MASTER OF SCIENCE (M.S.)

The M.S. and the Ph.D. in Biomedical Engineering are jointly offered between The University of Texas Health Science Center at San Antonio and The University of Texas at San Antonio (UTSA). The primary objective of this program is to broadly train students in the principles of biomedical engineering, so they are well prepared to participate in the development of new approaches for the diagnosis and treatment of human diseases.

As the program is multidisciplinary, the curriculum is designed to provide a synergistic combination of formal courses, seminars, teaching opportunities, interactions with clinicians, and individualized biomedical engineering research experiences in the laboratories of the biomedical engineering faculty. All students are required to take core courses in the areas of Biomaterials, Biomechanics, Bioelectronics/Imaging and Biology, Physiology, as well as Responsible Conduct of Research, and Experimental Design and Data Analysis. In addition to the basic core curriculum, students are required to take additional coursework in the area of specialization. Students have access to the bioengineering and biosciences laboratories at both The University of Texas Health Science Center at San Antonio and UTSA. This provides a unique opportunity to have learning experiences in medical, dental, bioscience, and engineering environments.

Biomedical Engineering Admissions Requirements

The minimum requirements for admission to the Master of Science degree in Biomedical Engineering program are described below. Note that admission to the Master in Biomedical Engineering program is competitive and satisfying these requirements does not guarantee admission.

Applicants must have a grade point average of 3.0 or better in the last 60 semester credit hours of coursework with a major in a recognized science or engineering discipline. All students should have had sufficient background in engineering, chemistry, biology and physics prior to being admitted to the program. It is expected that these students will have B.S. degrees with an emphasis in either engineering, physical science or biological science disciplines. All students are required to have completed at least one year of engineering physics, chemistry, biology, and mathematics (up to Differential Equations I or Applied Engineering Analysis I). Students with deficiencies in the above courses will be required to satisfactorily complete selected courses as a condition of acceptance.

Three letters of recommendation attesting to the applicant's readiness for graduate study are also required.

A *complete* application includes the application form, official transcripts, letters of recommendation, a résumé and a statement of the applicant's research experience, interests and goals. Graduate Record Exam (GRE) scores are optional.

The applicant's performance on a standardized test will be considered in addition to other criteria for admission or competitive scholarship awards and will not be used as the sole criterion for consideration of an applicant.

Students whose native language is not English must achieve a minimum score of:

- 79 on the Internet-based version of the Test of English as a Foreign Language (TOEFL) exam,
- 550 on the paper-based version of the Test of English as a Foreign Language (TOEFL) exam, or
- 6.5 on the IELTS exam

Those who do not meet the minimum English proficiency scores may be considered for the graduate pathway.

Minimum scores are based on UTSA's minimum required scores for international applicants. English language proficiency requirements can be viewed on UTSA graduate admissions site (https://future.utsa.edu/graduate/admissions/) or UTSA international admissions site (https://future.utsa.edu/international/).

International applicants who have completed or will complete their degree prior to matriculation at an accredited U.S. institution may be exempted from the TOEFL/IELTS requirement.

Biomedical Engineering Degree Requirements

Thesis Option

A minimum of 32.0 semester credit hours beyond the bachelor's degree and a minimum overall GPA of 3.0 is required for the M.S. degree in Biomedical Engineering thesis option. Undergraduate courses, general education courses, and prerequisites for graduate courses cannot be counted toward this total. For transferring students, course credit allowed for transfer will be decided on a case-by-case basis by the Biomedical Engineering Committee on Graduate Studies (COGS). If recommended by COGS, the request will then be submitted to the Dean of the Graduate School for approval. Regardless of their area of specialization, all students are required to take a total of 17.0 semester credit hours of required core courses. In addition, all students must register for three semesters of research seminar, a minimum of 6 semester credit hours of approved elective courses, and a minimum of 6 semester credit hours of biomedical engineering master's thesis research. The courses taken by students are intended to focus and support the individual's mastery of his or her particular area of specialization. The student must successfully present their thesis and be recommended by their program COGS for approval of their degree to the Dean of the Graduate School of Biomedical Sciences.

Non-thesis Option

A non-thesis option is available upon approval from the program director and the Graduate Advisor of Record. Typically, a master's degree (non-thesis option) plan of study will consist of at least 36.0 semester credit hours beyond the bachelor's degree. Undergraduate courses, general education courses and prerequisites for graduate courses cannot be counted toward this total. For transferring students, course credit allowed for transfer will be decided on a case-by-case basis by the Biomedical Engineering Committee on Graduate Studies (COGS). If recommended by COGS, the request will then be submitted to the Dean of the Graduate School for approval. Regardless of their area of specialization, all students are required to take a total of 18.0 semester credit hours of required core courses. In addition, all students must register for three semesters of research seminar and a minimum of 15 semester credit hours of approved elective courses.

