

University of Rochester Biomedical Engineering (BME) Program

Revised
10/14/19

First 1 ½ yrs - ALL Students

1 st Fall	BME 101 Introduction to Biomedical Engineering	*MTH 161 Calculus I	CHM 131 Chemistry I	WRT 105 Primary Writing Social Sci or Humanities
1 st Spring	WRT 105 Primary Writing Social Sci or Humanities	MTH 162 Calculus II	CHM 132 Chemistry II	PHY 121 Physics I Mechanics
Soph Fall	PHY 121 / 113 BME 201 & 201P Biomechanics & MATLAB	MTH 162 #MTH 165 Differential Equations	BIO 110 Biology	PHY 121 > C- PHY 122 Physics II Electricity & Magnetism

*An alternative to the MTH 161 and 162 sequence is the MTH 141, 142, 143 sequence. Careful attention must be paid to the effects of this longer sequence, including the possible need to take a course in the summer following the first year. Students taking the 141-3 series also take PHY 113 instead of PHY 121. MTH 171-4 also fulfills the Math requirements. # MTH 164 may be taken before MTH 165 – both courses are taught Fall & Spring.

★ All students must complete at least **two** additional BASIC SCIENCE Electives (at least 8 credits) in addition to BIO 110, CHM 131/132 and PHY 121/122. Any natural science with a number of 110 or higher (biology, chemistry, microbiology, environmental science, neuroscience, physics, or selected courses from brain & cognitive sciences) may be used to fulfill this requirement. Independent study courses **cannot** be used to satisfy this requirement. **Students in C&T concentration must take either BME 411, BIO 210 or BIO 202 as one of the BSE courses.** See curriculum guide for further information.

⌘ All students need **ONE** Upper Level BME course (listed in Curriculum Guide). These are offered in both fall and spring. Three of the four required Humanities/Social Science courses must form a CLUSTER.

**WRT 273 (2 cr.) may be taken either Spring sophomore year or Fall junior year.

Pre-requisites for each course are noted at the top of each box (underlined courses are co-requisites)

Flexibility: Boxes with diagonal splits represent **alternate** choices for that semester. Electives and BSE course may be moved between semesters. Use this flexibility to consider options for study abroad, research, minors, or other interests!

Color Code:	BME CORE	Basic Science & Math	Humanities / Soc Sci / Writing	Basic Science Elective	Concentration	Electives
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ALL Students

Soph Spring	PHY 122 & MTH 165 BME 210 Biosystems & Circuits	MTH 162 #MTH 164 Multidimensional Calculus
JR Fall	BME 210 & MTH 165 BME 230 Intro to Signals & Imaging	Elective & WRT 273 ** Prof Identity
JR Spring	BME 201/201P BME 221/099 Lab Biomedical Computation & Statistics	BME 201, PHY 122, CHM 132, BIO 110, MTH 162 BME 245/099 Lab Biomaterials
SR Fall	BME Senior BME 295 Design Seminar	BME 210 & BME 230 BME 260 Quantitative Physiology
SR Spring	BME 295 BME 296 Senior Design Project	Humanities / Social Science

Concentrations:

Biomechanics

Humanities / Social Science & WRT 273 ** Prof Identity	BME 201 ME 226 Solid Mechanics
Humanities / Social Science	★ Basic Science Elective
MTH 162, PHY 121 ME 123 Thermodynamics	★ Basic Science Elective
MTH 164, 165, BME 201, ME 123	⌘ UL BME BME 283 Elective
Elective	⌘ UL BME BME 212 Elective

Biosignals & Biosystems

Humanities / Social Science & WRT 273** Prof Identity	★ Basic Science Elective
BME 210 ECE 221 Elec Devs & Ckts BME 228 Phys Cont Sys BME 230	BME 210, MTH 164, 165 ECE 230 Electromagnetic Waves
Humanities / Social Science	★ Basic Science Elective
BME 230 ECE 246 Digital Signal Processing	⌘ UL BME BME 218 Elective
Elective	⌘ UL BME BME 251 Elective

Cell & Tissue Eng

Humanities / Social Science & WRT 273** Prof Identity	PHY 121 & MTH 165 CHE 243 Fluid Dynamics
★ Basic Science Elective	CHE 243, PHY 121, MTH 165 CHE 244 Heat & Mass Transfer
Basic Sci Elec. Elective	Humanities / Social Science
Junior standing CHE 225 Thermodynamics	⌘ UL BME BME 266 or 265 Basic Sci. Elective
Elective	⌘ UL BME BME 262 Elective

Medical Optics

Humanities / Social Science & WRT 273** Prof Identity	PHY 122 & MTH 162 BME 270 Biomedical Microscopy
PHY 121 & MTH 162 OPT 241 Geometrical Optics	★ Basic Science Elective
Humanities / Social Science	PHY 122 & MTH 164 OPT 261 Interference & Diffraction
★ Basic Science Elective	⌘ UL BME BME 255 Elective
Elective	⌘ UL BME BME 272 Elective

Check off **YOUR** progress towards the Biomedical Engineering Major!

