

Western Connecticut State University
Department of Biological and Environmental Sciences
Modified Course Proposal Outline
General Education: Scientific Inquiry (Sample)

Course Title: Scientific Inquiry in the Field

Course Level: BIO107

Course Credits: 4 semester hour credits (45 hours lecture and 45 hours lab).

Prerequisites: none, but an additional travel fee may be required.

Rationale

“*Scientific Inquiry In The Field*” expands non-major lab science offerings in the Department of Biology and Environmental Sciences by providing a course that immerses students in an outdoor laboratory setting and focuses on natural history, discovery through observation, and the conservation and management of biodiversity. Students use the outdoors as a laboratory from which to observe, record, and test natural phenomenon.

Course Description

Scientific Inquiry in the Field teaches students to use appropriate field biology sampling techniques, to record observations, and build hypotheses through inductive and deductive processes. Students will be expected to use quantitative and qualitative reasoning that will be documented in their field journals. Through the activities of this course students will participate in established conservation or field management programs. Students will be required to keep an accurate and detailed field journal. This journal will also include records of lab activities, as well as descriptions and drawings of species and habitat accounts.

Student Learning Outcomes

The student will ...

1. Explain how living systems are interconnected and interacting (Departmental Learning Goal).
2. Critically evaluate the pros and cons of resource management policies.
3. Differentiate the contributions of past Naturalists.
4. Identify and Document biodiversity.

Scientific Inquiry Learning Outcomes

The student will ...

1. Develop research questions or hypotheses through induction or deduction
 - a. ...through observation of phenomena in the field and selected readings a model will be postulated by students that identifies putative dependent and independent variables responsible for the phenomenon.
2. Design a strategy to test or address the hypothesis or research question
 - a. ...in the context of available field equipment, resources, and local expertise an experiment will be developed to address the association between dependent and independent variables.

3. Implement the research design strategy with faculty oversight
 - a. ...during the field experience the experiment will be repeated several times, and the data will be collected and tabulated.
4. Interpret the results within the context of the discipline
 - a. ...using available discipline specific analytical methods, literature, and validated best practices to assess the likelihood of patterns and/or relationships between tested variables.
5. Effectively communicate and defend outcomes 1-4.
 - a. ...through summative journaling, illustrations, graphical representations, writing prompts, and team-based active discourse and dialogue among students and faculty that contributes to the knowledge of the discipline.

Assessment Plan

Courses assessment tools will include include exams and quizzes to measure disciplinary context, and, field journals and written reports to assess competency in scientific inquiry. A standard grading scheme (A – F) will be used.

Course Outline: This outline can be modified to accommodate other field experiences:

1. The Naturalist – some examples (These can vary)
 - a. Alexander von Humboldt (1769 – 1859)
 - b. Alfred Moquin-Tandon (1804 - 1863)
 - c. Charles Darwin (1809 – 1882)
 - d. David Carroll (1942)
2. Documenting Biodiversity
 - a. Plants and drawings
 - b. Vertebrates and photography
 - c. Sound and Cornell’s Library of Ornithology
 - d. Journaling
 - e. Museums and collections
3. Sampling Biodiversity
 - a. Terrestrial habitats
 - b. Aquatic habitats
 - c. Marine habitats
 - d. Biodiversity Indexes
4. The Power of Field Observation
 - a. Examining and documenting phenomenon
 - b. Stating a Hypothesis
 - c. Making a Prediction

- d. The Alternative Hypothesis
- 5. Analysis of data
 - a. Tabulation of data
 - b. Descriptive Statistics
 - c. Graphical representations of information
 - d. Conclusions
 - 6. Conservation Laws and Practices
 - a. The importance of community engagement and education
 - b. Case studies in conservation
 - c. Government intervention
 - d. Ecotourism and sustainable conservation
 - e. Citizen Science

Frequency

There is a target of offering the course every two years, in the even numbered spring semesters. This course may be offered as early as Spring 2016.

Sample Resources and Texts (will vary by instructor).

Graham, M, Parker, J, and Dayton, P. 2011. The Essential Naturalist: Timeless Readings in Natural History. University of Chicago Press. ISBN-13: 9780226305707.

Price, Daniel. 1999. How to Make a Journal of Your Life. Simon and Schuster, Australia. ISBN: 1-58008-093-6.

Resources Needed

This is an existing course and no additional faculty resources will be needed. The bibliographic holdings in the Hass Library and the WCSU computer and video resources are sufficient. Students may be asked to pay an additional travel fee for lengthy travel experiences.