

SBME Pre-Approved Electives

In general, electives need to be at a 3000-level or above. The sections below serve as a source of pre-approved course options; however, approval from an SBME faculty advisor is recommended when selecting 'Math, Science, & Engineering' electives. Other courses not on this list may be approved with permission by the SBME faculty via the Undergraduate Studies Committee.

Not all classes are offered frequently. **Students are responsible for ensuring that courses will be offered in the semester they intend to take it, and that all prerequisites or other permissions are acquired before enrolling in electives.** Courses less than 3 credit hours will have to be supplemented with another course to account for the credit hour discrepancy.

Student should refer to their degree plans to determine the number of credit hours required for BME electives. For student on the 2019-degree plan or earlier, a total of at least 6 credit hours are required for BME electives. For students on the 2020-degree plan or later, a total of at least 12 credit hours are required for BME electives. For all students, a total of at least 6 credit hours are required for 'Science, Math, & Engineering' electives. BME elective course credits in excess of the required number of credit hours can be counted toward 'Science, Math, & Engineering' elective credit hours.

Courses not approved as electives:

- Anything below 3000 level
- Courses cannot be double counted for the 'Upper-Level Biology Elective' and a 'Science, Math, & Engineering' Elective
- Courses cannot be double counted for 'Science, Math, & Engineering' and 'BME' electives
- Any other courses already fulfilling another graduation requirement (e.g., ENGR 3511 Transfer Engineering Experience)

List of Approved Courses for 'BME' Electives

Course Code	Course Title	Offered		Undergrad Credit only	Undergrad / Grad Credit	Grad Credit only	NOTES
BME 3111	Bioimaging Lab	Spring	Annual	✓			# ^
BME 3121	Biotransport Lab	Spring	Annual	✓			# ^
BME 3131	Bioelectricity Lab	Fall	Annual	✓			# ^
BME 3141	Biomechanics Lab	Fall	Annual	✓			# ^
BME 3151	Molecular, Cellular, and Tissue Engineering Lab	Fall	Annual	✓			# ^
BME 3161	Biomedical Micro- and Nanotechnology Lab	Spring	Annual	✓			# ^
BME 3113	Bioimaging	Spring	Annual	✓			
BME 3133	Bioelectricity	Fall	Annual	✓			
BME 3153	Molecular, Cellular, and Tissue Engineering	Fall	Annual	✓			
BME 3163	Biomedical Micro- and Nanotechnology	Spring	Annual	✓			
BME 3243	Biomechanics of Human Movement	Spring	Annual	✓			
BME 3440 / 3980	Mentored Research	All	Annual	✓			See Research for Credit Policy
BME 4050	Design Projects in BME	All	Annual	✓			See Research for Credit Policy
BME 4281	Engineering Co-Op Program	All	Annual	✓			See Internships & Co-Ops Policy
BME 4013 / 5013	Introduction to Medical Device Design	Spring	Bi-Annual		✓		*
BME 4533 / 5533	Neural Engineering	Fall	Annual		✓		*
BME 4873 / 5873	Network Modeling & Analysis of Complex Systems	Spring	Bi-Annual		✓		*
BME 4970 / 5970	Special Topics in Biomedical Engineering	Fall / Spring	Annual		✓		*
BME 5123	Biophotonics Imaging & Microscopy	Fall	Bi-Annual		✓		
BME 5133	Therapeutic Biophotonics	Spring	Bi-Annual		✓		
BME 5143	Biosensors: Fundamentals & Application	Spring	Bi-Annual		✓		
BME 5283	Immunoengineering	Fall	Annual		✓		
BME 5413	Nanomedicine	Fall	Annual		✓		
BME 5443	Neural System & Rehabilitation Engineering	Spring	Irregular		✓		
AME / BME 4213 / 5213	Biomechanics I	Spring	Bi-Annual		✓		*
AME / BME 4970 / 5970	Ear Mechanics	Fall	Bi-Annual		✓		*
CHE / BME 5243	Biochemical Engineering	Spring	Bi-Annual		✓		
CHE / BME 5293	Transport in Biological Systems	Fall	Irregular		✓		
CHE / BME 5373	Tissue Engineering	Fall	Irregular		✓		
CHE 5453	Polymer Science & Engineering	Spring	Annual		✓		
CHE / BME 5970	Genetic Eng & Biotechnology	Fall	Bi-Annual		✓		
ECE 4823	Engineering Principles of the Human Body	Spring	Bi-Annual		✓		
ECE / BME 5843	Medical Imaging Systems	Fall	Annual		✓		
ECE / BME 5853	Biomedical Signals & Systems	Spring	Irregular		✓		
BME 5971	Biomedical Engineering Seminar	Fall / Spring	Annual			✓	
BME 5990	Independent Study	All	Annual			✓	&
ECE 6813	Advanced Topics in Biomedical Engineering	Spring	Bi-Annual			✓	

