Premedical students may choose any major, and many of the courses that an individual premedical student takes should be chosen based on his/her individual interests. However, all premedical students must take the courses that are required by the individual medical schools to which they will apply, and in addition, all premedical students must master the material that is tested on the MCAT.

Fortunately, there is a great deal of overlap between the courses required by many medical schools and the courses that cover the material required for the MCAT. Because the prerequisites for different medical schools vary, I will discuss the courses that cover the material on the MCAT first, and then comment on the courses that are required/recommended by the Virginia medical schools.

The MCAT:
In April 2015, the AAMC introduced a new version of the MCAT. The new version of the exam has four sections:

1. Molecular, Cellular and Organismatic Properties of Living Systems
2. Physical, Chemical and Biochemical Properties of Living Systems
3. Social and Behavioral Sciences Principles
4. Critical Analysis and Reasoning Skills

The new MCAT includes questions on introductory biology, general chemistry, organic chemistry, biochemistry, introductory physics, introductory sociology, and introductory social psychology; in addition, students will need to be competent in basic statistics to succeed on the exam.

The William and Mary courses that cover the science and social science concepts to be tested on the new version of the MCAT are the following, in which linked lecture and lab courses are designated as lecture/lab:

**Introductory biology:** BIOL 220/BIOL 221 and BIOL 225/BIOL 226

In addition to the two introductory biology courses, there are additional biology courses that can be useful for students preparing for the MCAT. Many students have said that BIOL 302: Integrative Biology: Animals, is very helpful for students preparing for the MCAT, so I recommend taking this course. In addition, BIOL 432: Animal Physiology and KINE 304: Human Physiology both cover physiology concepts that will be tested on the new exam. Note that BIOL 432 counts towards the Biology and Neuroscience majors, but KINE 304 does not.

**General chemistry:** CHEM 103/CHEM 103L and either CHEM 312/254 or CHEM 208/254

**Organic chemistry:** CHEM 206/206L and either CHEM 209/253 or CHEM 207/CHEM 253

**Biochemistry:** CHEM 314 (this can also be taken as the cross-listed BIOL 314)

**Introductory physics:** PHYS 101/101L and 102/102L or PHYS 107/107L and 108/108L (Note that Chemistry and Physics majors must take Physics 101/101L and 102/102L)

**Introductory sociology:** SOCL 250: Principles of Sociology or SOCL 362: Medical Sociology or SOCL 310: Wealth, Power and Inequality
**Introductory social psychology:** PSYC 202

**Statistics:** According to the AAMC, the statistics content that is usually covered in the introductory biology, chemistry and physics courses will be tested by the new MCAT. Students who want to be certain that their statistics background is strong should take a statistics course before taking the exam. MATH 106, PSYC 301, KINE 394, or BIOL 327 would all be acceptable; if there is a statistics/ research methods course offered by the department in which you plan to major, though, take that one.

**Undergraduate Prerequisite Courses for the Virginia Medical Schools:**

Most medical schools specify prerequisite courses that students must complete before starting medical school, and even the medical schools that have no formal prerequisites often recommend particular undergraduate courses to their applicants. Complete information on the requirements of individual allopathic (MD-granting) medical schools is available in the annually updated AAMC publication *Medical School Admissions Requirements*, also known as the MSAR, which can be purchased from the AAMC as an inexpensive e-book at https://www.aamc.org/students/applying/requirements/msar/. A similar publication, the *Osteopathic Medical College Information Book*, available from AACOM, lists the courses required/ recommended by individual osteopathic medical schools. Note that many medical schools are currently reconsidering their prerequisite courses. For this reason, students should pay close attention to the MSAR and to the websites of the medical schools that interest them.

Because most William and Mary students are Virginia residents, and because the Virginia medical schools also look favorably upon out-of-state applicants from the College, I will focus on the requirements of the Virginia medical schools in this section. Students from other states should consult the references listed above to see which additional courses their in-state schools might require.

Note that most medical schools require that students earn a C or better in the prerequisite courses. Check the policies of the schools that interest you to make sure you know how well you must do to have the courses you take count. Remember, though, that aiming for the minimum acceptable grade is not wise: GPA matters!

Note also that the prerequisite courses must be completed before you matriculate into medical school, not before you apply to medical school. Still, the vast majority of the prerequisite courses should be on your transcript when you apply to medical school.

**EVMS:** Matriculants are currently required to have completed two semesters of introductory biology with lab, two semesters of general chemistry with lab, two semesters of organic chemistry with lab, and two semesters of introductory physics with lab. Biochemistry is highly recommended.

