**Advice and Guidelines for TU Pre-Medical Students** Revised 1/19/15

These guidelines have been prepared for students as a supplement to regular faculty advising and information provided by the Pre-Medical/Pre-Dental Committee. Many additional questions can also be answered by following the links at: <http://www.towson.edu/FCSM/undergraduate_programs/premed-predent-undergraduate/index.asp>.

Another extremely useful website is the Association of American Colleges’ page for aspiring physicians, which you will want to bookmark: <https://www.aamc.org/students/aspiring/>. Here you can investigate the medical school application process, individual schools of interest, and the MCAT. You can also find a directory of medical schools (<https://services.aamc.org/30/msar/home>).

**General Information**

**Types of physicians:**

* **Primary Care Physicians (Generalists):** infamily medicine, general internal medicine and general pediatrics; treat the most common health problems.
* **Specialists:** concentrate on specific types of disease or problems with specific tissues or organs. Examples include cardiology, oncology, and nephrology.

**Medical Schools:** Medical schools are academic medical centers, either public or private, associated with teaching hospitals and medical clinics. Physicians at these institutions treat patients, mentor fellows and medical residents, teach medical students, and quite often conduct clinical or basic science research. Public medical schools often recruit students who they feel are likely, as professionals, to benefit the local community. This means that institutions are often biased in the admissions process toward "in-state" applicants. In many cases, demographic considerations, such as an applicant’s county of residence and whether an applicant plans general practice or a specialty, play a role in the selection process.

**Medical Degrees and Education Programs:**

Traditionally, individuals wishing to become doctors have pursued one of two degrees, a Doctor of Medicine (M.D.) or a Doctor of Osteopathy (D.O.). A comparison of the education required for each of these degrees can be found at <http://en.wikipedia.org/wiki/Comparison_of_MD_and_DO_in_the_United_States>.

D.O.s have traditionally had a focus on what is called [**manual medicine**](http://en.wikipedia.org/wiki/Osteopathic_manipulative_medicine). This is a method of non-invasive treatment that   
involves using manual manipulation to diagnose, treat and prevent illness or injury. Some osteopathic medical schools are not hospital-based for the first two years. However, in general, the medical training for an osteopathic degree is now virtually indistinguishable from that which leads to the M.D. degree. M.D.s and D.O.s complete the same residencies in all specialties, are licensed in all states, and have rights and responsibilities that are identical to M.D. qualified physicians and surgeons.

Application to American medical schools is separated by type (allopathic versus osteopathic). Applications are submitted through centralized services known as AMCAS (American Medical Colleges Application Service; <https://www.aamc.org/students/applying/>) for schools conferring the M.D. and AACOMAS (American Association of Colleges of Osteopathic Medicine Application Service; <https://aacomas.aacom.org/>) for those conferring the D.O. degree. Regardless of the number of medical schools to which you apply, a single application is submitted to these application services. Of course, if you plan to apply to BOTH allopathic AND osteopathic schools, you would need to submit your application to both services.

Note that physicians may hold other degrees in addition to their M.D. or D.O. Common degrees are master’s degrees in science, business, public health, education, hospital administration or law.

Some individuals pursue the M.D.-Ph.D. degree that is a dual doctoral degree designed for physician-scientists who wish to pursue research careers in the basic or clinical sciences. Some medical schools have Medical Scientist Training Programs (MSTP grants) that pay for medical school tuition expenses, provide a stipend and pay for health insurance for these students. M.D.-Ph.D. programs (be they MSTP funded or not) are exceptionally competitive and demand exemplary performance in both required and recommended activities mentioned below.

**Standard medical school curriculum**

What follows is representative of many medical schools, but note that course formats and approaches do vary from school to school.

**Year 1** – **Normal structure and function of body tissues** • biochemistry, cell biology, medical genetics, gross anatomy, structure and function of human organ systems, neuroscience, immunology

**Year 2** – **Abnormal structure and function** • infectious diseases, pharmacology, pathology, clinical diagnoses and therapeutics, health law

**Year 3** – **Clinical rotations** • During the third year, medical students begin “rotations” within the specialties of medicine, gaining hands-on experience and exposure to clinical care in these areas • These specialties include family and community medicine, general and ambulatory care, internal medicine, obstetrics and gynecology, pediatrics, surgery, and others.

