

# PRE-PROFESSIONAL PROGRAMS

The Fisher College of Science and Mathematics offers advising and pre-professional preparation in medicine, dentistry, pharmacy and veterinary medicine. The programs are described below.

## Premedical/Pre-dental Advising Program

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Students who are interested in careers in medicine or dentistry should consider the following:

1. Students must have an outstanding academic record to be competitive for admission to medical or dental school. Aim for an overall GPA and science GPA of 3.50-4.00. It is important to know that medical and dental schools will factor all attempts at courses taken at all colleges attended into your overall and science GPAs, including repeats.
2. There is no premedical or pre-dental major at TU. Students may select any major, but they must be sure to take the prerequisite courses, in addition to the major requirements. Students often select a science major because of the overlap between courses required for the major and required for medical or dental school. Regardless of the major, students must have a strong science GPA.
3. Students interested in medical or dental school usually take the Medical College Admission Test (MCAT) or the Dental Aptitude Test (DAT), respectively, once they've completed all of their required courses. Both tests are computerized and are given throughout the year. Students prepare for the MCAT or DAT, either on their own or by taking a commercial preparation course. Students are strongly urged to wait to take their exam until they are scoring their target score on timed, full-length practice tests. Having a competitive MCAT or DAT is critical for admissions to medical or dental school.
4. Research experience is valued, especially by larger, more academic medical and dental schools. Undergraduate research is valued at TU, so students should be able to locate research opportunities on campus.
5. Students should be engaging in relevant extracurricular activities, including opportunities that demonstrate leadership abilities.
6. Students must have relevant clinical exposure, preferably occurring throughout undergraduate years. This may include medical or dental volunteering, physician or dentist shadowing, or clinical employment, such as medical assistant, medical scribe, or dental assistant.
7. Students should have significant clinical or non-clinical volunteer community service, demonstrating their desire to help others.
8. Students need to engage with faculty in order to procure strong letters of recommendation for medical or dental schools.
9. TU students should also join our Pre-med/Pre-dent program, by signing up for our email/contact list, as well as for the Pre-medical or Pre-dental Blackboard community sites, where resources and other opportunities are posted. Email [premed.predent@towson.edu](mailto:premed.predent@towson.edu) for

sign-up instructions. Student-run pre-medical and pre-dental groups can also be found at Explore - Involved @ TU ([towson.edu](http://towson.edu)).

10. Students are encouraged to attend guest speaker presentations, information sessions, group advising, and other events sponsored by our program to broaden their knowledge of their chosen profession, learn how to become competitive for admission to the professional school, and to network with professionals and peers.
11. Students are advised by an adviser from their major, as well as a pre-med/pre-dent adviser. Call or email Brandi Mayo for more information.
12. The TU Pre-medical/Pre-dental Committee will prepare a committee letter of recommendation for qualified students and alumni, based on the student's academics (GPA and MCAT/DAT), letters of recommendation from faculty, extracurricular activities, clinical exposure, community service and an interview. The committee letter process begins in January of the application year.

Prospective students with questions about this or any program at TU should contact the Admissions Office.

## Required and Recommended Science Courses

Although educational philosophies and specific undergraduate course requirements differ among medical and dental schools, these institutions recognize the value of a broad-based undergraduate education including a strong foundation in the natural sciences (biology, chemistry, physics and mathematics), well-developed communication skills and a solid background in the humanities and social sciences. The prerequisite courses required for many medical and dental schools are listed below, but students should check individual schools of interest for specific requirements. Students are advised to take the required courses and as many of the recommended courses as possible, as these courses should help improve their performance on the MCAT/DAT exams.