**VCU:** Matriculants are currently required to have completed two semesters of introductory biology with lab, two semesters of general chemistry with lab, two semesters of organic chemistry with lab, and two semesters of introductory physics with lab; in addition, they must have completed six credits of college mathematics (calculus/ statistics) and six credits of writing-intensive courses. VCU also requires that matriculants have taken an additional three credit upper-level science course, such as Biochemistry, Anatomy or Genetics.

**VTC:** Matriculants are currently required to have taken two semesters of introductory biology with lab, two semesters of general chemistry with lab, two semesters of organic chemistry with lab, and two semesters of introductory physics with lab; in addition, they must have taken two
semesters of college mathematics (calculus/statistics) and two semesters of English or one semester of English plus one semester of Philosophy.

UVA: While UVA no longer has required prerequisite courses, they recommend that interested students take biochemistry, cell biology (at the College, this is BIOL 310: Molecular Cell Biology), statistics, and behavioral science courses. Students interested in applying to UVA should plan to take these courses, even though they are only “recommended.”

VCOM: VCOM currently requires matriculants to have taken two semesters of introductory biology with lab, two semesters of general chemistry with lab, two semesters of organic chemistry with lab, and two semesters of introductory physics with lab; VCOM also requires two semesters of English. Six additional biomedical credits at the 300 level or above are also required; see the VCOM website for details.

Additional courses to consider, based on the recommendations of the various in-state medical schools, include Integrative Biology: Animals, Molecular Genetics, Genetic Analysis, Molecular Cell Biology, Immunology, Microbiology, Virology, Human Physiology, Animal Physiology, and Human Anatomy and its lab.

So, What Should William and Mary Premedical Students Take?

Briefly, in order to be prepared to take the MCAT and apply to the Virginia medical schools, a William and Mary student should plan to take, at minimum, all of the courses needed for the new MCAT plus at least one semester of calculus (taking two semesters of calculus is strongly recommended), two semesters of English, and BIOL 310: Molecular Cell Biology. Here’s the full list; linked lectures and labs are designated as lecture/lab.

BIOL 220/BIOL 221
BIOL 225/BIOL 226
BIOL 310

CHEM 103/CHEM 103L
CHEM 312/254 or CHEM 208/254
CHEM 206/206L
CHEM 209/253 or CHEM 207/253
CHEM 314 (this can also be taken as the cross-listed BIOL 314)

PHYS 101/101L or 107/107L
PHYS 102/102L or PHYS 108/108L
(Note that Chemistry and Physics majors must take Physics 101/101L and 102/102L)

SOCL 250 or SOCL 362 or SOCL 310

PSYC 202

MATH 106 or PSYC 301 or KINE 394 or BIOL 327

MATH 111 or MATH 131
MATH 112 or MATH 132

Two semesters/six credits’ worth of English literature or composition courses; 150W freshman seminars/all first year C150 seminars count towards this requirement.
Course Scheduling:

Many premeds choose to start two of the premedical science sequences and take a math course as first-semester freshmen. This is a sensible approach for a student with a strong math and science background and good study and time management skills who would like to major in one of the sciences. This freshman schedule is not optimal for everyone, however. Premeds who are worried about the strength of their math and science backgrounds and students who are interested in medicine but have not committed themselves to the premedical path may want to consider a less demanding approach. Still, students who would like to go straight to medical school after college without taking a gap year should plan to finish all of the courses required for the MCAT by the end of junior year, as taking the MCAT no later than June of the year in which a student begins the medical school application process is highly recommended. Thus, it would be wise to start at least one of the premedical science sequences in the fall of the freshman year.

For premedical students who are considering majoring in one of the sciences, taking the introductory sequence in that science during the freshman year is strongly recommended. For premedical students who have no idea what they will choose as a major, starting the chemistry sequence as a freshman is strongly recommended, since there are five semesters of required chemistry courses for premedical students that must be completed by the time the student takes the MCAT. Alternatively, undecided students might want to start with the biology sequence, as introductory biology courses are not available at the College in the summer, while all of the required premedical chemistry and physics courses are. Given that CHEM 103 is a strongly recommended prerequisite for BIOL 225, the spring introductory biology course, though, students who choose to take the introductory biology sequence as freshmen should either have a strong high school chemistry background or take CHEM 103 along with BIOL 220 in the fall of the freshman year.