**Year 4** – **Clinical rotations** • During the fourth year, clinical rotations continue with higher levels of responsibility in direct patient care. Specialty exposure is broadened and may include electives and subspecialties. For a complete list of medical specialties please visit <http://en.wikipedia.org/wiki/Specialty_%28medicine%29>

**Post-degree training**

For most new doctors, the years after medical school are spent in **residencies**, usually at hospitals, where they pursue advanced training in their chosen specialties. Physicians must complete an accredited residency program to become certified to practice in a specialty. Residency programs vary in length depending on the specialty, but generally last three to five years for initial **board certification**. Physicians who seek more specialized training may pursue **fellowships** after their residencies.

**minimum COURSEwork RequireD BY MEDICAL SCHOOLS**

Most medical schools *require* applicants to have completed the following coursework:

* Two lab-based courses in Biology
* Two lab-based courses in Physics (may be calculus-based or non-calculus-based)
* Four lab-based courses in Chemistry (two in introductory [inorganic] and two in organic chemistry)
* Two courses in English, with one being a course that teaches writing

Note that a degree in the sciences is not necessary: in fact, about 35% of medical school students have non-science undergraduate degrees!

BE AWARE, however, that medical schools do vary in their admission requirements and the requirements for each school should be investigated individually. To find school-specific requirements for each U.S. and Canadian medical school use the **Medical School Admission Requirements** (**MSAR®**) text published each year (available in the Library or by purchase at <https://www.aamc.org/students/applying/requirements/msar/>).

**COURSES RECOMMENDED IN PREPARATION FOR THE**

**MEDICAL COLLEGE ADMISSION TEST (MCAT)**

As you saw in the previous section, most medical schools require completion of surprisingly few courses for admission. **They do, however, require high scores on the MCAT.**

Detailed information on the MCAT can be found here: <https://www.aamc.org/students/applying/mcat/mcat2015/>

The MCAT exam is currently a 4.5-hour exam divided into the following sections: biological sciences (BS), physical sciences (PS) consisting of chemistry and physics, and verbal reasoning (VR). Scores for the multiple choice sections (BS, PS, and VR) are graded 1-15. The highest possible score is 15+15+15 = 45. According to the Association of American Medical Colleges (AAMC), in 2011, the *average* score of students *admitted* to medical school was 31.1.

In addition to a strong foundation in mathematics and the sciences that relate most to medicine, courses in the humanities and the social sciences will help you prepare for the interpersonal aspect of medicine. The ideal physician understands how society works and can communicate well with people from a diverse array of backgrounds. In fact, starting in 2015, the MCAT will be changed such that there will be more questions that focus on knowledge of matters that could affect how a person relates to and cares for patients. This is why PSYC 101 and SOCI 101 now appear on the list of recommended courses below. In fact, physics and organic chemistry will be slightly deemphasized in order to accommodate this increase in new material, although the test will also be lengthened to 6.5 hours starting in 2015 (<https://www.aamc.org/students/applying/mcat/mcat2015/faqs/>). In order to promote a better understanding of the biochemical basis of physiology and disease, a broad emphasis on biochemistry will also appear in the new MCAT version. Regardless of the MCAT version you take, these are obviously areas designated as important to an evolving medical field and you should prepare yourself accordingly.

**Recommended Coursework *Prior* to Taking the MCAT**

Biology Courses

* BIOL 201: Cellular Biology and Genetics (prerequisite for BIOL 309)
* BIOL 202: Introduction to Ecology and Evolution (provides some statistics background)
* BIOL 221/222: Human Anatomy and Physiology

OR BIOL 325: Animal Physiology

* BIOL 309: Genetics (prerequisite for BIOL 408 and BIOL 409)
* BIOL 408: Cell Biology
* BIOL 409: Molecular Biology
* BIOL 470: Advanced Physiology

*continued…*

Chemistry Courses

* CHEM 131/131L: General Chemistry I lecture and lab (prerequisite: MATH 115, 119, 211 or 273)
* CHEM 132/132L: General Chemistry II lecture and lab
* CHEM 331: Organic Chemistry I lecture and lab
* CHEM 332: Organic Chemistry II lecture and lab
* CHEM 351: Biochemistry (prerequisite CHEM 332)

Math Courses

* MATH 237 Elementary Biostatistics or PSYC 212 Behavioral Statistics

Note: Some medical schools require that math courses be from math departments, so MATH 237 would be a better choice than PSYC 212 if you are taking statistics. Be sure to check the requirements at your top choices for medical school.

