



PREMED GUIDE

8TH ED.



Massachusetts Institute of Technology

THE MIT PREMED GUIDE

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EDITORS' NOTE

When you introduce yourself as a premed at MIT, many people raise their eyebrows—sometimes, from awe; sometimes, from confusion; sometimes, from pure surprise. Life at MIT has its own reputation. It's difficult to balance classes, extracurriculars, sports, research, and a social life (while still finding time to sleep). This is certainly no easy task for any MIT student, so one might wonder, “Why do we chose the ‘harder’ road to the premed life?”

Well, we love it.

MIT has a wonderfully supportive and collaborative environment to help you along as a premed. FPOPs (freshman pre-orientation programs), PSet “parties,” a committee of faculty members helping you through the written application process, senior year interviews, and many more are there to support you all the way! Clearly, not only our supportive classmates but also countless amazing resources surround us too. In this guide, MIT's premeds share their very own stories with you.

EDITORS' NOTE

Throughout the pages, you will find personal anecdotes, general advice, and knowledge only gained from four years of hard work—all scattered through the journey to medical school. We hope you can use these firsthand experiences, passed down from generation to generation, to help yourself through your own personal struggles and successes. Along with resources from the Career Advising and Professional Development (CAPD) office and medical school websites, this guide will be an aid to being premed at MIT.

We hope you enjoy reading our guide and glean something inspiring and encouraging from its stories.

~The MPS Executive Board

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INTRODUCTION

At every step of a physician's career, the same question appears: Why do you pursue medicine? Medical school admissions and your fellow physicians may consider your answer the turning point for acceptance into the medical community. Your patients, friends and children will ask out of innocent or incredulous curiosity, expecting a satisfying answer. You will rely on your answer for sustenance and happiness during the inevitable stressful and difficult moments as a physician. Thus, your motivations for entering medicine are extremely important.

There are a few wrong reasons to enter medicine: money, social prestige, the approval of your family. While physicians live in relative comfort and generally have decent job security, like that of all professionals, physicians' salaries are subject to market forces, and there are far easier, more efficient ways to accumulate money. Furthermore, the nature of medicine compels physicians to disregard money for the good of the patient, especially when caring for patients who cannot pay. The slight social prestige and familial approval gained by entering medicine may prove insufficient against the stress of long workdays, encroachment of work into the personal sphere, and social expectations of perfection and ever-increasing efficiency.

Today's universal health care and health maintenance organizations are changing medicine. In the future, physicians may train longer, work harder, earn less, and have less autonomy: a thoroughly unappealing combination.

INTRODUCTION

So, why enter medicine? Perhaps you see medicine as the pinnacle of applied science: you want to elucidate mechanisms governing the human body, then develop preventive and therapeutic procedures, making a direct and tangible impact on the lives of others. Perhaps you enjoy the humanistic aspect of medicine: you want to help people make decisions of life and death, heal people of emotional pain, alleviate suffering and preserve dignity in death. Perhaps the practical side of medicine appeals to you: as a physician, you are always on duty, ready to help family, friends and bystanders. You can help people who cannot help themselves.

Whatever your motivation may be, it must be strong, and finding it requires strategy and time. You will need self-examination, clinical experience and interaction with physicians at every stage in their careers. We hope the stories and advice in this guide will help you not only choose your

career, but

also

discover and



Choosing A Major 1

It can be difficult to choose a major when you first come to MIT. So many courses, yet so little time to explore them all. What is an incoming freshman to do? Luckily, although MIT does require that you pick a major by the end of freshman year, it is easy to switch majors later as long as you have a plan that allows you to graduate within four years. Many students will still be deciding between majors in their sophomore year, and even a few students switch majors during junior year.

The most common premed majors at MIT are:

- Biology (7)
- Brain and Cognitive Sciences (9)
- Biological Engineering (20)
- Chemical Engineering (10)
- Chemistry (5)
- Computer Science and Molecular Biology (6-7)

These majors are the most popular because they are usually more directly related to medicine, and because some premed requirements can be satisfied by the major's requirements. Majoring in one of the more common premed courses is also good because it can be easier to get to know other premed students and to build a peer support and advising network. That being said, do not be afraid of pursuing another major! You should major in whichever subject interests you the most.

Choosing A Major 1

If you are worried about completing the premed requirements, many of them are already included in the GIRs. I personally know premeds who are majoring in Computer Science (6), Mechanical Engineering (2), and Physics (8). In addition, many medical schools are beginning to appreciate applicants from non-traditional premed majors for their unique education, knowledge base, and background. I recently talked to MIT alum who majored in Nuclear Science and Engineering (22), because he was interested in radiology and imaging technology. He is now a student in the New Pathway program at Harvard Medical School. When I asked him about his unusual major, he told me he did not have a problem applying to medical school, but rather that his unique background helped him stand out. So you should not feel pressured to major in a "typical" premed course--just major in whatever interests you the most.

~Anne Huang '14

The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man.

~George Bernard Shaw

Choosing A Major 2

I feel that many premed students come to MIT knowing that they want to become physicians, but not sure about what they want to major in on the path to medical school. For me personally, I just sort of assumed that I would want to do something related to biology or biological engineering, and didn't give it too much thought until the end of sophomore fall. I decided to take early sophomore standing after my freshman fall semester and sort of checked off my major as biology because it seemed the default for pre-med students. I realized after taking some more biology courses that despite my love for biology, my interests laid more in the engineering side of life.

I looked around and went to some department academic fairs and realized that there was a biomedical concentration for mechanical engineering. I took a look at the different courses, talked to Brandy Baker (the MechE undergraduate academic administrator), and realized it was exactly what I wanted to do. I am now enjoying my life as a course 2A/20 pre-med (Mechanical Engineering and Biological Engineering).

The advice that I can give about choosing a major is don't rush it and don't be afraid to switch. Being pre-med is tough, but it shouldn't be a burden that makes your undergraduate years miserable. Finding the right major will give you the right balance between pre-med requirements and classes that you sincerely enjoy.

Choosing A Major 2

So if you are worried about finding a major that is right for you, talk to some older students, undergraduate department coordinators, and keep an open mind. Your freshman advisor will most likely have some suggestions, and a UROP in a department major you are considering might help you determine your interests as well. Your interests will become more apparent in time, and don't be surprised if you end up catching another major and a minor or two on the way to graduation. Medical school admissions committees repeat ad nauseum that they do not care about a student's major as long as they are passionate about it. Good luck!

~Roo-Ra Lee '15

Being Pre-Med is a different ball game than other paths through MIT. There isn't a constant interview process - like for people who go into Industry or Consulting. Your time at MIT can feel like there isn't any real feedback mechanism for how you are doing as a Pre-Med until the actual application process, which at that point the feedback is whether or not you get into medical school. It can sometimes feel like you have no idea what is going on. That being said, don't be discouraged. Seek help from the MIT Prehealth Advising Office and from upperclassmen who have been in your position.

~David Han '14

Getting the Grades

- Plan your classes well. Of course, major in something you love, but try to balance out your course load each semester so that you don't end up with too many difficult classes in one term. Unless you're trying to double major (which might not give you much of an advantage when it comes to med school applications), taking four classes a term is a solid way to do well in both your classes and your extracurriculars. For sophomores, there's sophomore exploratory; for freshmen, there's ABC/no record; for everyone else, there's a late drop date.
- Classes can be tough at MIT, so if you aren't doing well in a course it may be wise to drop and retake it. If you are set to get any grade lower than a C you should drop the class, have 3 or 4 classes on your record for that semester, and then get an A in the class when you take it again. GPA isn't everything, but it certainly is important for medical school admissions. Repeated dropping is not recommended however, since schools need to see that you can manage a full load of courses during the academic semester.
- Stay on top of your schoolwork. MIT classes are fast-paced, and it's really hard to catch up once you've lagged behind. In 5.12 (Organic Chemistry), I would do all the readings and practice problems before the corresponding lecture, and treat the lecture as a review. This way, come class time, I knew exactly what to listen for while the professor talked, and I could keep up with the material.

Getting the Grades

- Do practice problems! Sometimes, you may know the concepts, but it's hard to know them well enough to quickly solve problems on a test. Doing lots and lots of practice problems will help you develop intuition and raise your exam scores.
- If you need someone to hold you accountable to study for a class, even though there isn't assigned work for that class, get a tutor or sign up to be part of a Seminar XL group! Weekly meeting times would then force you to study for that class well before the exam. Seminar XL groups (offered through the Office of Minority Education) are open to everyone and are great for helping you become familiar with new topics introduced in class through various practice problems. These seminars are led by graduate students, or students who excelled in those classes.
- UROP for credit! UROPs can count as classes, and if your GPA isn't perfect, getting a lot of UROP credits can really help boost it come application season.