Choosing a major:

In recent years, the most popular premedical majors at the College have been Biology, Chemistry, and Neuroscience. Unsurprisingly, the courses required for these majors overlap extensively with the premedical science requirements. While premedical students can choose any college major or minor without negatively affecting their chances of getting into medical school, they must have a strong foundation in science and mathematics. Students who do not major in one of the sciences should plan to take additional upper-division science courses, rather than limiting themselves to only the required premedical science courses.

Additional recommended courses:

Other courses that could be helpful to a future physician include additional courses in the behavioral sciences, social sciences, and humanities, as many health problems have deep behavioral, socioeconomic, and cultural roots. Courses such as Health Psychology are thus of obvious interest to premedical students. Premedical students might also want to consider taking courses in public health, such as Introduction to Public Health and Epidemiology. AMST 203: Medicine in America and AMST 350: Social Determinants of Health are highly recommended by our alumni.

Finally, KINE 303: Human Anatomy (be sure to take this course with its lab, KINE 314 or KINE 315; if you take it in fairly late in your college career, the material will still be fresh in your mind when you start medical school) is enthusiastically recommended by many of our alumni.
Which courses satisfy the medical school English requirement?

Many medical schools require a year (two semesters or six credits) of English. Freshman seminars with a “W” designation/ all COLL 150 first year seminars can be used to fulfill half of the English requirement. To fulfill the second half of the requirement, any English literature or composition course would be acceptable, as long as the credits total to 6 or more. Some medical schools have accepted writing-intensive courses from other departments in partial fulfillment of the English requirement in the past, but such acceptance is not guaranteed, so I recommend choosing among the English Department’s course offerings rather than branching out.

Advice for students who have earned AP or IB credit:

Most medical schools, including all of the medical schools in Virginia, accept AP and IB credit for the required mathematics, science, and English courses, but some, including (but not limited to) Vanderbilt, Boston University, Saint Louis University, and the UC system in California, do not. Students with AP or IB credit for the required premedical courses should check the policies of the medical schools that interest them. These policies are described in the MSAR.

The Biology Department encourages students who have earned exemptions from BIOL 220/221 and BIOL 225/226 to take those courses anyway, and this is good advice for premeds, too. Premedical students who elect to use their exemptions and skip the introductory courses will still need college credit for a year of introductory biology with lab in order to fulfill their premedical science requirements: the zero-credit exemptions given to students who earn a 5 on the exam are not enough to satisfy the medical schools that require introductory biology with lab. Thus, these students should plan to take Biology 302: Integrative Biology I: Animals along with either BIOL 432: Principles of Animal Physiology or KINE 304: Human Physiology/KINE 305: Human Physiology Lab, as the medical schools have accepted these combinations in fulfillment of the introductory biology requirement in the past. Other upper-division lab science courses may not be accepted by individual medical schools in fulfillment of the introductory biology requirement, so it would be wise to stick with one of these time-tested combinations if you elect to use your AP/IB exemptions.

The Chemistry Department encourages students with a 4 or a 5 on the AP Chemistry exam, as well as students with comparable scores on the IB exam, to consider taking CHEM 205: Advanced Freshman Chemistry in the fall of the freshman year; there is no lab for this course. CHEM 205 can be used as a substitute for the second semester of general chemistry for medical school purposes. Students who earned a 4 on the AP Chemistry exam and who take CHEM 205 will still need to take CHEM 254, the second semester of general chemistry lab, to complete the premedical chemistry requirements for medical school.

Course selection advice for students who are considering majoring in Kinesiology and Health Sciences:

There are several different concentrations within this major. The “premed” concentration is a possible option for premedical students interested in Kinesiology, but the other concentrations, particularly the new public health concentration, would also be reasonable choices: indeed, the public health concentration focuses on material that is useful for physicians but is often not emphasized in medical school. The department suggests that premeds interested in any of the concentrations begin the major by taking one of the public health courses, such as Introduction to Public Health, Introduction to Global Health, or Epidemiology, or by taking Science of Nutrition or Health-Related Exercise Prescription.

Important note: Premeds should not take KINE 200: Introduction to the Human Body, which is a low-level introductory biology course that is inappropriate for students who will eventually take
BIOL 220 and BIOL 225 or who already have exemptions for those courses; the department also recommends that premeds not take KINE 204: Introduction to Kinesiology, as it is inappropriate for premeds. In addition, the department discourages freshmen from taking KINE 303: Human Anatomy and KINE 304: Human Physiology, as these courses might be surprisingly difficult for some freshmen.