Also consider: MATH 211: Calculus for Applications OR MATH 273: Calculus I

Calculus is not on the MCAT. However, some medical schools *require* “two semesters of math” and students typically take calculus + statistics. Some medical schools actually *require* a calculus course and some schools prefer or require a *4-credit calculus course* (MATH 273). Check the requirements of the medical schools to which you might apply.

Physics Courses

* PHYS 211: General Physics I (prerequisite: MATH 115 or higher) AND PHYS 212: General Physics II

OR

* PHYS 241: General Physics I Calculus-Based (prerequisite MATH 273) AND PHYS 242: General Physics II Calculus-Based (prerequisites PHYS 241 and MATH 274)

Social and Behavioral Science Courses

* SOCI 101: Introduction to Sociology
* PSYC 101: Introduction to Psychology

Core 9 – Advanced Writing Seminar

See “Options for meeting the English Requirement” section below.

**Other Recommended Courses**

Again, courses listed above should be taken *prior* to the MCAT. Other courses will be helpful in preparation for medical school but are not essential for MCAT preparation. Such courses would be courses related to human physiology or medicine, such as BIOL 360: Histology, BIOL 367: Endocrinology, BIOL 411: Biology of Cancer, BIOL 420: Microbiology of Infectious Disease, BIOL 421: Immunology, or BIOL 428: Virology. While it would be impossible to take all of these courses and graduate on schedule, to choose one or more within this group would be ideal.

**Options for meeting the English Requirement**

All TU students must take ENGL 102: Writing for a Liberal Education OR ENGL 190: Honors Writing Seminar. As noted above, however, most medical schools require a *second* course in English. More specifically, this second course must be a course that emphasizes *writing*. All TU students are required to take an Advanced Writing Seminar course (Core 9) and there are numerous Core 9 courses from which to choose (see: [www.towson.edu/core](http://www.towson.edu/core)). *However*, because some medical schools require that the advanced writing course taken be taught by the English department, it is wise to choose an ENGL course to fulfill Core 9. Possibilities include:

ENGL 310: Writing Argument

ENGL 313: The Academic Essay

ENGL 318: Advanced Informational Writing

ENGL 316: Writing About Literature and ENGL 317: Writing for Business and Industry are also options but are less desirable.

You will see that there are non-ENGL courses than can be used to fulfill the Core 9 requirement, including:

BIOL 381: Writing in the Biological Sciences

CHEM 301: Professional Ethics For Scientists

WRIT 312: History of Science

While these may look more tempting than one of the ENGL courses listed above, we do not recommend these courses for two reasons. First, as noted above, some medical schools want English courses to be taught by the university’s English Department… so that would mean taking an ENGL course. Second, at least for the latter two courses above, it is not immediately obvious from the course descriptions in the undergraduate catalog that these are truly writing courses. If you took one of these courses, you would then need to “explain” on your medical school application why you are trying to count the course as a writing course. This may be tricky and the less you have to “explain” about your application, the better.

**CHOICE OF A CONCENTRATION AND “ACADEMIC plans of study”**

The courses recommended in preparation for the MCAT are listed above. TU Biology majors interested in medical school can complete this coursework by choosing either the *Functional Biology of Animals* or the *Cellular and Molecular Biology* concentration as detailed on the next page.

*When choosing a concentration, it is critical to consider what might happen if you do not get into medical school and must pursue an alternative career*. If you likely would pursue some other profession involving human health (e.g., radiology technician, pulmonary therapy assistant, etc.) then you should choose Functional Biology of Animals. Alternatively, if it is more likely that you would pursue a career that has you working in, say, clinical or research labs, the pharmaceutical industry, genetic counseling, or biotechnology, you should choose Cellular and Molecular Biology.

