Biomedical Engineering – Program Map: Bioimaging Focus Area

Semester 1
- Chem I / Lab CHEM:1110
- Engr Calc I MATH:1550
- Intro Engr Prob Solving ENGR:1100
- Rhetoric RHET:1030
- Engr Success First Year ENGR:1000

Semester 2
- Chem II / Lab CHEM:1120
- Engr Calc II MATH:1560
- Engr Matrix Alg MATH:2550
- Physics I / Lab PHYS:1611
- Intro Engr Computing ENGR:1300
- BME Forum BME:1010

Semester 3
- Foundations of Biology / Lab BIOL:1411
- Engr Diff Equat MATH:2560
- Statics ENGR:2110
- Elec Circuits ENGR:2120
- Thermo ENGR:2130 or *Intro AI & Mach Learning ENGR:3110
- BME Prof Seminar BME:2010

Semester 4
- Fund Human Physiology HHP:2400 or Quantitative Physiology BME:2260
- Biostatistics BIOS:4120 or STAT:3510
- Systems, Instrum, & Data Acquisition / Lab BME:2200
- Bioimaging & Bioinformatics / Lab BME:2210
- Comp in Engr ENGR:2730

Semester 5
- Cell Biology for Engr / Lab BME:2400
- Biomaterials & Biomechanics / Lab BME:2500
- Medical Imaging Physics BME:5210
- Digital Image Processing ECE:5480
- Cultural Perspectives, Values, and Society

Semester 6
- Focus Area Elective #1
- Focus Area Elective #2
- Focus Area Elective #3
- Intro to Software Design ECE:3330
- Be Creative

Semester 7
- BME Senior Design I BME:4910
- Focus Area Elective #4
- Focus Area Elective #5
- Focus Area Elective #6
- Approved GEC course

Semester 8
- BME Senior Design II BME:4920
- Physics II / Lab PHYS:1612
- Focus Area Elective #7
- Approved GEC course
- Approved GEC course

Legend
- **Math & Science Courses** (green)
- **Required Engineering Courses** (light blue)
- **Focus Area Required Courses** (blue)
- **General Education Courses** (orange)
- **Engineering Core Courses** (purple)
- **Biomedical Core Courses** (yellow)
- **Focus Area Elective Courses** (pink)
- **Seminars** (white)

*If ENGR:3110 is not offered in Fall, it can be taken the following Spring. Students who want to take ENGR:3110 and not ENGR:2130 can take ENGR:2730 Computers in Engineering in Semester 3 and ENGR:3110 in Semester 4. At least two Focus Area Electives must be from the list of Engineering Topics.

Last updated 01/27/25

Biomedical Engineering – Program Map: Bioimaging Focus Area

Bioimaging Required Courses

BME:5210	Medical Imaging Physics	F	P: BME:2200, BME:2210
ENGR:2730	Computers in Engineering	F/S	P: ENGR:1300
ECE:3330	Intro to Software Design	F/S	P: ENGR:2730
ECE:5480	Digital Image Processing	F	P: BME:2200 or ECE:2400

Bioimaging Electives (Focus Area, Minor, or Certificate)

Engineering Topics (must choose two)

BME:5200	Biomedical Signal Processing	S §§	
BME:5240	Deep Learning in Medical Imaging	F	P: ENGR:3110; ECE:5480 recommended
ECE:5330	Graph Algorithms & Combinatorial Optimization	S	P: ECE:3330
ECE:5450	Machine Learning	F	P: BME:2200 or ECE:2400
ECE:5490	Multidimensional Image Analysis Tools & Techniques	See MyUI	P: ECE:5480 and (ECE:3330 or CS:2820)
+ENGR:3110	Intro to AI & Machine Learning in Engr	S	P: ENGR:1300 & soph. standing; C: MATH:2550

Suggested Electives

BME:5251	Advanced Biosystems	F §	P: BME:2200
BME:5441	Numerical & Statistical Methods for Bioengr	F §	P: MATH:2560 and MATH:2550
ECE:5460	Digital Signal Processing	F	P: ECE:3400
CS:2210	Discrete Structures	All	
CS:2230	Data Structures	All	P: ENGR:2730 or CS:1210
HHP:2100	Human Anatomy	All	
HHP:4250	Human Pathophysiology	S	P: HHP:2400 or HHP:3500 or HHP:3550
HHP:4260	Respiratory Pathophysiology	S	P: HHP:2400 or HHP:3500 or HHP:3550
MATH:3550	Engineering Vector Calculus	F/S	P:MATH:1560 & (MATH:2550 or MATH:2700); C: MATH:2560
MATH:3800	Introduction to Numerical Methods	F/S	P: (MATH:2550 or MATH:2700) and (MATH:1560 or MATH:1860)
+ENGR:2130	Thermodynamics	ALL	P: PHYS:1611 and CHEM:1110; C: MATH:1560

Pre-Medicine Electives

**BIOL:1412	Diversity of Form & Function	All	P: BIOL:1411 w/min C-
CHEM:2210	Organic Chemistry I	All	P: CHEM:1120 w/min C-
CHEM:2220	Organic Chemistry II	All	P: CHEM:2210 w/min C-
CHEM:2410	Organic Chemistry Lab	All	P: CHEM:1120 w/min C-, CHEM:2210 w/min C-; C: CHEM:2220
BMB:3110	Biochemistry	All	See MyUI for requirements
BIOL:2512	Fundamental Genetics	All	P: BIOL:1411 w/min C-, CHEM:1110; Recommended: CHEM:2210

+   Bioimaging students can take ENGR:3110 as an Engineering Topic if they take ENGR:2130 as a required engineering course or take ENGR:2130 as focus area elective if they take ENGR:3110 as a required engineering course.

**   Pre-medicine students should check with their Pre-medicine advisor regarding the need for this course.

§   Offered in academic years with odd fall and even spring semesters

§§   Offered in academic years with even fall and odd spring semesters

Note: At least two electives must be from the list of Engineering Topics. Electives not listed above may be approved via the Plan of Study form.

Please check MyUI for the current course offerings and pre/corequisites.

See the BME Bioimaging Focus Area web page for a link to a guide for courses with machine learning content.

Last updated (1/27/25)