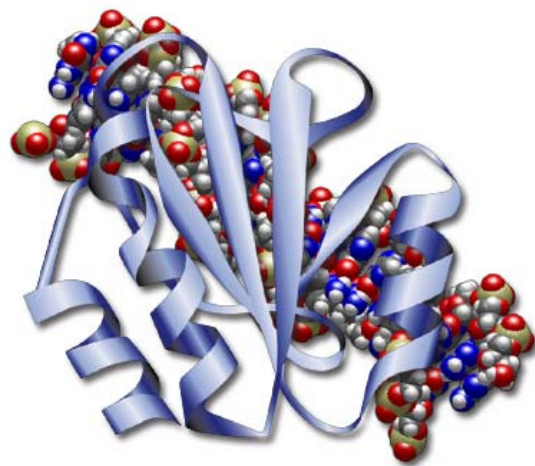


UNDERGRADUATE PROGRAMS

**Bachelor of Science in
Biochemistry and Molecular Biophysics
and
Bachelor of Arts in
Biochemistry**



Department of
Biochemistry and
Molecular Biophysics

THE UNIVERSITY OF ARIZONA.®

UNDERGRADUATE PROGRAMS IN BIOCHEMISTRY AND MOLECULAR BIOPHYSICS

(<http://www.biochem.arizona.edu>)

Professors Thomas O. Baldwin, Department Head, Danny L. Brower (Molecular and Cellular Biology), Michael F. Brown (Chemistry), Louise M. Canfield, Michael A. Cusanovich, Carol L. Dieckmann, Erik J. Henriksen (Physiology), Eugene W. Gerner (Cell Biology & Anatomy), Robert J. Gillies (Radiology), Darrel E. Goll (Animal Sciences), William J. Grimes, Richard B. Hallick, David J. Hartshorne (Nutritional Sciences), Mark R. Haussler (Basic Medical Sciences), John G. Hildebrand (Neurobiology), Victor J. Hruby (Chemistry), John W. Little, Roger L. Miesfeld, William R. Montfort, David W. Mount (Molecular and Cellular Biology), Howard Ochman, Roy R. Parker (Molecular and Cellular Biology), Marc E. Tischler, Associate Head, Gordon Tollin, Elizabeth Vierling, F. Ann Walker (Chemistry), Vicki H. Wysocki, Henry I. Yamamura (Pharmacology)

Associate Professors: Jennifer D. Hall (Molecular and Cellular Biology)

Assistant Professors: Vahe Bandarian, Matthew H. J. Cordes, Nancy L. Horton, Megan M. McEvoy, Florence Tama, Tsu-Shuen Tsao

Research Assistant Professors: Osamu Miyashita

Biochemistry provides the fundamentals for study of molecular principles in biology, medicine and the health sciences, and agricultural sciences. The Bachelor of Science and Bachelor of Arts programs in Biochemistry are designed to prepare students upon graduation to work as a biochemist or enter a graduate program. The biochemistry major serves as an excellent background for graduate study in biochemistry or the many health related sciences, including a major pre-professional program for qualification to professional schools of medicine, dentistry and osteopathy.

The undergraduate major in biochemistry is designed with some flexibility to allow adaptation to the needs of the student. The required basic core courses in chemistry and biology continue through the junior year, when the student is prepared to take General Biochemistry (BIOC462a,b), Biochemical Laboratory Techniques (BIOC463a) and Biochemistry of Nucleic Acids (BIOC466). The senior year allows a choice of advanced lecture or lecture-lab electives in chemistry and biology. Bachelor of Arts students will enroll in a semester-long Directed Research course (BIOC492). Bachelor of Science students will enroll in a year-long Senior Research Thesis course (BIOC498 or BIOC498H). The research thesis will involve working in the laboratories of biochemistry faculty or approved projects of faculty in related fields. We encourage qualified students to become a part of ongoing research programs under faculty supervision.

The Biochemistry major does not require a minor.

For further information concerning this program, please contact your major advisor, or Olivia A. Mendoza, Program Coordinator, Academic Affairs in Room 362B4, Biological Sciences West Building 520.621.3868, email omendoza@u.arizona.edu .