Biomedical Engineering Plans of Study

For the thesis option, a minimum of 32.0 semester credit hours is needed to obtain a Master of Science in Biomedical Engineering.

For the non-thesis option, a minimum of 36.0 semester credit hours is needed to obtain a Master of Science in Biomedical Engineering.

*** Please note that courses with the prefix BME are taken at The University of Texas at San Antonio.**

Thesis Option

First Year

Fall		**Credit Hours**
BIME 6004	Biology For Bioengineers	3
BIME 6090 or BME 6001	Seminar	1
BME 6903		3
Elective(s)-see department		varies
	Total Credit Hours:	**7.0**

First Year

Spring		**Credit Hours**
TSCI 5070	Responsible Conduct of Research	2
BIME 6006	Human Physiology for Bioengineers	3
BME 6803		3
Elective(s)-see department		varies
	Total Credit Hours:	**8.0**

First Year

Summer		**Credit Hours**
BIME 6098 or BME 6892	Thesis	1-12
	Total Credit Hours:	**1.0-12.0**

Second Year

Fall		**Credit Hours**
BIME 6090	Seminar	1
BIME 6097	Research	1-12
BIME 6098 or BME 6986	Thesis	1-12
BME 6703		3
BME 6033		3
Elective(s)-see department		varies
	Total Credit Hours:	**9.0-31.0**

Second Year

Spring		**Credit Hours**
Elective(s)-see department		varies
BIME 6097, BME 7951, BME 7952, BME 7953, or BME 7956	Research	1-12
BIME 6098 or BME 6986	Thesis	1-12
	Total Credit Hours:	**2.0-24.0**

Second Year

Summer		**Credit Hours**
BIME 6098 or BME 6986	Thesis	1-12
BIME 6097, BME 7951, BME 7952, BME 2953, or BME 7956	Research	1-12
	Total Credit Hours:	**2.0-24.0**

Third Year

Fall		**Credit Hours**
BIME 6098 or BME 6986	Thesis	1-12
	Total Credit Hours:	**1.0-12.0**

Non-thesis Option

First Year

Fall		**Credit Hours**
BME 6903		
BIME 6004	Biology For Bioengineers	3
BIME 6090 or BME 6001	Seminar	1
Elective(s)-see department		varies
	Total Credit Hours:	**4.0**

First Year

Spring		**Credit Hours**
TSCI 5070	Responsible Conduct of Research	2
BIME 6090 or BME 6001	Seminar	1
BME 6803		3

Elective(s)- see department		varies
	Total Credit Hours:	**6.0**

First Year

Summer		**Credit Hours**
Elective(s)- see department		varies
	Total Credit Hours:	**0.0**

Second Year

Fall		**Credit Hours**
BIME 6090 or BME 6001	Seminar	1
BME 6703		3
BME 6033		3
Elective(s)- see department		varies
	Total Credit Hours:	**7.0**

Second Year

Spring		**Credit Hours**
BME 6961 (take during last semester)		1
Elective(s)- see department		varies
	Total Credit Hours:	**1.0**

Second Year

Summer		**Credit Hours**
Elective(s)- see department		varies
	Total Credit Hours:	**0.0**

Third Year

Fall		**Credit Hours**
BME 6961 (take during last semester)		1
Elective(s)- see department		varies
	Total Credit Hours:	**1.0**

Third Year

Spring		**Credit Hours**
BME 6961 (take during last semester)		1
Elective(s)- see department		varies
	Total Credit Hours:	**1.0**

Biomedical Engineering Objectives/ Program Outcomes

1. BME students will demonstrate their understanding of fundamental biology concepts for biomedical applications. Fundamental knowledge of biology is evaluated.
2. BME students will be able to design and carry out research experiments. Fundamental research skills are evaluated.
3. BME students will be able to communicate research findings to diverse audience.
4. BME students will demonstrate their understanding of biomaterials concepts. Fundamental biomaterials knowledge and the students' abilities to apply the knowledge of biomaterials are evaluated.
5. BME students will demonstrate their understanding of biomechanics concepts. Fundamental knowledge of biomechanics is evaluated.
6. BME students will conduct themselves in a professional and ethical manner in all biomedical engineering research.
7. BME students will critically evaluate scientific literature.