

## B.S. BIOCHEMISTRY DEGREE PROGRAM

### Suggested Course Sequence

- 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 GPA of 2.0. C- or better grades are required in CHEM 341 and 343. All courses required for the major must be completed with grades of C- or better with only one exception. Many CHEM courses require prerequisites with grades of 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](http://www.chemistry.sfsu.edu/advising_undergrad/0layout.php)).
- General Education (GE) advising is available through the SFSU Advising Center (ADM 211, 415-338-2101; [advising@sfsu.edu](mailto:advising@sfsu.edu)) or the COSE Student Success Center (SCI 214, 415-338-2816, [cssc@sfsu.edu](mailto: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		Units
CHEM 115	General Chemistry I & Lab	5
MATH 226	Calculus I	4

Freshman Year - Spring Semester		Units
CHEM 215	General Chemistry II	3
CHEM 216	General Chemistry II Lab	2
MATH 227	Calculus II	4

Sophomore Year - Fall Semester		Units
PHYS 111 <sup>1</sup>	General Physics I	3
PHYS 112 <sup>1</sup>	General Physics I Lab	1
CHEM 233	Organic Chemistry I	3
CHEM 234	Organic Chemistry I Lab	2
CHEM 321	Quantitative Analysis	3

Sophomore Year - Spring Semester		Units
PHYS 121 <sup>1</sup>	General Physics II	3
PHYS 122 <sup>1</sup>	General Physics II Lab	1
CHEM 335	Organic Chemistry II	3
BIOL 230	Intro Biology I & Lab	5

Junior Year - Fall Semester		Units
CHEM 340	Biochemistry I	3
CHEM 343	Biochemistry I Lab	3
Upper division chemistry or biology elective (ideally GEAR)		3

Junior Year - Spring Semester		Units
CHEM 300 <sup>2</sup>	General Physical Chemistry I	3
CHEM 341	Biochemistry II	3
Upper division chemistry or biology elective		3

Senior Year - Fall Semester		Units
CHEM 301 <sup>2</sup>	General Physical Chemistry II	3
Upper division chemistry or biology elective		3

Senior Year - Spring Semester		Units
Upper division chemistry or biology elective		3
Upper division chemistry or biology elective		3

#### 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 GEAR 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.
- Check course co- and pre-requisites *before* choosing/enrolling in these elective classes.

Chemistry Electives		Units
CHEM 322	Quantitative Analysis Lab	2 (lab)
CHEM 325 <sup>5</sup>	Inorganic Chemistry	3
CHEM 336	Organic Chemistry II Lab	2 (lab)
CHEM 370	Computer Applications	3 (lab)
CHEM 390GW	Chem/Biochem Research	3
CHEM 420	Environmental Analysis	3 (lab)
CHEM 422	Instrumental Analysis	4 (lab)
CHEM 426	Inorganic Chemistry Lab	2 (lab)
CHEM 433	Advanced Organic Chemistry	3
CHEM 443	Biophysical Chemistry Lab	4 (lab)
CHEM 451	Experimental Physical Chemistry	2 (lab)
CHEM 640	Special Topics in Biochemistry	2-3
CHEM 645	Research Trends in Chem/Biochem	3
CHEM 680	Chemical Oceanography	3
CHEM 699 <sup>6</sup>	Independent Study	3 (lab)

Biology Electives <sup>3,4</sup>		Units
BIOL 350	Cell Biology	3
BIOL 351GW	Expts in Cell & Molecular Biology	4 (lab)
BIOL 355	Genetics	3
BIOL 357	Molecular Genetics	3
BIOL 358	Forensic Genetics	4 (lab)
BIOL 361	Human Genetics	3
BIOL 401	General Microbiology	3
BIOL 402GW	General Microbiology Lab	3 (lab)
BIOL 420	General Virology	3
BIOL 435	Immunology	3
BIOL 436	Immunology Lab	2 (lab)
BIOL 612	Human Physiology	3
BIOL 613GW	Human Physiology Lab	3 (lab)
BIOL 638	Bioinformatics & Gene Annotation	4 (lab)
BIOL 640	Cellular Neurosciences	3

<sup>1</sup> PHYS 220/222 and either 230/232 or 240/242 may be substituted for PHYS 111/112 and 121/122.

<sup>2</sup> CHEM 351 and 353 may be substituted for CHEM 300 and 301 upon advisement (require physics with calculus as prerequisite).

<sup>3</sup> BIOL 230 and BIO 240 are prerequisites for the biology electives listed here. Biochemistry majors may take BIOL 350, 355, or 612 without BIOL 240 if they have completed BIOL 230 and CHEM 340 with grades of C or better.

<sup>4</sup> BIOL 350, 355 and/or 357 are recommended for preparation for the ASBMB Biochemistry Certification exam.

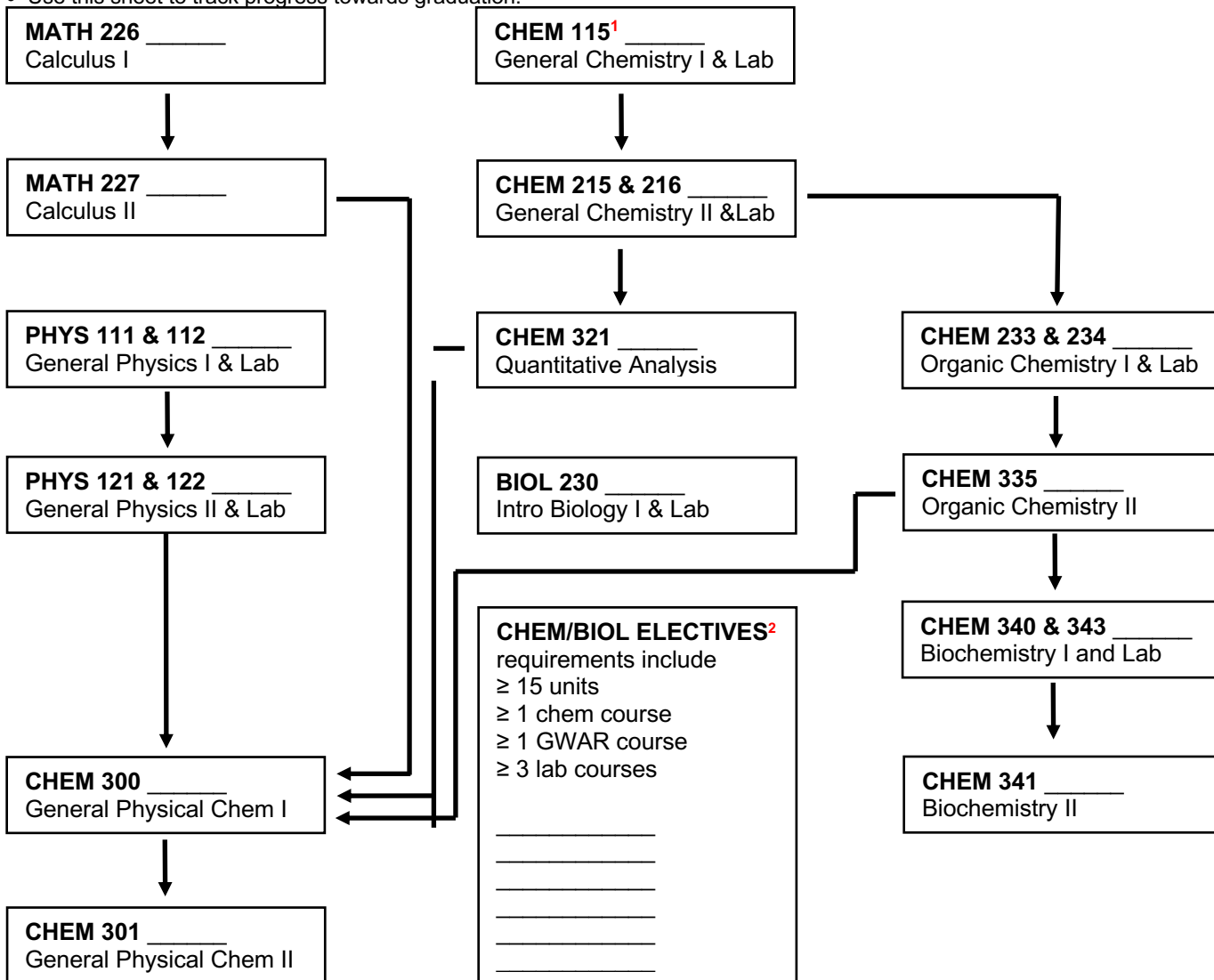
<sup>5</sup> CHEM 325 cannot be double counted towards a B.S. Biochemistry degree for students double-majoring with a B.A. Chemistry degree.

<sup>6</sup> CHEM 699 requires add permit from research advisor, must be 3 units, and requires a public poster presentation.

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### Flowchart for Major Classes

- 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.



<sup>1</sup> CHEM 115 requires students to complete a *placement exam* to assess readiness for college-level general chemistry. Refer to the Dept. website for more details ([chemistry.sfsu.edu](http://chemistry.sfsu.edu)).

<sup>2</sup> 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.