

LSC Use Only
Number: _____
Action: _____
Date: _____

UWUCC Use Only
Number: 9/50
Action: _____
Date: _____

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. Title/Author of Change

Course/Program Title: SC 104 Environmental Biology
Suggested 20 Character Course Title: Environmental Biology
Department: Department of Biology
Contact Person: Dr. Gary M. Ferrence

II. If a course, is it being Proposed for:

_____ Course Revision/Approval Only
X Course Revision/Approval and Liberal Studies Approval
_____ Liberal Studies Approval Only (course previously has been approved by the University Senate)

III. Approvals

Robert P. Hendron
Department Curriculum Committee

Allan F. Andrews
Department Chairperson

Ahamasty
College Curriculum Committee

W. J. Cal
College Dean *

Director of Liberal Studies
(where applicable)

Provost (where applicable)

*College Dean must consult with Provost before approving curriculum changes. Approval by College Dean indicates that the proposed change is consistent with long range planning documents, that all requests for resources made as part of the proposal can be met, and that the proposal has the support of the university administration.

IV. Timetable

Date Submitted
to LSC: _____
to UWUCC: _____

Semester to be
implemented: _____

Date to be
published
in Catalog: _____

LIBERAL STUDIES COURSE APPROVAL, PARTS 1-3: GENERAL INFORMATION CHECK-LIST

I. Please indicate the LS category(ies) for which you are applying:

LEARNING SKILLS:

- First Composition Course Second Composition Course
 Mathematics

KNOWLEDGE AREAS:

- Humanities: History Fine Arts
 Humanities: Philos/Rel Studies Social Sciences
 Humanities: Literature Non-Western Cultures
 Natural Sci: Laboratory Health & Wellness
 Natural Sci: Non-laboratory Liberal Studies Elective

II. Please use check marks to indicate which LS goals are primary, secondary, incidental, or not applicable. When you meet with the LSC to discuss the course, you may be asked to explain how these will be achieved.

Prim Sec Incid N/A

- | | | | | |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A. Intellectual Skills and Modes of Thinking: |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Inquiry, abstract logical thinking, critical analysis, synthesis, decision making, and other aspects of the critical process. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Literacy—writing, reading, speaking, listening. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. Understanding numerical data. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Historical consciousness. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Scientific Inquiry. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Values (Ethical mode of thinking or application of ethical perception). |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Aesthetic mode of thinking. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | B. Acquiring a Body of Knowledge or Understanding Essential to an Educated Person |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | C. Understanding the Physical Nature of Human Beings |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | D. Collateral Skills: |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1. Use of the library. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 2. Use of computing technology. |

III. The LS criteria indicate six ways that courses should contribute to students' abilities. Please check all that apply. When you meet with the LSC, you may be asked to explain your check marks.

1. Confront the major ethical issues which pertain to the subject matter, realize that although "suspended judgment" is a necessity of intellectual inquiry, one cannot live forever in suspension; and make ethical choices and take responsibility for them.
2. Define and analyze problems, frame questions, evaluate available solutions and make choices.
3. Communicate knowledge and exchange ideas by various forms of expression, in most cases writing and speaking.
4. Recognize creativity and engage in creative thinking.
5. Continue learning even after the completion of their formal education.
6. Recognize relationships between what is being studied and current issues, thoughts, institutions, and/or events.

