BIOMEDICAL ENGINEERING (BME)

BME 2000 - Biomedical Engineering Computing
3 Credits
Introduction to computer modeling and analysis in biomedical engineering. Introduction to the MATLAB programming environment, develop algorithms and computer programs that address biomedical engineering problems.
Prerequisite(s): (MATH 1520 or SLU Math Placement with a minimum score of 2530)

BME 2200 - Applied Physiology for Engineers
3 Credits
This course introduces students to the systems of the human body covering structure, function and regulation at multiple levels (cell, tissue, organ, system and body). By taking this course, students will: 1. Be able to describe the key components, structures and functions of the various human physiological systems. 2. Develop a qualitative understanding of how the various systems work together to achieve global (body) functions. 3. Enhance their ability to think critically and form solutions to conceptual problems. 4. Improve their technical communication skills (written and oral). (Offered in Spring)
Prerequisite(s): BIOL 1240 with a grade of C- or higher; PHYS 1610 with a grade of C- or higher
Attributes: UUC:Dignity, Ethics & Just Soc

BME 2910 - Co-Op with Industry
1-3 Credits (Repeatable for credit)
A full-time supervised work experience with an agency, firm or organization that employs persons in this degree field. This course is used for the first experiential learning session.
Prerequisite(s): CORE 1500*; (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S)

* Concurrent enrollment allowed.
Restrictions:
Students with a classification of Freshman may **not** enroll.

Attributes: UUC:Reflection-in-Action

BME 2930 - Special Topics
3 Credits (Repeatable for credit)

BME 2980 - Independent Study
1 or 3 Credits (Repeatable for credit)

BME 3000 - Engineering Entrepreneurship
3 Credits
This course introduces students to the methods used to develop an innovative, technology-based product or service in a competitive environment. Topics covered include the start-up mindset, disruptive innovation, lean development techniques, patents and other intellectual property, medical regulatory affairs, finance, venture capital, and company valuation and harvest. Offered in fall.
Prerequisite(s): BME 3200 with a grade of C- or higher; ECE 2001 with a grade of C- or higher; ECE 2002 with a grade of C- or higher

BME 3100 - Signals
3 Credits
Signal representations in the time domain and frequency domain, Fourier transforms, Laplace transforms, Z-transforms, linear systems, transfer functions, system response in time and frequency, analog and digital processing of signals. Relating signal properties to physical parameters.
Prerequisite(s): BME 2000 with a grade of C- or higher; ECE 2001 with a grade of C- or higher; ECE 2002 with a grade of C- or higher; MATH 3550 with a grade of C- or higher

BME 3150 - Biomedical Instrumentation
3 Credits
This course covers both clinical and medical research instrumentation. Specific examples include the design and application of electrodes, biopotential amplifiers, biosensors, therapeutic devices, clinical measurements, implantable devices, non-invasive methods, and medical imaging machines.
Prerequisite(s): (BME 3100 with a grade of C- or higher or ECE 3150 with a grade of C- or higher); (BME 2200 with a grade of C- or higher, BIOL 2600 with a grade of C- or higher, or BME 4930 with a grade of C- or higher)

BME 3200 - Mechanics
3 Credits
Topics include analyses of systems at static equilibrium; analyses of the deformation and stress of elastic and plastic materials under various loading modes; and an introduction to viscoelasticity. Cross-listed with ESCI 2100.
Prerequisite(s): PHYS 1610 with a grade of C- or higher

BME 3300 - Transport Fundamentals
3 Credits
Introductory topics in fluid, heat, and mass transfer including both integral and differential analysis. Develop and utilize Bernoulli's equation, Navier-Stokes relationships, Fourier heat transfer relationships, and Fick's laws. Analysis of problem statements and determination of assumptions for each set of equations is covered.
Prerequisite(s): (BME 2000 with a grade of C- or higher or CSCI 1060 with a grade of C- or higher); BME 3200 with a grade of C- or higher; MATH 3550 with a grade of C- or higher

