

# DEPARTMENT OF BIOMEDICAL ENGINEERING

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**Website:** <http://www.marshall.edu/cecs> (<http://www.marshall.edu/cecs/>)

The Biomedical Engineering discipline is the application of engineering principles and design concepts to medicine and biology for health care purposes. This discipline aims to narrow the gap between engineering and medicine, combining the design and problem-solving skills of engineering with medical and biosciences to advance health care treatment, including diagnosis, monitoring, and therapy. Biomedical engineering has only recently emerged as its own study, compared to many other engineering fields. Biomedical engineering is a rapidly growing field, and Marshall University has a unique program that will highlight the technical strengths of the university and garner interest in the development of the biomedical industry in the state.

## Programs

- Biomedical Engineering, B.S. (B.S.B.M.E.) (<http://catalog.marshall.edu/undergraduate/programs-az/engineering-computer-sciences/biomedical-engineering/biomedical-engineering-bs/>)

## Courses

 - General Education Course

### **BME 101 Intro to Biomedical Engr** 1 Credit hour

Students will be introduced to the interdisciplinary nature of Biomedical Engineering research and design through the use of lectures, discussions, homework and design projects.

**Grade Mode:** Normal Grading Mode

### **BME 201 Biomedical Engineering Seminar** 2 Credit hours

Introduce students to contemporary issues and research in Biomedical Engineering.

**Pre-req:** BME 101.

**Grade Mode:** Normal Grading Mode

### **BME 302 Engineering Biomechanics** 3 Credit hours

The application of engineering mechanics and anatomy to study and analyze human movement. Lectures and in-class labs will introduce students to experimental and theoretical techniques.

**Pre-req:** ENGR 214 with a minimum grade of D and BSC 228 with a minimum grade of D and BME 305 (may be taken concurrently) with a minimum grade of D.

**Concurrent PR:** BME 305

**Attributes:** No Textbook Required

**Grade Mode:** Normal Grading Mode

### **BME 305 Intro to Biophysical Measmnt** 3 Credit hours

Biomedical Engineering involves measurement of physiological processes in living organisms. An understanding of the variety of instruments used and the limitations are introduced.

**Pre-req:** BSC 228.

**Co-req:** BME 302

**Attributes:** No Textbook Required

**Grade Mode:** Normal Grading Mode

### **BME 306 Mechanics of Biological Tissue** 3 Credit hours

The mechanical properties of musculoskeletal tissues are presented along with modeling techniques and testing procedures. Tendons, ligaments, muscles, cartilage and bone will be addressed.

**Pre-req:** BME 302 with a minimum grade of D and BME 305 with a minimum grade of D and BME 310 (may be taken concurrently) with a minimum grade of D.

**Concurrent PR:** BME 310

**Grade Mode:** Normal Grading Mode

### **BME 310 Modeling & Simulation Bio Syst** 3 Credit hours

Modeling and simulation of physiological systems and their interactions with therapeutic devices, such as the artificial kidney.

**Pre-req:** BME 302 with a minimum grade of D and BME 306 (may be taken concurrently) with a minimum grade of D and MTH 335 with a minimum grade of D.

**Concurrent PR:** BME 306

**Co-req:** BME 306

**Grade Mode:** Normal Grading Mode

### **BME 405 Mech & Performance Bio Mtrls** 3 Credit hours

Structure of materials and behavior, material selection and biocompatibility, failure modes of applied biomaterials, failure analysis and performance, body responses, immunological, cell and tissue interaction, toxicity and safety.

**Pre-req:** BME 306.

**Grade Mode:** Normal Grading Mode

### **BME 460 Mechanics of Biofluids** 3 Credit hours

Introduction to the fundamentals of fluid mechanics and their application to biological, cardiovascular, respiratory and bio-fluid systems.

**Pre-req:** ENGR 318 with a minimum grade of D.

**Grade Mode:** Normal Grading Mode

### **BME 465 Biomedical Engr Capstone I** 2 Credit hours

The design process will be further discussed utilizing case studies and detailed biomedical engineering design projects.

**Co-req:** BME 405

**Attributes:** Capstone Course

**Grade Mode:** Normal Grading Mode

### **BME 466 Biomedical Engr Capstone II** 2 Credit hours

The design process will be further discussed utilizing detailed biomedical engineering design projects. Projects will be required to be interdisciplinary in nature.

**Pre-req:** BME 465.

**Attributes:** Capstone Course

**Grade Mode:** Normal Grading Mode