# BIOMEDICAL ENGINEERING - MINOR

The Department of Biomedical Engineering offers a minor to students within the College of Engineering who are interested in biomedical applications of engineering related to the sub-specialty fields of biomechanics, cellular and molecular bioengineering, computational bioengineering, medical devices, regenerative medicine, or imaging, sensing, and digital health. Students interested in the Biomedical Engineering minor can visit the Biomedical Engineering Minor website (https://engineering.tamu.edu/biomedical/academics/degrees/undergraduate/minor.html).

## Program Requirements

| Code | Title | Semester Credit Hours |
|---|---|---|
| BMEN 253 | Discovering Biomedical Engineering Design Thinking | 1 |
| VIBS 243 | Introductory Mammalian Histology | 2 |
| Select 12 hours from one area: [1] | | 12 |
| **Biomechanics Area** | | |
| Required courses: | | |
| BMEN 343 | Biomedical Engineering Materials | |
| BMEN 361 | Biomedical Engineering Mechanics | |
| Select two of the following: | | |
| BMEN 432 | Molecular and Cellular Biomechanics | |
| BMEN 457 | Orthopedic Biomechanics | |
| BMEN 458 | Motion Biomechanics | |
| BMEN 461 | Cardiac Mechanics | |
| BMEN 463 | Soft Tissue Mechanics and Finite Element Methods | |
| MEEN 363 | Dynamics and Vibrations | |
| MEEN 368 | Solid Mechanics in Mechanical Design | |
| **Cellular and Molecular Bioengineering** | | |
| Required courses: | | |
| BMEN 344 | Biological Interactions and Testing | |
| BMEN 431 | Biomolecular Engineering | |
| Select two of the following: | | |
| BMEN 432 | Molecular and Cellular Biomechanics | |
| BMEN 480 | Biomedical Engineering of Tissues | |
| BMEN 486 | Biomedical Nanotechnology | |
| BMEN 487 | Drug Delivery | |
| ECEN 414 | Biosensors | |
| **Computational Bioengineering** | | |
| Required courses: | | |
| BMEN 321 | Circuits, Signals, and Systems | |
| BMEN 401 | Principles and Analysis of Biological Control Systems | |
| Select two of the following: | | |
| BMEN 463 | Soft Tissue Mechanics and Finite Element Methods | |
| BMEN 471 | Numerical Methods in Biomedical Engineering | |
| MEEN 442 | Computer Aided Engineering | |
| MEEN 444 | Finite Element Analysis in Mechanical Engineering | |
| **Imaging, Sensing, and Digital Health** | | |
| Required courses: | | |
| BMEN 311 | Imaging Living Systems | |
| BMEN 321 | Circuits, Signals, and Systems | |
| Select two of the following: | | |
| BMEN 322 | Biosignal Analysis | |
| BMEN 401 | Principles and Analysis of Biological Control Systems | |
| BMEN 402 | Biomedical Optics Laboratory | |
| BMEN 420 | Medical Imaging | |
| BMEN 422 | Bioelectromagnetism | |
| BMEN 425 | Biophotonics | |
| BMEN 427 | Magnetic Resonance Engineering | |
| BMEN 428/ CSCE 461 | Embedded Systems for Medical Applications | |
| ECEN 411 | Introduction to Magnetic Resonance Imaging and Magnetic Resonance Spectroscopy | |
| ECEN 412 | Ultrasound Imaging | |
| ECEN 414 | Biosensors | |
| ECEN 447 | Digital Image Processing | |
| ECEN 463 | Magnetic Resonance Engineering | |
| **Medical Devices** | | |
| Required courses: | | |
| BMEN 404 | FDA Good Laboratory and Clinical Practices | |
| BMEN 469 | Entrepreneurial Pathways in Medical Devices | |
| Select two of the following: | | |
| MEEN 440 | Bio-inspired Engineering Design | |
| MEEN 441 | Design of Mechanical Components and Systems | |
| MEEN 442 | Computer Aided Engineering | |
| **Regenerative Medicine** | | |
| Required courses: | | |
| BMEN 343 | Biomedical Engineering Materials | |
| BMEN 344 | Biological Interactions and Testing | |
| Select two of the following: | | |
| BMEN 480 | Biomedical Engineering of Tissues | |
| BMEN 482 | Polymeric Biomaterials | |
| BMEN 483 | Polymeric Biomaterial Synthesis | |
| BMEN 486 | Biomedical Nanotechnology | |
| CHEN 451 | Introduction to Polymer Engineering | |
| MEEN 458 | Processing and Characterization of Polymers | |
| MSEN 410 | Materials Processing | |

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|---|---|
| MSEN 420 | Polymer Science |
| **Total Semester Credit Hours** | **15** |

[1] Students must select courses exclusively from one of the six areas represented and not mixed.

Students must be admitted to a degree sequence in the College of Engineering or the degree sequence in Biological and Agricultural Engineering. Students should know that all tracks require completion of math through Differential Equations (MATH 308). Students may use no more than 6 hours from their home department to satisfy minor requirements. All substitutions must be approved by the BMEN academic advisor and director. The application is available on the Biomedical Engineering website. Applications are reviewed on a competitive basis at the end of every fall and spring semester after final grades are posted.