BME 3400 - Materials Science
3 Credits
Materials Science is a multidisciplinary field requiring knowledge of chemistry, physics, and mechanics. In this first course we examine effect of chemistry on molecular structure and physical and mechanical properties of materials, and we examine methods of controlling those properties. Examples from the various engineering disciplines are used.
Prerequisite(s): (BME 3200 with a grade of C- or higher, CHEM 1120 with a grade of C- or higher, BME 3200 with a grade of C- or higher, and CHEM 1120 with a grade of C- or higher; MENG 3105, CHEM 1110, MENG 3105, and CHEM 1110; CVNG 3105X, CHEM 1110, CVNG 3105X, and CHEM 1110; ESCI 3100, CHEM 1110, ESCI 3100, and CHEM 1110)

BME 3840 - Junior Lab
1 Credit (Repeatable for credit)
Laboratory to provide an experience in engineering design and experimentation. Students develop fundamental lab and analysis skills across a broad array of core BME topics, including mechanics, materials, transport, signals, and instrumentation.
Prerequisite(s): BME 3400 with a grade of C- or higher; BME 3100* with a grade of C- or higher; BME 3300* with a grade of C- or higher

* Concurrent enrollment allowed.

BME 3850 - Design of Biomedical Engineering Lab Experiments
1 or 2 Credits
Laboratory to provide an experience in engineering research and design at a level appropriate to the student's background. Students will work on developing their laboratory skills and ability to successfully design and implement a research plan.
Restrictions:
Enrollment is limited to students with a major in Biomedical Engineering.

BME 3915 - Internship with Industry
1-3 Credits (Repeatable up to 3 credits)
This course is an experiential learning course, which takes place in the workplace of an industry partner. It is intended to be in partnership between the student, industry, and faculty. The student is intended to work for the industry partner per a specified agreement, while also fulfilling some academic requirements to receive credit for the internship or co-op.
Prerequisite(s): CORE 1500*; (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S)

* Concurrent enrollment allowed.
Attributes: UUC:Reflection-in-Action

BME 3930 - Special Topics
1-4 Credits (Repeatable for credit)

BME 3980 - Independent Study
1 or 3 Credits (Repeatable for credit)

BME 4100 - BioData Processing and Machine Learning
3 Credits
Fundamental and cutting-edge research tools used in analyzing biomedical data are the basis of this course. Beginning with basic filtering and correlation approaches, extending to optimal/adaptive filtering and multivariate analysis, and machine learning, neural network, and deep learning in processing biomedical signals and data.
Prerequisite(s): (BME 3100 with a grade of C- or higher or ECE 3150 with a grade of C- or higher); BME 2000 with a grade of C- or higher; BME 2200 with a grade of C- or higher

BME 4130 - Medical Imaging
3 Credits
This course introduces students to the physics, signals-and-systems, image processing, and clinical components of four widely used medical imaging technologies; X-ray (and angiography), computed tomography, magnetic resonance, and ultrasound. Coursework includes image processing in MATLAB and other medical image visualization platforms.
Prerequisite(s): BME 3100 with a grade of C- or higher

BME 4150 - Brain Computer Interface
3 Credits
This course introduces fundamental and advanced technologies in constructing prosthetic devices controlled by brain signals noninvasively. The topics will include the major BCI components, Electroencephalography (EEG) signal properties, acquisition and processing, the common research platform BCI2000, eye-movement tracking glasses, basic machine learning, classical and award-winning BCI research projects, etc. Students will gain a broad knowledge of the BCI research and its applications. The will learn the basics of brain-signal acquisition and processing. They will learn the four modules included in a typical BCI system. They will be able to work with a single-channel EEG system to measure brain signals and build complete applications on top of it.
Prerequisite(s): BME 2000; BME 3100

BME 4200 - Biomechanics
3 Credits
Advanced topics in skeletal tissue mechanics, including: skeletal biology, fracture healing, and bone remodeling; the mechanical properties, fracture resistance, and adaptability of bone to external forces; and the mechanics of synovial joints, cartilage, tendons, and ligaments.
Prerequisite(s): (BME 2200 with a grade of C- or higher, BIOL 2600 with a grade of C- or higher, or BME 4930 with a grade of C- or higher); BME 3200 with a grade of C- or higher; BME 3400* with a grade of C- or higher

* Concurrent enrollment allowed.