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| --- | --- |
| **Recommended coursework for students choosing**  ***Functional Biology of Animals*** | **Recommended coursework for students choosing**  ***Cellular and Molecular Biology*** |
| **For Foundation Courses must take**  BIOL 201 Cellular Biology and Genetics (4)  BIOL 202 Intro to Ecology and Evolution (4)  BIOL 204 Educational and Career Planning for the Biologist (1)  BIOL 309 Principles of Genetics (4)  **For Breadth Courses should take**  BIOL 208 Biodiversity (3)  BIOL 221/221L **and** BIOL 222/222L Human Anat & Phys, II (4, 4)  BIOL 408 Cell Biology (4)  **For Elective Courses**  **Must take** BIOL 470 Advanced Physiology (4)  **Should also take** CHEM 351 Biochemistry (3)  **For free elective should take** BIOL 409 Molecular Biology (4)  **For Ancillary courses should take**  CHEM 131/131L **and** CHEM 132/132L Gen Chemistry I, II (4, 4) CHEM 331 **and** CHEM 332 Organic Chemistry I, II (5, 5)  PHYS 211 **and** PHYS 212 General Physics I, II (4, 4)  ***or*** PHYS 241+242 General Physics I, II Calculus-based (4, 4)  MATH 237 Elem Biostats (4) ***or*** PSYC 212 Behavioral Stats (4)  MATH 211 Calculus for Application (3) ***or*** MATH 273 Calculus I (4)  **Also should take:**  SOCI 101: Introduction to Sociology (3)  PSYC 101: Introduction to Psychology (3) | **For Foundation Courses must take**  BIOL 201 Cellular Biology and Genetics (4)  BIOL 202 Intro to Ecology and Evolution (4)  BIOL 204 Educational and Career Planning for the Biologist (1)  BIOL 309 Principles of Genetics (4)  **For Breadth Courses should take**  BIOL 208 Biodiversity (3)  BIOL 325 Animal Physiology (4) OR  BIOL 221/221L **and** BIOL 222/222L Human Anat & Phys, II (4, 4)  **and must take** BIOL 408 Cell Biology (4) **and**  BIOL 409 Molecular Biology (4)  **For Elective Courses**  **Must take** **a lab course** (BIOL 410 Molec Bio, BIOL 483 Cell Bio, or CHEM 356 Biochem)  **Should also take** CHEM 351 Biochemistry (3) **as one elective**  **Must also take another elective course within concentration\***  **For free elective should take** BIOL 470 Adv Physiology (4)  **For Ancillary courses should take**  CHEM 131/131L **and** CHEM 132/132L Gen Chemistry I, II (4, 4) CHEM 331 **and** CHEM 332 Organic Chemistry I, II (5, 5)  PHYS 211 **and** PHYS 212 General Physics I, II (4, 4)  ***or*** PHYS 241+242 Gen Physics I, II Calculus-based (4, 4)  MATH 237 Elem Biostats (4) ***or*** PSYC 212 Behavioral Stats (4)  MATH 211 Calculus for Application (3) ***or*** MATH 273 Calculus I (4)  **Also should take:**  SOCI 101: Introduction to Sociology (3)  PSYC 101: Introduction to Psychology (3)  \* *Choices include:*  BIOL 318 (Microbiology) (4)  BIOL 360 (Histology) (4)  BIOL 411 (Biology of Cancer) (3)  BIOL 421 (Immunology) (4)  BIOL 428 (Virology) (3)  BIOL 463 (Developmental Biology) (3) |

On the next pages, you will see two sample Academic Plans of Study, i.e., suggestions on when to take different courses. The first is for students who could potentially take the MCAT in their junior year. The second is for students who would take the MCAT in their senior year or later (the majority of students). *Below we discuss why students would want to take the MCAT in their Senior vs. Junior year.*

