

Premed/Prehealth Students - 10 Tips for Choosing Fall Classes

Office of Health Professions Advising June 2017

1. What courses will I need to take for medical schools?

Medical schools require a strong background in science as well as a few courses in the humanities and social sciences. A general list is below. Veterinary and dental schools will require most of the same courses, so when choosing courses for this fall, follow premed advice. Later, you may modify or supplement the list of courses slightly.

- General (inorganic) chemistry
- Organic chemistry
- Biochemistry
- Math (calculus)
- Biology
- Physics
- Statistics
- Psychology and Sociology
- English

A table of specific courses can be found on page 7.

2. What courses can I enroll in this fall?

Most premed students begin with chemistry and math. The normal course load is four courses, so your options are below. You can choose math, or chemistry, or both, or NEITHER. If you have AP credit, or diverse interests, you might choose to postpone math and/or chemistry and substitute other courses. If you have AP credit in math and don't need it for a major or curriculum requirements, then you might not enroll in math at all. These things are explained in greater detail in the next sections.

option 1:	-	-	Writing 101 or seminar	and 3 other courses
option 2:	Math	-	Writing 101 or seminar	and 2 other courses
option 3:	-	Chemistry	Writing 101 or seminar	and 2 other courses
option 4:	Math	Chemistry	Writing 101 or seminar	and 1 other course

3. I'm not sure about medical school. Do I still need to get started on premed requirements in my first semester? What if I'm coming from a high school with weak science/math teaching?

You don't have to take premed courses this fall; you can put them off to the spring or even later. If you are coming in without a strong science background, be a little careful. You may need to take from 10 to 15 premed courses and you can work these in slowly. Most Duke students will take all four years (8 semesters and 3 summers) to complete prehealth classes. This allows them to try premed courses slowly and carefully, evaluate possible majors, and take advantage of all the opportunities at Duke. Applying at the end of the senior year and then taking a gap year to work, travel, mature, and be an adult is highly recommended and it makes you more competitive in the application process.

We caution that if you are coming from a high school that was not particularly rigorous in math and science, you may find the required natural science premed classes, e.g., math, chemistry and biology, to be a very different level of difficulty than what you have been accustomed to in high school. We have seen some students struggle in their fall semester premed classes, because they were not fully prepared and had not yet developed rigorous study skills. In many cases, these students would likely have done much better if they had taken a semester to acclimate to college and had time to develop those study habits and organizational skills that these courses require. Please consider this carefully. Our intent is not to discourage you from beginning on the prehealth path if you feel ready to take this challenge on. However, do not

feel that you have to enroll in premed courses this fall, or worry that you will be behind. That is not the case and there may be value in taking your time.

We note that Chem 99D has been designed for students who do not have AP credit and who have not had a chance to develop a strong science background. This course helps students transition easier into Chem 101DL.

4. Which math (calculus) course would I choose?

By math, we mean calculus. You may need calculus for several reasons. Calculus 1 is required for physics (Physics 141L, 142L). Some majors require calculus. And a few medical schools require a semester of math or calculus. However, the primary reason premed students need calculus 1 is that physics at Duke is calculus-based. If you don't have AP/IPC/PMC credit for calculus 1 and you intend to take physics at Duke or if you are contemplating a major that requires calculus, you will need to enroll in calculus 1. Many students will do so in their first semester or in their first year.

Here is a table of all the calculus courses at Duke, to help you understand the course numbering.

Math 21	Calculus 1 by AP credit (5 on AB exam, 4 or 5 on BC exam)
Math 105L and 106L	Calculus 1 in 2 semesters; for students with no experience, SATm 520-680
Math 111L	Calculus 1 for students with some calculus experience
Math 121	Calculus 1 by transfer from another university
Math 22	Calculus 2 by AP credit (5 on BC exam)
Math 112L	Calculus 2, in the fall this is only for students who have had Math 111L at Duke*
Math 122L	Calculus 2, taught only in the fall and only for students who have Math 21 AP credit*
Math 122	Calculus 2 by transfer from another university
Math 202	Multivariable Calculus for Economics
Math 212	Multivariable Calculus
Math 221	Linear Algebra and Applications, for prospective math majors

* If you have calculus 1 by AP credit and you wish to go on to calculus 2, you would enroll in Math 122L in the fall or Math 112L in the spring. Math 122L is a course taught only in the fall and only for students who have Math 21 AP credit.