BME 4210 - Human Movement Biomechanics
3 Credits
Theory behind and techniques of quantifying human movement, including segment and joint kinematics and kinetics, muscle activation, and simulation of musculoskeletal systems. (Offered every Spring)
Prerequisite(s): BME 3200 with a grade of C- or higher

BME 4300 - Biotransport
3 Credits
With the foundations of fluid, heat and mass transfer established in Transport Fundamentals, this course focuses on specific biological examples of transport including oxygen transport, blood flow and solute transport in biological systems. Additionally, discussion will include integration of fluid, heat and mass transfer in specific biomedical examples such as artificial organ development and extracorporeal devices.
Prerequisite(s): (BIOL 2600 with a grade of C- or higher or BME 2200 with a grade of C- or higher); BME 3300 with a grade of C- or higher

BME 4320 - Drug Delivery
3 Credits
This course will cover various modes and engineered vehicles for drug delivery, including nano- and micro-spheres, transdermal drug delivery systems (DDS), implant drug delivery, targeted delivery, and hydrogels for controlled delivery. The class will also cover mass transport fundamentals: especially diffusion, but also convection and basic pharmacokinetics models. Offered periodically.
Prerequisite(s): BME 3300 with a grade of C- or higher; BME 4400 with a grade of C- or higher

BME 4340 - Biofluids
3 Credits
This course focuses on analysis of fluid flow situations in the human body. The course starts from foundational equations in fluid mechanics, including both integral and differential analyses, and then considers more advanced topics that are relevant to the complexities of physiological fluid flows, including non-Newtonian flows, flows with curvature and abrupt changes in the cross-sectional dimension, and flows through small pores. Emphasis will be placed on blood flow in the cardiovascular system. Effects of biomedical implants and devices on fluid flow will also be considered.
Restrictions:
Enrollment is limited to students with a program in Biomedical Engineering.

BME 4400 - Biomaterials
3 Credits
Biomaterials is a multidisciplinary field requiring knowledge of biology, chemistry, materials science, mechanics, transport and medicine. In this course we will examine aspects of chemistry, biology, material science and mechanics as they apply to the interaction of a material with a biological system. Our examination of the field will lead to a general understanding of biocompatibility and how to design experiments that assess biocompatibility.
Prerequisite(s): BME 3400 with a grade of C- or higher; (BIOL 2600 with a grade of C- or higher or BME 2200 with a grade of C- or higher); (STAT 3850* with a grade of C- or higher or MATH 3850* with a grade of C- or higher)

* Concurrent enrollment allowed.

BME 4410 - Tissue Engineering
3 Credits
This course will explore quantitative topics in tissue engineering, including utilizing engineering topics such as materials science, kinetics and transport phenomena to describe biological processes in tissue engineering.000 Credit hours.
Prerequisite(s): BME 3300 with a grade of C- or higher; BME 4400 with a grade of C- or higher; (STAT 3850 with a grade of C- or higher or MATH 3850 with a grade of C- or higher)

BME 4430 - Regenerative Engineering
3 Credits
Fundamental concepts of cell biology, stem cell therapy, immune-modulation, mechanical and electrical stimulation will be introduced. Relevant peer-reviewed journal articles will be discussed. Students enrolled in the graduate section (BME 5430) and receiving graduate credit for this course will be expected to work at the higher level. For example, there will be additional assignments, reading, research topics, and/or presentations assigned by the instructor. (Offered in Spring)
Prerequisite(s): BME 4400 with a grade of C- or higher

