# Bachelor of Science in Biology: Concentration in Microbiology Roadmap – Quantitative Reasoning Category I/II and Stretch English

## Course Title Units
### First Semester
- **CHEM 115**
  - General Chemistry I: Essential Concepts of Chemistry (Major Lower-Division Core) 5
- **ENG 104**
  - Writing the First Year: Finding Your Voice Stretch I 3
- **MATH 226**
  - Calculus I (Major Lower-Division Core, B4) 4
- **GE Area A** 3

<table>
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<th>Units</th>
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<tr>
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<td>General Chemistry I: Essential Concepts of Chemistry (Major Lower-Division Core)</td>
<td>5</td>
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<tr>
<td>ENG 104</td>
<td>Writing the First Year: Finding Your Voice Stretch I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 226</td>
<td>Calculus I (Major Lower-Division Core, B4)</td>
<td>4</td>
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<td>GE Area A</td>
<td></td>
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### Second Semester
- **BIOL 230**
  - Introductory Biology I (Major Lower-Division Core) 5
- **BIOL 231**
  - Advising for Success as a Biology Major (Major Lower-Division Core) 1
- **CHEM 215**
  - General Chemistry II: Quantitative Applications of Chemistry Concepts (Major Lower-Division Core) 3
- **ENG 105**
  - Writing the First Year: Finding Your Voice Stretch II (A2) 3
- **GE Area A** 3

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<td>CHEM 215</td>
<td>General Chemistry II: Quantitative Applications of Chemistry Concepts (Major Lower-Division Core)</td>
<td>3</td>
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<td>ENG 105</td>
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### Third Semester
- **BIOL 240**
  - Introductory Biology II (Major Lower-Division Core) 5
- Select One (Major Lower-Division Core): 3

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<td>Introductory Biology II (Major Lower-Division Core)</td>
<td>5</td>
</tr>
<tr>
<td>Select One (Major Lower-Division Core)</td>
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This roadmap is a suggested plan of study and does not replace meeting with an advisor. Please note that students may need to adjust the actual sequence of courses based on course availability. Please consult an advisor in your major program for further guidance.
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<table>
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<tr>
<th>SF State Studies or University Elective – Take Three</th>
<th>9 Units</th>
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<tr>
<td>Total Units</td>
<td>120</td>
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</table>

1. ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose ENG 104/ENG 105 through DSP you will satisfy GE Area A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

2. To determine the best B4 course option, students should complete the online advising activity at mathadvising.sfsu.edu (https://mathadvising.sfsu.edu/). Questions? Contact Gator Smart Start. (https://gatorsmartstart.sfsu.edu/)

3. To avoid taking additional units, it is recommended that you meet the SF State Studies (AERM, GP, ES, SJ) requirements within your GE or major.

4. CHEM 233 is a prerequisite for CHEM 335. If students plan to take CHEM 335, they must take CHEM 233.

5. **Electives in Microbiology**
   Select 11 units from the following courses, including at least two laboratory courses. Consult an advisor to select electives that best align with your interests and future career goals. Any course taken as an elective that does not appear on this list will not be counted towards the completion of the Microbiology degree requirements unless it is approved by an advisor prior to enrolling in the course. Students who intend to apply for admission to Clinical Laboratory Science programs after graduation are strongly advised to speak with a Microbiology advisor for help in choosing their elective classes.

   - BIOL 420 General Virology (3 units)
   - BIOL 425 Emerging Diseases (3 units)
   - BIOL 430 Medical Microbiology (3 units)
   - BIOL 435 Immunology (3 units)
   - BIOL 442 Microbial Physiology (3 units)
   - BIOL 446 Microbial Genomics (4 units)
   - BIOL 453 General Parasitology (3 units)
   - BIOL 490 Ecology of Infectious Diseases (4 units)
   - BIOL 638 Bioinformatics and Genome Annotation (4 units)
   - BIOL 644 LEADerS Service Learning Course: Learners Engaged in Advocating for Diversity in Science (4 units)
   - or BIOL 652 Science Education Partners in Biology (4 units)

   Select two laboratory courses from the following:
   - BIOL 431 Medical Microbiology Laboratory (2 units)
   - BIOL 436 Immunology Laboratory (2 units)
   - BIOL 443 Microbial Physiology Laboratory (2 units)
   - BIOL 454 Parasitology Laboratory (1 unit)
   - BIOL 625 Hematology (3 units)
   - BIOL 699 Independent Study in Biology (1-3 units)
   - CHEM 343 Biochemistry I Laboratory (3 units)
   - or CHEM 336 Organic Chemistry II Laboratory (2 units)

± Given catalog rights, fall 2022 transfer students do not need to complete an Area F course.