

Course Outline
SCI 370 Integrated Science for Teachers
Fall 2000

Department: Chemistry and Physical Sciences

Credit Hours: 3

Prerequisites: Participants must be enrolled as education students of Lourdes College

General Education: N/A

College Learning Outcomes: Communication Competence 1a, 1b, 1c, 1d, Scientific Literacy 7a, 7b, 7c, 7d and Historical Consciousness 5a

I. Course Description:

An interdisciplinary science course for education majors designed to provide content knowledge in areas outlined in the *National Science Standards* and *Science for All Americans*. The course will demonstrate, through praxis, theme/project based approaches to teaching and learning science. The course will focus on science as an inquiry process. The course will involve students in lecture, relevant classroom projects, participation in hands-on science labs, resource portfolio development and the creation of a teachable science unit.

II. Purpose of the Course:

To enhance the future teacher's abilities to provide more fully integrated, inquiry-based science experiences to young learners through facilitation of ideas and avenues of action that will incorporate more inclusively other academic areas of discipline within the science classroom. To teach such project-based science in accord with the spirit, intent and goals of the Ohio Science Model and National Science Standards. To enrich the teacher's "toolbox" of integrated science teaching activities/resources through experiences in lab settings and with community resources. To enhance education students' understanding of their future role as facilitators of children's awareness of, valuing of, and bonding to the natural world and to increase the education students' science content knowledge.

III. College Learning Outcomes and Objectives

L.O. 1 Communication Competence – graduates can read, write, speak, and listen for a variety of purposes and audiences. They can use these skills to acquire, synthesize, summarize, develop, and convey ideas and information.

- a. They can write personal response/reflection papers, analytical essays, and persuasive essays.
- b. They can write a scholarly documented research paper that synthesizes their own ideas with ideas and information from other sources.
- c. They can speak effectively in front of a group or as part of a group.
- d. They can demonstrate effective listening skills through their ability to analyze and interpret verbal messages for content, context, and affect, as well as retain messages acquired from the listening process.

L.O. 7 Scientific Literacy – graduates can demonstrate an understanding of natural and behavioral scientific principles, technology, and methods.

- a. They can distinguish between the qualitative and quantitative characteristics of natural or behavioral phenomena.

- b. They can apply scientific principles and methods to support or disprove hypotheses.
- c. They can use theories to explain past observations and to predict answers to new questions.
- d. They can understand the uses of scientific technology and their implications.

L.O. 5 Historical Consciousness – graduates can discuss ideas and events of the past with clarity, insight, and awareness of historical context.

- a. They can demonstrate awareness and understanding of the human past.

IV. Course Objectives

Upon completion of this course students will be able to:

- 1. Demonstrate integrated/interdisciplinary knowledge of science concepts/content appropriate for K to grade 8.
- 2. Demonstrate knowledge of current science literature (fiction and non-fiction) that is of value (content-wise) for K to grade 8 integrated science learning.
- 3. Be aware of current trends and issues in science education in areas of ecology and global issues.
- 4. Master related science terminology and concepts enabling a teacher to be more articulate in, and have a fuller understanding of, science learning and technology.
- 5. Discuss the need for, and value of, using a variety of inquiry-based teaching techniques, and an integrated, cross-disciplinary, project-based approach to promote “hands-on, minds-on” science in the classroom.
- 6. Enhance integrated lesson planning and instructional skills through the design and implementation of an interactive science unit for classroom use, presentation to peers, and for instructor evaluation.

V. Topical Outline

– several of these topics will be expanded on in the course

- I. The nature of science, mathematics and technology
- II. The physical setting
 - A. The universe
 - B. The earth
 - C. Forces that shape the earth
 - D. Structure of matter
 - E. Transformation of energy
 - F. Forces of nature
- III. The living environment
 - A. Diversity of life
 - B. Interdependence of life
 - C. Flow of matter and energy
 - D. Evolution of life
- IV. The human organism
 - A. Human identity
 - B. Life cycle
 - C. Basic functions
 - D. Learning
 - E. Physical and mental health

- V. Human society
 - A. Cultural effects on behavior
 - B. Group organization and behavior
 - C. Social change
 - D. Forms of political and economic organizations
 - E. Social conflict
 - F. Worldwide social systems
- VI. The designed world
 - A. The human presence
 - B. Agriculture
 - C. Materials
 - D. Manufacturing
 - E. Energy sources
 - F. Energy use
 - G. Communications
 - H. Information processing
 - I. Health technology
- VII. Historical perspectives
 - A. Displacing the Earth from the center of the universe
 - B. Uniting the heavens and earth
 - C. Uniting matter and energy, time and space
 - D. Extending time
 - E. Setting the Earth's surface in motion
 - F. Splitting the atom
 - G. Explaining the diversity of life
 - H. Discovering germs
 - I. Harnessing power