BME 4600 - Quantitative Physiology I
3 Credits
In this course, students will quantitatively examine aspects of human physiology related to neural control and the sensory systems. The topics will cover excitable cells, the nervous system, chemical senses, hearing, vision, and the neuromuscular system. This examination of the field will lead to a quantitative understanding of how these systems work alone and integrate with one another.
Prerequisite(s): BME 2000 with a grade of C- or higher; BME 3100 with a grade of C- or higher; BME 3300 with a grade of C- or higher
Restrictions:
Enrollment is limited to students with a program in Biomedical Engineering.

BME 4650 - Quantitative Physiology II
3 Credits
In this course, students will quantitatively examine aspects of human physiology related to a number of body systems. The topics will cover cardiovascular physiology, respiratory physiology, renal physiology, gastrointestinal physiology, and endocrine. This examination of the field will lead to a quantitative understanding of how these systems work alone and integrate with one another.
Prerequisite(s): BME 4600 with a grade of C- or higher

BME 4700 - Biomedical Engineering Innovation and Entrepreneurship
3 Credits
This course is designed to teach students how to develop a biomedical technology-based product or service, not in a controlled company environment, with specifications provided, but in an ultra-competitive global marketplace where the only tests of success are whether value is created and a profit is made. The course will begin by examining entrepreneurship as a career choice. It will then cover the entire biomedical technology start-up process, from idea generation to product development to successful harvest. This includes value proposition and business model development, intellectual property, regulatory bodies and processes (The Food and Drug Administration and other biomedical product regulatory agencies, including IEC, ISO and ASTM), finance and accounting, and fundraising, including venture capital. Biomedical technologies studied will include medical devices, medical imaging, biologics, and tissue-engineered and regenerative medicine products. The principals and tools of innovation and entrepreneurship can apply equally well to a start-up company or a large.
Prerequisite(s): (BME 3100* with a grade of C- or higher or ECE 3150* with a grade of C- or higher)

* Concurrent enrollment allowed.

BME 4915 - Internship with Industry
1-3 Credits (Repeatable up to 3 credits)
This course is an experiential learning course, which takes place in the workplace of an industry partner. It is intended to be in partnership between the student, industry, and faculty. The student is intended to work for the industry partner per a specified agreement, while also fulfilling some academic requirements to receive credit for the internship or co-op.
Prerequisite(s): CORE 1500*; (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S)

* Concurrent enrollment allowed.
Attributes: UUC:Reflection-in-Action

BME 4930 - Special Topics in Biomedical Engineering
3 Credits (Repeatable for credit)
Experimental or one-time courses of special interest. Course must be approved by BME faculty prior to offering.
Prerequisite(s): BIOL 1240 with a grade of C- or higher

BME 4950 - Senior Project I
3 Credits
Capstone project; process of design; proposal development; project planning and scheduling; prototyping; quality; testing; regulatory issues; biomedical ethics; design review; teamwork; oral and written reports.
Prerequisite(s): BME 3150 with a grade of C- or higher; Minimum Earned Credits of 60; BME 3840 with a grade of C- or higher; (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S); CORE 1900; CORE 1500; CORE 1200*; CORE 2500*; CORE 1000; CORE 1500*

* Concurrent enrollment allowed.
Attributes: UUC:Collaborative Inquiry, UUC:Self in the World

BME 4960 - Senior Project II
0 or 3 Credits
Continuation of BME 4950.
Prerequisite(s): BME 4950 with a grade of C or higher; CORE 1900
Attributes: UUC:Creative Expression, UUC:Writing Intensive

BME 4970 - Advanced Independent Research in Biomedical Engineering
0-2 Credits (Repeatable for credit)
Individual or small group investigation of a topic.

BME 4980 - Advanced Independent Study in Biomedical Engineering
1-3 Credits (Repeatable for credit)
Individual or small group investigation of a topic. Consent of instructor required.