ECE 5973	Special Topics in Electrical & Computer Engineering	Fall/ Spring	Annual			✓	&
ECE/BME 6213	Optical Information Processing	Spring	Irregular			✓	&

Last Offering was in 2021/2022 Academic Year

^ Needs to be combined with other 1 credit courses to make 3 credits

* Undergrad Credit = 4000 level | Grad credit = 5000 level

& Can be approved for undergrad credit in special cases with petition

List of Approved Courses for 'Upper Division Biology' Electives

- BIOL 3113 - Cell Biology
 - Prerequisite: 1114, or 1124, or Biology 1134, or Botany 1114, and Chemistry 3053.
- BIOL 3333 - Genetics
 - Prerequisite: ZOO/BIOL 1124, or ZOO/BIOL 1114 and ZOO/BIOL 1121; Biology 1134 recommended
- BIOL 3833 - Introduction to Neurobiology
 - Prerequisite: BIOL 1124
- BIOL 4843 - Intro to Molecular Biology
 - Prerequisite: 1114 or 1124, or Botany/PBIO 1114, or Microbiology 3813 and 3812, and one course in organic chemistry
- CHEM 3053 - Organic Chemistry I: Biological Emphasis
 - ****Only applies to students on the 2021-degree plan or later**
 - Prerequisite: CHEM 1415 or CHEM 1425 or CHEM 1435.
- CHEM 3653 - Introduction to Biochemistry
 - Prerequisite: CHEM 3013, CHEM 3053, or CHEM 3064.
- MBIO 3813: Fundamentals of Microbiology
 - Prerequisite: BIOL 1005 or BIOL 1114 or BIOL 1124 or BIOL 1134 or PBIO 1114; and CHEM 1315 and CHEM 1415, or CHEM 1335 and CHEM 1435
- MBIO 4833 – Basic Immunology
 - Prerequisite: one semester of organic chemistry, and an introductory biology course, plus one of the following: 3813 and 3812, Zoology 2124, 3113, 3204, 3333.

