### BIOMEDICAL ENGINEERING (BME)

**BME 101 Fundamentals of Biomedical Engineering**
3 cr. Undergraduate.
A system approach to physiology, cell physiology and transport, major organ systems, cardiovascular system, biomedical signal processing, biomechanics, biomedical engineering design.
**Prerequisites:** Math 221(C) or Math 231(C).
**Last Taught:** Spring 2019, Fall 2018, Spring 2018, Fall 2017.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 302 Analysis and Modeling of Dynamic Systems**
4 cr. Undergraduate.
Modeling and analysis of mechanical, electrical, electromechanical, fluid, and physiological systems; laboratory experiments.
**Prerequisites:** MechEng 101(P), ElecEng 234(P), and Physics 210(P).
**Course Rules:** Jointly offered with & counts as repeat of MechEng 302.
**Last Taught:** Spring 2019, Fall 2018.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 305 Introduction to Engineering Biomechanics**
3 cr. Undergraduate.
Introduction to engineering biomechanics principles applied to the musculoskeletal system and human body for analysis of human movement.
**Prerequisites:** BioSci 203(P) & BME 302/MechEng302(P).
**Last Taught:** Fall 2018.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 310 Biomedical Signals and Systems**
3 cr. Undergraduate.
Introduction to principles of biosignals and system of the human body.
Time-domain analysis of Biosignals, Biosensing, Bio-electric signals, Electrocardiogram (ECG), muscle electromyogram (EMG), EEG, etc.
**Prerequisites:** BME 302(P).
**Last Taught:** Spring 2019.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 320 Engineering of Biomedical Devices I**
4 cr. Undergraduate.
Physiological and biomechatronic systems, sensors and actuators, signal processing, hearing aid and implants. Laboratory experiments sessions included.
**Prerequisites:** jr st, BME 101(P) and BME 302(P) or BME 101(P) and MECHENG 302(P).
**Last Taught:** Spring 2019, Fall 2018, Spring 2018, Fall 2017.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 325 Engineering of Biomedical Devices II**
3 cr. Undergraduate.
Feedback and control systems, visual prostheses, heart assist and replacement devices, respiratory aids, active and passive prosthetic limbs.
**Prerequisites:** jr st, Bio Sci 203(P), BME 320(P).
**Last Taught:** Spring 2019, Fall 2018, Spring 2018, Fall 2017.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 385 Introduction to Biomaterials**
3 cr. Undergraduate.
Introduction to the fundamentals of biomaterials including ceramics, metals, and polymers. Important issues in the selection, design, manufacturing, and evaluation of biomaterials. Current applications, and emerging technologies.
**Prerequisites:** jr st, MatlEng 201(P).
**Course Rules:** Jointly offered with & counts as repeat of MatlEng 385.
**Last Taught:** Spring 2019, Spring 2018, Spring 2017.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 437 Introduction to Biomedical Imaging**
3 cr. Undergraduate/Graduate.
Biomedical imaging modalities and underlying principles: X-radiography, computerized tomography, Radon transforms; image reconstruction techniques; ultrasonic imaging; nuclear medicine; magnetic resonance imaging; experimental techniques.
**Prerequisites:** senior standing; completion of BME 310(P) or ELECENG 310(P).
**Course Rules:** BME 437/ELECENG 437 are jointly offered and count as repeats of one another.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 437G Introduction to Biomedical Imaging**
3 cr. Undergraduate/Graduate.
Biomedical imaging modalities and underlying principles: X-radiography, computerized tomography, Radon transforms; image reconstruction techniques; ultrasonic imaging; nuclear medicine; magnetic resonance imaging; experimental techniques.
**Prerequisites:** senior standing; completion of BME 310(P) or ELECENG 310(P).
**Course Rules:** BME 437/ELECENG 437 are jointly offered and count as repeats of one another.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 439 Introduction to Biomedical Optics**
3 cr. Undergraduate/Graduate.
Biomedical imaging modalities and underlying principles: X-radiography, computerized tomography, Radon transforms; image reconstruction techniques; ultrasonic imaging; nuclear medicine; magnetic resonance imaging; experimental techniques.
**Prerequisites:** senior standing; completion of BME 310(P) or ELECENG 310(P).
**Course Rules:** BME 437/ELECENG 437 are jointly offered and count as repeats of one another.
**Current Offerings:** https://catalog.uwm.edu/course-search/

**BME 439G Introduction to Biomedical Optics**
3 cr. Undergraduate/Graduate.
Biomedical imaging modalities and underlying principles: X-radiography, computerized tomography, Radon transforms; image reconstruction techniques; ultrasonic imaging; nuclear medicine; magnetic resonance imaging; experimental techniques.
**Prerequisites:** senior standing; completion of BME 310(P) or ELECENG 310(P).
**Course Rules:** BME 437/ELECENG 437 are jointly offered and count as repeats of one another.
**Current Offerings:** https://catalog.uwm.edu/course-search/
BME 495 Biomedical Instrumentation Laboratory
3 cr. Undergraduate.
Characteristics of measurement systems, experiment planning, sensor and system calibration, measurement of basic quantities, first and second order systems, data acquisition and processing, experimental projects.
Prerequisites: BME 305(C), BME 310(C), BME 325(C).