~Joanne Zhou '15

For me, an area of moral clarity is: you're in front of someone who's suffering and you have the tools at your disposal to alleviate that suffering or even eradicate it, and you act.

~Paul Farmer, MD, PhD

Intro to Organic Chemistry

One of the biggest sources of concern for pre-meds at MIT is organic chemistry: the infamous 5.12 and 5.13. Many premeds hear from upperclassmen that organic chemistry is difficult and may destroy GPA. Here are a number of different strategies that MIT pre-meds employ.

First, 5.12 is offered in both the fall and spring semesters, while 5.13 is only offered in the fall. Because MIT Pre-health Advising recommends taking 5.13 before taking the MCAT, pre-meds who plan to take the test after sophomore year should take 5.13 sophomore fall and 5.12 freshman spring. A good number of freshman premeds take 5.12 in the spring, causing non-premeds to avoid taking it then, thinking the large number of pre-meds may mess up the curve. For similar reasons, many premeds also take 5.12 sophomore fall and complete 5.13 the following fall. These students tend to take the MCAT in January of the application year. Since material from 5.13 covered on the MCAT is relatively minimal, some premeds take 5.13 later in their academic career, but still test the summer of sophomore year.

When you take these classes doesn't really matter that much to your final grade or understanding of organic chemistry, so don't stress out too much about it, and take it when it most conveniently fits your schedule. That being said, organic chemistry is a challenge for most people. Personally, I struggled a bit in the beginning because I had never seen any of it before, but after a while I got used to it and it became somewhat easier to understand.

Intro to Organic Chemistry

For me, the key to doing well in these classes was to do many practice problems, really understand all of the mechanisms and reactions, and have an open mind to think creatively while problem-solving.

Generally for 5.12, there were a good number of practice exams available before each of the four exams. These exams were from previous years so it was helpful to go through and do all of them, because the real exam was often quite similar in format. However, sometimes the professors like to throw in questions that we had never seen before but were similar to what we had learned, which required some creativity on our part to get the right answer.

Additional tips for success:

- Problem sets are only worth 4% of your final grade, so you shouldn't stress too much about getting perfect scores on all of them, but they are also very important to understanding the material so definitely do them.
- TA's generally have the final say in your grade if you are borderline, so get to know your TA and ask questions.
- For 5.12 and 5.13, TAs are fairly generous with partial credit on exams, giving at least a few points for writing something vaguely in the right direction.

Organic chemistry was indeed challenging and stressful at times, but with practice and a bit of creativity, it can be manageable and even somewhat enjoyable.

~Vivian Liu '15

Intro to Organic Chemistry 2

More on 5.12 and 5.13...

The same professors rotate teaching 5.12 and 5.13 every few years, so they're "experienced," to say the least. Regardless, all the professors' teaching styles are more or less the same: mainly lecture-based with a few clicker questions here and there. Don't delay taking 5.12 or 5.13 because a certain professor is teaching a section on the semester you're planning to take either of them; they're all amazing teachers and people. However, do note that the chemistry department offers 5.12 in both Spring and Fall semesters while 5.13 has historically been a Fall class, so plan accordingly.

As for tips in 5.12 or 5.13, the common advice is that you shouldn't spend hours trying to memorize mechanisms; by now, you've probably figured that MIT tests are usually *not* a game of "memorization." Instead, try to develop an "intuition" for the mechanisms, reactions, and so forth. Admittedly, "orgo @MIT" is fast-paced, especially 5.12. To provide some perspective, Tuft University's organic chemistry 1 syllabus covers roughly $\frac{3}{4}$ of what 5.12 covered. In spite of your greatest efforts to keep up and to understand the "more organic picture" of 5.12 and 5.13, lagging behind in the classes is a common concern. Don't feel bad if you ever need help! Remember that the professors and the TAs are surely always glad to help out! Oh, side note: you're at MIT—surrounded by MIT students. Just *ask*, and you shall receive.

Required Premed Classes

The MIT Prehealth Advising Office has a list of recommended premed classes that you should take. These classes are required by most (but not all) U.S. medical schools, and they will also help you prepare for the MCAT. Luckily for us, many of these classes are GIRs, or General Institute Requirements. In other words, we are already required to take them so we can graduate. The recommended premed classes that are also GIRs are:

- Introductory Biology (7.012, 7.013, 7.014, 7.015 or 7.016)
- Introductory Chemistry (5.111, 5.112, or 3.091)
- Physics I (8.01, 8.011, 8.012, or 8.01L)
- Physics II (8.02 or 8.022)
- Calculus I (18.01, 18.01A, or 18.014)
- Calculus II (18.02, 18.022, 18.02A, or 18.024)
- One year of English/Humanities/Writing (two CI-H or CI-HW classes).

**For other recommended courses please see the MIT Premed Recommended Course list:*

http://gecd.mit.edu/grad_school/health/prepare/academic

If you have any questions about what classes are required by a specific medical school, or whether you can substitute one class for another, you should contact MIT Prehealth Advising. You are required to fit the recommended premed classes in your schedule so that you will complete all of them by graduation.

Required Premed Classes

However, if you have been accepted to medical school and you have not yet completed one of the recommended premed courses, you may be able to call them and ask if you no longer have to take that class. Note that this only works if that specific medical school does not require you to take that class, or if you can make a good argument as to why you do not need to take that class. For example, you may not need to take Chemistry Laboratory (5.310) if you have already taken several chemistry-related labs as part of your Chemical Engineering major. However, these are exceptions rather than the rule, so you should plan to take all of the recommended premed classes before graduation.

Another important note about premed requirements is to never take them on pass/fail, unless you take them during your first semester of freshman year. It is MIT policy that all of your grades from first semester freshman year remain hidden, even to medical schools. However, you cannot use Junior/Senior P/D/F on any of the recommended premed classes. You **MUST** take them for a grade.

~Anne Huang '14

Editors' Note: In response to the new MCAT in 2015, the set of required premed classes may change. At that point, these comments may not apply.

Common Coursework

We've all been there—mindlessly addicted to CourseRoad while fretting over how to cram the ten classes you love in 48 credits' worth of classes. For those who don't know what CourseRoad is,

CourseRoad is a useful online tool for planning out all your MIT classes; it tracks if you have the prerequisites for certain



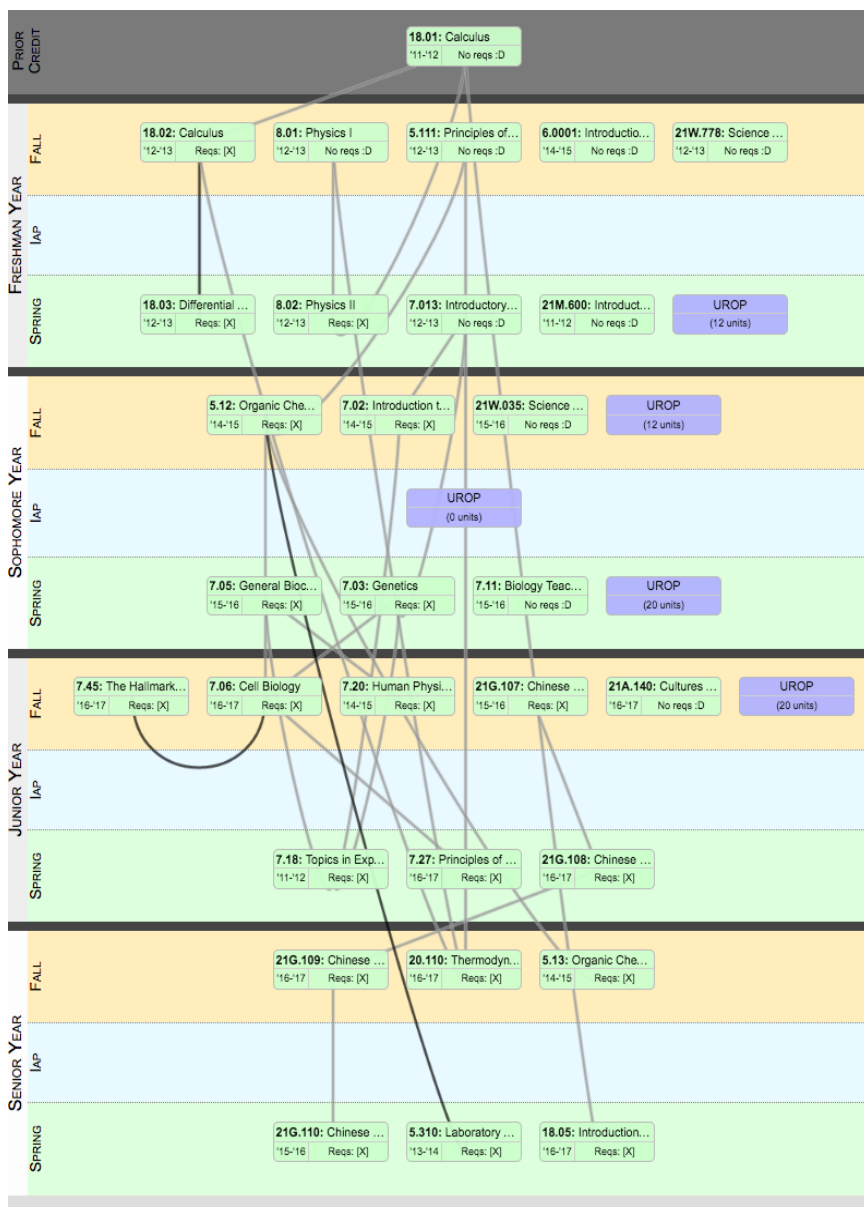
classes and whatnot. To help out, here are some CourseRoads that your fellow MIT premeds are following... But remember that everyone's interests (yes, yours!) are unique! Choose classes *you* are genuinely interested in!