For fall, you can enroll in:

NO math at all ... if you have AP credit for calculus 1 (Math 21) and don't need more math for a major
NO math at all ... if you aren't sure about prehealth and want to postpone making a decision

Math 105L (then Math 106L in the spring) ... if you've had no calculus
Math 111L ... if you've had some calculus experience

Math 122L ... if you have AP credit (Math 21) and need calculus 2 for a major or interest

Math 202 or 212 ... if you have AP credit (Math 21, 22) and need multivariable calculus

Math 221 if you are seriously considering a math major (followed by Math 222 in the spring)

Be sure to check the math website for course and placement information:

<http://math.duke.edu/courses/placement-guidelines>

Questions???? If you need help with math placement, email with the Supervisor of First Year Instruction in Math. Go to <http://math.duke.edu/courses/placement-guidelines>, click on the link "Contacting the SFI" and you will find a list of questions that you should answer and these will be sent to the Supervisor of First Year Instruction. The math department also has a webpage of advice on enrollment/registration policies: <http://math.duke.edu/courses/enrollment-policies>
The math department may also have a facebook page in the summer.

5. Do I need to take more than Calculus 1?

You should consider major requirements and curriculum requirements. For example

These majors require calculus 2:

- Chemistry
- Computer Science (AB degree)
- Earth and Ocean Science (BS, but not the AB degree)
- Environmental Science (BS, but not the AB degree)
- Neuroscience (BS, but not the AB degree)

These majors require calculus 2 and multivariable calculus;

- Computer Science (BS degree)
- Economics
- Math
- Physics
- Statistics
- sometimes Chemistry

Biology: The BS degree requires calculus 1 and II OR calculus 1 and a statistics course.

Duke's curriculum requires you to complete two courses coded QS (quantitative studies).

QS course #1: must be a QS course in the math, statistics or computer science department

QS course #2: can be a QS course in any department (this will usually be physics 141L or 142L)

You can fulfill the QS requirement in several ways, for example:

Math 105L and 106L

Math 111L and 112L

Math 111L (or 112L or 122L) and Physics 141L (or 142L)

Statistics 101L (or 102L) and Physics 141L (or 142L)

If you'd like information on major requirements, there are two ways to look up information:

Departmental websites; links to these are at trinity.duke.edu/undergraduate/majors-minors

Undergraduate Bulletin; departments are listed alphabetically

registrar.duke.edu/university-bulletins/current-publications

6. What chemistry course would I choose for the fall?

It depends on your background. You need courses in inorganic chemistry, organic chemistry, and biochemistry for the MCAT and medical schools. So depending on whether you have AP credit, you may take 3 or as many as 5 or 6 chemistry courses.

You should plan to follow one of these sequences:

sequence 1:		99D	101DL	-	201DL	202L	210DL	Bch 301
sequence 2:		-	101DL	-	201DL	202L	210DL	Bch 301
sequence 3:	Chem 20 AP	-	-	110DL	201DL	202L	-	Bch 301 (or sequence 2)
sequence 4:	Chem 21 AP	-	-	-	201DL	202L	-	Bch 301 (or sequence 3)

Chem 99D is an introduction to chemistry and problem solving; it is for students with limited background in chemistry. 99D is ONLY TAUGHT IN THE FALL. You would go on to Chem 101DL in the spring.

Chem 101DL and 210DL are the two semesters of inorganic chemistry.

Chem 110DL is honors chemistry and involves applications of inorganic chemistry; this course is recommended for students who have a 4 on the AP chemistry exam (Chem 20 credit). You would take Chem 110DL instead of Chem 101DL and 210DL.

Chem 201DL and 202L are the two semesters of organic chemistry. There is a first-year only section of Chem 201DL offered in the fall (Chem 201DL.002).

Bch 301 is biochemistry.

So the general choices for a fall chemistry course are these:

Chem 99D	less than 1 year of high school chemistry, SATm \leq 630
Chem 101DL	some background, no AP credit, SATm > 630
Chem 110DL	recommended for Chem 20 credit (4 on AP exam), but Chem 101DL is also OK
Chem 201DL.002	recommended for Chem 21 credit (5 on AP exam), but Chem 110DL is also OK
OR no chemistry at all, postpone it to a later semester	

*** For more details and specific placement advice, be sure to check the chemistry website:
chem.duke.edu/undergraduate/placement-guidelines

*** If you have questions about chemistry placement, contact a Director of Undergraduate Studies in Chemistry
chem.duke.edu/undergraduate/dus-group

There are some helpful things to know when enrolling in a chemistry course:

* Medical schools will list inorganic or general chemistry as a requirement. But Duke's Chem 101DL class has a course title of "Core Concepts in Chemistry", Chem 210DL has a title of "Modern Applications of Chemical Principles", and Chem 110DL is titled Honors Chemistry. Don't worry about the titles, these courses are all inorganic chemistry.

