Liberal Studies Program

Learning Outcomes and Writing Expectations

SCIENTIFIC INQUIRY

Approved by LSC and Faculty Council, 2016

Scientific literacy is an essential skill in our society and a critical component of liberal arts education at DePaul University. To adequately prepare our students in scientific understanding, the Scientific Inquiry domain has three categories of courses: Science as a Way of Knowing (SWK), Scientific Inquiry-Elective (SI-Elective) and Scientific Inquiry-Laboratory (SI-Lab). SWK courses are designed to help students understand the scientific worldview and the nature and process of science. SI-Elective courses are designed for students to apply scientific inquiry, describe scientific methodologies, and explain how scientific content interacts with other disciplines. In SI-Lab courses, students will understand how science serves as a mechanism for inquiry into the natural world through hands-on experience-based investigation.

Learning Outcomes for "Science as a Way of Knowing (SWK)" courses

In the context of natural science content:

1. Students will understand the scientific worldview. As a result of their learning in this course, students will be able to:

a. Identify the types of questions that can and cannot be answered by science, and recognize the strengths and limitations of science in answering questions about the natural world.
b. Critically evaluate the assumptions that underlie scientific investigations.
c. Substantiate the claim that scientific knowledge is durable but can evolve with new evidence and perspectives.

2. Students will understand the nature and process of science. As a result of their learning in this course, students will be able to:

a. Connect evidence to the predictions made by theories and hypotheses, and then assess the extent to which the presented evidence supports or refutes a scientific claim.
b. Evaluate the role of creativity, curiosity, skepticism, open-mindedness and diligence of individuals in scientific discovery and innovation.
c. Recognize the uncertainty inherent in the scientific approach and evaluate scientists' efforts to minimize and understand its effect through experimental design, data collection, data analysis and interpretation.
d. Evaluate the role of communication, collaboration, diversity and peer review in promoting scientific progress and the quality of scientific evidence and ideas, and ensuring compliance with ethical standards.
e. Determine the extent to which science both influences and is influenced by the societies

and cultures in which it operates.
f. Apply scientific approaches to problem solving and decision-making in their own lives, and evaluate how scientific knowledge informs policies, regulations, and personal decisions.

Note: the Scientific Inquiry Domain Committee will consider proposals grounded in natural science content from any instructor.

Learning Outcomes for Scientific Inquiry-Elective (SI-Elective) courses

1. Students will be able to apply appropriate concepts, tools, and techniques of scientific inquiry.

2. Students will be able to describe how natural scientific, mathematical, and/or computational methodologies function as mechanisms for inquiry.

3. Students will be able to explain the interaction between the content of their SI-Elective course and other scientific disciplines or the broader society.

Learning Outcomes for Scientific Inquiry-Laboratory (SI-Lab) courses

In the context of natural science content, and building on the understanding of the scientific worldview and the nature and process of science they have developed in the Science as a Way of Knowing (SWK) course:

Students will understand how science serves as a mechanism for inquiry into the natural world through hands-on, experience-based investigation.

a. Students will be able to pose meaningful scientific questions and generate testable scientific hypotheses.
b. Students will be able to plan, design and conduct scientific investigations in a collaborative environment using appropriate tools and techniques to gather relevant data in order to test and revise scientific hypotheses.
c. Students will be able to develop and use scientific models (conceptual, physical, and mathematical) to make predictions and develop explanations of natural phenomena.
d. Students will be able to address variability in the data and recognize and analyze alternative explanations and predictions.
e. Students will be able to communicate scientific procedures, results, and explanations and engage in arguments based on scientific evidence.

Writing Expectations for all Scientific Inquiry courses

Formal writing is essential for communicating ideas and progress in science, mathematics, and computation to experts within the field and to the broader society. Courses within the Scientific Inquiry Domain should include both formal writing (for example lab reports, essays, and written responses to questions) and supplemental elements that are appropriate for the subject of the course such as mathematical equations, computer code, figures and graphs, lab notebooks, or field journals.