The BS Biochemistry degree program provides excellent preparation for a career in the biotech industry or post-graduate work. It also offers flexibility in upper division elective options, which enables students to better customize their degree program for their intended career path. Students are urged to consult with an advisor regarding their educational and career plans.

Courses used in the major program must be completed with a minimum grade point average of 2.0. All courses used in the major program must be completed with letter grades (CR/NC not allowed) and courses used for CHEM prerequisites must be completed with a C or better.

Chemistry/biochemistry advisors, contact info, and other important advising information are available on the Dept website (http://www.chemistry.sfsu.edu/advising_undergrad/0layout.php).

General Education (GE) advising is available through the SFSU Advising Center (ADM 211, 415-338-2103; advising@sfsu.edu) or the COSE Student Success Center (SCI 381, 415-338-2816, cssc@sfsu.edu).

Refer to the SFSU Bulletin for detailed information on University policies and procedures, GE requirements, requirements for the major, and course descriptions and prerequisites (http://bulletin.sfsu.edu).

### Freshman Year - Fall Semester
- PHYS 111: General Physics I 3 units
- PHYS 112: General Physics I Lab 1 unit
- CHEM 115: General Chemistry I & Lab 5 units

### Freshman Year - Spring Semester
- PHYS 121: General Physics II 3 units
- PHYS 122: General Physics II Lab 1 unit
- CHEM 215: General Chemistry III 3 units
- CHEM 216: General Chemistry II Lab 2 units

### Sophomore Year - Fall Semester
- CHEM 233: Organic Chemistry I 3 units
- CHEM 234: Organic Chemistry I Lab 2 units
- MATH 226: Calculus I 4 units
- CHEM 321: Quantitative Analysis 3 units

### Sophomore Year - Spring Semester
- CHEM 335: Organic Chemistry II 3 units
- BIOL 230: Intro Biology I & Lab 5 units
- MATH 227: Calculus II 4 units

### Junior Year - Fall Semester
- CHEM 340: Biochemistry I 3 units
- CHEM 343: Biochemistry I Lab 3 units
- Upper division chemistry or biology elective (ideally GW) 3 units

### Junior Year - Spring Semester
- CHEM 300: General Physical Chemistry I 3 units
- CHEM 341: Biochemistry II 3 units
- Upper division chemistry or biology elective 3 units

### Senior Year - Fall Semester
- CHEM 301: General Physical Chemistry II 3 units
- Upper division chemistry or biology elective 3 units
- Upper division chemistry or biology elective 3 units

### Upper Division Chemistry and Biology Electives
- Students must complete at least 15 units of upper division electives selected from the lists below, including at least one chemistry course, at least one GWAR course (indicated by GW in course titles below), and at least three lab courses (indicated below).
- Courses taken at community colleges cannot be used to meet electives in the major. Students may substitute graduate courses in chemistry or appropriate courses in biology, physics, geosciences, and computer science with prior approval of a major advisor.

#### Chemistry Electives
- CHEM 322: Quantitative Analysis Lab 2 (lab) units
- CHEM 327: Practical GC and HPLC 4 (lab) units
- CHEM 336: Organic Chemistry II Lab 2 (lab) units
- CHEM 370: Computer Applications 3 (lab) units
- CHEM 420: Environmental Analysis 3 (lab) units
- CHEM 422: Instrumental Analysis 4 (lab) units
- CHEM 325: Inorganic Chemistry 3 units
- CHEM 426: Inorganic Chemistry Lab 2 (lab) units
- CHEM 433: Advanced Organic Chemistry 3 units
- CHEM 443: Biophysical Chemistry Lab 4 (lab) units
- CHEM 451: Experimental Physical Chemistry 2 (lab) units
- CHEM 640: Special Topics in Biochemistry 2-3 units
- CHEM 645: Research Trends in Chem/Biochem 3 units
- CHEM 680: Chemical Oceanography 3 units
- CHEM 699: Independent Study 3 (lab) units
- CHEM 390GW: Chem/Biochem Research 3 units

#### Biology Electives
- BIOL 350: Cell Biology 3 units
- BIOL 351GW: Expts in Cell & Molecular Biology 4 (lab) units
- BIOL 355: Genetics 3 units
- BIOL 357: Molecular Genetics 3 units
- BIOL 358: Forensic Genetics 4 (lab) units
- BIOL 361: Human Genetics 3 units
- BIOL 401: General Microbiology 3 units
- BIOL 402GW: General Microbiology Lab 3 (lab) units
- BIOL 420: General Virology 3 units
- BIOL 435: Immunology 3 units
- BIOL 436: Immunology Lab 2 (lab) units
- BIOL 612: Human Physiology 3 units
- BIOL 613GW: Human Physiology Lab 3 (lab) units
- BIOL 638: Bioinformatics & Gene Annotation 4 units
- BIOL 640: Cellular Neurosciences 3 units
- CHEM 325 cannot be double counted towards a B.S. Biochemistry degree for students double-majoring with a B.A. Chemistry degree.
- CHEM 699 requires add permit from research advisor, must be 3 units, and requires a public poster presentation.
B.S. BIOCHEMISTRY DEGREE PROGRAM
Flowchart for Degree Program

- Students should consult course descriptions in the current SFSU Bulletin to confirm prerequisite course(s) and minimum grade requirements prior to registering for the course.
- Solid arrows indicate prerequisite courses (courses that must be completed before enrolling).
- Dashed arrows indicate co-requisite courses (courses that must be completed before enrolling or at same time).
- Use this sheet to track progress towards graduation.

PHYS 111¹ & 112
General Physics I & Lab

PHYS 121 & 122
General Physics II & Lab

MATH 226²
Calculus I

MATH 227
Calculus II

CHEM 115²
General Chemistry I & Lab

CHEM 215 & 216
General Chemistry II & Lab

CHEM 233 & 234
Organic Chemistry I & Lab

CHEM 321³
Quantitative Analysis

CHEM 335
Organic Chemistry II

CHEM 300
General Physical Chem I

CHEM 301
General Physical Chem II

CHEM/BIOL ELECTIVES⁵
≥ 15 units
≥ 1 chem course
≥ 1 GWAR course
≥ 3 lab courses

CHEM 340
Biochemistry I

CHEM 341
Biochemistry II

CHEM 342
Biochemistry Lab

CHEM 343
Biochemistry Lab

1 PHYS 111 requires either a C- or better in MATH 199 or completion of an online mini-course.
2 CHEM 115 requires C or better grade in CHEM 100 or satisfactory score on chemistry placement exam (see Department website for details: chemistry.sfsu.edu), and 50 or above on ELM or C or better in MATH/ESM 70.
3 MATH 226 requires acceptable score on calculus readiness test and either C or better in MATH 199 or B or better in pre-calculus class.
4 Although the corresponding lab class (CHEM 322) is not required for the B.S. Biochemistry degree, it is a prerequisite for some upper division chemistry elective classes (i.e., CHEM 327, 420, 422, 426, 451).
5 Some CHEM electives require CHEM 335 and/or CHEM 321/322 as a prerequisite. All BIOL electives require BIOL 230 and many have other prerequisites. Check with the Bulletin and your advisor for more information.