"Being a premed at MIT isn't that bad. You just gotta put in a lot of energy to overcome the activation barrier so that the reaction can thermodynamically go to completion. Of course, MIT offers many catalytic activities which can help with the process, such as its many clubs and its UROPs, and one should very much take advantage of it. Most importantly, as we all have the same enthalpy of reaction to go to Med. School, it matters more to enjoy the path and have fun at MIT than to slave away with a rigorous academic life. There's more to life than tooling, don't you know?"

~Anonymous MIT Student

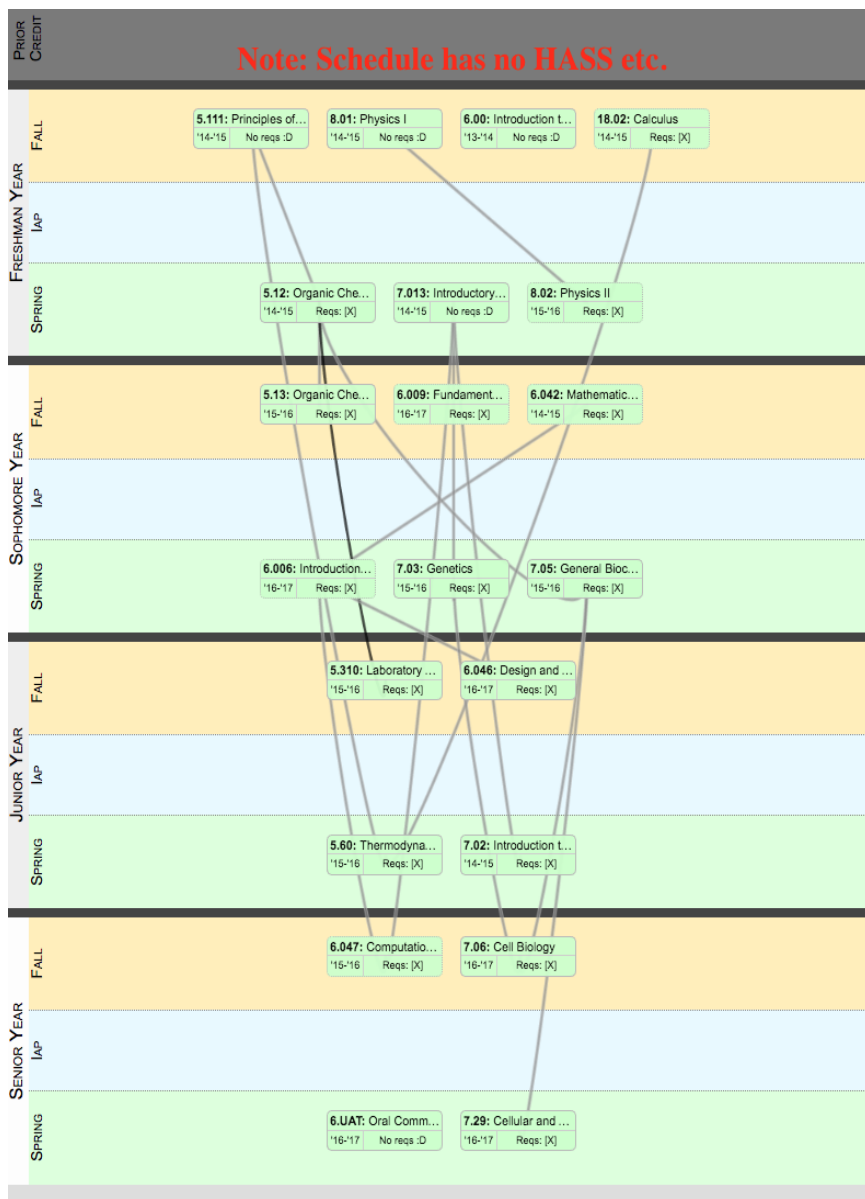
Common Coursework

COURSE VII:



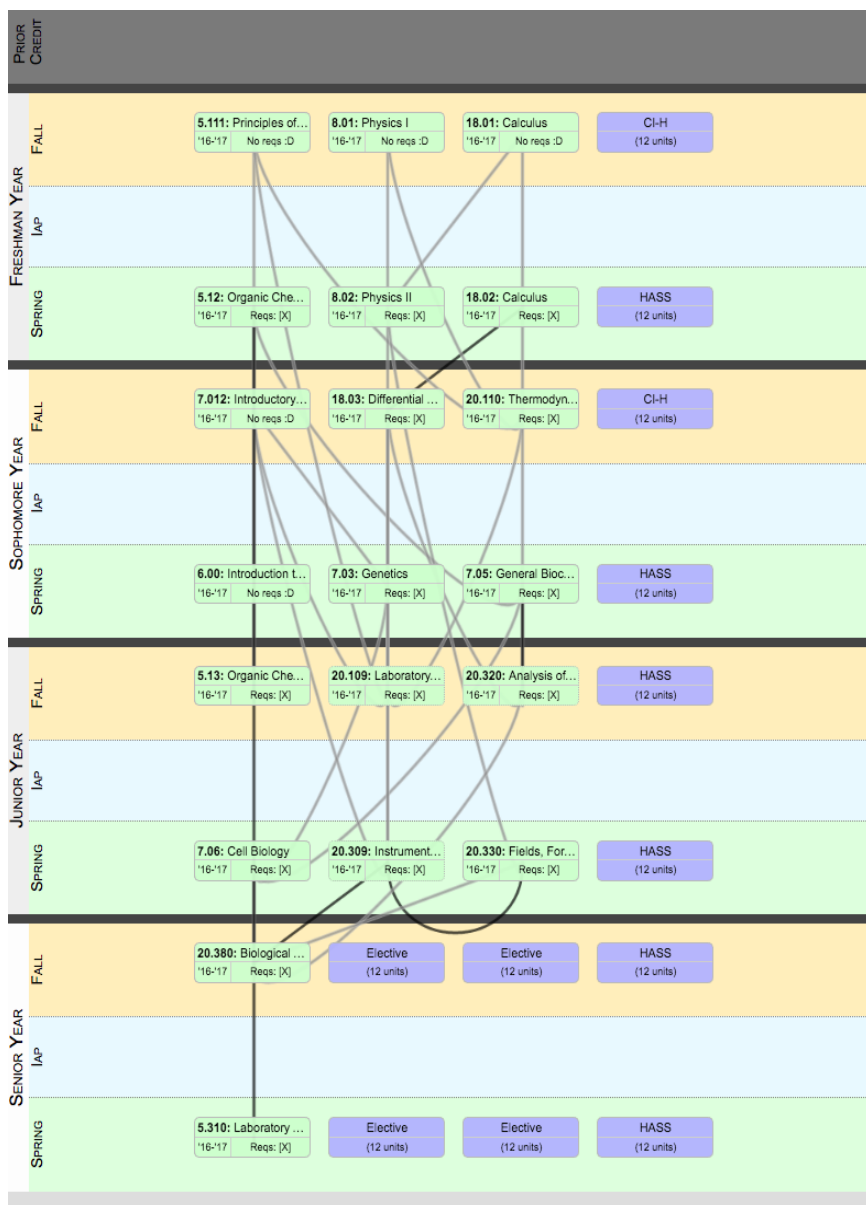
Common Coursework

COURSE VI-VII:



Common Coursework

COURSE XX:



Community Service

Service is definitely a large part of healthcare, and medical schools want to know that you truly care about serving people. Summers/IAPs are great for doing service! Also during the school year, there are great opportunities for volunteering at local organizations and in student clubs.

