

## 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 the 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 12 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).

Please refer to the 'BME' Electives list for BME Elective recommendations.

### List of Approved Courses for 'Upper-Level Biology' Elective

- 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\*\***
  - 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, &amp; Engineering' Elective

**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

\* *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.*