### Required Courses (44 units)<sup>1</sup>

*These courses are most frequently required by medical and dental schools.*

Code	Title	Units
BIOL 200 & 200L	BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LECTURE] and BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LAB]	4
BIOL 206 & 206L	BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LECTURE] and BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LAB]	4
CHEM 131 & 131L	GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY	4
CHEM 132 & 132L	GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY	4
CHEM 334	ORGANIC CHEMISTRY I [LECTURE] <sup>2</sup>	3
CHEM 336	INTRODUCTORY ORGANIC CHEMISTRY LABORATORY <sup>2</sup>	2
CHEM 337	ORGANIC CHEMISTRY II [LECTURE] <sup>2</sup>	3
CHEM 351	BIOCHEMISTRY	3
MATH 115	COLLEGE ALGEBRA	3
or MATH 211	CALCULUS FOR APPLICATIONS	
or MATH 273	CALCULUS I	
MATH 237	ELEMENTARY BIostatISTICS <sup>3</sup>	4

PHYS 211	GENERAL PHYSICS I; NON CALCULUS-BASED <sup>4</sup>	4
or PHYS 241	GENERAL PHYSICS I CALCULUS-BASED	
PHYS 212	GENERAL PHYSICS II; NON CALCULUS-BASED <sup>4</sup>	4
or PHYS 242	GENERAL PHYSICS II CALCULUS-BASED	
<b>Total Units</b>		<b>42</b>

<sup>1</sup> All prerequisite courses should be taken before taking the MCAT, and all courses except physics should be completed before taking the DAT.

<sup>2</sup> Some medical schools may accept CHEM 330 / CHEM 333 / CHEM 333L for their organic chemistry requirement, if CHEM 351 is also taken. Be sure to check the MSAR or individual school websites to confirm prerequisites.

<sup>3</sup> Biostatistics is preferred by most medical schools, but PSYC 212 (Behavioral statistics) is also accepted. Basic statistics (MATH 231) is less desirable.

<sup>4</sup> PHYS 241 and PHYS 242, both of which require calculus, may be taken in place of PHYS 211, PHYS 212. PHYS 241, PHYS 242 must be taken by Physics majors.

## Highly Recommended Courses

These courses are sometimes required by medical and dental schools and may be useful in preparing for the MCAT or DAT exams.

Code	Title	Units
BIOL 221 & 221L	HUMAN ANATOMY & PHYSIOLOGY I [LECTURE] and HUMAN ANATOMY & PHYSIOLOGY I [LAB] <sup>5,6</sup>	4
or BIOL 342	HUMAN ANATOMY AND PHYSIOLOGY I FOR BIOLOGY MAJORS	
BIOL 222 & 222L	HUMAN ANATOMY & PHYSIOLOGY II [LECTURE] and HUMAN ANATOMY & PHYSIOLOGY II [LAB] <sup>5,6</sup>	4
or BIOL 343	HUMAN ANATOMY AND PHYSIOLOGY II FOR BIOLOGY MAJORS	
BIOL 309	GENETICS	4
BIOL 408	CELL BIOLOGY	4
BIOL 409	MOLECULAR BIOLOGY	4
BIOL 318	MICROBIOLOGY <sup>6</sup>	4

<sup>5</sup> BIOL 342 and BIOL 343 should be taken by Biology majors, instead of BIOL 221 / BIOL 221L and BIOL 222 / BIOL 222L.

<sup>6</sup> These courses are also required by some dental schools.

## Prepharmacy Preparation

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Students planning a career in pharmacy may apply to a college of pharmacy after taking or expecting to complete a total of 68 units of university credit, including the required courses. Student averages are evaluated in the following four areas:

1. overall college work
2. required courses
3. chemistry courses
4. mathematics and physics courses

In addition, applicants are required to satisfactorily pass the Pharmacy College Admission Test (PCAT), followed by a personal interview by the admission committee of the pharmacy school.

Required courses include 3 units of English, 6 units of mathematics (through Calculus I), 16 units of biology, 8 units of physics and 18 units of chemistry. The remaining units (18–20) include elective courses, such as sociology, economic principles and problems, public speaking, modern languages, art, music, psychology, botany, biology and computer programming. Colleges of pharmacy now give preference in admission to students who not only complete the specific course requirements, but also are on schedule to graduate with a B.S. before beginning pharmacy school.

Students interested in pharmacy as a professional career should consult with the prepharmacy adviser in the Department of Chemistry upon admission to TU. Students need to plan a course program, declare an academic major and become cognizant of the specific admissions requirements of the pharmacy college that they plan to attend. The recommended course sequence is based upon the requirements of the University of Maryland and is typical of most pharmacy schools.

