Concentration Electives

All BME students must complete 12 credits of Concentration Electives in order to satisfy the requirements for the Bachelor of Science. These Concentration Electives are typically completed in the senior year, though they may be taken as a junior as long as all prerequisite courses have been completed. Specific sets of Concentration Electives have been approved for each of the undergraduate concentrations. If students have an interest in other courses that are not on these lists, an Academic Petition may be filed with the Undergraduate Program Chair. This includes courses offered at other institutions that may be taken as a guest student while on an out-of-town placement.

Students who are interested in maximizing the use of AGRADE credits towards an MS degree should select 5000-level courses for their Concentration Electives.

In order to guarantee that ABET requirements regarding minimum numbers of Engineering credits are met, at least 4 of 12 credits (Classes of 2014 & 2015) of Concentration Electives or 6 of 16 credits (Classes of 2016 and beyond) of Concentration Electives + Directed Electives must be in an engineering course. With some minor exceptions, students can assume that courses offered by Engineering departments have sufficient engineering content to be considered an engineering course.

Notable exceptions are these BME courses that count as life science credits and not engineering courses:

BME 2005 – Introduction to Molecular and Cellular Biology for Engineers

BME 2010 – Introduction to Physiology for Engineers

BME 2070 – Introduction to Anatomy for Engineers

BME 4010 – Engineering Physiology Laboratory

BME 5005 – Introduction to Physiology and Cell Biology for Engineers

BME 5010 – Engineering Physiology

BME 5070 – Engineering Anatomy

Prior to registration for senior year courses, each student should meet with the designated cohort professional advisor for their concentration to discuss and decide Concentration and Directed Electives. Forms are available on the BME website. Once the plan is completed, the student should file the approved plan with the Undergraduate Program Chair via email (scanned or optimized PDF photo, < 1MB). The explanation of choices should briefly summarize the student's career and educational goals, anticipated Concentration Electives, and relate how the selected courses support the post-graduation goals. NOTES: Students should pay attention to listed course prerequisites in developing their Concentration Plans. Also, if a student will require their BE 5998 Honors Thesis credits to reach the 48 Engineering credit ABET threshold, the Honors Thesis Proposal (available on the BME website) may need to be approved prior to final approval of a concentration.

All Concentrations

B E 5998	Honors Thesis (3-4 cr)
BME 5020	Computer and Mathematical Applications in Biomedical Engineering (4 cr)
BME 5070	Engineering Anatomy (4 cr)
BME 5900	National Design Competition (var)
BME 5990	Directed Study (var)
BME 5995	Molecular Imaging & Bio (4 cr)
BME 6500	Enabling Technology (4 cr)
IE 6240	Quality Management Systems (4 cr)
IE 6260	Quality Assurance and Control (2 cr)
IE 6405	Integrated Product Develop (4 cr)
IE 6410	Introduction to Six Sigma (4 cr)
IE 4450	Concurrent Engineering Design (4 cr)
IE 6840	Project Management (4 cr)
IE 4260	Principles of Quality Control (3 cr)

Concentration Electives

Biomaterials

BME 5380 – Biocompatibility (4 cr)
BME 5390 – Exp Methods in Biomaterials (2 cr)
BME 5995 – Cell & Tissue Biomechanics (4 cr)
CHE 5995 – Introduction to Nano Medicine & Nano Technology (3 cr)
CHM 5600 – Biochemistry (4 cr)
MSE 5350 – Polymer Science (4 cr)
MSE 5360 – Polymer Processing (4 cr)
MSE 5600 – Composite Materials (3 cr)

Biomechanics

BME 5130 – Vehicle Safety Engineering (3 cr)
BME 5210 – Musculoskeletal Biomech (4 cr)
BME 5995 – Cell & Tissue Biomechanics (4 cr)
BME 6130 – Accident Reconstruction (3 cr)
KIN 3570 – Physiology of Exercise (3 cr)
KIN 3580 – Biomechanics (3 cr)
KIN 6310 – Physiology of Exercise II (3 cr)
IE 4120 – Intro to Human Factors Engg (4 cr)
ME 3400 – Dynamics (3 cr)
ME 5040 – Finite Element Analysis I (4 cr)
ME 5360 – Intro to Computational Biofluidics and Heat Transfer (4 cr)
ME 5400 – Dynamics II (4 cr)
ME 5580 – Computer-Aided Mech Design (4 cr)
ME 5600 – Adv Mechanics of Materials (4 cr)
ME 5610 – Exp Mech of Materials (4 cr)
ME 5720 – Mech of Composite Materials (4 cr)

Biomedical Instrumentation

BME 5510 – Intro to Clinical Engineering & Technology (2 cr)
BME 5530 – Mechatronic Syst Design I (4 cr)
BME 5540 – Mechatronic Syst Design II (4 cr)
BME 5730 – Application of Techniques in Biomed Image Processing (3 cr)
BME 6470 – Smart Sensor Tech I: Design (4 cr)
BME 6480 – Biomedical Instrumentation (4 cr)
CSC 5860 – Intro to Digital Image Proc (3 cr)
CSC 6860 – Digital Image Processing & Analysis (3 cr)
ECE 3330 – Circuits II (4 cr)
ECE 3570 – Electronics I (4 cr)
ECE 4050 – Algorithms & Data Structures (4 cr)
ECE 4330 – Linear Network & System Analysis (4 cr)
ECE 4340 – Microcomputer-Based Instrumentation Lab (2 cr)
ECE 4570 – Electronics II (4 cr)
ECE 5575 – Introduction to Micro and Nano Electro Mechanical Systems (4 cr)
ECE 5690 – Introduction to Digital Image Processing (4 cr)
ECE 5770 – Digital Signal Processing (4 cr)
PHY 5340/5341 – Optics Lecture + Lab (5 cr)
RAD 5010 – Intro to Radiological Physics (4 cr)