

# Biomedical Engineering – Program Map: Bioimaging Focus Area

|                   |   |   |  |   |  |   |
|-------------------|---|---|--|---|--|---|
| <b>Semester 1</b> | Chem I & Lab<br>CHEM:1110   | Engr Math I<br>MATH:1550                                  |  | Intro Engr Prob Solving<br>ENGR:1100    | Rhetoric<br>RHET:1030  | Engr Success<br>First Year<br>ENGR:1000 |
| <b>Semester 2</b> | Chem II & Lab<br>CHEM:1120  | Engr Math II<br>MATH:1560                                 | Engr Math III<br>MATH:2550                       | Intro Engr Computing<br>ENGR:1300       | Physics I / Lab<br>PHYS:1611                                   | BME Forum<br>BME:1010                   |
| <b>Semester 3</b> | Foundations<br>of Biology<br>BIOL:1411                              | Engr Math IV<br>MATH:2560                                 | Statics<br>ENGR:2110                             | Elec Circuits<br>ENGR:2120              | Thermo ENGR:2130 or<br>*Intro AI & Mach Learning<br>ENGR:2995* | BME Prof<br>Seminar<br>BME:2010         |
| <b>Semester 4</b> | Human Physiology<br>HHP:3500 or BME:2260<br>Quantitative Physiology | Systems, Instrum,<br>& Data Acquisition<br>/ Lab BME:2200 | Bioimaging &<br>Bioinformatics / Lab<br>BME:2210 | Comp in Engr<br>ENGR:2730               | Biostatistics<br>BIOS:4120 or<br>STAT:3510                     |   |
| <b>Semester 5</b> | Cell Biology for<br>Engr / Lab<br>BME:2400                          | Biomaterials &<br>Biomechanics / Lab<br>BME:2500          | Medical Imaging<br>Physics<br>BME:5210           | Intro to Software<br>Design<br>ECE:3330 | Diversity &<br>Inclusion                                       |   |
| <b>Semester 6</b> | Focus Area<br>Elective #1   | Focus Area<br>Elective #2                                 | Physics II / Lab<br>PHYS:1612                    | Be<br>Creative                          | Approved<br>GEC course   |   |
| <b>Semester 7</b> | BME Senior Design I<br>BME:4910                                     | Digital Image<br>Processing<br>ECE:5480                   | Focus Area<br>Elective #3                        | Focus Area<br>Elective #4               | Approved<br>GEC course   |   |
| <b>Semester 8</b> | BME Senior Design II<br>BME:4920                                    | Focus Area<br>Elective #5                                 | Focus Area<br>Elective #6                        | Focus Area<br>Elective #7               | Approved<br>GEC course   |   |

- Math & Science Courses
- Required Engineering Courses
- Focus Area Required Courses
- General Education Courses
- Engineering Core Courses
- Biomedical Core Courses
- Focus Area Elective Courses
- Seminars

\*If ENGR:2995 is not offered in Fall, it can be taken the following Spring. Students who want to take ENGR:2995 and not ENGR:2130 can take ENGR:2730 Computers in Engr in Semester 3 and ENGR:2995 in Semester 4.

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

Last updated 03/20/23

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### 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 §§ |                                       |
| ECE:5490 | Multidimensional Image Analysis Tools & Techniques | S §§ | P: ECE:5480 and (ECE:3330 or CS:2820) |
| BME:5251 | Advanced Biosystems                                | F    | P: BME:2200                           |
| ECE:5330 | Graph Algorithms & Combinatorial Optimization      | S    | P: ECE:3330                           |
| ECE:5450 | Machine Learning                                   | F    | P: BME:2200 or ECE:2400               |

#### Suggested Electives

|           |   |     |  |
|-----------|---|-----|--|
| BME:5441  | Numerical & Statistical Methods for Bioengr | F § | P: MATH:2560 and MATH:2550                               |
| MATH:3800 | Elementary Numerical Analysis               | F/S | P: (MATH:2550 or MATH:2700) and (MATH:1560 or MATH:1860) |
| 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                                  |

#### 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-, BIOL:1412 or PSY:2701 w/min C-, CHEM:1110; Recommended: CHEM:2210 |

\*\* 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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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 (03/20/23)