- Public Service Center Opportunities
 - Signup for the PSC Community Service mailing list
 - Four Weeks for America
 - Public Service Center grants for summer or IAP projects
- Volunteer at a hospital
 - Boston Children's Hospital
 - Massachusetts General Hospital
- Service through Fundraising
 - Relay for Life (Colleges against Cancer)
 - Camp Kesem
- Service during academic terms
 - FPOP counselor
 - Mentoring high school kids through the Office of Engineering Outreach Programs (CORE, SEED, etc.)
- Clubs!
 - Globemed
 - Global Poverty Initiative
 - Leadership Training Institute
 - Community Work-Study
 - Amphibious Achievement
 - Alternative Spring Break
 - MIT EMS

Community Service

- Serve in local organizations
 - Cradles to Crayons
 - Boston Court Appointed Special Advocates
 - Salvation Army Soup Kitchen
 - Haley House (<http://www.haleyhouse.org/>)

~Joanne Zhou '15

I tutored a fellow MIT student, who was blind, in biology. This was another great opportunity to improve communication skills and also to gain valuable perspective in working with people with disabilities. I am a hospice volunteer, and through my experience, I learned that it's sometimes not necessary to invent a genius medical device or anything like that to make a big impact in someone's life. Sometimes, all you need to give is your genuine friendship/company, and that can help someone be peaceful and content in their last few days instead of being lonely or in pain. That's a really big gift you're giving.

~Jane Han '13

Activities

Selecting which extracurricular activities to participate in is indeed very difficult. The activities that you choose will occupy much of your time outside of class. As such, they will be among the most prominent things that will define your MIT experience.

The first question to think about is not what an admissions officer may have to say about your extracurricular involvement. You should never participate in certain activities simply to get into medical school. The most important concern is choosing activities that really interest you. If you have genuine interest in what you're doing, it is much easier to excel at the activity and allow it to double as a stress reliever. Having genuine interest will help you demonstrate enthusiasm about your activities later on as you fill medical school applications and participate in interviews. Also, should you decide that medicine is not what you want to do, you won't think that you wasted your time doing things you did not find meaningful.

Time is a valuable commodity at MIT and you may find that many activities can potentially benefit you personally and professionally. However, avoid spreading yourself too thin. When choosing among a variety of activities that interest you, you should think about the characteristics of a physician. You should particularly focus on characteristics you may not have developed or want to strengthen. Ultimately, you should answer the question: How do you want to grow as a person by the end of college?

Activities

Perhaps you believe you are not a great listener, so you want to try becoming a peer advocate. Perhaps you have difficulties explaining complex subjects to others and you find becoming a tutor or teaching assistant as a valuable experience. Alternatively, you may want to become comfortable communicating with people from many walks of life, so you engage in activities that directly expose you to health disparities and help you understand different backgrounds.

Whether you find activities that help you practice compassion and empathy, or activities that provide you with leadership experiences and teamwork skills, you should frequently reflect on your activities and journey through college. By the time you apply to medical school, you should be able to identify how you acquired traits that possibly characterize a “good doctor” and articulate how your process of self-discovery and -improvement point in the direction of medicine.

There is also great value in finding at least one activity that you simply enjoy doing regardless of whether the activity is related to medicine or the traits of a physician. For instance, you can be involved in one of MIT’s a capella groups or dance teams. The activity doesn’t necessarily have to be “organized” as a club or team. Simply going for a morning run every weekend or snowboarding once a month is a hobby that can be justly reported as an “activity.”

Activities

Doing something purely enjoyable will enrich your college experience and show that you lead a balanced lifestyle and may become an interesting addition to a medical school class. Also, you'll have a great answer to the frequent interview question: "What do you do for fun?"

Below is a short list of activities at MIT that provide exposure to "health-related" areas. Participating in these particular activities can be helpful but are not required to earn admission to medical school. An activity that allows you to acquire personal traits that are desirable in a physician can be just as valuable as an activity that exposes you to a health-related area. Some activities below may accomplish both.

Activities Related to Medicine:

- ActiveMinds
- MIT Pre-Medical Society (MPS)
- American Red Cross Team and Network (ARCTAN)
- Best Buddies
- BrainTrust
- Camp Kesem
- Colleges against Cancer
- Emergency Medical Services (MIT EMS)
- GlobeMed
- MEDLIFE

Activities

- MedLinks
- Students at MIT Allied for Student Health (SMASH)
- Team HBV
- Traditional Medicine Society (TMS)
- Universities Allied for Essential Medicines (UAEM)
- Health Equity Club
- MedLingual

Other Service Organizations:

- Alpha Phi Omega (APO)
- Alternative Spring Break (MIT ASB)
- Amphibious Achievement
- China Care at MIT
- China Development Initiative (CDI)
- dynaMIT
- Engineers without Borders
- Fighting World Hunger
- Global Poverty Initiative
- Leadership Training Institute (LTI)
- LIFT
- Sustainability@MIT

Do not feel limited to these clubs/organizations or MIT-specific activities. If you have an interest that cannot be pursued at MIT, you should take the initiative to start a group or check whether a local organization in Cambridge or Boston is addressing the issue you have in mind.

UPOP, Experiences Abroad

Undergraduate Practice Opportunities Program

UPOP IS AWESOME. DO IT. I signed up for it even though I'm not an engineer, because I just wanted more opportunities to practice my communication skills. It was totally worth it, and the skills they teach (such as negotiation, efficient problem-solving, and teamwork skills) have really wide applications (not just for engineers!). The IAP activities are very fun and you get free food.

Experiences Abroad

I went to South Korea one summer with a UROP grant to do research in traditional medicine. Since alternative therapies and traditional medicine is much more commonly practiced there, it was easier to gather subjects for my particular research project. That's just one example of a difference in environment you can find when you go abroad. In general, going abroad is a super fast way to widen your perspectives and find inspiration for fresh ideas. Being immersed in a different culture also increases your ability to understand (and accept, or deal with) people who are very different from you, and you become highly adaptable to new situations and maybe even a little more creative. Anything that has to do with going abroad is highly valued by everyone everywhere.

~Jane Han '13

UROP Research

Having connections really helps. If you don't have any connections, you can always start by asking your academic advisor or even professors if they know anybody doing such and such research, and ask them to introduce you (by email and cc, for instance). If your goal is to publish a paper, work with someone who doesn't have tenure yet, because they're more likely to have paper-publishing as their priority, too!

Know that you have a lot of say in what you get out of your UROP experience. If your supervisor is just treating you like a labtech and hogging all the data analysis to him or herself, ask to have your share of the fun... Even if they insist on doing the final analysis, you can just tell them not to tell you all the answers before you try to think through the data yourself. You also shouldn't be afraid to quit UROPs when you realize it's not your thing, or if you feel like you're going to have to fudge data to produce anything useful.

~Jane Han '13

“Having great components is not enough, and yet we’ve been obsessed in medicine with components. We want the best drugs, the best technologies, the best specialists, but we don’t think too much about how it all comes together.”

~Atul Gawande, MD

Research

A Research Reflection

I have conducted research for the last 3 years in the laboratory of Dr. Bradley Hyman, the Director of the Massachusetts Alzheimer's Disease Research Center at Massachusetts General Hospital (MGH). My projects have focused on the role of tau protein in Alzheimer's disease (AD). There are two main proteins that are hallmarks of AD: amyloid-beta and tau. While the function of amyloid precursor protein (APP) is not known, deposition of amyloid-beta has been linked to the pathological changes in AD, such as synapse loss. Tau's main known function is to stabilize neuronal microtubules in the central nervous system. AD is characterized by misfolding and deposition of amyloid-beta, and hyper-phosphorylation and aggregation of tau which result in neuronal death and cognitive decline. In one project I showed that amyloid-beta deposition enhances tau propagation and that the presence of pathological tau exacerbates amyloid-beta deposition. These findings suggest a complex synergistic interaction between these two pathologies in AD; combination therapies targeted at these two lesions might provide better treatments for this disease (published in *Acta Neuropathologica Communications*, third author). I also showed that while tau is thought of as a prion-like protein, knocking out endogenous tau surprisingly reduced neurodegeneration without affecting tau spread. Thus, reducing tau levels to decrease neurodegeneration could be an effective therapy (published in *EMBO*, second author). Both of these projects resulted in publications and I presented both projects at several venues including the NIH and Society for Neuroscience conference. I am currently leading a project to dissect the pathway by which tau aggregates become toxic to neurons by analyzing molecular and biochemical changes in endoplasmic-reticulum stress response in neurons, mouse models, and brain samples of AD patients.