**SAMPLE PLAN OF STUDY FOR PRE-MEDICAL STUDENTS TAKING THE MCAT IN THEIR JUNIOR YEAR**

**AND ATTEMPING TO ENTER MEDICAL SCHOOL IN THE FALL IMMEDIATELY AFTER GRADUATION**

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| **Fall 1**  BIOL 201  CHEM 131/131L  MATH 115 or MATH 119  TSEM or ENGL 102 or ENGL 190 | **Spring 1**  BIOL 202  CHEM 132/132L  MATH 211 or MATH 273 (Calculus)  TSEM or ENGL 102 or ENGL 190 | **Summer 1**  Possible coursework to stay on track  Caution: Science courses, including anatomy/physiology, microbiology, chemistry and physics should NOT be taken at a community college after students have enrolled at TU. |
| **Fall 2**  CHEM 331  BIOL 309  BIOL 221/221L or BIOL 325  *Plus one of the following:*  Statistics (MATH 237/PSYC 212)  SOCI 101  PSYC 101  Honors course (if needed) | **Spring 2**  CHEM 332  BIOL 408 (suggested before BIOL 409)  BIOL 222/222L (if took BIOL 221)  *Plus one of the following:*  Statistics (MATH 237/PSYC 212)  SOCI 101  PSYC 101  Honors course (if needed) | **Summer 2**  Clinically related internship or  research experience  Possibly study abroad  Start preparing for MCAT |
| **Fall 3**  PHYS 211 or 241  BIOL 470 (Advanced Physiology)  *Plus one or two of the following:*  Statistics (MATH 237/PSYC 212)  SOCI 101  PSYC 101  Bio elective or Required lab course  Honors course (if needed) | **Spring 3**  PHYS 212 or 242  CHEM 351 (Biochemistry)  BIOL 409 (Molecular Biol)  Core or Honors or other course  \*\*MCAT in late semester or early summer\*\* | **Summer 3**  Clinically related internship or  research experience  Possibly study abroad  \*\*Complete application to  Medical School\*\* |
| **Fall 4 and Spring 4:** Complete remaining Core coursework and remaining requirements for the major, any minor, and the Honors College (if an Honors student). | | |

**Notes:** *This plan is just one of many possible plans. Students will have to develop their own plans, based on things like AP credit, the Math course with which they start, when they start their Chemistry courses, their need to repeat courses for higher grades, whether they take courses in the summer or minimester, whether they plan to study abroad during a fall or spring semester, etc.*

This plan does not show ALL of the courses required for one’s degree. Rather it shows primarily the critical courses for the MCAT and entry into medical school. **Honors students should notice that this plan does NOT show required Honors courses. These would need to be taken *in addition to* courses shown above, giving a student a heavy load of 5 courses per semester, usually including two lab sciences. If there is any danger of such a heavy courseload lowering one’s GPA, students should consider the alternative plan of study that appears on the next page.**

Students also have the option to take one or more courses during minimesters. Typically core courses are taken but at least one BIOL elective course is offered most minimesters. Minimester would also be a good time for a student to study abroad, if he or she wants to do so.

**SAMPLE PLAN OF STUDY FOR PRE-MEDICAL STUDENTS TAKING THE MCAT IN THEIR SENIOR YEAR**

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| **Fall 1**  BIOL 201  MATH 115 or 119  TSEM or ENGL 102/190  One other course | **Spring 1**  BIOL 202  CHEM 131/131L  TSEM or ENGL 102/190  MATH 211 or 273 (Calculus) or  Honors Course (for Honors students) | **Summer 1**  Possible coursework to stay on track  Caution: Science courses, including anatomy/physiology, microbiology, chemistry and physics should NOT be taken at a community college after students have enrolled at TU. |
| **Fall 2**  BIOL 221/221L or BIOL 325  CHEM 132/132L  *Plus two other courses, which could include BIOL 208, Calculus (if not taken), a Core course, a BIOL elective course, or an Honors course (if needed)* | **Spring 2**  BIOL 222/222L (if took BIOL 221)  BIOL 309  A third course - see Fall 2 options  *Plus one of the following:*  Statistics (MATH 237/PSYC 212)  SOCI 101  PSYC 101 | **Summer 2**  Medically related internship or  research experience  Possibly study abroad |
| **Fall 3**  BIOL 309 (if not yet taken) or  Honors course (if needed)  CHEM 331  PHYS 211 or 241  *Plus one of the following:*  Statistics (MATH 237/PSYC 212)  SOCI 101  PSYC 101  Honors course (if needed) | **Spring 3**  BIOL 408 (suggested before BIOL 409)  CHEM 332  PHYS 212 or 242  *Plus one of the following:*  Statistics (MATH 237/PSYC 212)  SOCI 101  PSYC 101  Honors course (if needed) | **Summer 3**  Medically related internship or  research experience  Possibly study abroad  Start preparing for MCAT |
| **Fall 4**  BIOL 409 (Molecular Biol)  BIOL 470 (Advanced Physiology)  CHEM 351 (Biochemistry)  *Plus other core, major, minor or honors requirements* | **Spring 4**  *Other core, major, minor, or honors requirements*  \*\*MCAT in late semester/early summer\*\* | **Summer 4**  \*\*Complete application to  Medical School\*\* |