William J. Grimes, Professor
Director of Undergraduate Studies

Equal Employment Opportunity/Affirmative Action Employer

**REQUIREMENTS
BACHELOR OF SCIENCE DEGREE
BIOCHEMISTRY AND MOLECULAR BIOPHYSICS**

BIOCHEMISTRY (BMB)

Semester

Hours

181R or 181RH	Introductory Biology I (3) or Honors Introductory Biology I (4)	31 – 36
181L	Introductory Biology Laboratory I (1)	
182 or 182H	Introductory Biology II (4) or Honors Introductory Biology II (6)	
195G	Opportunities in Biochemistry and Molecular Biophysics (1) – Highly recommended	
466	Biochemistry of Nucleic Acids (4)	
462a or 462aH	Biochemistry (4) or Honors Biochemistry (5)	
462b	Biochemistry (4)	
463A	Biochemical Laboratory Techniques (4)	
498 or 498H	Senior or Honors Research Thesis (3-3)	
496a	Biochemistry Pro-seminar (1)	

CHEMISTRY (CHEM)

22 - 24

103a-103b	Fundamentals of Chemistry (3-3) and	
104a-104b	Fundamental Techniques of Chemistry (1-1)	
-OR-		
105a-105b	Honors Fundamentals of Chemistry (3-3) and	
106a-106b	Honors Fundamental Techniques of Chemistry (1-1)	
246a-246b	Lectures in Organic Chemistry (3-3) and	
247a-247b	Organic Chemistry Laboratory (2-2)	
(For those who are not Honor Students it is recommended to enroll in Chem 246/247)		
-OR-		
242a-242b	Honors Lectures in Organic Chemistry (3-3) and	
244a-244b	Honors Organic Chemistry Laboratory (2-2)	
-OR-		
241a-241b	Lectures in Organic Chemistry (3-3) and	
243a-243b	Organic Chemistry Laboratory (1-1)	
480a	Physical Chemistry (3)	
481 or 480b	Biophysical Chemistry (recommended) or Physical Chemistry (3)	

MATHEMATICS

9 - 12

124 or 125	Calculus I with Applications (recommended)(5) or Calculus I (3)
129	Calculus II (3)
223 or 254	Vector Calculus (4) or Differential Equations (3)

PHYSICS

8

131-132	Introductory Physics with Calculus (4-4)
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DEGREE PROGRAM IN SCIENCE

Foundations

Composition - English 101, 102
Mathematics - Satisfied by major

Tier 1

Traditions & Cultures (2 courses)
Indv & Societies (2 courses)
Natural Sciences (satisfied by major)
Natural Sciences (satisfied by major)

Tier 2

Arts (3 units)
Indv & Societies (1 course)
Humanities (1 course)
Natural Sciences (satisfied by

Second Language

2nd semester proficiency for B.S. major)

TOTAL SEMESTER HOURS

120

Minimum semester hours required for a B.S. degree are 120. Students graduating under the 1991-93 and subsequent catalogues must have 42 upper-division credits. (Note that there are 29 specific biochemistry and chemistry upper division credits.)

Academic Plan for a B.S. Degree in Biochemistry and Molecular Biophysics

Freshman Year

	Fall		Spring	
Math 124 (or 125)	5 (or 3)		Math 129	3
Engl 101	3		Engl 102	3
Chem 103a/104a	4		Chem 103b/104b	4
Tier 1	3		Tier 1	3
BIOC195G	1		Tier 1 (optional)	3
	16 (or 14)			13-16

Sophomore Year

	Fall		Spring	
Bioc 181R/L	4		Bioc 182	4
Math 223 or 254	4 or 3		Tier 1	3
Chem 246a/247a or	5 or		Chem 246b/247b or	5 or
Chem 241a/243a	4		Chem 241b/243b	4
Tier 1	3		Tier 2	3
Bioc 496a (or spring)	1		Bioc 496 a (or fall)	1
	15-17			15-16

Junior Year

	Fall		Spring	
Phys 131	4		Phys 132	4
Bioc 462a	4		Bioc 462b	4
Tier 2	3		Bioc 466	4
Opt elective or Bioc 463a	3 or 4		Opt elective or Bioc 463a	3 or 4
Tier 2 (optional)	3			1
	17-18			16-17

