
<tr>
<td>7A</td>
<td>PSY 4200</td>
<td>Biopsychology</td>
<td>9A</td>
<td>SOC 2100</td>
</tr>
<tr>
<td>7A</td>
<td>PSY 1000</td>
<td>General Psychology</td>
<td>9A</td>
<td>SOC 2300</td>
</tr>
<tr>
<td>7A</td>
<td>PSY 3600</td>
<td>Social Psychology</td>
<td>9A</td>
<td>SOC 2600</td>
</tr>
<tr>
<td>7A</td>
<td>PSY 3500</td>
<td>Psychology of Personality</td>
<td>9A</td>
<td>SOC 2700</td>
</tr>
<tr>
<td>7A</td>
<td>PSY 3200</td>
<td>Human Development</td>
<td>9A</td>
<td>SOC 2900</td>
</tr>
<tr>
<td>7A</td>
<td>PSY 3700</td>
<td>Abnormal Psychology</td>
<td>9A</td>
<td>SOC 3750</td>
</tr>
<tr>
<td>7B</td>
<td>PSY 1000</td>
<td>General Psychology</td>
<td>9A</td>
<td>PJ 2250</td>
</tr>
<tr>
<td>7B</td>
<td>PSY 3600</td>
<td>Social Psychology</td>
<td>9A</td>
<td>PJ 2500</td>
</tr>
<tr>
<td>7B</td>
<td>PSY 3200</td>
<td>Human Development</td>
<td>9A</td>
<td>PJ 5400</td>
</tr>
<tr>
<td>7B</td>
<td>PSY 3700</td>
<td>Abnormal Psychology</td>
<td>9B</td>
<td>SOC 1000</td>
</tr>
<tr>
<td>7B</td>
<td>PSY 4500</td>
<td>Cognitive Psychology</td>
<td>9B</td>
<td>SOC 2100</td>
</tr>
<tr>
<td>7B</td>
<td>SOC 1000</td>
<td>Introductory Sociology</td>
<td>9B</td>
<td>SOC 3600</td>
</tr>
<tr>
<td>7B</td>
<td>SOC 2200</td>
<td>Sociology of Deviance</td>
<td>9B</td>
<td>SOC 3750</td>
</tr>
<tr>
<td>7B</td>
<td>SOC 2100</td>
<td>Cultural Anthropology</td>
<td>9B</td>
<td>PJ 2800</td>
</tr>
<tr>
<td>7B</td>
<td>ETH 2050</td>
<td>Ethics</td>
<td>9B</td>
<td>PJ 5500</td>
</tr>
<tr>
<td>7C</td>
<td>PSY 1000</td>
<td>General Psychology</td>
<td>10A</td>
<td>SOC 1000</td>
</tr>
<tr>
<td>7C</td>
<td>PSY 3600</td>
<td>Social Psychology</td>
<td>10A</td>
<td>ETH 2050</td>
</tr>
<tr>
<td>7C</td>
<td>PSY 4500</td>
<td>Cognitive Psychology</td>
<td>10A</td>
<td>SOC 3900</td>
</tr>
<tr>
<td>7C</td>
<td>PSY 3200</td>
<td>Human Development</td>
<td>10A</td>
<td>SOC 2950</td>
</tr>
<tr>
<td>8A</td>
<td>PSY 1000</td>
<td>General Psychology</td>
<td>10A</td>
<td>SOC 3400</td>
</tr>
<tr>
<td>8A</td>
<td>PSY 3600</td>
<td>Social Psychology</td>
<td>10A</td>
<td>PJ 2900</td>
</tr>
<tr>
<td>8A</td>
<td>SOC 1000</td>
<td>Introductory Sociology</td>
<td>10A</td>
<td>PJ 5000</td>
</tr>
<tr>
<td>8A</td>
<td>ETH 2050</td>
<td>Ethics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8B</td>
<td>PSY 3600</td>
<td>Social Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8B</td>
<td>SOC 3900</td>
<td>Social Inequality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8B</td>
<td>SOC 3500</td>
<td>Sociology of Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8B</td>
<td>SOC 3600</td>
<td>Race and Ethnic Relations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8B</td>
<td>PJ 2800</td>
<td>Race, Class, and Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8B</td>
<td>PJ 5500</td>
<td>Politics of Whiteness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8C</td>
<td>PSY 1000</td>
<td>General Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8C</td>
<td>PSY 3600</td>
<td>Social Psychology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Frequently Asked Questions

What major should I choose to prepare as an applicant for a health professional program?