**Notes:**

*This plan is just one of many possible plans. Students will have to develop their own plans, based on things like AP credit, the Math course with which they start, when they start their Chemistry courses, whether they take courses in the summer or minimester, whether they plan to study abroad during a fall or spring semester, etc.*

Students also have the option to take one or more courses during minimesters. Typically, core courses are taken but at least one BIOL elective course is offered most minimesters. Minimester would also be a good time for a student to study abroad, if he or she wants to do so.

**PREPARING FOR THE MCAT BEYOND JUST TAKING THE RECOMMENDED COURSEWORK**

Preparation for the MCAT should not be limited to taking the required and recommended courses above.

Start by learning as much as you can about the MCAT at this site:

<https://www.aamc.org/students/applying/mcat/mcat2015/>

Note that, at this site, you can link to Khan Academy video tutorials, which may be quite helpful.

In many cases, an MCAT preparatory course is helpful and should be completed during the winter or spring of the year when you will take your MCAT. The major MCAT review companies are **Kaplan**, **Princeton Reviews**, and **ExamKrackers**. At minimum, one should prepare for the exam in terms of content preparation, test familiarity and testing skills.

You should go into the MCAT as fully prepared as possible the first time you take it. Yes, you can take the MCAT more than once, but multiple attempts can be a “red flag” for medical school admission committees. Therefore, to take the exam unprepared just to see how well you do is *highly inadvisable*. In short: **Try to be super-prepared for the MCAT the first time you take it**!

**RECOMMENDED EXTRACURRICULAR ACTIVITIES**

Extracurricular activity involvement is an essential element to medical school application and should emphasize quality over quantity. Leadership roles are an important part of these experiences and generally only come with time and commitment to particular endeavors. The list of possible activities includes, but is not limited to, the following:

**Clinical exposure**: Applicants should consider volunteering at a local hospital or clinic to gain practical experience in the health professions. Other, less traditional yet equally valuable experiences include working in an AIDS clinic or dialysis clinic, hospice volunteering or participation in a medical mission trip (see <http://www.medicalmissions.org> for examples, many of which accept volunteers with no medical training). Clinical exposure is essential as it provides medical schools with the knowledge that you are fully informed about your career choice. Students can get credit for these types of experiences by signing up for BIOL 493 - Internship. Students should see their advisor or the Biology Department’s Internship Coordinator for further information.

**Community Service:** Medical schools positively view non-clinical service to one’s community**.** Some schools even require their medical students to perform community service. Examples of service that will round out your application include: Habitat for Humanity, working in a soup kitchen, church-related work, and the like.

**Participation in pre-medical and academic societies (e.g., Beta Beta Beta Biological Honor Society)**: Leadership roles within these groups are valued experiences. These groups also provide useful information and networking opportunities.

**Research experience**: Although not required, involvement in research is considered a plus by some medical schools. Indeed, if you plan to apply to top-tier medical schools or to M.D.-Ph.D. programs, research experience will be *required*. The area of research is not nearly as important as your commitment to it and demonstration of intellectual involvement in the studies. Research in the social sciences is also accepted if your interests lie in psychology, sociology, public health or some other related field.

**Hobbies**: Medical schools often look for well-rounded individuals. Sustained involvement in interests outside your vocation is recommended and often valuable to the interview process.

**WHEN TO TAKE THE MCAT AND WHEN TO APPLY TO MEDICAL SCHOOL**

While medical schools individually determine their application deadlines, applications can be started at the beginning of May and a completed application can be submitted at the beginning of June. Considering that medical schools generally accept students on a rolling basis (first come, first served), it makes sense to apply relatively *early*. If you apply late, most or all of the “slots” may be taken and you are more likely to get “wait-listed” regardless of how strong a candidate you are.

