

Student Learning Objectives

Biology Major and Minor Programs

Biology Dept, Calvin College

Student Learning Objectives

1. Concepts & Methodologies - Students will be able to explain the conceptual understanding of the basic and advanced methodologies commonly used in biology-related research. They will demonstrate competence in designing appropriate experiments to address research problems, in troubleshooting common impediments, and in interpreting results in light of biological concepts ranging from cell and gene theories to evolutionary and ecological principles.
2. Competencies
 - In Laboratory Skills - Students will demonstrate competence in standard laboratory practices, safety, and research ethics. They will exhibit proficiency in handling chemical reagents and solutions, in performing routine calculations, in maintaining a laboratory notebook, and in manipulating/interpreting experimental data.
 - In Communication Skills - Students will effectively communicate the scientific and social aspects of biology through the appropriate use of visual and written rhetoric. They will demonstrate competence in reviewing and critiquing scientific and other literature. They will hone skills to effectively engage professional (research reports & presentations) and general audiences (position papers & presentations).
3. Applications - From foundational concepts in basic biology and chemistry, students will demonstrate broad knowledge of current applications in biology and gain insights from historical approaches to problems in medicine, agriculture, forensics, industry, and environmental stewardship. They will be able to communicate the benefits and risks of applied biology, critique current practices and controversies, and identify means to manage risks.
4. Ethical, Religious, & Social Responsibilities - Students will develop keen sensitivity to diverse concerns related to biology, understand the complexity and embeddedness of these concerns in diverse social values and ecological contexts, and become adept at formulating perspectives that balance them. Their written and oral work will exhibit core virtues and an underlying Christian worldview that embraces creation care (stewardship) as a fundamental calling to be lived out within the context of a faith community. Most will engage in academically based service learning.
5. Vocational Orientation – Students will master ‘soft’ skills (interpersonal, time management, strategic/creative, motivation/commitment, personal image, interviewing), demonstrate awareness of occupational trends and preparatory steps in biology-related fields, and develop a set of career goals that reflect a Reformed sense of calling and a clear vision of their own varied gifts and interests.

Student Learning Objectives

Biotechnology Major & Minor Programs
Biology Dept, Calvin College

Student Learning Objectives	
6.	<u>Methodologies</u> - Students will be able to explain underlying principles of basic and advanced methodologies commonly used in biotechnology-related research, particularly those involving cell culture, DNA, RNA, or proteins. They will demonstrate competence in designing appropriate experiments to solve research problems and in troubleshooting common impediments.
7.	<u>Applications</u> - From a foundation in the concepts of basic biology and chemistry, students will demonstrate broad knowledge of current applications in biotechnology and gain insights from historical approaches to problems in medicine, agriculture, forensics, industry, and environmental stewardship. They will be able to communicate the benefits and risks of biotechnology, critique current practices and controversies, and identify means to manage risks.
8.	<u>Laboratory Skills</u> - Students will demonstrate competence in standard laboratory practices, safety, regulatory frameworks, and research ethics. They will exhibit proficiency in handling chemical reagents and solutions, in performing routine calculations, in maintaining a laboratory notebook to industry standards, and in manipulating/interpreting experimental data.
9.	<u>Ethical, Religious, & Social Concerns</u> - Students will develop keen sensitivity to diverse concerns raised by biotechnology, understand the complexity and embeddedness of these concerns in diverse social values and ecological contexts, and become adept at formulating perspectives that balance them. Their written and oral work will exhibit core virtues and an underlying Christian worldview that embraces creation care (stewardship) as a fundamental calling to be lived out within the context of a faith community.
10.	<u>Policies & Regulations</u> - Students will demonstrate familiarity with regulatory frameworks that govern biotechnology policies and practices in the United States and throughout the world. They will understand how those frameworks address scientific and social concerns regarding biosafety, human rights & dignity, intellectual property rights, scientific misconduct, etc. They will appreciate the delicate nature of public trust and scientific responsibility.
11.	<u>Communication Skills</u> - Students will effectively communicate the scientific and social aspects of biotechnology through the appropriate use of visual and written rhetoric. They will demonstrate competence in reviewing and critiquing scientific and other literature. They will hone skills to effectively engage professional (research reports & presentations) and general audiences (position papers & presentations).