



University at Buffalo
The State University of New York
College of Arts and Sciences
General Education Program

Goals and Standards for UGC 301, 302, 303,
Great Discoveries in Science and Scientific Inquiry

Note: This statement is excerpted from the proposal submitted to the campus in 1990 to establish a general education program and the courses that were created to facilitate the program. Since that time there have been extensive modifications to the rationale, extent, and context of the program. This statement acknowledges the intervening changes in the structure of the courses and program.

Peter Gold, 3/15/05

The courses engage non-science students in a meaningful analysis of scientific developments and methodology, building on the student's prior knowledge of science, social science, arts and literature. *Great Discoveries in Science* will examine modern scientific paradigms and the critical experiments and debates that shaped these concepts. *Scientific Inquiry* will acquaint students with scientific reasoning and help them develop analytical thinking skills.

Key goals for the student outcomes from these courses include: 1) to present a significant body of scientific factual and conceptual knowledge about the physical and biological world, information which should be within the general working knowledge of an educated person; 2) to present the methods of science, to display the process of science in action; 3) to present the interdependency of basic science and technology; 4) to increase awareness and understanding of the political and ethical issues that are raised by advances in sciences and technology; and 5) to present an historical sense of science, its philosophical underpinnings, and its limitations.

The *Great Discoveries* course will focus upon major paradigms of science. It will present a particular body of scientific facts and concepts and will focus on a detailed understanding of how a central paradigm sets the framework for a discipline. Students completing this course should be able to recognize unsolved questions and conflicts which are still present in today's modern paradigms.

The *Scientific Inquiry* course is intended to help students learn the methods of science: question posing, hypothesis formation, deduction (prediction), testing of predictions by observation and experiment to determine the validity or falsification of hypotheses. One section contains two major elements: Statistics and Case Histories. Since experimental design, measurement, and data collection are used throughout much of science, significant time is devoted to the discussion of statistics. The course is ideally suited to discussing political and ethical issues of science.

Whether the matters be medical, environmental, or issues of national defense, students must be able to sort fact from fantasy, accident from design, research from quackery. They must feel secure enough in the world of science to participate in those decisions which will determine the quality of their lives, and that of their world.