BME 5000 - Seminars
0 Credits (Repeatable for credit)
A weekly departmental lecture-discussion presented by students, faculty, and invited guests. Offered every semester.

BME 5010 - Research Analysis
2 Credits
Introduction to scientific design, critique, communication, and analysis for biomedical engineers. Offered every fall semester.

BME 5040 - Technical Communication in the Discipline
1 Credit
This class will focus on written technical communication in Biomedical Engineering – an essential skill for every graduate student. The students will learn how to write the various sections of a research paper, namely: Abstract, Introduction, Materials and Methods, Results, Discussion, Conclusions. They will also learn how to present and interpret scientific data, how to format figures and figure captions, how to properly cite, including how to use EndNote, how to choose the proper journal for their work, and how to approach paper revisions. The students will also learn strategies to overcome writers block. While different written assignments will be graded throughout the semester, the final deliverable from this class will be a complete written research paper. Thus, the class is tailored towards Master's students in their last semester or PhD students typically in their second year or beyond, who are preparing their first manuscript. However, students who have a well-defined project and significant preliminary data could also benefit from the instruction. Offered in spring.

BME 5100 - BioData Processing and Machine Learning
3 Credits
Fundamental and cutting-edge research tools used in analyzing biomedical data are the basis of this course. Beginning with basic filtering and correlation approaches, extending to optimal/adaptive filtering and multivariate analysis, and machine learning, neural network, and deep learning in processing biomedical signals and data. Graduate students are expected to develop the ability to explain methodologies and corresponding results, as well as to apply algorithms to real-world problems.
Prerequisite(s): (BME 3100 or ECE 3150)
Attributes: BME Graduate Elective

BME 5130 - Medical Imaging
3 Credits
This course introduces students to the physics, signals-and-systems, image processing, and clinical components of four widely used medical imaging technologies; X-ray (and angiography), computed tomography, magnetic resonance, and ultrasound. Coursework includes image processing in MATLAB and other medical image visualization platforms. Students enrolled in the graduate section (BME5130) and receiving graduate credit for this course will be expected to work at the higher level. For example, there will be additional assignments, reading, research topics, and/or presentations assigned by the instructor.
Prerequisite(s): BME 3100
Attributes: Bioinformatics & Comp Bio Elec

BME 5150 - Brain Computer Interface
3 Credits
This course introduces fundamental and advanced technologies in constructing prosthetic devices controlled by brain signals noninvasively. The topics will include the major BCI components, Electroencephalography (EEG) signal properties, acquisition and processing, the common research platform BCI2000, eye-movement tracking glasses, basic machine learning, classical and award-winning BCI research projects, etc. Students will gain a broad knowledge of the BCI research and its applications. The will learn the basics of brain-signal acquisition and processing. They will learn the four modules included in a typical BCI system. They will be able to work with a single-channel EEG system to measure brain signals and build complete applications on top of it. Graduate students will lead the design groups and will apply more advanced analysis techniques than the undergraduates.
Attributes: AI Applications, Bioinformatics & Comp Bio Elec, BME Graduate Elective

BME 5210 - Human Movement Biomechanics
3 Credits
Theory behind and techniques of quantifying human movement, including segment and joint kinematics and kinetics, muscle activation, and simulation of musculoskeletal systems. Students enrolled in the graduate section (BME 5210) and receiving graduate credit for this course will be expected to work at the higher level. For example, there will be additional assignments, reading, research topics, and/or presentations assigned by the instructor.
Prerequisite(s): BME 3200

BME 5300 - Biotransport
3 Credits
This course focuses on specific biological examples of transport including oxygen transport, blood flow and solute transport in biological systems. Additionally, discussion will include integration of fluid, heat and mass transfer in specific biomedical examples such as artificial organ development and extracorporeal devices.
Prerequisite(s): (BIOL 2600 or BME 2200); BME 3300
Restrictions:
Enrollment is limited to students with a program in Biomedical Engineering.

