

College of Natural Resources & Sciences

AREA B GENERAL EDUCATION

STATEMENT OF PROGRAM GOALS

General education in the natural sciences and mathematics focuses on the physical universe, its life forms, and on quantitative reasoning to assist students in understanding, appreciating, and participating in a changing world. Program goals recognize the importance of scientific methods as investigative tools and present science as a unified discipline with a major impact on the human condition.

The goals of the general education program in the natural sciences and mathematics are:

(1) to provide an understanding of the nature, scope and limits of science and its relation to other branches of human inquiry. These facets of science are exemplified by:

a. introducing the scientific world-view that our universe operates according to a set of laws and that it is, therefore, comprehensible;

b. exposing the student to the various ways in which scientists go about understanding the world around us, recognizing that some of the natural sciences rely heavily on detailed observation and analysis of existing evidence, while others are primarily experimental in their approach;

c. explaining the nature of observations, experiments, evidence, inferences, and conclusions;

d. appreciating that scientific principles are the products of human imagination and endeavor;

e. acquainting the student with the kinds of questions that science can answer and those that it cannot;

f. teaching the student to distinguish the rational from the irrational, the sound argument from the mathematically and statistically fallacious one, and the scientific from the pseudoscientific; and

g. fostering the traits of inquisitiveness, objectivity, open-mindedness, and skepticism.

(2) to impart the facts and principles that form our understanding of the living and non-living systems of our universe;

- a. to teach the language of science to facilitate cognition, interpretation, and communication;
- b. to develop scientific reasoning for use in the critical examination of concepts and information; and
- c. to identify sources of information for the pursuit of scientific inquiry, not only for current use, but also as a foundation for future study.

(3) to develop mathematical concepts and quantitative reasoning and to demonstrate their widespread application in problem solving;

(4) to provide for direct participation in a laboratory experience;

(5) to promote an understanding of the impact of scientific knowledge and technology on our civilization -- both past and present -- and to recognize the contributions that have been made by members of various cultural groups and by women; and

(6) to consider the moral and ethical implications of science, so as to nurture a respect for human values.

These should be viewed as overall goals of the entire program of general education in the natural sciences and mathematics. No single course is expected to meet all of them. The program is designed to emphasize goals 1-4 in lower division courses, while goals 5 and 6 are stressed more at the upper division level. These goals must be presented overtly and explicitly; the professor should not assume that the student will understand them solely from implicit examples of science. Further, it is understood that these objectives can be met by devoting specific lecture or laboratory time to them or by weaving them throughout the structure of the class, as the instructor desires.

LOWER DIVISION COURSES

The lower division component of general education in the natural sciences and mathematics requires a minimum of nine semester units and includes inquiry into the physical universe (facts and principles that form the foundation of non-living systems), life forms (diversity and unity of life and its fundamental processes), and mathematical concepts and quantitative reasoning (basic concepts and their broad applications).

The focus of the general education requirement is not skill-based, technique-based or utility-based. Instruction approved for the fulfillment of the Area B general education requirement is intended to impart knowledge of the facts and principles which form the foundations of living and non-living systems. Such studies should promote understanding and appreciation of the methodologies of science as investigative tools and the limitations of scientific endeavors: namely, what is the

evidence and how was it derived? Particular attention should be given to the influence that the acquisition of scientific knowledge has on the development of the world's civilizations.

The Area B requirements are generally met by selecting from among the courses identified below which are offered, approved, and reviewed by the College of Natural Resources and Sciences. Other courses offered at HSU may be recommended by the CNRS Curriculum Committee and Dean (see Course Approval) and periodically reviewed (see Review of Approved Courses) if the class meets the program goals, requirements and focus addressed in this document.

The Area B requirement in life forms may be met by taking any CNRS approved 3-5 unit lower division course with a biology, botany, or zoology prefix.

The Area B requirement in the physical universe may be met by taking any CNRS approved 3-5 unit lower division course with a chemistry, geology, oceanography, physics or physical science prefix.

The Area B requirement in mathematical concepts and quantitative reasoning may be met by taking any CNRS approved 3-5 unit lower division course with a biometry, mathematics, or statistics prefix.

In specifying inquiry into mathematical concepts and quantitative reasoning and their application, the intention is not to imply merely basic computational skills or to emphasize only utility or interpretation, but to encourage the understanding of basic mathematical concepts. Courses approved for the Area B requirement in mathematical concepts and quantitative reasoning must have prerequisites that meet ELM minimum requirements.

UPPER DIVISION COURSES

The upper division component of science general education is intended to broaden students' perspectives by demonstrating the interrelation of science and society and by developing the intellectual tools required for making informed judgments. To help to ensure a desirable level of sophistication among students, all lower division science general education must be completed before enrolling in an upper division course. An upper division science general education course must be developed around a strong science core and must draw upon the information and experience gained in lower division science general education classes. A number of approaches are possible, such as organizing a course along historical lines, critically examining contemporary topics susceptible to scientific evaluation, or surveying disciplinary or thematic issue.

Although course content may vary substantially from one class to another, every upper division general education course in natural sciences and mathematics must:

1. discuss a body of knowledge in natural science or mathematics and place its major scientific discoveries in an historical perspective relative to important social, cultural, religious, or political events; and

2. expose students to the critical thinking skills necessary to make informed judgments on scientific and technological issues facing society.

Students may satisfy a six unit upper division Area B requirement by completing an approved minor in one of the Area B disciplines in the College of Natural Resources and Sciences or they may satisfy the three unit requirement by taking one of the approved courses.

COURSE APPROVAL

Programs or departments wishing to propose a general education course in the natural sciences and mathematics are required to submit:

1. an explanation of how the course meets the program goals in the natural sciences and mathematics;
2. a detailed course outline, including the approximate number of lectures per topic or specific objective;
3. a statement of the method(s) of student evaluation to be employed in the course, addressing specifically the university requirement of a critical interaction between the student and the ideas, perspectives, and methodology of the area.

REVIEW OF APPROVED COURSES

The University Curriculum Committee requires periodic review of all general education courses. The first review typically occurs within two years of its initial offering. Unless the College of Natural Resources and Sciences requests otherwise, courses will then be reviewed every 5 years. To assist the college in its review, the faculty of the department offering the course must:

1. carry out a peer review of the course. It is assumed that this process will be conducted in the same manner that the department uses for any other curricular matters, e. g. the review may be carried out by the faculty as a whole or the task is delegated to a standing curriculum committee. The peer review statement should contain three elements: (a) a description of how it was carried out; (b) an evaluation of how the course is meeting general education goals, as they were presented at the time the course was approved; and (c) a judgment of whether the performance required of the student is consistent with lower or upper division class standards, as appropriate.

2. submit representative samples of course outlines, assignments, and one or more sets of final examinations or other evaluative instruments.

3. submit one or more sets of course evaluations that include a small number of standardized questions provided by the college.

A lecture syllabus and sample assignments or examinations may not reflect the full array of subjects covered or of points raised in lectures, laboratories, and discussions. Instructors are encouraged to submit any additional statement that they feel would assist in the review. An interview with a recent instructor in a particular course may be requested.

Revised: CNRS Curriculum Committee, 02 May 1996

Approved: Dean, 03 May 1996

Approval by UCC 07 May 1996