Senior Year

	Fall		Spring	
Chem 480a	3		Chem 481 or 480 b	3
Bioc 498	3		Bioc 498	3
Tier 2 (or spring)	3		Tier 2 (or fall)	3
Opt elective	6 or 9		Opt elective	6 or 9
	15			15

Total Units 120

**REQUIREMENTS
BACHELOR OF ARTS DEGREE IN BIOCHEMISTRY**

<u>BIOCHEMISTRY (BIOC)</u>		<u>Semester Hours</u>
181R or 181RH	Introductory Biology I (3) or Honors Introductory Biology I (4)	22 – 32
181L	Introductory Biology Laboratory I (1)	
182 or 182H	Introductory Biology II (4) or Honors Introductory Biology II (6)	
195G	Opportunities in Biochemistry and Molecular Biophysics (1) – Highly recommended	
466	Biochemistry of Nucleic Acids (4)	
462a or 462aH	Biochemistry (4) or Honors Biochemistry (5)	
462b	Biochemistry (4)	
496a	Biochemistry Pro-seminar (1)	
492 *	Directed Research (1) or	
498	Senior Thesis (3-3)	

*Requires a written paper on a topic selected by the student in consultation with a faculty sponsor

<u>CHEMISTRY (CHEM)</u>		16-18
103a-103b	Fundamentals of Chemistry (3-3) and	
104a-104b	Fundamental Techniques of Chemistry (1-1)	
-OR-		
105a-105b	Honors Fundamentals of Chemistry (3-3) and	
106a-106b	Honors Fundamental Techniques of Chemistry (1-1)	
241a-241b	Lectures in Organic Chemistry (3-3) and	
243a-243b	Organic Chemistry Laboratory (1-1)	
-OR-		
242a-242b	Honors Lectures in Organic Chemistry (3-3) and	
244a-244b	Honors Organic Chemistry Laboratory (2-2)	

<u>MATHEMATICS</u>		6-8
124 or 125	Calculus (5-3)	
129	Calculus (3)	

<u>PHYSICS</u>		6
102-103	Introductory Physics (3-3)	

DEGREE PROGRAM IN SCIENCE

<u>Foundations</u>	<u>Tier 1</u>	<u>Tier 2</u>
Composition - English 101, 102	Traditions & Cultures (2 courses)	Arts (3 units)
Mathematics - Satisfied by major	Indv & Societies (2 courses)	Indv & Societies (1 course)
Second Language – 4th semester proficiency for B.A.	Natural Sciences (satisfied by major)	Humanities (1 course)
		Natural Sciences (satisfied by major)

<u>UPPER-DIVISION SCIENCE ELECTIVES</u>		6
Six units selected from upper-division science courses with approval from a Biochemistry advisor.		

<u>TOTAL SEMESTER HOURS</u>		120
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Minimum semester hours required for a B.A. degree are 120. Students graduating under the 1991-93 and subsequent catalogues must have 42 upper-division credits.

Academic Plan for a B.A. Degree in Biochemistry

Freshman Year

	Fall		Spring	
Math 124 (or 125)	5 (or 3)		Math 129	3
Engl 101	3		Engl 102	3
Chem 103a/104a	4		Chem 103b/104b	4
BIOC195G	1		Tier 1	3
Tier 1 (take without lang)	3		Language (as needed)	4
Language (take without Tier 1)	4			
	13-17			13-17

Sophomore Year

	Fall		Spring	
Bioc 181R/L	4		Bioc 182	4
Language (as needed)	4		Language (as needed)	4
Chem 241a/243a	4		Chem 241b/243b	4
Tier 1	3		Tier 1	3-6
Bioc 496a (or spring)	1		Bioc 496a (or fall)	1
	12-16			12-16

Junior Year

	Fall		Spring	
Phys 102	3		Phys 103	3
Bioc 462a	4		Bioc 462b	4
Tier 2	3		Bioc 466	4
Tier 1 (optional)	3		Tier 2	3
Opt elective	3		Opt elective	3
	13-16			17

Senior Year

	Fall		Spring	
Bioc 498 (optional)	3		Bioc 498 (optional)	3
Sci elective	3		*Bioc 492	1
Opt elective	3-9		Sci elective	3
Tier 2	3		Opt elective	3-9
	15-18			13-16

Total Units 120

* Requires a written paper on a topic selected by the student in consultation with a faculty sponsor