Regardless of when you apply, you need to take the MCAT far enough in advance so your scores will be ready for your application. The MCAT is offered from January through September. However, it takes about a month to process your exam and report your scores. Thus, if you plan to submit your application by June or July (recommended), you should plan to take your test in April, May or early June.

Typically, students will learn whether they have or have not been admitted in the fall or winter following application. If they are accepted, they would start medical school the *next* fall.

**The *earliest* that a student could be ready to take the MCAT is spring of her/his junior year.** S/he would then apply to medical school between her/his junior and senior years, hear back from medical schools in her/his senior year, and then enter medical school the fall after graduation.

HOWEVER, as noted above, students are strongly advised to take a number (actually, a rather *large* number) of courses before attempting the MCAT. **In reality, most students will not complete the recommended coursework before spring of their *senior* year**. There are a number of reasons for this, but the primary one is that students will have difficulty getting into courses such as Cell Biology, Advanced Physiology, and Biochemistry before the fall of their senior year. Typically, only students who have early registration privileges - specifically, honors students and athletes and students who come to TU with substantial AP credit in the sciences - will get into such courses earlier, in time to complete the MCATs in their junior year.

Note, however, that even honors students may have difficulty completing all the recommended coursework by the spring of their junior year, given the large number of honors courses they have to take. Also, honors students attempting a second major or a minor, or those planning to study abroad in a fall or spring semester, will not be able to complete recommended coursework in time to take the MCATs in their junior year.

If a student takes the MCAT in the spring of her/his senior year, s/he will have a year “off” after graduation before entering medical school (the year off is often called a “glide” year). Many students think that to take the MCAT “late” and then have a year off puts them at a disadvantage in competing for slots in medical school. In fact, the opposite is actually true. There are multiple potential benefits of this strategy, including:

- Medical schools tend to prefer students that are a little older, a little more mature, and a little more experienced; the average age of students entering medical school is typically ≥ 24 years.

- Students who apply to medical school at the end of their junior year would not report on their application grades they get in courses during their senior year. Often, a student’s grades are highest in senior year because students are taking interesting courses and now have so much experience handling university courses. Thus, application to medical school in one’s senior year can mean application with a higher GPA.

- An extra year before application gives students more time to engage in critical extracurricular activities, such as clinically related internships, research, volunteer work, etc. (see below).

- An extra year before application gives students more time to study and prepare for the MCAT. This can result in higher scores, which would give students an extra advantage.

- A year “off” after graduation gives students time to enjoy themselves before they begin 7+ intense years of medical training. It can also give one time to make some much-needed spending money.

**WILL YOU BE ACCEPTED TO Medical School?**

**SOME INDICATORS AND THINGS TO CONSIDER**

***In a recent year, 19,230 students were admitted to U.S. medical schools while 43,919 applied. Thus, the application success rate was ~44%.***

As a way to measure your competitiveness with other applicants and the likeliness of getting into medical school, we have included some of the key indices of success below. Please note that these are not the only determining factors. However, significant deviation from these values will dramatically decrease your probability of success.

* 90+% of American medical schools have accepted student GPA **averages** of 3.5 or above. Most schools have minimum GPA cutoffs to reduce the number of applications reviewed. If a student has a GPA below 3.3 (especially in science coursework), s/he will generally have to, at a minimum, do additional coursework after s/he obtains her/his B.S. degree to demonstrate competence in advanced science courses (see below). Please note that ALL grades must be reported on your medical school application and all grades are used when calculating your GPA. This includes grades in courses that were repeated for a better grade. For example, if you got a D in PHYS 211 the first time and a B the second time, both grades are reported and **both grades** are used to calculate your GPA for the medical school application. This means that your medical school application GPA may be **lower** than that shown on your Towson University transcripts if you repeated a course for a higher grade.

Note also that W’s (especially after your freshman first semester) and course repeats will definitely be noted by those reviewing your application and may raise concerns. Thus, you want to minimize withdrawals from courses and repetition of courses. Valid excuses for withdrawal from courses such as medical leave or family emergencies are acceptable but may require documentation. Again, the less you have to “explain,” the better.

