

# Biochemistry and Molecular Biology

Biochemists and molecular biologists study the chemistry of life. This includes the study of protein structure and function, metabolism, and the mechanics of DNA, RNA and protein synthesis. The Cal Lutheran program emphasizes genomics and bioinformatics as methods that teach students how to perform research. Like other Cal Lutheran science majors, biochemistry and molecular biology students are encouraged to design and carry out their own experiments, and advanced students are encouraged to complete independent studies and internships. The University's state-of-the-art equipment and resources offer students access to the latest scientific information and techniques.

Preprofessional programs in medicine, dentistry, veterinary medicine, pharmacy and bioengineering can be pursued through the biochemistry program at Cal Lutheran. The biochemistry curriculum prepares students for positions in industrial and governmental research laboratories.

Careers in biochemistry and molecular biology are available in government and private companies and include positions in a variety of research industries. The growing areas of genetics and biotechnology provide many career opportunities with companies such as Amgen and Baxter Biotech, both international biotechnology companies that are located near the University.

Likewise, many biochemistry majors from Cal Lutheran are accepted into medical, dental, pharmaceutical and graduate schools throughout the United States.

## Bachelor of Arts in Biochemistry and Molecular Biology

38 credits minimum, 24 credits upper division.

BIOL 121 or BIOL 122	Introduction to Cells and Organisms Introduction to Metabolism, Genes and Development	3
BIOL 124L	Introduction to Biological Experimentation II	2
BIOL 425/425L	Biochemistry and Biochemistry Lab	4
BIOL 426/426L	Molecular Biology and Molecular Biology Lab	4
BIOL 427 or BIOL 422	Genomics Bioinformatics-Analytical	2-4
CHEM 151	General Chemistry	4
CHEM 151L	General Chemistry Lab	1
CHEM 152	General Chemistry II	4
CHEM 152L	General Chemistry II Lab	1
CHEM 305/305L	Quantitative Analysis and Quantitative Analysis Lab	4
CHEM 331	Organic Chemistry	4
CHEM 332	Organic Chemistry II	4
CHEM 341	Organic Chemistry Lab	1
CHEM 342	Organic Chemistry II Lab	1
BIOL 399/498/499 or CHEM 485	Junior Honors and Senior Honors I - Capstone and Senior Honors II - Capstone Capstone Seminar	2-8
Total Hours		41-49

## Required Supporting Courses

MATH 251	Calculus I	4
MATH 252	Calculus II	4
Select one of the following:		8-10
PHYS 201/201L/202/202L	Mechanics and Thermodynamics-Algebra and Mechanics and Thermodynamics-Algebra Lab and Electricity, Magnetism, and Optics - Algebra and Electricity, Magnetism, and Optics - Algebra Lab	
PHYS 211/211L/212/212L	Mechanics and Thermodynamics-Calculus and Mechanics and Thermodynamics-Calculus Lab and Electricity, Magnetism, and Optics - Calculus and Electricity, Magnetism, and Optics - Calculus Lab	
Total Hours		16-18

## Recommended

BIOL 331/331L	Genetics and Genetics Lab	4
BIOL 332	Macromolecular Structure	2
BIOL 361/361L	Microbiology and Microbiology Lab	4

BIOL 375/375L	Cell Biology and Cell Biology Lab	4
BIOL 428/428L	Virology and Virology Lab	4
CHEM 405/405L	Physical Chemistry and Physical Chemistry Lab	4
CHEM 406/406L	Physical Chemistry and Physical Chemistry Lab	4
CSC 210	Introduction to Computer Programming	4
Total Hours		30

## Bachelor of Science in Biochemistry and Molecular Biology

46 credits minimum, 30 credits upper division.

BIOL 121	Introduction to Cells and Organisms	3
BIOL 122	Introduction to Metabolism, Genes and Development	3
BIOL 124L	Introduction to Biological Experimentation II	2
BIOL 425/425L	Biochemistry and Biochemistry Lab	4
BIOL 426/426L	Molecular Biology and Molecular Biology Lab	4
BIOL 427 or BIOL 422	Genomics Bioinformatics-Analytical	2-4
CHEM 151	General Chemistry	4
CHEM 151L	General Chemistry Lab	1
CHEM 152	General Chemistry II	4
CHEM 152L	General Chemistry II Lab	1
CHEM 305/305L	Quantitative Analysis and Quantitative Analysis Lab	4
CHEM 331	Organic Chemistry	4
CHEM 332	Organic Chemistry II	4
CHEM 341	Organic Chemistry Lab	1
CHEM 342	Organic Chemistry II Lab	1
CHEM 405	Physical Chemistry	4
BIOL 399/498/499 or CHEM 485	Junior Honors and Senior Honors I - Capstone and Senior Honors II - Capstone Capstone Seminar	2-8
Total Hours		48-56

## Required Supporting Courses

MATH 251	Calculus I	4
MATH 252	Calculus II	4
Select one of the following:		8-10
PHYS 201/201L/202/202L	Mechanics and Thermodynamics-Algebra and Mechanics and Thermodynamics-Algebra Lab and Electricity, Magnetism, and Optics - Algebra and Electricity, Magnetism, and Optics - Algebra Lab	
PHYS 211/211L/212/212L	Mechanics and Thermodynamics-Calculus and Mechanics and Thermodynamics-Calculus Lab and Electricity, Magnetism, and Optics - Calculus and Electricity, Magnetism, and Optics - Calculus Lab	
Total Hours		16-18

## Recommended

Recommended Courses:

BIOL 331/331L	Genetics and Genetics Lab	4
BIOL 332	Macromolecular Structure	2
BIOL 361/361L	Microbiology and Microbiology Lab	4
BIOL 375/375L	Cell Biology and Cell Biology Lab	4
BIOL 428/428L	Virology and Virology Lab	4
CHEM 406/406L	Physical Chemistry and Physical Chemistry Lab	4
CSC 210	Introduction to Computer Programming	4
Total Hours		26