BME Core Courses:

- | | |
|--|--|
| <input type="checkbox"/> BME 101: <i>Intro to Biomedical Engineering</i> | <input type="checkbox"/> BME 230: <i>Biomed Signals, Systems & Imaging</i> |
| <input type="checkbox"/> BME 201: <i>Fundamentals of Biomechanics</i> | <input type="checkbox"/> BME 221: <i>Biomed Computation & Statistics</i> |
| <input type="checkbox"/> BME 201P: <i>MATLAB for Biomed Eng.</i> | <input type="checkbox"/> BME 245: <i>Biomaterials</i> |
| <input type="checkbox"/> BME 210: <i>Biosystems & Circuits</i> | <input type="checkbox"/> BME 260: <i>Quantitative Physiology</i> |
| | <input type="checkbox"/> BME 295: <i>BME Design Seminar</i> |
| | <input type="checkbox"/> BME 296: <i>BME Senior Design</i> |

Writing, Humanities and Social Sciences

- WRT 105 (grade of C or better) *Primary Writing*
- WRT 273 *Communicating your Professional Identity*
- 4 cr. Humanities OR Social Science course _____

Cluster in Humanities or Social Science

- Cluster Chosen: _____
- Cluster Course 1 _____
 - Cluster Course 2 _____
 - Cluster Course 3 _____

Math & Basic Sciences

- | | | |
|--|----------------------------------|---|
| <input type="checkbox"/> MTH 161 | <input type="checkbox"/> MTH 141 | |
| <input type="checkbox"/> MTH 162 OR | <input type="checkbox"/> MTH 142 | <input type="checkbox"/> PHY 121 or PHY 113 (<i>if in MTH 141-3</i>) |
| | <input type="checkbox"/> MTH 143 | <input type="checkbox"/> PHY 122 |
| <input type="checkbox"/> MTH 164 | | |
| <input type="checkbox"/> MTH 165 | | <input type="checkbox"/> Basic Science Elective 1 _____ |
| | | <input type="checkbox"/> Basic Science Elective 2 _____ |
| <input type="checkbox"/> CHM 131 | | <input type="checkbox"/> (must include BIO 202 or 210 or BME 411 if choosing C&T Concentration) |
| <input type="checkbox"/> CHM 132 | | |
| <input type="checkbox"/> BIO 110 | | |

Concentration Courses

- | Biomechanics | Cell & Tissue | Medical Optics | Biosignals & Biosystems |
|--|----------------------------------|--|---|
| <input type="checkbox"/> ME 226 | <input type="checkbox"/> CHE 243 | <input type="checkbox"/> BME 270 | <input type="checkbox"/> ECE 221 or <input type="checkbox"/> BME 228 |
| <input type="checkbox"/> ME 123 | <input type="checkbox"/> CHE 225 | <input type="checkbox"/> OPT 241 | <input type="checkbox"/> ECE 246 |
| <input type="checkbox"/> ME 225 | <input type="checkbox"/> CHE 244 | <input type="checkbox"/> OPT 261 | <input type="checkbox"/> ECE 230 |
| <input type="checkbox"/> ULBME | <input type="checkbox"/> ULBME | <input type="checkbox"/> ULBME | <input type="checkbox"/> ULBME |
| <input type="checkbox"/> BME 283 or | <input type="checkbox"/> BME 265 | <input type="checkbox"/> BME 255 or | <input type="checkbox"/> BME 251 or |
| <input type="checkbox"/> BME 212 | <input type="checkbox"/> BME 266 | <input type="checkbox"/> BME 272 | <input type="checkbox"/> BME 218 or |
| | <input type="checkbox"/> BME 265 | <input type="checkbox"/> OPT 276 | <input type="checkbox"/> ECE 452 |

Electives: (12 credits *required*)

- Elective 1 _____
- Elective 2 _____
- Elective 3 _____