Current Offerings: https://catalog.uwm.edu/course-search/

BME 585 Advanced Biomaterials
3 cr. Undergraduate/Graduate.
Theory and application of advanced biomaterials including cardiovascular devices, orthopedic applications, drug delivery systems, biosensors, and tissue engineering.
Prerequisites: sr st; MatlEng 385(P) or BME 385(P); or cons instr.
Course Rules: Jointly offered with & counts as repeat of MatlEng 585.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 585G Advanced Biomaterials
3 cr. Undergraduate/Graduate.
Theory and application of advanced biomaterials including cardiovascular devices, orthopedic applications, drug delivery systems, biosensors, and tissue engineering.
Prerequisites: sr st; MatlEng 385(P) or BME 385(P); or cons instr.
Course Rules: Jointly offered with & counts as repeat of MatlEng 585.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 595 Capstone Design Project
4 cr. Undergraduate.
Introduction to design process and ethics; Students work in teams to plan, design, and test in a simulated real-world environment; formal oral and written reports.
Prerequisites: sr st; BME 495(P).

Current Offerings: https://catalog.uwm.edu/course-search/

BME 599 Senior Thesis
1-3 cr. Undergraduate.
Independent research under the direction of a faculty member; submission of a written thesis required. 3 cr total required.
Prerequisites: sr st & cons instr.
Course Rules: May be retaken to max of 3 cr.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 690 Topics in Biomedical Engineering
3 cr. Undergraduate/Graduate.
Specific topics, credits, and any additional prerequisites will be announced in the Schedule of Classes each time the course is offered.
Prerequisites: jr st.
Course Rules: May be retaken w/chg in topic to max of 9 cr.
Last Taught: Spring 2019, Fall 2018.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 690G Topics in Biomedical Engineering
3 cr. Undergraduate/Graduate.
Specific topics, credits, and any additional prerequisites will be announced in the Schedule of Classes each time the course is offered.
Prerequisites: jr st.
Course Rules: May be retaken w/chg in topic to max of 9 cr.
Last Taught: Spring 2019, Fall 2018.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 699 Independent Study
1-3 cr. Undergraduate.
In consultation with a faculty advisor, student will develop the study plan on a topic related to biomedical engineering.
Prerequisites: jr st; cons instr & CEAS Associate Dean.
Course Rules: May be retaken to 6 cr max.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 720 Machine Perception
3 cr. Graduate.
Fundamentals of computer vision and graphics, fundamentals of human-machine interaction, object sensing and tracking, virtual/augmented reality, automatic human behavior analysis, and biomedical applications.
Prerequisites: grad st.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 733 Sensors and Systems
3 cr. Graduate.
Physical principles and working of sensors, interfacing, and sensor networks.
Prerequisites: grad st; ElecEng 305 or cons. instr.; Jointly offered with & counts as repeat of ElecEng 733 & MechEng 733.

Last Taught: Fall 2018, Fall 2017.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 888 Candidates for Degree
0 cr. Graduate.
Available for graduate students who must meet minimum credit load requirement.
Prerequisites: grad st.
Course Rules: Fee for 1 cr assessed.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 890 Special Topics:
3 cr. Graduate.
Lectures on special topics in biomedical engineering. Variable content course. Specific topics and any additional prerequisites will be announced in the schedule of classes each time the course is offered.
Prerequisites: grad st
Course Rules: May be repeated w/ chg in topic to 9 cr max.
Last Taught: Fall 2017.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 990 Masters Thesis
1-9 cr. Graduate.
Masters Thesis
Prerequisites: grad st; cons instr
Last Taught: Summer 2019, Spring 2019, Fall 2018, Fall 2017.
Current Offerings: https://catalog.uwm.edu/course-search/

BME 998 Doctoral Thesis
1-12 cr. Graduate.
Doctoral thesis is a part of degree requirements.
Prerequisites: grad st; cons instr & grad prog committee.
Course Rules: Re-takeable up to 99 credits.
Current Offerings: https://catalog.uwm.edu/course-search/
BME 999 Advanced Independent Study
1-3 cr. Graduate.
Advanced Independent Study
Prerequisites: grad st & cons instr.
Last Taught: Spring 2018.
Current Offerings: https://catalog.uwm.edu/course-search/