Truth is that any major can be selected when it comes to preparing as a pre-health student. Most students at Villanova who apply to health professional programs are science majors with Biology being the most prevalent however, students from VSB and Engineering and many from Arts and Humanities majors have also been successful at preparing for application and gaining a seat in a health-related professional program. The only issue with major selection is understanding the following: What prerequisite courses are necessary to qualify as an applicant (see Question #2 below) and understanding that if you are not a science major, you may have some course registration glitches. It is important to realize that science majors are given preference for seats in courses that are required for their major. If you are a non-science major, you are taking that course as an elective as a pre-health student and therefore majors’ needs are “more pressing.”

While some students may have trouble getting a seat in a popular course such as General Chemistry or General Physics), instructional faculty and Department chairpersons will work to the best of their ability to accommodate the needs of all students who seek entrance to a course. Patience will be important as the process unfolds. The Health Professions Advising Office cannot get students into closed courses for any reason. Permission to gain admittance to a closed course is ALWAYS handled by the instructor for that course and the Department chairperson. Please do not contact the HPA Office to ask for permission to get into a class. That step will only slow down the process.

Should I pursue a double major or multiple minors? What kind of curricular enrichments (i.e. multiple degrees) are important for application success?

Admission personnel in professional schools do not base a decision upon how many degrees one has accrued in college. They need to know that you are a good student and that you are academically qualified to apply (pre-requisites are in order). You can prove that by completing one degree, a single major. The other things you pursue should be done for you and not because of how it may be viewed by admission personnel.

Additional minors and concentrations or majors can contribute to your academic maturation by providing alternate perspectives that may help you discuss your thoughts and experiences in the application and the interview. That is where the effort pays off, however there is no mandate to pursue additional degrees and it can be detrimental if one spreads him/herself too thin and ends up hurting their academic record by trying to do too much with the transcript. Second majors should be undertaken with caution. A second major is a commitment to advanced work in two fields during the years when you are also preparing for professional exams and engaging in meaningful extracurricular activities. If you truly have a second intellectual passion and the commitment to make time to pursue it, that may be a reason for a second major. If you are taking it on to enhance your resume, there are better ways.
Minors can be a terrific way to explore a second area of interest without the credit load required of a second major. Moreover, many of the minors at Villanova are interdisciplinary (Global Health, Peace and Justice, Africana Studies), allowing for an opportunity to examine a topic through several lenses. Pre-health students who are contemplating minors or second majors need to plan carefully. Be sure to consult with your advisors to ensure your goals fit your timeline.

What courses do I need to take in order to apply to a specific health professional program?

Course pre-requisites may be similar between some health professional programs (such as medical and dental school) however there are differences. Therefore it is important that you access information early to produce a course planning map for your undergraduate studies.

Health professions graduate programs are heavy in rigorous science content and therefore the science courses you take at VU must be science majors’ level courses. There are exceptions such as Human Anatomy and Physiology I and II that are core courses in the Nursing curriculum but are taught at a majors’ level. Graduate programs understand that is our only option for human-specific curricular content and most will not question this course combination for applicants who must have Human A&P specifically to meet requirements for admission.

For those applying to Physician Assistant Studies and Physical Therapy programs, there are often school-specific requirements that you can only uncover by visiting program websites and doing investigation work on your own. While the HPA Office and advisors may have some understanding of specific programs, we do not have a listing of the requirements for every program in the U.S. You will have to think about possible places you may want to apply and do the necessary investigation work to make sure that something isn’t left out before you graduate. PA and PT programs (and some others) typically allow students to apply with up to 8-12 credits in required courses still outstanding for a senior year of college (assuming you apply between junior and senior year which is typical for many students).

Can I withdraw from a course without ruining my chances of getting an acceptance to a professional school?

A single WX on your transcript will not ruin your application chances. What may worry admissions staff is a pattern of WXing courses particularly if they come in the same subject area (such as repeat WXs in math or science courses). A repeat pattern of WXing courses in general is not good but one or possibly two scattered over four years of undergraduate studies is not going to ruin you. If extenuating circumstances affected your academic performance in a given semester or an academic year, you will have the opportunity to address that in the application. They will welcome information that places your record in perspective. This is especially true for medical and dental applicants who obtain a committee letter in order to apply. This letter will provide information related to academic record issues if the applicant is willing to discuss potentially sensitive information during the committee letter meeting.
If I get a “C” in a course or courses, do I have to repeat that class or those classes?