List of Approved Courses for 'Science, Math, and Engineering' Electives

Anthropology

§ANTH 5273 Bioethics, Biotechnology, Biomedicine

ANTH 4823 Medical Anthropology

Biology

BIOL 3103 Principles of Physiology

*BIOL 3113 Cell Biology

BIOL 3201 Animal Development Lab

BIOL 3203 Animal Development

*BIOL 3333 Genetics

*BIOL 3833 Intro to Neurobiology

BIOL 4233 Neurobiology of Disease

BIOL 4244 Animal Histology

*BIOL 4843 Intro to Molecular Biology

BIOL 4853 Neurobiology of Memory

BIOL 4893 Behavioral Neurobiology

BIOL 4913 Quantitative Biology

BIOL 5153 Endocrine Physiology

BIOL 5293 Cytology Ultrastructure

BIOL 5343 Developmental Genetics

BIOL 5364 Transmission Electron Microscopy

BIOL 5374 Scanning Electron Microscopy

BIOL 5843 Molecular Biology

§BIOL 5923 Programming in R for Biology

MBIO 3673 Practical Bioinformatics

MBIO 3812 Fund. Microbiology Lab

*MBIO 3813 Fundamentals of Microbiology

*MBIO 4833 Basic Immunology

Chemical, Biological, & Materials Engineering

CHE 3313 Structure & Properties of Materials

CHE 5463 Polymer Processing

Chemistry

*&CHEM 3053 Organic Chemistry I: Biological

CHEM 3153 Organic Chemistry II: Biological

CHEM 3423 Physical Chemistry

CHEM 3523 Physical Chemistry II

*CHEM 3653 Biochemistry

CHEM 3753 Intro to Biochemical Methods

CHEM 4023 Instrumental Methods in Chemical
Analysis

CHEM 4333 Advanced Inorganic Chemistry

CHEM 5453 Polymer Science

CHEM 5753 Principles of Biochem I

CHEM 5853 Principles of Biochem II

CHEM 6813 Intro to Biochemical Methods

CHEM 6823 Protein, Nucleic Acids, & Gene
Expression

CHEM 6833 Structure & Function of Membranes
& Hormones

CHEM 6843 Enzyme Mechanisms & Metabolic
Regulation

CHEM 6853 Protein Structure & Function

Computer Science

CS 4013 Artificial Intelligence

CS 4033 Machine Learning

CS 4063 Human Computer Interaction

CS 4433 Computational Methods in Discrete Optimization

CS 5043 Advanced Machine Learning

CS 5073 Artificial Neural Networks Evolution

CS 5593 Data Mining

CS 5703 Machine Learning Practice

Data Science & Analytics

DSA 3013 Machine Learning for Data Science

DSA 3023 Big Data Engineering

^DSA 5013 Fundamentals of Engineering Statistical Analysis

^DSA 5103 Intelligent Data Analytics

DSA 5011 Introduction to R

DSA 5203 Time Series Analysis

^DSA 5503 Healthcare Analytics

DSA 5403 Bayesian Statistic

Engineering

#ENGR 3401 Engineering Economics

#ENGR 3431 Electromechanical Systems

#ENGR 3441 Fluid Mechanics

ENGR 4003 Engineering Practice

ENGR 4013 Leadership & Management for Engineers

ENGR 4023 Disruptive & Innovative Technology Ideation

§ENGR G4510 Global Environmental Health

Electrical and Computer Engineering

ECE 3323 Intro-Solid State Elec Devices

ECE 3813 Introductory Electronics

ECE 4813 Electronics

ECE 5213 Digital Signal Processing

ECE 5273 Digital Image Processing

ECE 5523 Random Signals

ECE 5363 Optical Engineering

Health & Exercise Science

HES 3513 Health Promotion Planning

HES 3583 Sociocultural Aspects of Health

HES 3843 Biomechanics

HES 4543 Comprehensive Stress Management

HES 4553 Measurement and Evaluation in Health
Promotion

HES 4573 Chronic Disease Intervention

^HES 5823 Exercise Physiology

Industrial Systems Engineering

ISE 4223 Fundamentals of Engineering Economics

ISE 4553 Data Driven Decision Making I

ISE 4804 Ergonomics in Systems Design

^ISE 5013 Fundamentals of Engineering
Statistical Analysis

ISE 5033 Systems Engineering

^ISE 5103 Intelligent Data Analytics

ISE 4553 Data Driven Decision Making

ISE 5373 Additive Manufacturing

^ISE 5503 Healthcare Analytics

^ISE 5823 Exercise Physiology

Math

MATH 3333 Linear Algebra

MATH 3423 Physical Math II

MATH 4163 Intro Partial Diff. Equations

MATH 4373/5373 Abstract Linear Algebra

MATH 4383/5383 Modern Algebra

Meteorology

METR 4990-024 Foundations of Academic Research
Creative Activity

Physics

PHYS 3043 Physical Mechanics

PHYS 3233-001 Modern Physics for Engineers

Psychology

PSY 3203 Cognitive Psychology

PSY 3803 Physiological Psychology

Notes:

* *If not taken as Upper-Level Biology Requirement*

Needs to be combined with other 1 credit courses to make 3 credits.

& *Only applies to students on the 2021-degree plan or later.*

^ *No student may earn credit for both sections of cross-listed courses.*

§ *These courses are offered on an irregular basis.*