BME 101. Introduction to Biomedical Engineering. 3 hours.
Principles, practice, and the role of biomedical engineers in science, engineering, and commercialization of medical products. Professional ethics, career paths, introduction to graphical design tools and instrumentation. Course Information: Credit is not given for BME 101 if the student has credit in BIOE 101. Previously listed as BIOE 101.

BME 102. Biomedical Engineering Freshman Seminar. 1 hour.
Exposure to biomedical engineering research through attendance of graduate student seminars followed by faculty-mediated discussion. Writing seminar summaries, student shadowing, articulating long-term goals, and planning an academic trajectory. Course Information: Satisfactory/Unsatisfactory grading only. Previously listed as BIOE 102. Restricted to first year Biomedical Engineering students (freshmen or transfer students).

BME 205. Biomedical Engineering Thermodynamics. 3 hours.
Introduction to equilibrium and non-equilibrium thermodynamics, with emphasis on non-equilibrium (living) systems. Applications include thermodynamics of living cells and the lung, molecular energy exchange, and energy exchange in exercise. Course Information: Previously listed as BIOE 205. Credit is not given for BME 205 if the student has credit in BIOE 205 or CHE 201 or ME 205. Prerequisite(s): PHYS 141.

BME 240. Modeling Physiological Data and Systems. 3 hours.
Computational tools and techniques for models and statistics used to describe, interpret and analyze physiological data and systems. Time series, image and population data types. Course Information: Previously listed as BIOE 240. Credit is not given for BME 240 if the student has credit for BIOE 240. Prerequisite(s): BIOS 110; and MATH 180; and CS 109.

BME 250. Clinical Problems in Biomedical Engineering. 3 hours.
Examination of three current problems in biomedical engineering. Student teams work with a faculty facilitator toward each solution. Problem identification, strategic planning, brainstorming, information gathering, and reporting. Course Information: Credit is not given for BME 250 if the student has credit in BIOE 250. Previously listed as BIOE 250. Credit or concurrent registration in BIOE 101 and Credit or concurrent registration in BIOE 102; or Credit or concurrent registration in BME 101 and Credit or concurrent registration in BME 102.

BME 310. Biological Systems Analysis. 3 hours.
System dynamics and frequency-domain analysis in bioengineering systems. Topics include population models, predator-prey models, metabolic networks, biological oscillation, dynamics of infectious diseases. Course Information: Previously listed as BIOE 310. Credit is not given for BME 310 if the student has credit in BIOE 310 or ECE 310 or ME 312. Prerequisite(s): MATH 220 and MATH 310; and BIOE 240 or BME 240.

BME 325. Biotransport. 3 hours.
Transport phenomena in biomedical engineering and living systems, specifically processes vital to the design of medical devices for artificial clinical intervention. Topics include circulatory system dynamics and modeling of physiological systems. Course Information: Previously listed as BIOE 325. Credit is not given for BME 325 if students have credit in BIOE 325. Prerequisite(s): MATH 220 and BIOS 100 and BME 205.

BME 339. Biostatistics I. 3 hours.
Statistical treatment of data and model estimation treated in a framework of biological experiments, and attributes of data generated from such experiments. Experimental design is included. Course Information: Credit is not given for BME 339 if the student has credit in BIOE 339. Previously listed as BIOE 339. Extensive computer use required. Prerequisite(s): MATH 210 and CS 109. Recommended background: Prior knowledge of Excel.

BME 396. Senior Design I. 3 hours.
Design considerations for biomedical devices emphasizing traditional engineering design concepts. Course Information: Prerequisite(s): Credit or concurrent registration in BIE 339. Course Information: Previously listed as BIOE 396. Credit is not given for BME 396 if the student has credit in BIOE 396. Prerequisite(s): Credit or concurrent registration in BIOE 332 and Credit or concurrent registration in BIOE 333 and Credit or concurrent registration in BIOE 339.

BME 397. Senior Design II. 3 hours.
Application of principles of engineering and engineering design methodology to the solution of a large scale biomedical engineering design problem. Course Information: Credit is not given for BME 397 if the student has credit in BIOE 397. Previously listed as BIOE 397. Prerequisite(s): BIOE 396 or BME 396.

BME 398. Undergraduate Research. 0-5 hours.
Research under the close supervision of a faculty member. Course Information: May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Conference and one Practice.

BME 415. Biomechanics. 3 or 4 hours.
Continuum mechanics of cells, tissues and organs. Statics and force balances; stress, strain and constitutive relations; equilibrium, universal solutions and inflation; finite deformation; nonlinear problems; finite element methods. Course Information: 3 undergraduate hours. 4 graduate hours. Credit is not given for BME 415 if the student has credit in BIOE 415. Previously listed as BIOE 315. Prerequisite(s): BIOE 310 or BME 310.

BME 421. Biomedical Imaging. 3 or 4 hours.
Introduction to engineering and scientific principles associated with X-ray, magnetic resonance, ultrasound, computed tomographic and nuclear imaging. Course Information: 3 undergraduate hours. 4 graduate hours. Previously listed as BIOE 421. Credit is not given for BME 421 if the student has credit in BIOE 421. Prerequisite(s): MATH 210 and PHYS 142.

BME 471. Biomedical Optical Imaging. 3 or 4 hours.
Fundamentals of light-matter interactions, geometric optics, nonlinear optics, ultra-fast lasers, photodetectors, light microscopy, super-resolution imaging, photacoustic tomography, optical coherence tomography, functional optical imaging. Course Information: 3 undergraduate hours. 4 graduate hours. Credit is not give for BME 471 if the student has credit in BIOE 471. Previously listed as BIOE 471. Prerequisite(s): PHYS 142 and BIOS 110.

BME 472. Models of the Nervous System. 3 or 4 hours.
Mathematical models of neural excitation and nerve conduction, stochastic models and simulation of neuronal activity, models of neuron pools and information processing, models of specific neural networks. Course Information: 3 undergraduate hours. 4 graduate hours. Credit is not given for BME 472 if students have credit in BIOE 472. Previously listed as BIOE 472. Prerequisite(s): BIOE 310 or BME 310; and Credit or concurrent registration in BIOS 484.
BME 480. Intro to Bioinformatics. 3 or 4 hours.
Computational analysis of genomic sequences and other high throughput data. Sequence alignment, dynamic programming, database search, protein motifs, cDNA expression array, and structural bioinformatics. Course Information: 3 undergraduate hours. 4 graduate hours. Credit is not given for BME 480 if the student has credit in BME 480. Prerequisite(s): BIOS 100 and CS 109.

BME 481. Biinformatics Laboratory. 2 hours.
Teaches students how to use bioinformatics tools, including sequence alignment methods such as Blast, Fasta, and Pfam, as well as structural bioinformatics tools, such as Rasmol and CastP. Course Information: Extensive computer use required. Previously listed as BIOE 481. Credit is not given for BME 481 if the student has credit in BIOE 481. Prerequisite(s): Credit or concurrent registration in BME 480 or Credit in BIOE 480; and senior standing or above.

BME 494. Special Topics in Biomedical Engineering IV. 1-5 hours.
Special topics to be arranged. Course topics aimed at fourth-year undergraduate and graduate students. Course Information: May be repeated. Students may register in more than one section per term. Previously listed as BIOE 494.