Effective: Fall 2022
### Biomedical Engineering Curriculum

#### Standard Course Substitutions
- APPM 1350: MATH 1300
- APPM 1360: MATH 2300
- APPM 2350: MATH 2400
- APPM 2360: MATH 2130 and MATH 3430
- BMEN 1025: MCEN 1025, GEEN 3830-800 (fall 2020 only)
- BMEN 4117: MCEN 4117, IPHY 3410 and IPHY 3430
- CHEM 1221: CHEM 1114, CHEM 1134
- CHEN 1201: CHEM 1211 (CHEM 1113 approved for transfer students)
- CHEN 1203: CHEM 1211 (CHEM 1133 approved for transfer students)
- CHEN 1310: ECEN 1310, CSCI 1300, (CSCI 1320, ASEN 1320 approved for transfer students). Students considering a minor in Computer Science or Computational Biology should take CSCI 1300.
- CHEN 2810: MCEN 1150, EBIOL 1210 and 1220. Pre-med students should consider taking MCEN 1150.
- CHEN 3010: STAT 4000, MCEN 3047, GEEN 3853. Pre-med students should consider taking STAT 4000. Students considering a minor in Applied Math should take STAT 4000.
- ECEN 2250: ECEN 3010, GEEN 3010
- ECEN 3301: ECEN 3300
- MCEN 2023: CVEN 3161
- MCEN 2063: CVEN 3161

#### Technical Electives
Pre-Med Bioinstrumentation requires a total of 9 technical elective credits, of which at least 6 credits must be BME-Approved Engineering Technical Elective credits, and at least 6 credits of the total must be upper-division. Visit the program’s Advising & Curriculum webpage for options.

#### Humanities & Social Science Electives/Writing Requirements
Visit the college’s Humanities, Social Sciences, and Writing Requirements webpage for options.

#### Grade Requirements
The minimum passing grade for a prerequisite or co-requisite course within the biomedical engineering curriculum is a C-. This requirement includes courses completed in another program or department (APPM, PHYS, etc.). However, if a course taught in another program or department is a co-requisite/pre-requisite for a course in the biomedical curriculum that requires a minimum passing grade of C or higher its co-requisite/prerequisite courses, then this higher requirement applies to biomedical engineering students. The minimum passing grade for a standalone classes is a D-. In addition, students need to have a cumulative and major GPA of at least 2.000 in order to graduate from the College of Engineering. Pass/No Pass is only permitted for BMEN 1000 and Free Elective credits. Effective: Fall 2022

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### Biomechanics Option

Biomechanics is the study of the structure, function and motion of the mechanical aspects of biological systems, at any level from whole organisms to organs, cells and molecules, using the methods of mechanics.

#### Why pursue Biomechanics?

Biomechanics draws from the traditional engineering discipline of mechanical engineering. You may wish to take the biomechanics track if you are interested in human motion, performance, disabilities, prosthetics or orthopedics. You may find biomechanics interesting if you want to learn more about the mechanical interaction of surgical tools with tissue, the impact of mechanical stimulation on engineered tissues, or the rapidly developing field of mechanobiology.

#### Courses Added:
- MCDB 1161 (2) Genetics Lab 1
- MCDB 2150 (3) Principles of Genetics
- MCDB 2161 (2) Genetics Lab 2
- CHEM 3311/3321 (5) Organic Chemistry 1 w/ lab
- CHEM 3331/3341 (5) Organic Chemistry 2 w/ lab
- CHEM 4611 (3) Biochemistry

#### Recommended Technical Electives:
- MCEN 2043 (3) Dynamics
- MCEN 4228 (3) Modeling Human Movement

#### Courses Removed:
- ECEN 2250 (3) Intro to Circuits & Electronics
- ECEN 2260 (3) Circuits as Systems
- ECEN 2270 (3) Electronics Design Lab
- ECEN 3300 (3) Linear Systems
- BMEN 3030 (3) Bioinstrumentation
- Free Electives (5)

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### Bioinstrumentation Option

Bioinstrumentation is an application of biomedical engineering, which focuses on devices used to measure, evaluate and treat biological systems. Examples include biosensors and imaging systems.

#### Why pursue Bioinstrumentation?

Bioinstrumentation draws from the traditional engineering discipline of electrical engineering. You may wish to take the bioinstrumentation track if you are interested in medical devices, such as biosensors and imaging systems, or robotic surgical tools. You may find bioinstrumentation interesting if you want to learn more about the electrical interaction of surgical tools with tissue, methods to image the engineered tissues post-translation, or the rapidly developing field of neurobiology.

#### Courses Added:
- MCDB 1161 (2) Genetics Lab 1
- MCDB 2150 (3) Principles of Genetics
- MCDB 2161 (2) Genetics Lab 2
- CHEM 3311/3321 (5) Organic Chemistry 1 w/ lab
- CHEM 3331/3341 (5) Organic Chemistry 2 w/ lab
- CHEM 4611 (3) Biochemistry

#### Recommended Technical Electives:
- Take two technical electives in ECEN to earn a Minor in Electrical Engineering

#### Courses Removed:
- MCEN 2023 (3) Statics
- MCEN 2063 (3) Solids
- MCEN 4133 (3) Tissue Biomechanics
- BMEN 4117 (3) A&P for Biomedical Engineering
- Technical Electives (3)
- Free Electives (5)