Undergraduate Program Assessment

Department of Biology

Learning Goals and Objectives: One goal of the Biology curriculum for undergraduate majors is to introduce students to the diversity of life and the breadth of the study of Biology with focus on 5 broad areas: Cell and Molecular Biology, Ecology, Evolution, Genetics, and Physiology. Broadly, other goals and objectives of the curriculum are to instill an understanding of the living world from the molecular level to the level of the ecosystem, promote an understanding of the different levels of investigation and tools used by Biologists to answer questions, and provide classroom, lab, and field environments where students practice and hone the skills of practicing scientists. More specifically, we aim for our students to gain the following skills and abilities through completion of the major’s curriculum:

Student Learning Objectives

Skills
- Ability to observe and describe nature accurately.
- Ability to construct logical arguments in biology.
  - Generate and state testable hypotheses
  - Develop and elaborate models
- Ability to critique logical arguments in biology.
  - Design experiments to test hypotheses
  - Recognize possible outcomes & assess the probability of occurrences
  - Collect, organize, and analyze relevant data
  - Draw conclusions and evaluate their relative quality
- Ability to communicate ideas and arguments effectively both orally and in writing.
- Ability to work effectively in a team.
- Ability to apply problem-solving to learning.
  - Develop strategies for identifying deficits in knowledge
  - Acquire information gathering and study skills
  - Self-assess progress in learning
- Ability to apply quantitative reasoning to biological questions.
  - Construct and interpret graphs and plots
  - Analyze data using statistical methods

Perspectives
- Appreciation that learning changes “how one thinks” as well as “what one knows.”
- Ability to approach novel problems with flexibility, creativity, and confidence.
- Appreciation for the interconnectedness of knowledge.
- Appreciation that the pursuit of science can be exciting and fulfilling.
- Confidence in oneself as a College-Trained Biologist.
- Appreciation for the diversity of living things and the diversity of approaches used to study them.
- Appreciation for the impact of biological science on the environment and society.

Assessment tools
Direct:
- Student learning (and their activities) is evaluated using a range of tools that vary from course to course. These include exams, quizzes, group projects, team-based learning activities, in class problem solving using clickers, homework, lab exercises, design and conducting independent research projects, case studies, and research papers.

Indirect:
- Examination of the grade distribution and DFW rates within and between courses, preparedness of students for and success in future courses, student ability to progress in the major.
• SRTI forms, instructor-driven mid-semester reviews, Center for Teaching Midterm Assessment Processes (MAPs), course syllabi, informal student feedback
• The Classroom Undergraduate Research Experience (CURE) survey, administered as a pre and post test evaluation of scientific attitude, learning style, learning gains in the course elements, learning benefits, and overall evaluation of the experience.

Review and Interpretation of Evidence and Implementing Change
The Teaching Committee of the Biology Department is charged with reviewing and discussing broad issues of teaching and assessment and presenting them to the Faculty at the annual Department Retreat and at bimonthly faculty meetings as needed.

Highlighted recent activities
• Based on assessment data indicating that Junior Year Writing courses were not effective, the Department has appointed another new Coordinator of the JYWP, bringing more instructors together to discuss their course formats, providing students with more online information about the writing section, and incorporating projects and presentations as part of the course format.
• Redesign of Introductory Biology experience. We have made a dramatic reorganization of the suite of courses for life science majors and science majors and are currently working on a discovery-based 2 credit laboratory experience for life science majors.
• Based on our assessment and the demonstrated success of the lab project-based HHMI courses, Biol 477H Bioimaging and Biol 383H Gene and Genome Analysis, we have designed and implemented other discovery project-based lab experiences (Biol 397MC Cell and Molecular Biology Lab, Biol 486H Molecular Biology or Model Systems) and introduced semester-long group projects into other courses (Biol 523 Histology).