Syracuse University

# Course Tag Reflection Exemplar
## Scientific Inquiry & Research Skills

**Katie M. Becklin, Ph.D.**
**BIO 345: Ecology and Evolution**

**Identify the course learning objectives in the syllabus that are clearly aligned to Scientific Inquiry & Research Skills and respective assignment(s).**

- Evaluate current theory and practices in ecology and evolution.
- Analyze and interpret data from scientific experiments.
- Use scientific data and models to construct evidence-based hypotheses."

**Explain the connection between specific assignment(s) and Scientific Inquiry & Research Skills. At least 30% of the course grade must engage students in the selected competency for the course to be tagged.**

The majority of assignments and assessments in this course include aspects of scientific inquiry.
(1) Through daily lecture activities (10% of the grade) students practice quantitative skills in ecology and evolution, interpret scientific evidence presented in figures and tables, and apply scientific models to predict biological outcomes.
(2) Students collaborate with their peers on five case studies (15% of the grade) throughout the semester. During each case study students explore a specific research question and hypothesis using real scientific data and/or model simulations. Follow-up assignments ask students to apply what they learned in the case study to new scenarios, much like they would if conducting research.
(3) Scaffolded writing assignments ask students to evaluate and apply scientific evidence to real-world problems. As part of these assignments students may be asked to propose a solution (e.g., a testable hypothesis) to the problem, design an experiment to test if their proposed solution works, and/or evaluate scientific evidence comparing different solutions currently used in the field.
(4) Finally, formal quizzes and exams (60% of the grade) reinforce skills in scientific inquiry by asking students to apply quantitative skills and scientific models to new problems, use data presented in figures and tables to evaluate support for different hypotheses, and design experiments to test key scientific concepts.

**Describe in detail the instructional strategies faculty use to intentionally teach Scientific Inquiry & Research Skills in the course.**

Online lectures developed by faculty members guide the students through examples of quantitative and modeling skills related to ecology and evolutionary biology, including basic principles of figure analysis and hypothesis testing. Practice problems are embedded in each lecture video using PlayPosit. During in-person classes, faculty lead students through more in-depth case studies and practice problems to reinforce relevant skills and concepts in science inquiry. Faculty also lead class discussions of the scientific method, focusing on principles of hypothesis testing and common practices in ecology and evolutionary biology.

**Describe the feedback tool(s) faculty use to support students' competency development on Scientific Inquiry & Research Skills.**

Students receive support and feedback from the instructors through multiple means:
(1) Students can access faculty feedback for all PlayPosit questions directly in the lecture videos.
(2) Faculty provide students with a figure analysis guide that describes the components of a scientific figure, different types of figures, and strategies for interpreting data in a figure. This guide is referenced throughout the semester.
(3) Case studies and other in-class practice problems are designed to give students immediate feedback from faculty at specific stopping points throughout the activity.
(4) Students receive peer feedback on scaffolded writing assignments prior to submitting their final essays. Faculty also provide students with a detailed rubric and example essays to guide the writing process. Faculty provide feedback on the final essays through Turnitin.
(5) Faculty lead post-exam review sessions where students can review their answers to specific questions and ask questions of the faculty.