Student Learning Goals and Objectives

The Biology Department has set forth three content goals and four process goals for the Biology major. Content goals are those that are specific to a Biology major, based on biological principles and information. Process goals represent a more generalized suite of skills that are applicable to most, if not all students at the university level. We set our content and process goals as follows:

1. **Content Goal 1**: *Our students will understand fundamental biological principles from the major areas of biology (cell and molecular biology, genetics, evolution, ecology, organismal, and population biology).*
   Students will be able to explain and apply their understanding of:
   a. the basic principles of chemistry and some application to the understanding of living systems
   b. the molecular basis for the form and function of cells
   c. the form and function of multicellular organisms
   d. the organization and transfer of genetic information
   e. the ecological relationships between organisms and their environment.
   f. the principles of evolutionary biology and the phylogenetic relationships of the major groups of organisms
   g. the organizing principle of evolution by natural selection and its role in the explanation of life's diversity on earth

2. **Content Goal 2**: *Our students will apply and integrate fundamental biological principles from the major areas of biology.*
   Students will be able to explain and apply their understanding of:
   a. the relationship between structure and function at all levels: molecular, cellular, organismal and population
   b. the importance of evolutionary theory as a unifying principle of biology.
   a. the cellular basis for physiological processes
   b. cellular basis for developmental processes
   c. interactions between organisms and their abiotic and biotic environment

3. **Content Goal 3**: *Our students will acquire laboratory and field skills necessary to answer biological questions.* Students will be able to:
   a. perform a variety of lab techniques
   b. perform a variety of field techniques
   c. identify organisms based on common and distinguishing traits
   d. demonstrate the process of scientific inquiry and explain how scientific knowledge is discovered and validated
   e. design a biological study and analyze experimental results

4. **Process Goal 1**: *Our students will develop enhanced critical thinking skills.*
   Students will be able to:
a. identify questions that can be addressed scientifically
b. collect and interpret primary data and draw conclusions from experiments
c. demonstrate the ability to read, understand and critically review scientific papers

5. Process Goal 2: Our students will develop effective quantitative reasoning skills. Students will be able to:
   a. use mathematical equations to represent biological phenomena
   b. use mathematical equations and models to predict biological outcomes
   c. understand and use correct statistical techniques to evaluate results

6. Process Goal 3: Our students will communicate precisely and analytically in written and oral forms. Students will be able to:
   a. discuss biological processes using precise scientific terminology
   b. prepare written and/or oral reports in standard scientific formats

7. Process Goal 4: Our students will engage independently and collaboratively in the scientific process. Students will be able to:
   a. apply the scientific process, including designing and conducting experiments and examining hypotheses
   b. acquire the laboratory and/or field skills necessary to perform laboratory exercises and experiments
   c. place their research in a broader scientific context based on current literature
   d. evaluate the work of their peers