* When you enroll in Chem 101DL, 110DL, or 201DL, you need to enroll TWICE ... once in the lecture/discussion section and also in the lab, e.g. Chem 101DL (and the lab Chem 101L9), Chem 110DL (and the lab Chem 110L9), and Chem 201DL (and the lab 201L9).

* The sequencing of chemistry courses is a little unusual, as you begin with a semester of inorganic chemistry (Chem 101DL or 110DL), continue into two semesters of organic chemistry (Chem 201DL, 202L), and then complete the second semester of inorganic chemistry (Chem 210DL) if you need to. This is why the second semester of inorganic chemistry has a course number of 210DL.

* If you are worried about going into honors chemistry (Chem 110DL) or organic chemistry (Chem 201DL.002) as a freshman, remember that these are for first-year students. Chem 110DL will be taken by other freshmen with AP credit like you, and the organic chemistry section you enroll in (lecture section 002) is only for first-year students.

7. Are there other courses I could take instead of math and chemistry?

Yes! Some students prefer to begin with courses in the humanities and social sciences in their first semester, postponing math and chemistry to later. Other students come in with strong backgrounds and AP credit in math and chemistry, and are ready to enroll in biology. Suggestions and advice are below

Biology: Biology 201L and 202L are required for medical schools and you can enroll if you have a strong background in inorganic chemistry and biology AND if there are seats available. Currently Biology 201L is full, but there are about 30 seats open in Biology 202L. Just be careful if you enroll. Most first-year prehealth students will begin biology in the second semester of their freshman year or even in the fall of their sophomore year and that is a fine choice and very

acceptable. Note that biology courses at the 100 level may be interesting, but they are primarily designed for non-majors and will not fulfill premed or biology major requirements. The biology department has a short guide for first-year students:

biology.duke.edu/undergraduate/first-year-guide

Statistics: We do not usually recommend taking statistics in the first semester, unless you are interested in this as a major or the course is part of a program you are enrolled in. There are many statistics courses at Duke and the students in these classes are usually sophomores and juniors who may be more experienced than you. It's best to wait until you decide on a major and then take a statistics course that goes with your major. However, if you are doing research or other work which involves statistics, or if this is a potential major - then statistics may be appropriate. Questions on placement or advice should go to the Director of Undergraduate Studies in Statistics (dus@stat.duke.edu)

Physics: This is also not generally recommended for freshmen. Physics 141L and 142L are mostly taken by juniors and seniors who will have more experience than you. However, if this is a potential major or if you have an exceptional background or interest, talk with the Director of Undergraduate Studies in physics and check their suggested course sequences for majors. If you are a Pratt student, you should follow Pratt requirements for physics.

phy.duke.edu/director-and-associate-director-undergraduate-studies
phy.duke.edu/suggested-course-sequences-and-study-abroad

Humanities, social sciences: Medical schools appreciate and often expect some background in the humanities and social sciences, so enrolling in a class may be a great choice for your first semester. Such courses can give you an understanding of the psychological, social, and biological foundations of behavior, as well as an understanding of ethics, morality, culture and ethnic background of patients and others you will work with. So in preparing for medical school, work in courses that give you a glimpse and understanding of people in this world. If you are looking for another course for the fall, see if you can find a course that appeals to you.

There is a list of courses on page 8 that you might find interesting. Some may not have many seats available, but perhaps the list will give you some ideas.

8. Should I send my AP scores to Duke, or ignore them and just start at the beginning?

Yes! Send your scores to Duke and follow the placement guidelines by departments. The general philosophy here is to not repeat a course that you already have credit for. This is because ...

* All of your AP credits will appear on your Duke transcript. They can look impressive, indicate you were doing advanced work in high school and that you have a strong foundation. This can help with jobs, internships, applications, etc. If you have AP scores, have them all sent. Your Duke transcript does not show scores, only the Duke courses we give you credit for.

* Repeating coursework at Duke can be boring; students sometimes find it's hard to study and then don't do as well as they should.

* Repeating courses at Duke can be unexpectedly challenging, as courses here may be taught in a different way than in high school. They are not necessarily a review or easier.

* There are a lot of premed courses to take at Duke; if you can replace some with AP credits, it will give you more time for other things and you may have an easier time scheduling courses.