Attributes: BME Graduate Elective

BME 5320 - Drug Delivery
3 Credits
This course will cover various modes and engineered vehicles for drug delivery, including nano- and micro-spheres, transdermal drug delivery systems (DDS), implant drug delivery, targeted delivery, and hydrogels for controlled delivery. The class will also cover mass transport fundamentals: especially diffusion, but also convection and basic pharmacokinetics models.
Attributes: BME Graduate Elective

BME 5340 - Biofluids
3 Credits
This course focuses on analysis of fluid flow situations in the human body. The course starts from foundational equations in fluid mechanics, including both integral and differential analyses, and then considers more advanced topics that are relevant to the complexities of physiological fluid flows, including non-Newtonian flows, flows with curvature and abrupt changes in the cross-sectional dimension, and flows through small pores. Emphasis will be placed on blood flow in the cardiovascular system. Effects of biomedical implants and devices on fluid flow will also be considered.
Prerequisite(s): BME 3300

BME 5360 - Reaction Kinetics and Bioreactors for Biomedical Engineering
3 Credits
This course will take the students from the chemical kinetics concepts such as rate laws and rate data analysis to biological applications, such as enzyme kinetics, cell growth kinetics, pharmacokinetics, and design and analysis of bioreactors. There will be an emphasis on applying kinetics concepts to biological systems and on developing critical reading skills of current research in the field.
Restrictions:
Enrollment is limited to students with a program in Biomedical Engineering.

BME 5400 - Tissue-Material Interfaces
3 Credits
This course will expand on the concepts introduced in the typical undergraduate biomaterials sequence. In particular, the response of tissues to implanted materials will be studied extensively. Offered every spring semester.

BME 5410 - Tissue Engineering
3 Credits
Beginning with the history of tissue engineering, this course will describe the challenges in developing new functional human tissue including the ethical and legal implications of 'designing' tissue, relevant background, and current directions in research and development. Offered every other fall semester.

BME 5420 - Tissue Engineering Scaffold Fabrication Techniques
3 Credits
This course will explore various techniques for fabricating and assessing scaffolds for tissue engineering applications. This course will provide students with classroom instruction and hands-on laboratory experience with a number of scaffold fabrication techniques; such as electrospinning, various hydrogels technologies, cryogels, tissue decellularization, solvent casting, and particular leaching. Students will also learn about and perform a number of assessments for these scaffolds, and may learn about swelling and degradation testing, mechanical testing, scanning electron and atomic force microscopy imaging, and cell seeding and interaction studies.
Prerequisite(s): BME 5410
Attributes: BME Graduate Elective

BME 5430 - Regenerative Engineering
3 Credits
Fundamental concepts of cell biology, stem cell therapy, immune-modulation, mechanical and electrical stimulation will be introduced. Relevant peer-reviewed journal articles will be discussed. Students enrolled in the graduate section (BME 5430) and receiving graduate credit for this course will be expected to work at the higher level. For example, there will be additional assignments, reading, research topics, and/or presentations assigned by the instructor.
Prerequisite(s): (BME 4410 or BME 5410)
Attributes: BME Graduate Elective

BME 5455 - Biomaterials Characterization and Instrumentation
3 Credits
This course introduces various characterization techniques commonly used to measure the physical and chemical properties of biomaterials. Techniques will include spectrophotometry, infrared spectroscopy, light scattering, microscopy, scanning electron microscopy, transmission electron microscopy, rheology, and atomic force microscopy. Students will learn the theoretical basis of each of these techniques and gain hands-on experience with measurement and analysis of a variety of biomaterials. Special emphasis will be given to biomaterials commonly used in labs, including hydrogels, cryogels, and electrospun scaffolds.
Prerequisite(s): BME 4400
Restrictions:
Enrollment is limited to students with a program in Biomedical Engineering.

