**BIOMEDICAL ENGINEERING**

AET 1.102 – (210) 458-7084

Students enrolled in the BME degree program are given opportunities to develop a strong background in the engineering, technology and physical and biological sciences to learn the analysis, design, and synthesis tools necessary to function successfully as active participants in new and emerging areas of biosciences, medical devices and healthcare technologies.

The BME degree is an interdisciplinary program that combines engineering principles, approaches, and methodologies with biological, chemical and physical sciences in order to define and solve problems in medicine. Students are trained in the fundamentals of science and engineering and expected to apply this knowledge to investigate fundamental biomedical engineering questions associated with complex living systems as well as with the diagnosis and treatment of human diseases. A broad understanding of sciences and engineering principles is provided in the first two years of the program. Students develop a degree of depth by selecting courses in three areas of concentration: 1) Biomechanics; 2) Biomaterials and Tissue Engineering; and 3) Biomedical Imaging and Nanotechnology. Critical thinking and innovative design skills are integrated throughout the program to aid students in developing solutions and in solving biomedical engineering-related problems. Design projects throughout the program and Senior BME Design courses provide students the opportunity to integrate their design, critical thinking and communication skills with the scientific and engineering knowledge they acquired throughout the Biomedical Engineering program.

The regulations for this degree comply with the general University regulations (refer to Bachelor’s Degree Regulations).

**FOCUS AREAS**

* Biomechanics
* Biomaterials, Cellular and Tissue Engineering
* Imaging and Nanotechnology

**EDUCATIONAL OBJECTIVES**

The objectives of this program are founded on the belief that engineering principles and understanding of biological and physical sciences are critical to the investigation of fundamental bioengineering questions associated with complex living systems as well as with the diagnosis and treatment of human diseases. As such, the program educational objectives of the UTSA Biomedical Engineering program are to prepare graduates who will be able to:

* contribute positively to the biomedical industries and/or other sectors such as hospitals, government agencies, and academia;
* enhance competence in biomedical engineering by pursuing an advanced or a professional degree; and
* work successfully as a member in a team environment to facilitate biomedical engineering practice.

The minimum number of semester credit hours required for this degree is 125, at least 39 of which must be at the upper-division level. All candidates for this degree must fulfill the Core Curriculum requirements.