Research

The way I met Dr. Bradley Hyman was pretty random. There is a club called Brain Trust, which besides organizing social events for acquired brain injury survivors, also hosts special lectures on particular neurological diseases each semester. My freshman year I was historian of Brain Trust, so I attended the lecture, which ended up being on Alzheimer's disease. I was fascinated by the promising neurobiological research and the strong medical focus that Dr. Hyman presented. So when he said that whoever was interested on working with him could talk to him after the lecture, I immediately went up to him and asked to join his lab that summer. Since his lab is not affiliated with MIT directly, he set up a co-mentorship with one of his collaborators, Dr. Matthew Frosch, who was affiliated with MIT. In that way I could get UROP funding through MIT. Since Dr. Frosch is director of the neuropathology service at MGH, I got to meet with him every Friday at the neuropathology seminar he hosts at the hospital; so I got receive a lot of mentorship from him. I managed to develop a strong relationship with Dr. Hyman by having one on one meetings very early when I started working in the lab. In these meetings we talked about the project I was working on and some career development. As a result, he tried to give me projects that accommodated my schedule at MIT, and also I could contribute to the most. After a year or so, once I have proven myself through some projects and the post-docs were starting to listen to my ideas, I was given more and more autonomy. So the two main takeaways are: meet with your PI as early and as frequently as possible so that he knows that you are interested in the science and what your goals are, and to stick with a lab for a long period of time so that you can see projects go through completion and get a more meaningful research experience. Also, try going to talks by professors during your freshman year so that you can sample the type of research and the vision each PI has to offer.

Premed Life at MIT

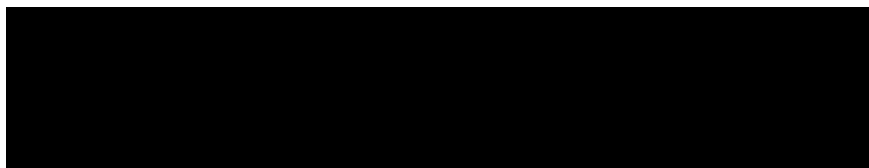
Premed Life at MIT

Freshman Transition to MIT

Everyone knows that the transition from high school to MIT can be difficult. The great thing about MIT is that the first semester of freshman year is pass/no record. For all of your classes, if you get an A, B, or C, a "pass" will be recorded on your external transcript. If you get a D or an F, your external transcript will show no record of you taking that class. You will still receive a grade in your classes, but they will be seen only by you and the professor of that class. This first semester policy really helps students adjust to college life and to the academics at MIT.

There are two major schools of thought in approaching the first semester of freshman year. The first is using this opportunity to see how much work you need to do in order to get the grade you want. The second is using this opportunity to put academics on the back burner and make new friends, explore the city of Boston, and have as much fun as you can without failing all of your classes. While there is no "right" way to get through first semester of freshman year, it is important that you use this semester as a time where you can safely explore your academic limits and implement good study habits.

~Anne Huang '14





Advising

Throughout your journey through MIT, try to actively find mentors. A mentor can be a doctor, professor, teaching assistant, medical/graduate student, upperclassman, or peer. Be sure to ask your mentors how to navigate MIT's vast array of academic and support resources and explore an interest in medicine. MPS organizes two advising programs:

The first program called Peer Advising provides office hours once a month where upperclassmen in various majors serve as peer advisors for anyone who attends. Peer advisors can provide helpful guidance as to how to manage your workload through the semesters and tips to succeed in the particular classes or majors.

MPS also organizes the MIT-Medical Student Mentor Program, which matches current MIT premedical students with recent MIT alumni in medical schools across the country. Because they have gone through the MIT experience, medical student mentors can provide MIT-specific advice on many topics, including the medical school application process and transitioning to life in medical school.

~Eric Trac '13

Premed Life at MIT

Advice to Freshmen

Hello future premeds!

The first thing one might hear here at MIT is a groan or an "Oh, I'm sorry" when you announce to everyone that you are a premed. Do not listen to them; I was scared at first when I heard the reactions, but overall I feel like I'm managing just fine! All I can tell you all is to do your best; you may or will meet competitive premeds, but do not let them get you down. Do not let your grades get you down also; I don't have the best supermegafoxyawesomehot grades, but I'm still not letting that stop me into thinking positively about the rest of my classes and med school. All you really can do is do your best!

~Micah Nishigaki '15

"This is a general truth at MIT - not just for Pre-Meds. No matter what happens, keep your relationships as a top priority. These are the people who will share in your successes and be there when you fall. Thank these people in your life, and let them know what they mean to you."

~David Han '14

Premed Life at MIT

Balance at MIT

As an incoming freshman, MIT can seem daunting, massive, and completely unfamiliar. From scrolling through the never-ending course catalog of the hundreds of classes offered here to searching through the student activities database, you will probably be overwhelmed at the abundance of choices MIT offers you. Not to worry though, because every other incoming freshman feels the same way as you do. So how do you figure it all out?

Once you get to MIT, you'll find that freshman are given a large amount of help to choose their classes and transition into MIT. MIT grants freshman the boon of pass-no-record. Take advantage of it! This is a *huge* gift because it gives freshmen the opportunity to dive into all the activities and classes that interest them, and gives them a chance to pick and choose the ones they really enjoy. It is really rare that you can do well in your classes and be an active member of ten or more different clubs and organizations no matter what upperclassmen have proven and said.

That being said, the best way to find that sense of balance in your life is by trial and error in your first semester. Pick your classes wisely, asking upperclassmen and advisors for advice. In the beginning, you will want to be a part of everything because everything is new and exciting. However, you'll quickly learn with the pace and rigor of MIT classes, doing everything won't be possible.

Premed Life at MIT

You might try to continue to stuff all the club meetings and classwork time into your day, but that might mean fewer and fewer hours of sleep, more tiredness, and a stressed out first semester. Choose the activities that you truly enjoy and where you can see yourself contributing significantly, because that is where you will be happiest in the long run.

But don't be scared off from trying new things and joining student groups. The balance at MIT comes from a mix of classes, activities, social time, and sleep (yes sleep is not for the weak). Spending all your time doing schoolwork is not going to make you happy or help you succeed. Spending your time running around to different activities, doing classwork in between, and not sleeping is not going to work either. Instead, spend time in the beginning to research classes and activities, judge how many hours a week each commitment is going to take, and choose the things that seem most significant to you. Everybody will need to find their own balance because no two people are alike, but with the help offered here at MIT, you are sure to succeed.

Remember that as you continue your MIT journey, time becomes more valuable and the way you spend it is key to your success here, and if you choose to spend your time doing things that you enjoy and are happy doing them, the time will be well spent.

~Lakshmi Subbaraj '16

Premed Life at MIT

Humanities at MIT

I came to MIT sure that I wanted to major in Biological Engineering and pursue med school, perhaps even an MD-PhD, upon graduating. While I wouldn't want to trade in the analytical skills I've gained and extremely exciting applications I've seen through my major, now as a graduating senior, some of my most meaningful experiences over the past four years have come from exploring the social science and humanities aspects of healthcare.

While I was just beginning to get my feet wet in bioengineering research at MIT my freshman fall, I simultaneously joined a student-driven organization called GlobeMed, which seeks to promote health equity throughout the world. The MIT chapter is partnered with a system of HIV/AIDS clinics in Togo, West Africa, where we primarily focus on technological capacity building in a variety of ways to improve patient care at the clinics. I quickly developed a strong commitment to the group, and my involvement ever since has significantly impacted the trajectory of my time at MIT and my goals post-graduation.

I decided to start exploring healthcare more rigorously from a social sciences perspective. I ended up taking a fair number of classes on medical and global health anthropology, health policy, and basic economics governing public policy. I'll be graduating with a minor in Public Policy, with a focus on health policy. With some digging, I think MIT offers a great greater

Premed Life at MIT

number of classes on the non-science aspects of healthcare, supplemented by a plethora at Harvard. I only wish I could go back and take more! If you don't know where to start, as was the case for me, I highly recommend sitting down with a professor for a class you might be interested in, or perhaps a minor advisor, to try and figure out what might be interesting and relevant for you! They're usually more than happy to help.

