

Biomedical Engineering – Program Map: Cellular Engineering Focus Area

| Semester | Course 1 | Course 2 | Course 3 | Course 4 | Course 5 | Seminar |
|----------|---|---|---|---|---|-------------------------------------|
| 1 | Principles Chem I / Lab CHEM:1110 <i>(Math & Science)</i> | Engr Calculus I MATH:1550 <i>(Math & Science)</i> | Intro Engineering Problem Solving ENGR:1100 <i>(Engineering Core)</i> | Rhetoric RHET:1030 <i>(Gen Ed)</i> | — | |
| 2 | Principles Chem II / Lab CHEM:1120 <i>(Math & Science)</i> | Engr Calculus II MATH:1560 <i>(Math & Science)</i> | Engr Matrix Algebra MATH:2550 <i>(Math & Science)</i> | Physics I / Lab PHYS:1611 <i>(Math & Science)</i> | Intro Engr Computing ENGR:1300 <i>(Engineering Core)</i> | BME Forum BME:1010 |
| 3 | Foundations of Biology / Lab BIOL:1411 <i>(Math & Science)</i> | Engr Diff Equations MATH:2560 <i>(Math & Science)</i> | Statics ENGR:2110 <i>(Required Engineering)</i> | Electrical Circuits ENGR:2120 <i>(Required Engineering)</i> | Thermodynamics ENGR:2130 <i>(Required Engineering)</i> | BME Prof Seminar BME:2010 |
| 4 | Fund Human Physiology HHP:2400 or BME:3260 Quantitative Physiology <i>(Math & Science)</i> | Biostatistics BIOS:4120 or STAT:3510 <i>(Math & Science)</i> | Bioimaging & Bioinformatics / Lab BME:2210 <i>(Biomedical Core)</i> | Cell Biology for Engr / Lab BME:2400 <i>(Biomedical Core)</i> | Mech Def Bodies ENGR:2750 <i>(Focus Area Required)</i> | |
| 5 | Systems, Instrum, & Data Acquisition / Lab BME:2200 <i>(Biomedical Core)</i> | Biomaterials & Biomechanics / Lab BME:2500 <i>(Biomedical Core)</i> | Focus Area Elective #1 | Focus Area Elective #2 | Cultural Perspectives, Values, & Society <i>(Gen Ed)</i> | |
| 6 | Focus Area Elective #3 | Focus Area Elective #4 | Any required focus area course from the other BME focus areas OR Systems Biology for BME BME:5435 | Cell Material Interactions BME:5421 <i>(Focus Area Required)</i> | Be Creative <i>(Gen Ed)</i> | |
| 7 | BME Senior Design I BME:4910 <i>(BME Core)</i> | Focus Area Elective #5 | Focus Area Elective #6 | Biotransport BME:5430 <i>(Focus Area Required)</i> | Approved Gen Ed course | |
| 8 | BME Senior Design II BME:4920 <i>(BME Core)</i> | Physics II / Lab PHYS:1612 <i>(Math & Science)</i> | Focus Area Elective #7 | Approved Gen Ed course | Approved Gen Ed course | |

At least two Focus Area Electives must be from the list of Engineering Topics.

Biomedical Engineering – Program Map: Cellular Engineering Focus Area

Cellular Engineering Required Courses

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|------------|--------------------------------|-----|----------------------------------|
| ENGR:2750 | Mechanics of Deformable Bodies | All | P: ENGR:2110; C: MATH:2560 |
| BME:5421 | Cell Material Interactions | S | P: BME:2400 |
| BME:5430 | Biotransport | F | C: BME:2500 |
| +XXXX:#### | Any required focus area course | | (From the other BME Focus Areas) |

Cellular Engineering Electives (Focus Area, Minor, or Certificate)

Engineering Topics (must choose two)

| | | | |
|----------|-----------------------------------|------|--------------------------------------|
| BME:4310 | Computational Biochemistry | F | P: MATH:1560 or MATH:1860, CHEM:1120 |
| BME:5441 | Num. & Stat. Methods for Bioengr. | F § | P: MATH:2560 and MATH:2550 |
| BME:5445 | Stem Cells in Regenerative Engr | F §§ | P: BME:2400 or BIOL:2723 |
| BME:5451 | Research Methods in Cellular Engr | S | P: BIOL:1411, STAT:3510 or BIOS:4120 |
| ECE:5480 | Digital Image Processing | F | P: BME:2200 |

Suggested Electives

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|-----------|-------------------------------------|----------|--|
| BME:5431 | Biofabrication for Tissue Engr | S §§ | P: ENGR:2110, BME:2400, BME:2500 |
| BME:5460 | Biomed Micro Devices & Systems | F § | P: BME:2500 |
| BME:5525 | Cardiopulmonary Modeling & Design | F | P: BME:2500, ENGR:2510 |
| BME:3995 | Undergraduate Research in BME | F/S | See MyUI for requirements |
| ENGR:2510 | Fluid Mechanics | F/S | P: MATH:2560, ENGR:2710; C: ENGR:2130 |
| ENGR:2710 | Dynamics | All | P: MATH:1550, ENGR:2110 |
| ENGR:2720 | Materials Science | All | P: CHEM:1110; C: MATH:1550 |
| ENGR:2730 | Computers in Engineering | F/S | P: ENGR:1300 |
| ME:5179 | Continuum Mechanics | See MyUI | P: ENGR:2750 or ENGR:2510 |
| BIOL:1412 | Diversity of Form & Function | All | P: BIOL:1411 w/min C- |
| BIOL:2512 | Fundamental Genetics | All | P: BIOL:1411 w/min C-, CHEM:1110; Recommended: CHEM:2210 |
| BMB:3120 | Biochemistry & Molecular Biology I | F/S | See MyUI for recommendations |
| BMB:3130 | Biochemistry & Molecular Biology II | F/S | P: BMB:3120 |
| MATH:4750 | Intro to Mathematical Biology | S | P: MATH:3600 or MATH:2560 |
| MATH:3550 | Engineering Vector Calculus | F/S | P: MATH:1560 & (MATH:2550 or MATH:2700); C: MATH:2560 |

Pre-Medicine

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|-------------|------------------------------|-----|--|
| **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 |

+ When it is offered, BME:5435 Systems Biology for BME can also count as a required focus area 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

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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.

Last updated (03/23/26)