Attributes: BME Graduate Elective

BME 5600 - Quantitative Physiology I
3 Credits
In this course, students will quantitatively examine aspects of human physiology related to neural control and the sensory systems. The topics will cover excitable cells, the nervous system, chemical senses, hearing, vision, and the neuromuscular system. This examination of the field will lead to a quantitative understanding of how these systems work alone and integrate with one another. Offered as needed in fall.

BME 5650 - Quantitative Physiology II
3 Credits
In this course, students will quantitatively examine aspects of human physiology related to a number of body systems. The topics will cover cardiovascular physiology, respiratory physiology, renal physiology, gastrointestinal physiology, and endocrine. This examination of the field will lead to a quantitative understanding of how these systems work alone and integrate with one another. Offered as needed in spring.
Prerequisite(s): BME 5600

BME 5850 - Design of Biomedical Engineering Lab Experiments
3 Credits
Laboratory to provide an experience in engineering research and design at a level appropriate to the student's background. Students will work on developing their laboratory skills and ability to successfully design and implement a research plan.
Restrictions:
Students with a classification of Graduate Doctoral may **not** enroll.

Attributes: BME Graduate Elective

BME 5910 - Co-op with Industry
1-6 Credits
A full-time supervised work experience with an agency, firm or organization that employs persons in this degree field. This course is used for experiential learning session.
Attributes: BME Graduate Elective

BME 5915 - Internship with Industry
1-3 Credits
A work experience with an agency, firm, organization that employs persons in this degree field. This experience may be full time or part time as required by the industry sponsor.
Attributes: BME Graduate Elective

BME 5930 - Special Topics
1-3 Credits (Repeatable for credit)
A one-time or trial course.
Attributes: BME Graduate Elective

BME 5955 - Capstone Project 1
3 Credits
A capstone project for the BS degree combined with the beginning of research toward the MS degree; process of design; proposal development; project planning and scheduling; prototyping; quality; testing; regulatory issues; biomedical ethics; design review; teamwork; oral and written reports. Restricted to students in the Accelerated BS-MS Program in Engineering.

BME 5960 - Master's Project
1-3 Credits (Repeatable for credit)
For the M.S. project option.
Attributes: BME Graduate Elective

BME 5965 - Capstone Project 2
3 Credits
Continuation of BME 5955. Restricted to students in the Accelerated BS-MS Program in Engineering.
Prerequisite(s): BME 5955

BME 5970 - Research Topics
1-3 Credits (Repeatable for credit)
For research other than the thesis or project.
Attributes: BME Graduate Elective

BME 5980 - Graduate Independent Study in Biomedical Engineering
1-3 Credits (Repeatable for credit)
An independent study with a faculty member.
Attributes: BME Graduate Elective

BME 5990 - Thesis Research
0-6 Credits (Repeatable for credit)

BME 6000 - Preparing Future Faculty
3 Credits
In this course, we will systematically address the primary functions of faculty in academia. The purpose of the course is to provide Ph.D.-level students with an interest in pursuing an academic career the tools necessary to be successful members of academia, as well as provide them with an understanding and contextual knowledge of the rigors of the professoriate. The course will address varying faculty roles and responsibilities, primarily focusing on advanced research methods (i.e. grant writing and submission, literature reviews, publishing, research philosophy / statement, etc.) and the foundations of engineering education (i.e. engineering education pedagogy, teaching techniques, student mindset)
Attributes: Aviation Elective (Graduate), BME Graduate Elective

BME 6930 - Special Topics
1-6 Credits (Repeatable for credit)
A one-time or trial course.
Attributes: BME Graduate Elective

BME 6970 - Advanced Research Topics in Biomedical Engineering
1-3 Credits
For research other than dissertation research.
Attributes: BME Graduate Elective

BME 6980 - Graduate Independent Study in Biomedical Engineering
1-3 Credits (Repeatable for credit)
An independent study with a faculty member.
Attributes: BME Graduate Elective

BME 6990 - Dissertation Research
0-6 Credits (Repeatable for credit)