# Biomolecular Engineering and Bioinformatics: Biomolecular Engineering Project

## Mathematics

- MATH 3 or math placement of 400 or higher
  - MATH 19A Calculus I [F/W/Sp/Su]
- MATH 19B Calculus II [F/W/Sp/Su]
- MATH 19B and AM 10 Mathematical Methods of Engineers I [W/Sp]
- STAT 131 Intro to Probability Theory [F/W/Sp/Su]
- STAT 206 Applied Bayesian Statistics

## Chemistry & Biochemistry

- MATH 3 or math placement of 300 or higher
- CHEM 1A General Chemistry [F/W/Sp/Su]
- CHEM 1B/M General Chemistry/Lab [F/W/Sp/Su]
- CHEM 1A CHEM 1C/N General Chemistry/Lab [F/W/Sp/Su]
- CHEM 1B/CN Organic Chemistry [W/Sp]
- CHEM 8A/B Organic Chemistry [W/Sp/Su]
- CHEM 8A/B CHEM 100A Biochemistry and Molecular Biology [W]
- CHEM 8B/C CHEM 100B Biochemistry and Molecular Biology [W]

## Laboratory Courses: Choose one Sequence

- (Strongly Recommended) BME 21L Intro. To Basic Laboratory Techniques [Sp]
  - BME 21L and Chem 1B/M
- (Strongly Recommended) BME 22L & BME 23L Foundations of Design and Experimentation in Molecular Biology I & II [F]
  - BME 22L [F]
  - BME 23L [W]

## Biology & Physics

- CHEM 1A BIOL 20A Cell and Molecular Biology [F/W/Sp/Su]
- BIOL 100A Introduction to Physics I [F]
- PHYS 5A/L* Introduction to Physics II [W/Sp/Su]
- PHYS 5B/M* Introduction to Physics II [F]

## Genetics & Bioinformatics

- BIOL 215 (Strongly Recommended) Genetics in the Genomics Era
  - BIOL 205 Genomics [F/W/Sp/Su]
  - BIOL 205 or BIOL 105 or BIOL 105A or declared BMEB majors
- CHEM 100 Computational Biology Tools
  - BIOL 20 6 (6 units) Research Programming in the Life Sciences [W]
  - BIOL 160 or BIOL 205
- CHEM 163 (3 units) Applied Visualization and Analysis of Scientific Data

## Elective: Course used as an Elective cannot be used to satisfy other major requirements

- BIOL 115*, METX 119, BIOC 100C, BME 122H, BME 128, BME 128L, BME 130, BME 132, BME 140, BME 175, BME 177, BME 178, ECE 104, or any 5-credit biomolecular engineering graduate course

## Exit Requirements

Requirements must be completed by the end of a student’s final quarter.

1. Portfolio
2. Exit Survey
3. Exit Interview

## Biomolecular Capstone: Students must complete one of the following:

<table>
<thead>
<tr>
<th>Bioinformatics Capstone*</th>
<th>iGEM</th>
<th>Senior Design</th>
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</thead>
<tbody>
<tr>
<td>BIOL 160, STAT 131, and prev. or conc. Enrollment in BIOC 100A</td>
<td>BIOL 20A and BIOC 100A</td>
<td>BIOL 20A and BIOC 100A</td>
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<tr>
<td>BME 205 Biomathematics Models and Algorithms</td>
<td>BME 177 Engineering Stem Cells</td>
<td>BME 180(2 units)</td>
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<tr>
<td>BME 230A Introduction to Computational Genomics and Systems Biology [W]</td>
<td>BIOL 180(2 units) Professional Practice in Bioengineering [F]</td>
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<tr>
<td>BIOL 180 and prev. or conc. Enrollment in BIOC 185 or CHEM 185E</td>
<td>BME 180 and prev. or conc. Enrollment in BIOC 185 or CHEM 185E</td>
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<tr>
<td>BME 185A(2 units)</td>
<td>BME 185A(2 units)</td>
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<td>*BME 188A</td>
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<td>BME 188B</td>
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<tr>
<td>*BME 188C</td>
<td>*BME 188C</td>
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<tr>
<td>Synthetic Biology – Mentored Research C [Sp]</td>
<td>Synthetic Biology – Mentored Research C [Sp]</td>
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* BIOL 185 or CHEM 185E, conc. Enrollment in BME 185.

## Senior Thesis*

- BIOL 20A and BIOC 100A | BIOL 20A and BIOC 100A |
  - BIOL 195(5 units) Senior Thesis Research [F]
  - BIOL 195F (2 units) Senior Thesis Research [F]
  - BIOL 237 (5 units) Senior Thesis Writing [W]
  - BIOL 195 (5 units) Senior Thesis Research [Sp]

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**Legend**

Ω Students with no prior programming experience are advised to take CSE 20 prior to BME 160

# The Bioinformatics capstone is programming heavy. Students interested in this capstone are advised to take additional programming classes.

α The thesis option consists of 12 credits of Independent Study (BME 198), Field Study (BME 193), or Senior Thesis Research (BME 195) in Biomolecular Engineering; and BME 123T Senior Thesis Writing (5 units). Students pursuing the senior thesis option must write a two-page thesis proposal and seek approval of their project from the undergraduate director in the quarter preceding the independent study courses, typically spring quarter of the third year. Students spend three or more quarters working on their thesis projects. These students must enroll in BME 123T, Senior Thesis Writing, before completing their thesis.

♦ Students following the 2020-2021 curriculum may use Phys 6A/L and Phys 6B/M in place of Phys 5A/L and Phys 5B/M. The Physics 5 series is strongly recommended.

Student Name:

Adviser Name/Notes: