

## BIOCHEMISTRY (CH31)

Major Requirements for the **BIOCHEMISTRY B.S.** Degree Starting Fall 2017 and After

The Biochemistry B.S. focuses on the chemical processes in living organisms, including the structure and function of proteins, nucleic acids, lipids, and carbohydrates. It is suitable for those planning to go to graduate school as well as medical, dental, veterinary, and other professional schools. It is also suitable at the bachelor's level for jobs in the biotechnology or pharmaceutical field. Note the requirement for six courses in biochemistry, including two advanced electives. If you do not wish to take so much biochemistry, you should major in Chemistry and use electives to take the desired number of biochemistry courses.

**The following courses must be taken for a letter grade:**

### Lower-Division Requirements

1. General Chemistry (CHEM 6A, 6B & 6C or 6AH, 6BH & 6CH)
2. General Chemistry Laboratory (CHEM 7L or 7LM)
3. Physics (PHYS 2A, 2B & 2C or 2D)
4. Physics Laboratory (PHYS 2BL or 2CL or 2DL)
5. Calculus (MATH 20A, 20B, 20C & 20D)
6. Organic Chemistry (CHEM 40A, 40B & 40C or 40AH, 40BH & 40CH)
7. Organic Chemistry Laboratory (CHEM 43A or 43AM)

### Upper-Division Requirements

1. Physical Chemistry (CHEM 126A & 126B recommended; CHEM 130, 131 & 132 acceptable)
2. Inorganic Chemistry (CHEM 120A)
3. Biochemistry (CHEM 114A, 114B, & 114C)
4. Required Laboratory Courses:
  - o Analytical Chemistry Laboratory (CHEM 100A)
  - o Organic Chemistry Laboratory II (CHEM 143B)
  - o Physical Chemistry Laboratory (CHEM 105A) and
  - o Protein Biochemistry Laboratory (CHEM 108) or Recombinant DNA Laboratory (CHEM 109)
5. Laboratory Elective (Select 1 of the following courses):
  - o Instrumental Chemistry Laboratory (CHEM 100B)
  - o Advanced Physical Chemistry Laboratory (CHEM 105B)
  - o Protein Biochemistry Laboratory or Recombinant DNA Laboratory (CHEM 108 or CHEM 109)
  - o Advanced Inorganic Chemistry Laboratory (CHEM 123)
  - o Organic Chemistry Laboratory III (CHEM 143C)
  - o Molecular Design and Synthesis (CHEM 143D)
  - o Reading and Research (CHEM 199): 8 units with of research with the same instructor may be petitioned to fulfill one elective lab.
6. Biochemistry Electives (Select 2 of the following courses):
  - o Physical Chemistry of Biological Macromolecules (CHEM 113)
  - o Molecular and Cellular Biochemistry (CHEM 114D)
  - o Chemistry of Enzyme Catalyzed Reactions (CHEM 116)
  - o Pharmacology and Toxicology (CHEM 118)
  - o Bioinorganic Chemistry (CHEM 125)
  - o Bioorganic and Natural Products Chemistry (CHEM 157)
  - o Structural Biology of Viruses (CHEM 164)
  - o 3D Electron Microscopy of Macromolecules (CHEM 165)
  - o Medicinal Chemistry (CHEM 167)
  - o Drug Synthesis and Design (CHEM 168)
7. 1 Additional Elective: This elective is defined as a four-unit (minimum) upper division course offered by the Department of Chemistry and Biochemistry OR a course from the following list of courses offered by the Division of Biological Sciences: BICD 100, BICD 110, BICD 140, BIMM 114, BIMM 120, BIPN 100, BIPN 102, BIPN 140. Chem 199 may be petitioned to fulfill this elective. (*Some biology courses will require additional course work to fulfill any prerequisites*).

## Suggested Program for Biochemistry B.S. Major

FALL	WINTER	SPRING
<b>FRESHMAN YEAR</b>		
CHEM 6A	CHEM 6B	CHEM 6C
MATH 20A	MATH 20B	MATH 20C
	BILD 1*	CHEM 7LM or 7L
<b>SOPHOMORE YEAR</b>		
CHEM 40A	CHEM 40B	CHEM 40C
PHYS 2A	PHYS 2B	PHYS 2C or 2D
MATH 20D	CHEM 43AM or 43A	PHYS 2BL or 2CL or 2DL
<b>JUNIOR YEAR</b>		
CHEM 114A	CHEM 114B	CHEM 114C
CHEM 100A	CHEM 143B	CHEM 105A
CHEM 126A	CHEM 126B	
<b>SENIOR YEAR</b>		
CHEM 108 or 109	Chemistry Elective Lab	Biochem Elective
CHEM 120A	Biochem Elective	Chemistry Open Elective

\*BILD 1 recommended, but not required

### Important Notes:

- Courses listed above only include **major requirements**. Speak with your college advisor for planning completion of general education and university requirements.
- Priority enrollment in CHEM 123 is granted to Molecular Synthesis majors, and seats are highly limited. Please plan for an alternate lab elective.
- Many courses have enforced prerequisites or are offered once per year. It is your responsibility to know which prerequisites are needed for each course. <https://www.ucsd.edu/catalog/courses/CHEM.html>
- The quarter in which a course is offered is subject to change based on space and instructor availability. Please check the department website (<http://chemistry.ucsd.edu/graduate-program/courses17-18.html>) each academic year to see a projection of classes offered by quarter.
- The best time to study abroad is generally fall quarter of Sophomore or Junior Year. Education Abroad Program deadlines for upcoming year vary by country. See [EAP website](#). See the Chemistry & Biochemistry Undergraduate Advisor for assistance in planning to study abroad.