A single “C” in your transcript will not ruin your chances at acceptance provided that your overall record is strong. A pattern of “C” level grades, such as in more than one science course (i.e. both Biology and Chemistry or both Chemistry and Physics), is going to have a negative impact since most application systems calculate a technical GPA separate from your overall GPA. The technical GPA includes grades exclusively from Math, Biology, Chemistry, and Physics courses. Therefore a number of “C” level grades in those course areas will produce a poor technical GPA and that will compromise your application quality. It is important NOT to let yourself get into this dilemma by taking advantage of any assistance in the form of private tutors or review sessions and office hours with instructors to prevent yourself from ending up with consistently average grades in science subjects. Stop in the Math Center or contact the Department Offices for science areas to inquire about tutor help. Prevent the weak technical GPA “syndrome” from occurring. That is an absolute detriment to your success when you enter the applicant pool! Most competitive applicants have overall and technical GPA values at a 3.5 or better. You cannot have any grades below a “C” in required pre-requisite courses for application. Therefore courses in which you received grades of a “C-” or lower MUST be repeated.

Can I take pre-requisite courses at another institution?

You can take required courses for application at another institution over the summer, however it is important that the reason for this is because you are having trouble making them fit with your other courses required for your major (this is true for a number of non-science majors, athletes, or students who do full semester study abroad programs). It will be easy for admissions staff to understand that summer classes were the only way you could manage to fit all of the required courses in your curriculum prior to application. They will be able to pick up on patterns that reflect a decision to “end-around” taking a difficult course(s) at Villanova. They are evaluating you as a Villanova student and therefore expect to see the bulk of your pre-requisite courses taken at Villanova.

Is there an issue with the kind of institution outside of Villanova where I take a pre-requisite course?

It is best to take required courses for application at four year colleges rather than Community Colleges (CC) even if that CC confers Bachelor’s degrees. There are some situations where a CC course may be necessary (such as no other institution is close enough to your home, or the one that is does not offer the course you need). If at all possible, taking the class at a four year institution that is not a CC is preferred. The HPA Office and advisors are not involved in the process of approving courses at another institution that you may want to take for credit transfer to Villanova. Speak with your academic advisor about that process. They should be able to advise you as to the procedure and necessary paperwork that has to be completed prior to taking a course elsewhere if you want the credits to transfer to VU. When you apply to the professional school you will have to send an official transcript from every college where you took courses for grade. While a “T” may appear in the VU transcript for a course you took at another institution, they have to be able to verify that you received an actual letter
grade for that course. Therefore they will see the actual grade through submission of an official transcript.

Can I do a full semester study abroad program? How will study abroad experiences affect my application?

If you are interested in doing study abroad for a full semester, pursue it because college is the best opportunity to have that experience. While you may be able to do a clinical rotation at an international site while in professional school, it is not going to be the same kind of experience as a fully immersive 4 month long program during college. The only roadblocks with full semester study abroad for pre-health students are these:

1. **You have to plan well in advance.** Know what courses you may have to take the summer before you leave or how study abroad timing will affect preparation for application exams such as the MCAT or DAT which cannot be taken easily in another country. Speak with your academic advisor about SA early (as a freshman or sophomore) so you can get the advice and information you need from them and the Office of Education Abroad (OEA).

2. **Pre-requisite courses for health professional school application must be taken in U.S. institutions.** They will not accept an international transcript for evidence of proficiency in required courses. Some international programs provide a U.S. transcript through another university and this would make that science course acceptable in an application. Again, do your homework early and confirm with OEA that the program you are pursuing will handle the grades in this manner if you decide to take a science class abroad.

Can I take science courses out of sequence?

Most science pre-requisite courses are two semester sequence courses. Typically at Villanova the first portion of the course is taught in fall semester and the second portion is run in spring semester. Very few Departments offer off-sequence courses *i.e.* part I in spring and part II in fall. There are some options for taking at least one of the courses off sequence including the offering of General Chemistry I in spring and Human A&P I in spring (as a hybrid course, meaning part online) and possibly a few others. At present part II of science courses are typically not offered in fall semester (with the exception of Hybrid Human A&P II in fall) therefore you would have to take part II in summer or else wait until the following spring semester to finish the course sequence if summer work is not an option financially or personally (other commitment).

Some students want the option of taking part II of a course prior to taking part I to accommodate their schedule. This is ONLY an option if you get permission from the Department Office that runs that course. That decision is up to the instructional faculty and Department chairperson. Taking courses off-sequence is very risky. Continuation courses are exactly that, the first part is background for the second. Starting halfway through the content puts pressure on you to get up to speed on background knowledge that all the other students achieved by taking part I of the course. When grades matter you may be
compromising your application by being too ambitious in taking courses out of sequence. Consider this...the grade is much more important than the schedule. You can take courses off sequence with permission and may want to do that because it works better with your course map, but if you do poorly what benefit did it bring?