* Over 90% of American medical schools have accepted student MCAT score **averages** of 29-32. A relatively even score distribution (e.g., 10-10-10) among the three sections of the exam is also much better than excellence in a single area (e.g., 7-9-14).
* As a minimum, the equivalent of one full year of regular clinical exposure in paid or volunteer positions is generally expected.
* Note that the AAMC website posts a wealth of data on applicant and matriculated averages based upon race, ethnicity, sex, major, institution, age and state of legal residence (<https://www.aamc.org/data/facts/applicantmatriculant/>). These data may be helpful in determining your chances as well as being advisory in terms of choosing the right schools to which to apply. While there are a multitude of applicant credentials assessed at every school, a ranking of medical schools by MCAT scores of students admitted may help you to choose schools that best match your credentials (i.e., your own MCAT scores). See: <http://www.medicalschoolsinusa.com/medical-school-rankings/>

**WHAT IF YOUR GRADES/MCAT SCORES ARE NOT GOOD ENOUGH**

**AND/OR YOU DON’T GET IN ON YOUR FIRST TRY?**

Failure to gain entrance to medical school on your first try is not uncommon – in a recent year, 56% of applicants were unsuccessful. Generally, rejected students have GPAs and/or MCAT scores that do not meet the standards required for admission. Many medical schools have cut-off values (GPA and MCAT) below which they will not review applications.

If you do not get into any school on your first try, you first need to consider whether you applied to an appropriate number of schools AND schools with standards that match your credentials (see above). Rarely is it advisable to apply to fewer than 10 schools and 15-20 is typical. If your credentials are borderline, closer to 20 is advisable to broaden your chances. Again, as discussed in the section above, you specifically want to focus on schools that regularly admit students with your MCAT scores, GPA, etc.

If your MCAT scores are lower than desired, it may make sense to take a year off to prepare better for the exam while improving other elements of your application (clinical time, volunteering, research, etc.). It may be warranted to take an MCAT preparatory course or even to repeat a preparatory course. With or without a preparatory course, extensive focused preparation for several months is highly recommended prior to a second attempt at the MCAT.

If your GPA is lower than desired, you may choose to enter a Master’s degree program (thesis or non-thesis program) to do additional coursework at a higher level to prove your academic abilities. While graduate-level grades are not averaged into your undergraduate GPA, you will want to excel in graduate coursework to the point where the graduate GPA meets or exceeds the medical school standards. However, medical schools focus on undergraduate course work considered to be most relevant to and predictive for success in medical school academic performance.

Expensive but often effective alternatives to graduate work are post-baccalaureate programs designed to provide students the tools to prepare them better for medical school application. Some of these programs are designed for students who have not taken the prerequisite science coursework. Other post-baccalaureate programs are designed to aid students from disadvantaged circumstances or those that just need to boost their credentials. Please visit this AAMC website to determine if a post-baccalaureate program might be right for you: <http://services.aamc.org/postbac/>.

**WHAT IS YOUR “PLAN B”?**

Despite the fact that your *main* goal is to be accepted into medical school and eventually enter clinical practice, it's wise to consider alternate career paths as well. Medicine is an extremely competitive field. Many individuals who have begun undergraduate programs fully intending to become physicians end up changing their plans, either because their academic records don't meet the admission standards, because their MCAT scores are too low, or because they've simply found something more appealing to pursue. Please understand that to think about, even to plan, for the possibility of a "plan B" career is not a sign of weakness and does not mean you are not serious about going to medical school. Instead, it indicates that you are mature, forward-thinking, and adaptable. To be astute enough to consider secondary careers is not just smart - it could be extremely beneficial, save time and money, and almost certainly make a favorable impression on those evaluating that individual's application materials. In fact, you can expect a question about your ‘plan B’ in many medical school interviews for just these reasons.

Students interested in medicine are encouraged to research the wide variety of jobs available in the health professions very early in their collegiate education, including a discussion of the nature and demands of medicine with a pre-medical advisor and practicing health professionals. Please review the list of 80 health profession careers listed by the American Medical Association (AMA) at <http://www.ama-assn.org/ama/pub/education-careers/careers-health-care/directory.page?>

**Citation for these guidelines:** “Silldorff, E. and L.S. Johnson. [document date – see first page]. *Advice and Guidelines for TU Pre-Medical Students*. Unpublished document accessed from BIOL 204 course website.”