## Prepharmacy Course Requirements

Code	Title	Units
BIOL 200 & 200L	BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LECTURE] and BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LAB]	4
BIOL 221 & 221L	HUMAN ANATOMY & PHYSIOLOGY I [LECTURE] and HUMAN ANATOMY & PHYSIOLOGY I [LAB]	4
BIOL 222 & 222L	HUMAN ANATOMY & PHYSIOLOGY II [LECTURE] and HUMAN ANATOMY & PHYSIOLOGY II [LAB]	4
BIOL 318	MICROBIOLOGY	4
CHEM 131 & 131L	GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY	4
CHEM 132 & 132L	GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY	4
CHEM 334 & CHEM 336	ORGANIC CHEMISTRY I [LECTURE] and INTRODUCTORY ORGANIC CHEMISTRY LABORATORY	5
CHEM 337 & CHEM 339	ORGANIC CHEMISTRY II [LECTURE] and INTERMEDIATE ORGANIC CHEMISTRY LABORATORY	5
COMM 131	PUBLIC SPEAKING	3
ECON 201	MICROECONOMIC PRINCIPLES	3
ENGL 102	WRITING FOR A LIBERAL EDUCATION	3
MATH 231 or MATH 237	BASIC STATISTICS ELEMENTARY BIostatistics	3
MATH 273	CALCULUS I	4

PHYS 211	GENERAL PHYSICS I; NON CALCULUS-BASED <sup>1</sup>	4	BIOL 408	CELL BIOLOGY	4
PHYS 212	GENERAL PHYSICS II; NON CALCULUS-BASED <sup>1</sup>	4	CHEM 131 & 131L	GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY	4
			CHEM 132 & 132L	GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY	4
			CHEM 334 & CHEM 336	ORGANIC CHEMISTRY I [LECTURE] and INTRODUCTORY ORGANIC CHEMISTRY LABORATORY	5
			CHEM 337 & CHEM 339	ORGANIC CHEMISTRY II [LECTURE] and INTERMEDIATE ORGANIC CHEMISTRY LABORATORY	5
			CHEM 351	BIOCHEMISTRY	3
			MATH 237 or PSYC 212	ELEMENTARY BIostatISTICS BEHAVIORAL STATISTICS	4
			MATH 211 or MATH 273	CALCULUS FOR APPLICATIONS CALCULUS I	3
			PHYS 211	GENERAL PHYSICS I; NON CALCULUS-BASED	4
			PHYS 212	GENERAL PHYSICS II; NON CALCULUS-BASED	4

<sup>1</sup> PHYS 241 and PHYS 242 can be substituted for the above, but these two courses require calculus as a prerequisite.

## Preveterinary Preparation

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Students planning a career in veterinary medicine should be aware of the following considerations as they prepare for admission to veterinary school:

1. To be admitted to these very selective schools, students must have an outstanding record, usually with a minimum of 90 undergraduate units.
2. Most entering veterinary students have a B.S. or B.A. degree with a major in Biology or Chemistry, although other specific disciplines may be acceptable if basic courses in biology, chemistry, physics and mathematics are included.
3. Although there are no specific tests required for admission to some veterinary schools, some request indications of aptitude as reflected in the GRE or other standardized examinations.
4. Veterinary schools expect applicants to have experience in aiding or assisting a veterinarian or working in adjunct fields as a volunteer or paid assistant. Varied experience, including research, is considered valuable.
5. Increasingly, veterinary schools are looking for students who have strong soft skills, showing that a student can act as both a leader and a team member. Extracurricular activities, on and off campus, can provide opportunities to develop these skills.
6. Advising for preveterinary students is available through the Department of Biological Sciences. It is strongly suggested that students seek these advisory services upon entering TU to maximize their career planning strategies.

Careful planning and early contact with veterinary schools is crucial. For further information, contact Professor Christa Partain, Department of Biological Sciences, at cpartain@towson.edu.

## Recommended Science Courses

Code	Title	Units
BIOL 200 & 200L	BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LECTURE] and BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LAB]	4
BIOL 206 & 206L	BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LECTURE] and BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LAB]	4
BIOL 207	GENERAL ZOOLOGY	4
BIOL 309	GENETICS	4
BIOL 318	MICROBIOLOGY	4
BIOL 325	ANIMAL PHYSIOLOGY	4