While many premeds often spend summers immersed in wet-lab, basic science UROPS, which is certainly a great option, I relegated that work to the academic year, and instead spent one summer interning at the U.S. Agency for International Development (USAID) through the MIT Comprehensive Initiative for Technology Evaluation, and another at the Singapore Ministry of Health's Policy, Research, and Economics Office.

Many, many, many people will try to convince you that if you're involved in science research, you must without question devote your IAPs and summers to full-time work in the lab. For some people, that is the right choice, but don't feel bound to the lab bench if you have other interests you'd like to explore! This is the time to get those new experiences, and it would be a disservice to your time at MIT and the opportunities it affords to do otherwise. In fact, my work at USAID even influenced me to switch my UROP to a bioengineering lab focusing on malaria, since that had been the topic of my work from a non-science angle while at atUSAID.

Premed Life at MIT

USAID. During my junior spring, I broke away from bioengineering UROPs altogether and spent some time UROPing in the Political Science department!

Now after four years here, I'll be heading off to medical school in a few months, likely pursuing a joint MD-Masters of Public Health. I hope to practice medicine, but to also get involved in health policy in order to try and alleviate the healthcare disparities that plague our system alongside the huge costs and inefficiencies. I'm sure my engineering background will come in handy not only in understanding the science and technologies involved in-depth, but also in analyzing the problems and optimizing the solutions.

There were folks who advised me to do what many see as stereotypical premed activities (e.g. all summers in the lab!), but others encouraged me to do what seemed interesting, and that latter mindset has made all the difference. Not only am I now more sure of my professional goals, but even during the application and interview process, I've had experiences and interests to talk about which I feel passionately about and which might not be as expected from an MIT engineering major. Don't treat your MIT years as a checklist to get into medical school. (There is no magic formula that will get you in!) Instead, capitalize on the huge array of possibilities you have here and find out what your unique path will be!

. ~Rafa Rahman '16

Premed Life at MIT

Dos and Don'ts

DO:

- Prepare early. Know that medical schools are looking for high GPA and MCAT scores, clinical exposure such as shadowing and volunteering, extra-curricular involvement, and research experience.
- Make use of MIT resources such as the Prehealth Advising Office, GECD, MPS, etc.
- Keep your long-term goals in mind while choosing activities and UROPs.
- Try something new: you want to have new experiences and challenges to stretch your boundaries and introduce you to new perspectives.
- Be organized- the fire hose of MIT does not stop once you get here.
- Sleep. Seriously. Your brain and body will thank you.
- Learn from those around you. Your best resources for advice are the students around you. Don't be shy and ask questions.

Certainly the primary imperative of a physician is to be skilled in medical science, but if he or she does not probe a patient's soul, then the doctor's care is given without caring, and part of the sacred mission of healing is missing.

~Jerome Groopman, MD

Premed Life at MIT

DON'T:

- Let the idea of being a premed at MIT intimidate you: if you're truly interested in medicine, pursue your passion.
- Think of MIT as a stepping-stone to medical school: make the most of your time here and really enjoy the experience.
- Let your pursuit of a wonderful GPA dominate your life. If grades are all you take away from a class, you're neither learning nor growing.
- Have a laundry list of activities. Medical schools do not care how much you do if you are not truly interested in it.
- Feel pressure from other premeds. We all go through times when we think that we're not doing enough and falling behind. Even if you have similar goals, feel free to take a different path to reach it.
- Think that you have no other options. Medicine is a long and often difficult path. If you find yourself more miserable than happy, step back and reconsider your options.

~Jenny Halford '16

The value of experience is not in seeing much, but in seeing wisely.

~William Osler, MD

MIT Premed Survey

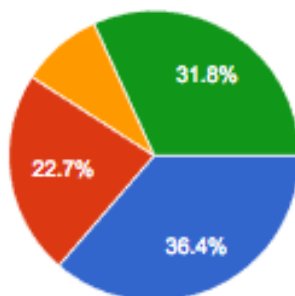
44 Total MIT premeds were kind enough to answer a quick survey on their premed life at MIT.

Here are the results of the survey!

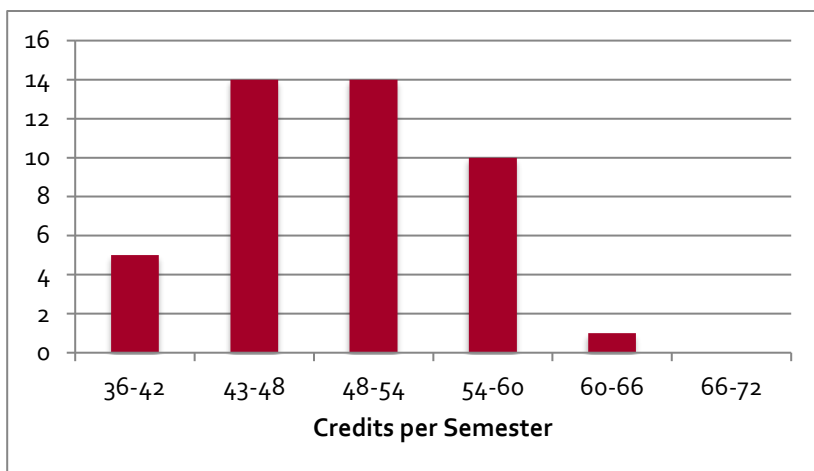
Thank you to all those who took the survey!

Class Year:

Freshmen
Sophomores
Juniors
Seniors

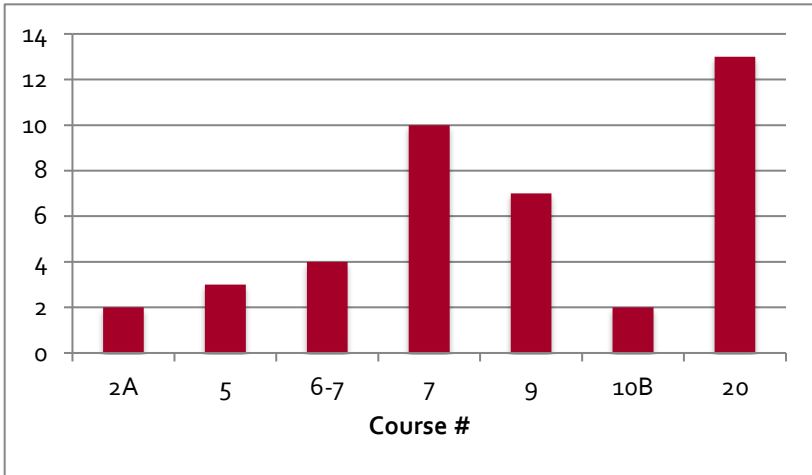


Credits per Semester:



MIT Premed Survey

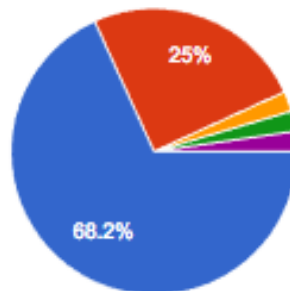
Course Number:



Changed Courses X times:

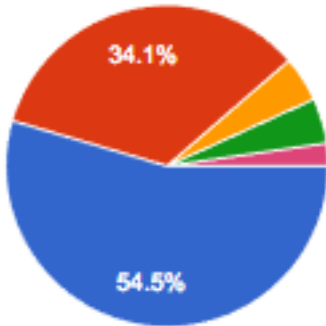


0
1
2
3
4+



MIT Premed Survey

Degree Plans:



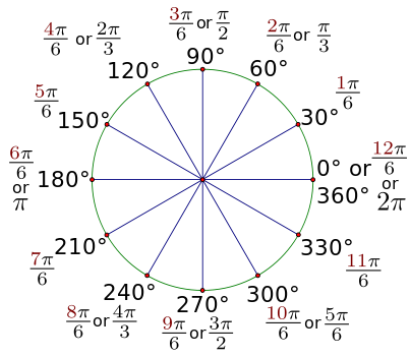
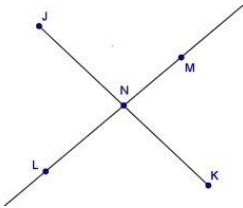
MD