**BIOMEDICAL ENGINEERING**

RECOMMENDED PROGRAM OF STUDY

2018 – 2020 UNDERGRADUATE CATALOG

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER I (Fall)** | | | | | **SEMESTER II (Spring)** | | | |
| AIS | 1203 | Academic Inquiry and Scholarship (core) | | 3 | BME | 1002 | Introduction to Biomedical Engineering | 2 |
| BIO | 1404 | Biosciences I (core) | | 4 | CHE | 1113 | General Chemistry II | 3 |
| CHE | 1103 | General Chemistry I | | 3 | MAT | 1224 | Calculus II | 4 |
| MAT | 1214 | Calculus I (core and major) | | 4 | PHY | 1943 | Physics for Scientists and Engineers I (core and major) | 3 |
| WRC | 1013 | Freshman Composition I (Q) (core) | | 3 | PHY | 1951 | Physics for Scientists and Engineers I Laboratory | 1 |
|  |  |  | |  | WRC | 1023 | Freshman Composition II (Q) (core) | 3 |
| **Semester Total Credits** | | | | **17** | **Semester Total Credits** | | | **16** |
| **SEMESTER III (Fall)** | | | | | **SEMESTER IV (Spring)** | | | |
| BME | 2103 | Physiology for Biomedical Engineering | | 3 | BME | 2203 | Biomechanics I | 3 |
| EGR | 2323 | Applied Engineering Analysis I | | 3 | BME | 3003 | Biomaterials I | 3 |
| STA | 1403  or 2303 | Probability and Statistics for the Biosciences  or Applied Probability and Statistics for Engineers | | 3 | BME | 3114 | Cellular Biology for Biomedical Engineering | 4 |
| PHY | 1963 | Physics for Scientists and Engineers II | | 3 | BME | 3211 | Biomedical Engineering Laboratory I | 1 |
| PHY | 1971 | Physics for Scientists and Engineers II Laboratory | | 1 | Technical elective |  |  | 3 |
| Technical elective |  |  | | 3 |  |  |  |  |
| **Semester Total Credits** | | | | **16** | **Semester Total Credits** | | | **14** |
| **Summer** | | | | | | | | |
| BME | 3013 | Clinical Internship in Biomedical Engineering | | 3 |  | | | |
| **Summer Total Credits** | | | | **3** |
| **SEMESTER V (Fall)** | | | | | **SEMESTER VI (Spring)** | | | |
| BME | 3303 | Bioinstrumentation | | 3 | BME | 3023 | Biomedical Engineering Technology and Product Development | 3 |
| BME | 3311 | Biomedical Engineering Laboratory II | | 1 | BME | 3703 | Biotransport Phenomena | 3 |
| Government-Political Science core |  |  | | 3 | BME | 3711 | Biomedical Engineering Laboratory III | 1 |
| Technical elective |  |  | | 3 | Government-Political Science core |  |  | 3 |
| Upper-division BME elective |  |  | | 3 | Upper-division BME elective |  |  | 3 |
| **Semester Total Credits** | | | | **13** | **Semester Total Credits** | | | 13 |
| **Summer** | | | | | | | | |
| BME | 3033 | | Biomedical Engineering Internship (BME Elective) | 3 |  | | | |
| **Summer Total Credits** | | | | **3** |
| **SEMESTER VII (Fall)** | | | | | **SEMESTER VIII (Spring)** | | | |
| BME | 4903 | Senior BME Design I | | 3 | BME | 4913 | Senior BME Design II | 3 |
| Upper-division BME elective |  |  | | 3 | American History core |  |  | 3 |
| Upper-division BME elective |  |  | | 3 | Component Area Option core |  |  | 3 |
| American History core |  |  | | 3 | Language, Philosophy and Culture core |  |  | 3 |
| Creative Arts core |  |  | | 3 | Social and Behavioral Sciences core |  |  | 3 |
| **Semester Total Credits** | | | | **15** | **Semester Total Credits** | | | **15** |
| **TOTAL CREDIT HOURS** | | | | | | | | **125** |

**Bachelor of Science Degree in Biomedical Engineering**

A first-time, full-time freshman admitted as a biomedical engineering major must meet the minimum admission criteria of the College of Engineering. These criteria are:

* Students must meet all UTSA and College of Engineering admission requirements;
* Students must have credit for [MAT 1214](http://catalog.utsa.edu/search/?P=MAT%201214) Calculus I or have completed all necessary prerequisites to enroll in [MAT 1214](http://catalog.utsa.edu/search/?P=MAT%201214) (through a mathematics placement test or credit for [MAT 1093](http://catalog.utsa.edu/search/?P=MAT%201093) Precalculus or an equivalent).
* Students must:

1. Have graduated in the top quartile of their high school graduation class, or
2. Have graduated in the second quartile of their high school class and have a combined SAT critical reading and mathematics score of at least 1170 with a minimum mathematics score of 550, or an ACT composite score of at least 24, or
3. Be granted admission into a College of Engineering major by holistic review by the College of Engineering if not meeting the criteria in 1 and 2 above.

All students applying for admission to the Biomedical Engineering program must submit the following supplemental documents to the Department of Biomedical Engineering:

* A cover page containing two references and declaration of intent form (<http://engineering.utsa.edu/biomedical/wp-content/uploads/sites/2/2017/10/declaration-of-intent.pdf>)
* A copy of the transcript
* A statement of their interests, professional career goals and how the Biomedical Engineering program will help them achieve those goals.

All transfer students must meet the aforementioned minimum admission requirements for the College of Engineering and the Biomedical Engineering program. Transfer students must also meet the minimum Good Academic Standing Requirements for a Biomedical Engineering Major (see below) in order to be considered for admission to the Biomedical Engineering program. Additionally, transfer students should also have an overall grade point average of 3.0 or better.

\*\* Admission to the Biomedical Engineering program is competitive; meeting the aforementioned requirements does not guarantee admission to the program. Admission will be restricted only to the most qualified applicants. No conditional admission will be granted.