# **Biomedical Engineering – Program Map:** Bioimaging Focus Area

| Semester | Course 1 | Course 2 | Course 3 | Course 4 | Course 5 | Seminar |
|---|---|---|---|---|---|---|
| 1 | Principles Chem I / Lab **CHEM:1110** *(Math & Science)* | Engr Calculus I **MATH:1550** *(Math & Science)* | Intro Engineering Problem Solving **ENGR:1100** *(Engineering Core)* | Rhetoric **RHET:1030** *(Gen Ed)* | — | |
| 2 | Principles Chem II / Lab **CHEM:1120** *(Math & Science)* | Engr Calculus II **MATH:1560** *(Math & Science)* | Engr Matrix Algebra **MATH:2550** *(Math & Science)* | Physics I / Lab **PHYS:1611** *(Math & Science)* | Intro Engr Computing **ENGR:1300** *(Engineering Core)* | BME Forum **BME:1010** |
| 3 | Foundations of Biology / Lab **BIOL:1411** *(Math & Science)* | Engr Diff Equations **MATH:2560** *(Math & Science)* | Statics **ENGR:2110** *(Required Engineering)* | Electrical Circuits **ENGR:2120** *(Required Engineering)* | Thermo **ENGR:2130** or Intro AI & Machine Learning **ENGR:3110** *(Required Engineering)* | BME Prof Seminar **BME:2010** |
| 4 | Fund Human Physiology **HHP:2400** or **BME:3260** Quantitative Physiology *(Math & Science)* | Biostatistics **BIOS:4120** or **STAT:3510** *(Math & Science)* | Systems, Instrum, & Data Acquisition / Lab **BME:2200** *(Biomedical Core)* | Bioimaging & Bioinformatics / Lab **BME:2210** *(Biomedical Core)* | Computers in Engineering **ENGR:2730** *(Focus Area Required)* | |
| 5 | Cell & Tissue Engineering Fundamentals / Lab **BME:2400** *(Biomedical Core)* | Biomaterials & Biomechanics / Lab **BME:2500** *(Biomedical Core)* | Medical Imaging Physics **BME:5210** *(Focus Area Required)* | Digital Image Processing **ECE:5480** *(Focus Area Required)* | Cultural Perspectives, Values, & Society *(Gen Ed)* | |
| 6 | Focus Area Elective #1 | Focus Area Elective #2 | Focus Area Elective #3 | Intro to Software Design **ECE:3330** *(Focus Area Required)* | Be Creative *(Gen Ed)* | |
| 7 | BME Senior Design I **BME:4910** *(BME Core)* | Focus Area Elective #4 | Focus Area Elective #5 | Focus Area Elective #6 | Approved Gen Ed course | |
| 8 | BME Senior Design II **BME:4920** *(BME Core)* | Physics II / Lab **PHYS:1612** *(Math & Science)* | 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.**

Last updated 05/11/2026

# **Biomedical Engineering – Program Map:** Bioimaging Focus Area

| **Bioimaging Required Courses** | | Semester | |
|---|---|---|---|
| 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:2730; ECE:5480 recommended |
| ECE:5330 | Graph Algorithms & Combinatorial Optimization | See MyUI | P: ECE:3330 |
| ECE:5200 | 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 | F/S | P: ENGR:1300; C: MATH:2550 |
| ***Suggested Electives*** | | | |
| BME:5251 | Advanced Biosystems | See MyUI | 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 |
| BME:3995 | Undergraduate Research in BME | F/S | See MyUI for requirements |
| ***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 | F/S | 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**

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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.**

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

**Last updated (10/19/26)**