9. Will all medical schools accept my AP credits in math, chemistry, physics, english, psychology and statistics?

Mostly yes. Many medical schools are in the process of changing requirements for admission, requiring fewer courses or are allowing flexibility in how you demonstrate "competency". Because you are at least three, and probably four years away from applying to medical school, our recommendations are these:

- * Use the placement guidelines for chemistry and math according to those departments.
- * Send your AP scores to the Duke registrar's office. If you have AP credit, assume for now it will be acceptable.
- * In your sophomore and junior years, begin to check the requirements of medical schools in your home state or others you might apply to.
- * If you need to, you could add an extra course or courses during your junior or senior year or in a summer, if you decide to apply to one of the very few schools that still restricts AP credits.

10. I'm in the Pratt School of Engineering ... are my premed requirements the same as for Trinity students?

Almost the same. Pratt students need to follow Pratt schedules and then fit in prehealth courses whenever they can. Specifically -

- * **Chemistry:** Follow the same coursework as Trinity students. However, you might consider putting organic chemistry into the summer here at Duke or at a home institution in order to make your Pratt schedule easier.
- * **Math:** You will take many more math courses than required by medical schools.
- * **Physics:** Enroll in Physics 151L and 152L instead of Physics 141L and 142L. Schedule these courses according to Pratt guidelines. If you have AP credit for both Physics 25 and 26, you should enroll in Physics 152L (a repeat of your AP course) or enroll in Physics 153L. See the footnote at ... <http://pratt.duke.edu/undergrad/students/policies/3483>
- * **Biology:** Enroll in Biology 201L and BME 244L. Biology 202L is optional. You don't need to enroll in a physiology course as this is covered in BME 244L.
- * **Statistics** is also optional; you will cover statistics in BME 244L.
- * **Psychology, sociology:** These are good courses to work into your schedule, when you can. See page 8 for suggestions.
- * **English:** If you don't have AP credit for English, enroll in an English course or course with a W (writing) code ... or an English course with a W code to be very safe. Medical schools are not always clear if they want a writing course or an English course.

TABLE 1. RECOMMENDED COURSES FOR PREMED STUDENTS

Basic set of courses	Extra preparation for math, chem	AP Chem 20	AP Chem 21	AP Math 21	AP Physics 25	AP Physics 26	AP Chem 21 AP Math 21 AP Physics 25	Courses for BME/Pratt students
-	Chem 99D	-	-	-	-	-	-	-
-	-	Chem 110DL	-	-	-	-	-	-
Chem 101DL	Chem 101DL	-	-	Chem 101DL	Chem 101DL	Chem 101DL	-	Chem 101DL
Chem 201DL	Chem 201DL	Chem 201DL	Chem 201DL	Chem 201DL	Chem 201DL	Chem 201DL	Chem 201DL	Chem 201DL
Chem 202L	Chem 202L	Chem 202L	Chem 202L	Chem 202L	Chem 202L	Chem 202L	Chem 202L	Chem 202L
Chem 210DL	Chem 210DL	-	*	Chem 210DL	Chem 210DL	Chem 210DL	*	Chem 210DL
Biochem 301	Biochem 301	Biochem 301	Biochem 301	Biochem 301	Biochem 301	Biochem 301	Biochem 301	Biochem 301
Biology 201L	Biology 201L	Biology 201L	Biology 201L	Biology 201L	Biology 201L	Biology 201L	Biology 201L	Biology 201L
Biology 202L	Biology 202L	Biology 202L	Biology 202L	Biology 202L	Biology 202L	Biology 202L	Biology 202L	BME 244L
Physiology	Physiology	Physiology	Physiology	Physiology	Physiology	Physiology	Physiology	-
-	Math 105L	-	-	-	-	-	-	-
-	Math 106L	-	-	-	-	-	-	-
Math 111L	-	Math 111L	Math 111L	-	Math 111L	Math 111L	-	Math 111L
Physics 141L	Physics 141L	Physics 141L	Physics 141L	Physics 141L	-	Physics 141L	-	Physics 151L
Physics 142L	Physics 142L	Physics 142L	Physics 142L	Physics 142L	Physics 142L	-	Physics 142L	Physics 152L
Also add:								
Statistics	Statistics	Statistics	Statistics	Statistics	Statistics	Statistics	Statistics	-
Psychology	Psychology	Psychology	Psychology	Psychology	Psychology	Psychology	Psychology	Psychology
Sociology	Sociology	Sociology	Sociology	Sociology	Sociology	Sociology	Sociology	Sociology
English/W	English/W	English/W	English/W	English/W	English/W	English/W	English/W	English/W

*If you have a 5 on the AP chemistry exam (Chem 21) and go directly into organic chemistry (Chem 201DL), there is a slight chance that you would need to add an additional chemistry course (e.g., Chem 210DL or Biochem 302) later, if you apply to a school that does not accept AP credit.