What else is important for me to accomplish in addition to having a strong GPA and good application exam scores?

Academic attributes (GPA and test scores) are critical assessment parameters for professional schools, however it is important to recognize that programs are looking for well-rounded applicants. They expect to see evidence of your ability to multi-task by being an active citizen while in school. They want to know that you have a humanitarian nature by engagement in activities that support community interests (both on and off campus) and have made a positive impact on the lives of others. Consider getting involved in at least one service organization that will place you in contact with culturally diverse individuals. Use these activities as a way to gain confidence communicating with a variety of people. Think about demonstrating to the admissions personnel that clinical work will not be shock to you because you can comfortably approach different people to strike up a conversation and, that your empathy and listening skills allow you to gain their confidence and trust. Understand something about the human condition through volunteer work in the U.S. Service/mission opportunities abroad are also good but professional schools are educating healthcare practitioners for the U.S. so it’s best not to pursue only international health-related experiences as evidence of your understanding of healthcare in this country.

Shadowing experiences are critical for pre-health students. Connect with practitioners that will provide you a variety of area exposure. Think about volunteer experiences in diverse practice areas (so not just a hospital as a place to learn about healthcare). Stop in the HPA office to look at the “AED Shadowing Binder” which has contact information for a variety of alumni many of whom will take students for shadowing. You DO NOT need to be a member of AED (Alpha Epsilon Delta pre-Medical Honor Society) to use this information! You should start career-specific exploration early and do it consistently. If your application lacks depth in healthcare-relevant experience and knowledge of the profession to which you say you want to dedicate your life, you have not proven to them that you really understand the challenges and rewards of that profession. This is a major weakness. Too many students do one or two things while in college and depend upon a high school resume for their major healthcare-related activities. Professional schools will not consider anything prior to college as relevant so don’t rest on your laurels from your teenage years. As you age and mature your perspective also changes. You may view experiences differently as your knowledge base grows from college courses and co-curricular experiences (such as service learning, mission trips, etc.). So continue to engage in healthcare-related activities throughout your college experience.

The Health Professions Advising Office and the HPA Blackboard site contain information on volunteer locations in the greater Philadelphia region and both domestic and international volunteer programs for summer experiences in healthcare-related activities (two folders specifically on the Blackboard site). Use these as a starting point to explore options and be willing to think outside the box. The HPA Office
also posts notices for co-curricular opportunities and internships on Facebook. Take the time to check those updates so you don’t miss out on an experience that may have an early application deadline.

Whatever you do as to club involvement, volunteerism, service trips, shadowing, etc. be sure not to spread yourself too thin. If you over commit your time, it may negatively affect your grades and these activities will NOT trump academics when professional schools review an application. In other words, all the service work in the world will not make them overlook a weak GPA.

Do I need a research experience on my resume in order to be a competitive applicant?

Research is a valuable experience but it isn’t necessarily the right thing for everyone to pursue. You can achieve knowledge of the scientific inquiry process from many upper level science courses that have lab experiences which include project based research work. Therefore a course that you took that required experimentation with some degree of independence on the part of students for study design and/or data interpretation and presentation (orally or in writing), qualifies as research exposure. Some students opt to connect with VU faculty to engage in independent research experiences in their laboratories or field study projects. This is not recommended for everyone, only for those who know they will enjoy the work. No faculty member wants students in their lab or field study group who really aren’t motivated to be a meaningful contributor to their project. If you don’t feel like you are excited to be in the lab or in the field doing the work, then don’t continue to pursue it. If you have to force yourself to get the work done, that resistance is telling you that it isn’t right for you.

Many students pursue clinical research projects as a way to gain research experience. The Academic Associates Programs at Thomas Jefferson University Hospital or Cooper Hospital of Rowan University Medical School are great examples of programs that take a number of undergraduate students each semester to recruit patients in the Emergency Department to be subjects in clinical research projects. The Pre-Medical Club, AED, and the HPA Office will send information notifying students of opportunities such as this.

The bottom line is that while many students list research experience on their applications, admission personnel are not selecting applicants solely because of a research listing. If a school mentions research as a critical component of their academic mission, then it will likely be a mistake not to have had some kind of research exposure before you apply to that school. If you list a research experience in your application, be prepared to fully explain the context of the project, what your role was in the study, and what kind of outcome your work produced (or was produced by the research group of which you were a part). If you list something but can’t explain it, that research experience you thought was getting you consideration for admission will end up being more of a detriment than an asset.