



University of California, Santa Barbara
Program Learning Outcomes

B.S. in Microbiology

Students graduating with a B.S. in Microbiology should be able to:

Knowledge

1. Apply the processes and methods of scientific inquiry, including the search and retrieval of scientific information, the formulation of scientific hypotheses, the design and conduct of experiments, and the analysis and interpretation of data.
2. Describe the structure, function and metabolism of microbial cells.
3. Explain the genetic principles that govern microbial inheritance.
4. Recognize the scope of microbial diversity and the phylogenetic relationships among major groups of microorganisms.
5. Discuss the interactions between microbes and their environments, and the consequences of these interactions in natural populations, microbiomes, and disease.
6. Use the fundamental tools and knowledge of mathematics, chemistry, and the physical sciences needed for studying biochemical phenomena relevant to understanding the molecular and cellular basis of microbial processes.
7. Understand basic biochemistry of proteins, nucleic acids, lipids, and carbohydrates.
8. Understand fundamental concepts concerning microbial metabolic pathways and bioenergetics.
9. Understand the roles of viruses and bacteria in human disease.
10. Understand mechanisms of antimicrobial therapy and antibiotic resistance.

Research and Laboratory Skills

11. Conduct procedures widely used by biochemists and molecular biologists to elucidate microbial biochemical and genetic mechanisms, critically assess data, and draw appropriate conclusions from the results.
12. Read, process, and communicate ideas from the scientific literature.