MD-PhD

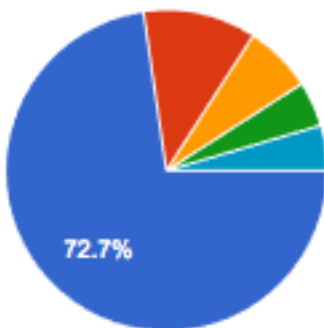
MD-MPH

MD-MBA

DVM



Year Matriculating:



After senior year

1 year after senior year

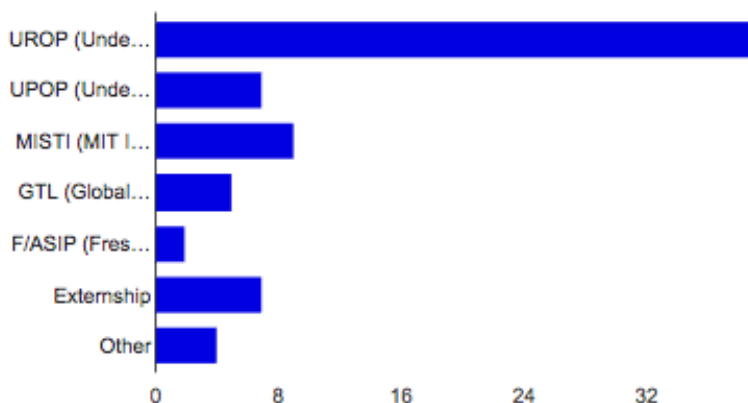
2 years after senior year

3 years after senior year

Other

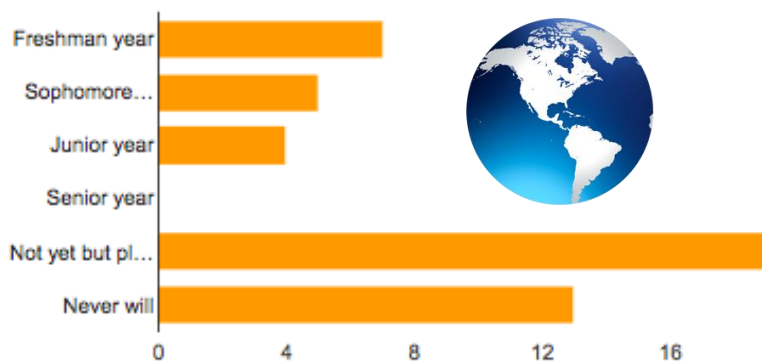
MIT Premed Survey

Extracurricular Activities:

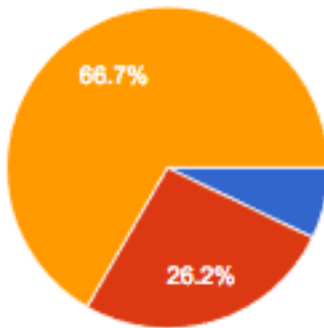


“Abroad” Experiences:

Did you ever "go abroad" with MIT's support? When?



MIT Premed Survey



*Do you feel that
being "premed at*

*MIT" is exciting,
stressful, or both?*

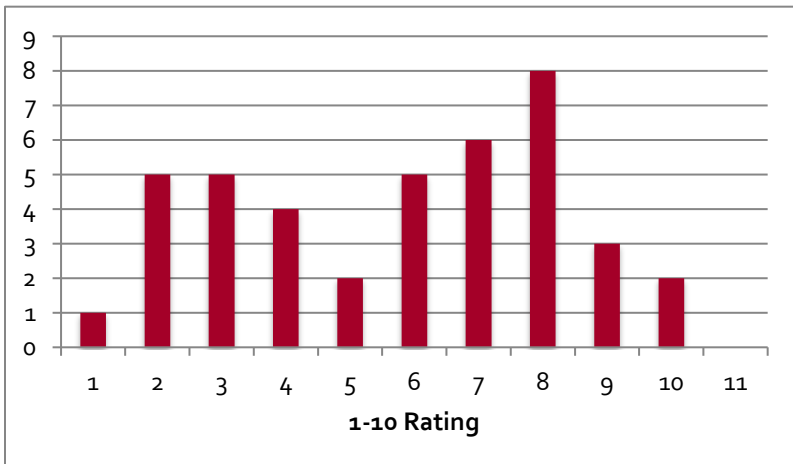
Both

Stressful

Exciting

The "Premed Experience" at MIT:

*On a scale of 1-10, how much does "being premed"
govern your experience at MIT?*



Applying to Medical School

This is an opportunity for students to explain any questions that may come up in their application. For example, a student may explain to the committee why for a particular semester their grades dropped. The committee would then be able to advocate on your behalf to medical schools. Students will also receive feedback during their interview on what they need to improve. This feedback could include improving your interviewing skills to enhancing your clinical exposure.

~Aleshia Carlsen-Bryan

*Assistant Director of Pre-Health Advising
MIT Career Advising & Professional Development*



**"You caught a virus from your computer and
we had to erase your brain. I hope
you've got a back-up copy!"**



COPA (Committee on Pre-Health Advising)

If you are applying to medical school, you should consider going through the COPA process. The Committee on Pre-Health Advising is here to help and support students applying to medical school and other health profession schools.

The largest percentages of students that go through COPA are medical school students. Students that decide to go through COPA will be provided with a committee letter for medical schools. Many medical schools expect to receive a committee letter from a student if their undergraduate institution provides this service.

Students that decide to go through COPA will submit their application material to their credential service account. After submitting preliminary application materials, students will be allowed to schedule their COPA interview with the Assistant Director for Pre-Health Evaluation and a faculty member.

During the interview, students can be expected to answer, why they are interested in medicine, what their strengths and weaknesses of their application are, along with a variety of other questions. This interview is meant to allow COPA to better get to know you in order to write your committee letter.

Applying to Medical School

MCAT

Editor's Note: The MCAT format changed in 2015, in that the test is longer and includes areas such as biochemistry, psychology, and social sciences. However, we believe that the study strategies shared below remain applicable.

I never took a prep course because what I had heard (and what I've found to be true) is that if you're disciplined enough to study on your own, a prep class isn't much help. Basically what a prep class does is keep you to a schedule and forces you to study regularly. If you can already do that, I haven't seen a prep class that is very useful.

Regarding how I studied, I'll share it, but with a word of advice: not everyone can do what I did, so take it with a grain of salt. I did relatively unfocused reading on the entire subject matter for about 2 weeks off and on, and then basically did non-stop questions (focusing on the areas that were the weakest) for about 3 weeks. As in 9 hours a day, every day, for 3 weeks.

The books I recommend: Kaplan for the material (their bio/physics books are absolutely great – I didn't see the chem/orgo ones because I'm strong in both subjects), and Exam Krackers for both the material and the questions (Barron's and Princeton Review really didn't match the difficulty of MCAT questions at all). I did every question I could find from both companies. I highly recommend EK 1001 questions (and 101 for verbal) for every subject.

Applying to Medical School

Depending on how you learn, pick and choose how many you want to do. I learn best by practicing, so I did all roughly 4500 questions. Again, perhaps not the best study strategy for everyone. It really depends on your comfort level and studying style. I have also seen students and friends study for 6 months for the MCAT and do well. I personally couldn't do that because I don't like having to retain knowledge for so much time. But to each his/her own.

I would focus on your weak areas. Focus on physiology. Focus on the cardio and renal systems in particular. Learn fluid mechanics. And understand how concepts from one can be applied to something else (fluid mechanics applying to blood pressure and anti-diuretics, for example). There are inevitably things you're strong at. Just refresh those but don't spend too much time studying them. Make sure you brush over all areas that you see in Kaplan. Even if they say that evolutionary bio isn't that important, it can show up in a big way (and it has on recent exams). Orgo II matters more than Orgo I. Be able to do quick estimations of multiplication/division/basic math. The numbers you get on the MCAT won't be easy powers of 10.

It's a long, tiring exam. And the questions on the AAMC practice tests (do all of those too, sadly they do cost a lot) are a compilation of the easiest questions from the actual MCATs, so be prepared. If you study hard and practice, you're going to kill it.

Applying to Medical School

At the end of the day, it is both an important exam but also only one part of your application. You need a 33+ to be in really good shape for any school in the country (The MIT average MCAT score is 35). You need a 36+ to be considered seriously for top 10 schools. Since the schools see all attempts of the MCAT it's best to take it once and to take multiple practice tests ahead of time to be sure you are scoring in an acceptable range. If something goes wrong on test day, it's okay to retake it if you think you can do significantly better (2+ point improvement). And it's possible to make a holistically good application with a lower MCAT score. And lastly, don't take it late. Give yourself time to take it again, just in case.