Physiology courses include Biology 329D, 329L, 278LA and Cell Biology 503; you would enroll in one of these.

For sociology and psychology courses, see the next page.

Statistics courses include Sta 101, 102, 111, Biology 204, and Psychology 201. Be careful of the QS curriculum requirement, which requires you to take one QS course in the Math, Statistics or Computer Science departments.

Dental and veterinary schools have similar requirements. All students should check the websites of health professions schools they may apply to, to see if there are additional courses needed.

SUGGESTIONS FOR OTHER FALL COURSES THAT MIGHT BE APPEALING

The courses below could give you a chance to expand your knowledge of the world, or perhaps find new areas to explore. As a physician or health care professional, you will want to develop good communication skills, an understanding of people, diversity, cultures, lifestyles and how complex health care issues are. Some of these courses might help you prepare for study abroad, or Duke Engage, or other experiences you will plan.

1. Courses highly recommended for prehealth and for MCAT preparation:

Psy 101 Introduction to Psychology
Psy 106/Neurosci 101 and Psy 107/Neurosci 102... same course but Psy 106/NS101 is taught in a lecture format and Psy 107/NS102 is a team-based format. Psy 106/NS101 is currently full, but Psy 107/NS 102 is open.
Soc 110D Sociological inquiry

2. Courses that deal with people, lifestyle, health, diversity, culture etc. (as of June, seats are open in these classes but some may fill up during registration in July)

AAAS courses

AMES courses

ARTS&SCI 125D Introduction to global development politics, policy & practice

ARTS&SCI 261D Race genomics and society (cross-listed GLHLTH 258D and AAAS 261D)

Bio 158 Plants and human use

Chem 130L Science of cooking

Culanth 101 Intro to cultural anthropology (lots of seats!)

Educ 101 and 101S Foundation of education (service-learning course, tutor in local schools)

Ethics 101D Challenges of living an ethical life

Evanth 101 and 101D Introduction to evolutionary anthropology (sometimes an alternate to a biology major or for students with an interest in evolution, lemurs, or physiology and anatomy)

GSF 202S Study of sexualities

GLHLTH 101D Fundamentals of global health.

GLHLTH 304D/Evanth 285D Human health in evolutionary perspective (may be advanced for first-year students without background in this area)

History 101 Problems in the history of globalization

History 185S Gateway Seminar: Premodern disease

History 190S-01 Gateway Seminar: History of science

History 236 Ancient science and technology

History 299 Women and popular culture

ICS 110 Intro to African studies

ISS 110 Information, society and culture

ISS 279S Visual cultures of medicine

Latamer 230 Intro contemporary Latin America

Philosophy 220 Philosophical perspectives on disability

Psy 102 Cognitive psychology (Psy 101 experience recommended)

Psy 104 Social psychology (Psy 101 experience recommended)

Psy 105 Abnormal psychology (Psy 101 experience recommended)

Sociology 218 Sex, gender, society

Sociology 255 Sociology of immigration and health

VMS 202D Intro visual culture

3. House courses = these are 0.5 credit courses taught on a satisfactory/unsatisfactory basis;

HC 59-11 Be Well, Stay Well, Du-Well

HC 59-12 Ethics, science and the body

HC 59-15 Personalizing health

HC 59-16 Neglected tropical diseases

4. A course in a department in which you might major.

5. A course that deals with an area of the world you'd like to travel to (could be religion, arthistory, history, political science, a foreign language, etc.)

6. A course that deals with an activity you spent a lot of time on in high school, and that you'd like to continue at Duke (e.g. leadership, politics, theater, children)

7. A course that is a strength of yours, for instance look for W courses if you like to write, or a music course if you enjoy music.

8. A service learning class if you feel strongly about being engaged in civic and community support (Educ 101 for example).

9. Add a seminar if you can't find a fourth course and are in Writing 101, to finish your first year requirements. If you are already in a seminar and can't find a fourth course, see if there is a Writing 101 section open during drop/add that you could enroll in

Office of Health Professions Advising 5.25.17 dk