# Bachelor of Science in Biology: Concentration in Cell and Molecular Biology - Quantitative Reasoning Category I/II and Stretch English

- **Total Units Required:** 120
- **Minimum Number of Units in Major:** 68

## Course Schedule

### First Semester
- **CHEM 115:** General Chemistry I: Essential Concepts of Chemistry (Major Lower-Division Core) - 5 units
- **ENG 104:** Writing the First Year: Finding Your Voice Stretch I - 1 unit
- **MATH 226:** Calculus I (Major Lower-Division Core, B4) - 2 units
- **GE Area A:** 3 units
  - Total: 15 units

### Second Semester
- **BIOL 230:** Introductory Biology I (Major Lower-Division Core) - 5 units
- **CHEM 215 & CHEM 216:**
  - General Chemistry II: Quantitative Applications of Chemistry Concepts and General Chemistry II Laboratory: Quantitative Applications of Chemistry Concepts (Major Lower-Division Core) - 5 units
- **ENG 105:** Writing the First Year: Finding Your Voice Stretch II (A2) - 3 units
- **PHYS 111 & PHYS 112:**
  - General Physics I and General Physics I Laboratory (Major Lower-Division Core, B1, B3) - 4 units
  - Total: 17 units

### Third Semester
- **CHEM 130:** General Organic Chemistry (Hidden Prerequisite for BIOL 355 and CHEM 349) - 3 units
- **CHEM 233:** Organic Chemistry I (Major Lower-Division Core) - 3 units
- **Select One (Major Lower-Division Core):** 3-4 units
  - **BIOL 358:** Forensic Genetics: Math Matters
  - **BIOL 458:** Biometry
  - **CSC 210:** Introduction to Computer Programming
- **MATH 227:** Calculus II - 4 units
- **GE Area A:** 3 units
- **GE Area E:** 3 units
  - Total: 15-16 units

### Fourth Semester
- **BIOL 240:** Introductory Biology II (Major Lower-Division Core) - 5 units
- **PHYS 121 & PHYS 122:**
  - General Physics II and General Physics II Laboratory (Major Lower-Division Core) - 4 units
- **GE Area C:** 3 units
- **GE Area D:** 3 units
  - Total: 15 units

### Fifth Semester
- **BIOL 355:** Genetics (Major Upper-Division Core) - 3 units
- **CHEM 335:** Organic Chemistry II (Major Upper-Division Core) - 3 units
- **GE Area C:** 3 units
- **GE Area D - Take Two:** 6 units
  - Total: 15 units

### Sixth Semester
- **BIOL 350:** Cell Biology (Major Upper-Division Core) - 3 units
- **BIOL 357:** Molecular Genetics (Major Upper-Division Core) - 3 units
- **CHEM 349:** General Biochemistry (Major Upper-Division Core) - 3 units
- **GE Area C:** 3 units
- **GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course):** 3 units
  - Total: 15 units
Seventh Semester

BIOL 351GW
Experiments in Cell and Molecular Biology - GWAR (Major Upper-Division Core)
4

Select Major Electives Requirement (11 Units Total) - Take Two

GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)
3

SF State Studies or University Elective
2

Total Units 15-16

Eighth Semester

Select Major Electives Requirement (11 Units Total) - Take Two

GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)
3

SF State Studies or University Elective – Take Three
9

Total Units 15-16

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 A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

2 Depending on courses completed through Early Start, students in Pathway/Category III or IV may be required to enroll in a support course to complement their Quantitative Reasoning/B4 requirement. There are multiple course options for this pathway. Before enrolling in a B4 course, students should verify their MATH Pathway/Category in their Student Center (http://cms.sfsu.edu/content/student-center). Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website (http://developmentalstudies.sfsu.edu).

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

4 Students who plan to pursue a Ph.D. should complete at least two semesters of calculus and one semester of physical chemistry.

5 GE Areas B2 (Life Science) and B3 (Laboratory Science) are satisfied upon completion of BIOL 240.

6 Upper-Division General Education, Physical, and Life Sciences (UD-B) is satisfied upon completion of BIOL 355.

7 Students may take CHEM 340 and CHEM 341 in lieu of CHEM 349 upon advisement. In this case, CHEM 341 counts towards the upper-division elective unit requirement.

8 Major Electives (11 units)
Select 11 units upon advisement. At least one elective course must have an upper-division laboratory component. Graduate level courses may be used upon advisement.

- BIOL 332 Health Disparities in Cancer (3 units) (AERM, GP, SJ)
- BIOL 337 Evolution (3 units)
- BIOL 344GW Research Skills - GWAR (3 units)
- BIOL 349 Bioethics (3 units) (UD-B, SJ)
- BIOL 356 Honors Genetics (2 units)
- BIOL 358 Forensic Genetics: Math Matters (4 units)
- BIOL 380 Evolutionary Developmental Biology (3 units)
- BIOL 382 Developmental Biology (3 units)
- BIOL 401 General Microbiology (3 units)
- BIOL 402GW General Microbiology Laboratory - GWAR (3 units)
- BIOL 411 Environmental Microbiology (3 units)
- BIOL 420 General Virology (3 units)
- BIOL 425 Emerging Diseases (3 units)
- BIOL 435 Immunology (3 units)
- BIOL 436 Immunology Laboratory (2 units)
- BIOL 442 Microbial Physiology (3 units)
- BIOL 443 Microbial Physiology Laboratory (2 units)
- BIOL 446 Microbial Genomics (4 units)
- BIOL 453 General Parasitology (3 units)
- BIOL 454 Parasitology Laboratory (1 units)
- BIOL 458 Biometry (4 units)
- BIOL 490 Ecology of Infectious Diseases (4 units)
- BIOL 525 Plant Physiology (3 units)
- BIOL 526 Plant Molecular Physiology Laboratory (2 units)
- BIOL 615 Molecular Pathophysiology (3 units)
- BIOL 618 Biology of Aging (3 units)
- BIOL 623 Pharmacology (3 units)
- BIOL 630 Animal Physiology (3 units)
- BIOL 631GW Animal Physiology Laboratory - GWAR (4 units)
- BIOL 638 Bioinformatics and Genome Annotation (4 units)
- BIOL 640 Cellular Neurosciences (3 units)
- BIOL 652 Science Education Partners in Biology (4 units)
- BIOL 699 Independent Study in Biology (1-3 units)
- CHEM 343 Biochemistry I Laboratory (3 units)

* Course fulfills the upper-division laboratory elective requirement.