

CROSS DISCIPLINARY STUDIES MINOR IN BIOINFORMATICS

Offered at: San Luis Obispo Campus

Through an inter-college collaboration, the Biology, Chemistry, Computer Science and Software Engineering, and Statistics Departments offer a Cross-Disciplinary Studies Minor (CDSM) in Bioinformatics. Bioinformatics lies at the intersection of computational sciences and biology. The CDSM in Bioinformatics creates a strong foundation in molecular biology as well as the design and applications of software and databases commonly used by computational biologists. The student will gain an understanding of how bioinformatic data are generated, organized, and used to gain insights into molecular life science.

The CDSM in Bioinformatics will provide the opportunity for biology, biochemistry, computer science and statistics students to identify solutions to biological questions using bioinformatics, to write and implement software on a bioinformatics project, to apply statistical analyses associated with bioinformatics, and to learn algorithms that can be useful for software development in the bioinformatics/computational biology field.

A student may not be awarded both the Cross Disciplinary Studies Minor in Bioinformatics and the Biotechnology minor.

Target majors: Biology, Biochemistry, Statistics, Computer Science and Software Engineering

Program Learning Objectives

1. Describe and apply fundamental concepts of biology related to molecular organization and function.
2. Explain experimental methodologies for the generation of bioinformatics data
3. Find, retrieve, and organize different types of biological data
4. Analyze biological data by implementing algorithms and applying statistical tools
5. Apply the scientific discovery process to a novel research question using bioinformatics and cross-disciplinary approaches
6. Collaborate effectively and professionally on an interdisciplinary team
7. Communicate bioinformatics research results to a variety of audiences
8. Evaluate the impact of bioinformatics and genomics on individuals, organizations, and societies

Minor Requirements and Curriculum

The minor must be completed prior to, or at the same time as, the requirements for the bachelor's degree. A major and a minor may not be taken in the same degree program, and a minor is not required for a degree. Requirements for the minor include:

- At least half of the units must be from upper-division courses (3000-4000 level).
- At least half of the units must be taken at Cal Poly (in residence).
- No more than one-third of the units will be taken with credit-no credit grading (CR/NC), not counting courses with mandatory CR/NC. Departments may further limit CR/NC grading if desired.
- A minimum 2.0 GPA is required in all units counted for completion of the minor.

Code	Title	Units
REQUIRED COURSES ¹		
Biology/Biochemistry		
BIO 1151	Life: Molecules and Cells	4
Select from the following:		3
BIO 3312	Human Genetics	
BIO 3351	Principles of Genetics	
CHEM 3356	Genetic Information Processing ²	
MCRO 3351	Microbial Genetics	
Depth in Biology/Biochemistry		
Select from the following:		7-8
BIO 2252	Orientation to Biotechnology	
BIO 3315	Biology of Cancer	
BIO 3318	Genetic Engineering Technology	
or CHEM 3318	Genetic Engineering Technology	
BIO 3327	Wildlife Ecology	
BIO 3352	Principles of Animal Physiology	
BIO 4413	Evolutionary Medicine	
or BIO 4414	Evolution	

BIO 4442	Behavioral Ecology	
BIO 4444	Population and Community Ecology	
BIO 4449	Biogeography	
BIO 4457	Molecular Biology Laboratory	
BOT 3326	Plant Ecology	
CHEM 3350 or CHEM 3352	Biochemistry: Fundamentals and Applications Biochemistry	
MCRO 3320	Emerging Infectious Diseases	
MCRO 3342	Public Health Microbiology	
MCRO 4421	Food Microbiology	
MCRO 4433	Microbial Biotechnology	
Foundation in Computer Science and Statistics		
CSC 1001 & 1001L	Fundamentals of Computer Science and Fundamentals of Computer Science Laboratory	4
CSC 2001 & 2001L	Data Structures and Data Structures Laboratory	4
STAT 3520	Statistics II	3
Data Science and Bioinformatics		
BIO 4451 or CHEM 4451	Bioinformatics Applications Bioinformatics Applications	4
DATA 3301	Introduction to Data Science	4
DATA 4461	Senior Project - Bioinformatics Capstone	2
Total Units		35

- ¹ Courses in this minor may have additional prerequisites that will not count towards the minor. In addition, your ability to select specific elective courses may vary depending upon the curriculum requirements for your major
- ² A maximum of 1 unit in excess of total will be applied to Depth in Biology/Biochemistry.