Application process

I would certainly keep March Junior year - March Senior year completely devoted to applications (or the equivalent time frame if you've taken time off or plan on graduating early). In April/May you'll be finalizing your activities list, recommendations, and personal statement. Remember, you have to apply *very* early for applications. It matters. Be prepared to submit the AMCAS when it opens in June. I submitted the second week that it was open, and I regret it. I wish I had done it in the first week.

Regarding essays, give yourself a lot of time to think through and write the personal statement. I wouldn't expect to get it right in one (or even two drafts).

Applying to Medical School

The inspiration for my personal statement actually just came to me one day in February, so deciding what to write luckily wasn't hard. But the tweaking took constant work over about 3 months to finally get it to form.

AMCAS opens in May for preview. I never took a look at it to prepare my submission ahead of time, but I wish I had. The closer to the first day you can submit, the better off you'll be. The AMCAS verification process takes a *very* long time the later you submit. Even submitting 11 days after it opened, AMCAS took a month to verify me. Schools take notice of how early you submit, and you'll be in much better shape for interviews later on down the road. Really think through your activity descriptions and which ones you want to list. It's not necessary to list 15, and it's also not necessary to list every single thing that you're doing.

Get your recommendations lined up well before May. Make sure that you've done well in their classes, and that you have a sense that they'll write you a strong one. And remember to thank them and keep them updated on how you're doing down the road!

After getting AMCAS planned out and submitted, the secondaries start rolling in. This was by far the most exhausting part of the app process. I finished all of my secondaries within about 5 weeks, and it was basically a full-time job.

Applying to Medical School

Luckily the standard for tightness and quality of writing isn't as high as your personal statement because schools recognize there's just too much to do. BUT ensure your essays are free of typos and grammar mistakes. And most importantly, make sure the content is genuine. I went into the entire process with a single-minded determination never to spin or tweak anything. I didn't want to make any of my activities/essays/resumes seem contrived. Thus, for my secondaries, no matter what my thoughts on the school, I sat down for an hour to peruse the website and find a feature of the school I genuinely liked. While it did take a little research, the essays were so much easier to write. You can reuse secondaries, but make sure you're answering each school's prompts in their entirety.

Don't hold secondaries for more than 1-2 weeks. I held one secondary for about 6 weeks and I think the school noticed. I had my entire application marked as complete by most schools in mid-August, and I was on the late side of the early pool of applicants.

This process heavily favors people who apply early. I can't stress that enough. No matter how great of an applicant you are, it will hurt you to apply late. And remember, the earlier you apply, the smaller the applicant pool is. You have a lot of interview spots for fewer applications. That works in your favor. Not to mention the *vast* majority of schools are rolling.

Applying to Medical School

Later on, you can send update letters to your schools with any developments in terms of your activities and your fall semester grades. Most schools welcome this, so just make sure the school doesn't have a policy of not taking updates (Stanford, for the most part, is a school that doesn't like updates, for example).

Picking schools

I picked schools based on locations I wanted to end up in. In hindsight I applied to 150% the number of schools I should have. A good way to decide is to look at the MSAR and look at average MCATs and GPAs for each school. Interestingly enough, though, I was rejected by most of my true "safeties" and granted interviews at the schools generally accepted as "reach" for everyone. Nonetheless, make sure that you've evenly applied across Tiers I, II, and III.

Interviews

I really enjoy speaking to people so I think my excitement showed and made me far less stressed about the interview. Be relaxed, but formal. It's very much okay to crack a joke and smile a lot. Don't lie or get caught in a lie on your application. Therefore, know your application in and out. I also made sure there was at least one particular point about the school I knew I liked so I could talk about it if asked. I was polite to every person I met there, and went out of my way to chat with the administrative staff and everyone in the office I saw.

Applying to Medical School

It's nice to leave a positive impression with everyone you meet. I sent thank you emails to all of my interviewers that I personalized with an aspect of the conversation I found particularly memorable (helps with update letters too). Don't get too worried if you don't get a response back. Some interviewers don't reply as a policy and many are just too busy. I've gotten into schools where I've heard nothing back at all in response to the thank-you note. I was out all of fall of my senior year interviewing, as I made sure that most of my interviews were scheduled early. I did 10 interviews between mid-September and the first week of January. It's tough, but it's doable. If you apply early, you'll also have the flexibility to schedule your interviews in groups so that one trip can help you knock out a couple interviews.

~Sneha Kannan '13

Note from the MIT Prehealth Advising Office: Interviews are a really important part of the application process because they allow you an opportunity to make a positive impression off paper. If you make it to the interview stage, the school thinks you are a viable candidate, but wants to make sure that you are a good fit for that school. They want to know if you can communicate your experiences clearly, and if your personality meshes well with their culture. It is wise to prepare for interviews by reflecting on your experiences, researching the schools, and most importantly participating in a mock interview with MIT Prehealth Advising.

Applying to Medical School

Types of Interviews

Open-File Traditional Interviews: These interviews are the most common and are generally straight-forward. Your interviewer (a medical student or faculty) has read your application and will have prepared tailored questions to ask. Make sure you know your application and can talk about your interests and activities. Also be sure to have prepared your answer to “why medicine” and know why you want to attend their school.

Closed-File Traditional Interviews: These are also interviews with a current student or faculty, but your interviewer will not know anything about your application. For these interviews, it’s especially important to have a good answer to the “Tell me about yourself” opener, since your interviewer doesn’t know anything about you. These interviews can feel somewhat like you’re rehashing your application, but otherwise are similar to the open-file interviews.

Multiple Mini Interviews: Many schools are now using the Multiple Mini Interview (MMI) instead of traditional interviews to evaluate students. At a typical MMI, there will be 8-10 stations, each with a different question or scenario. You will start outside the door to a small room and have 2 minutes to read the prompt, typically an ethical situation or dilemma. After the 2 minutes have passed, you will be told to enter the room and have 6-8 minutes to engage with an evaluator about your thoughts on the prompt. You will be stopped once time is up and rotate to the next station. While this type of interview may sound scary, but it generally goes by quickly and many students end up enjoying them.

Applying to Medical School

Types of stations:

1. Ethical question or scenario: These may or may not directly relate to medicine and usually don't have a clear answer. Make sure to evaluate different perspectives and solutions before stating what you think is the best option.
2. Teamwork: Usually you will be working with another applicant to complete a task. One person will be giving instructions (typically drawing or building something) and the other will be recreating the given design using only the instructions given.
3. Writing: Some schools may include a writing station where you respond to a prompt in 10 minutes.
4. Roleplay: You will be given a scenario and have to play out a role with an actor in the room. Not as many schools have these, and it's fairly difficult to be totally prepared.

Tips:

1. Prehealth Advising will usually hold an MMI workshop in the fall to help students prepare for these types of interviews. This workshop is highly recommended because you will be able to practice various types of stations with other MIT applicants and get a better idea of what kinds of scenarios are included.
2. Search Google/Youtube for sample questions and example videos to practice
3. Most evaluators at ethical scenario stations will have follow-up questions to ask after your initial response, so don't worry too much about filling up the 6-8 minutes.

MIT Pre-Medical Society

The MIT Pre-Medical Society has to serve the pre-medical student community through informational, service, and social events.

We wish to provide all MIT undergraduates the resources to make an informed decision regarding a career in medicine. We also seek to give premedical students the chance to look into the lives of doctors, patients, and researchers, and thereby better understand their career paths.

It is our hope that through MPS, premedical students will be able to cultivate their appreciation for both the science and art of medicine, and thus become better doctors.

For the most recent listing of our planned events, please visit our website at <http://mitpremed.com/>. For additional information, please email mps-exec@mit.edu or the MIT Prehealth Advising website at <http://gecd.mit.edu/grad-and-med-school/prepare-medical-school>.

The premed guide will be updated throughout the year. Please visit the MPS website for the latest version.

Sincerely,
The MPS Executive Board 2019
mps-exec@mit.edu
April 2019

Last Laugh

A Short History of Medicine

2000 B.C. - "Here, eat this root."

1000 B.C. - "That root is heathen, say this prayer."

1850 A.D. - "That prayer is superstition, drink this potion."

1940 A.D. - "That potion is snake oil, swallow this pill."

1985 A.D. - "That pill is ineffective, take this antibiotic."

2000 A.D. - "That antibiotic is artificial. Here, eat this root."

~Anonymous

Special Thanks to...

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into the premed guide

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mitpremed.com
Cambridge, MA 02139