- IV. A. SC-104 will be a multiple-section, multiple-instructor course. All instructors will be required to follow a common syllabus for the course. In addition, they will utilize the same basic textbooks and laboratory manual. They will meet periodically throughout the semester to coordinate their activities. Flexibility will be permitted to allow for individual teaching styles and creativity. Faculty will be permitted to select their supplementary readings from a listing of approved sources. These will be approved by the faculty responsible for teaching the course. Faculty will use an agreed upon procedure for evaluation that will be uniformly applied to all students enrolled.
- B. The faculty teaching SC 104 will be encouraged to include the contributions of women and racial minorities whenever appropriate. One of the texts is actually a taxonomic key written by May Theilgaard Watts. The contributions of authors such as Anna Botsford Comstock, Rachael Carson, and Lucy Braun will be utilized in lecture and discussion. The basic text selected for the course includes references to numerous female scientists and writers including contemporaries such as Lynn Margulis, Sandra Postel, Christine Mlot, and Liza Tuttle. Supplementary readings will be selected from a diversity of publications including contributions of females. Contemporary issues will be discussed in the course and will be selected from the diversity of materials available for the period of time during which the course is being taught. The works of women and minorities will be utilized when appropriate.
- C. Students will be required to read one supplementary volume each semester. Individual lecture professors will select the book their students will be required to read during a given semester. This book will be selected from a group of supplementary readings that has been approved by the professors responsible for teaching the course. A listing of supplementary books is provided with the syllabus for the course. This listing will be reviewed each semester. Faculty will make a concerted effort to include in the list a selection of works by female and minority authors.
- D. Both SC 104 and BI 362, Ecology for Biology Majors, cover the major principles of ecology. Whereas BI 362 has prerequisites of two other majors courses, BI 110 and BI 120, SC 104 is designed for non-majors. Most of the students enrolled in SC 104 will have had no other courses in biology at the university level before taking this course. The SC 104 will focus upon what might be called "macroscopic ecology." The relationships existing among ecology, technology, and society will be given major consideration. Living systems will be studied as they relate to human concerns. Majors going toward a B.S. in Biology enroll in BI 105, BI 110, and BI 120 as their introductory level courses. The scope of SC 104 is restricted to a small portion of the content covered in these three courses. The focus of the SC 104 has been narrowed to those ecological principles that should be understood by the general citizenry so that they can better understand the system of which they are a vital part and make intelligent decisions regarding its future. In essence, the major goal of SC 104 is environmental literacy. The faculty recognize that SC 104 may be the only biology course taken by the students at the university level. A basic level ecology course can be used as a vehicle for teaching many biological concepts and principles to students in a non-threatening way. This is the intent of the faculty teaching SC 104.

CHECK LIST -- NATURAL SCIENCES (Laboratory)

6

Knowledge Area Criteria which the course must meet:

- Treat concepts, themes, and events in sufficient depth to enable students to appreciate the complexity, history, and current implications of what is being studied; and not be merely cursory coverages of lists of topics.
- Suggest the major intellectual questions/problems which interest practitioners of a discipline and explore critically the important theories and principles presented by the discipline.
- Allow students to understand and apply the methods of inquiry and vocabulary commonly used in the discipline.
- Encourage students to use and enhance, wherever possible, the composition and mathematics skills built in the Skill Areas of Liberal Studies.

Natural Science Criteria which the course must meet:

- Examine a body of knowledge of natural science that will contribute to an understanding of the natural world.
- Provide an understanding of the development of natural science theories and their modification.
- Teach students to formulate and test hypotheses.
- Provide an understanding of some of the "great moments" in the history of natural science and the individuals, including women and minorities, responsible for them.

Natural Science Laboratory Criteria which the course must meet:

- Provide students with opportunities to learn and apply data-gathering techniques.
- Provide students with opportunities to develop skills in making accurate observations, in formulating concise and appropriate descriptions of natural phenomena, and in producing meaningful systems of classification for natural objects.
- Provide students with opportunities to apply theories to practice in the the working world of science.

Additional Natural Science Criteria which the course should meet:

- Encourage an appreciation of the complex interrelationship of natural science with the life of the individual.
- Develop in students the abilities necessary to cope with the consequences of natural sciences in the modern world.
- Develop an inquiring attitude consistent with the tenets of natural science, an attitude that is willing to expose fallacy on the basis of reason, that demands evidence for scientific assertions, and yet is tolerant of hypotheses in the absence of contradictory evidence.

Catalog Description

SC 104 Environmental Biology

G.M. Ferrence

SC104 Environmental Biology

**2.5 credits
2 lecture hours
2 lab hours
(2c-2l-2.5 sh)**

Prerequisites: SC 101, SC 102

A basic introduction to the major concepts and principles of ecology and their application to modern living.

I. Catalog Description

SC 104 Environmental Biology

**2.5 credits
2 lecture hours
2 lab hours**

Prerequisites: SC 101, SC 102

A basic introduction to the major concepts and principles of ecology and their application to modern living.

II. Course Objectives

All objectives will begin with the phrase "At the end of this course the students should be able to".

- 1. demonstrate an understanding of the processes of scientific inquiry.**
- 2. describe the characteristics of living systems.**
- 3. identify common flora and fauna of the area and describe their natural histories.**
- 4. discuss the structure of ecosystems including both the biotic and abiotic components.**
- 5. describe ecosystem function including the cycling of nutrients and the flow of energy through the system.**
- 6. explain how populations of organisms interact with one another thereby maintaining the stability of the system.**
- 7. describe how ecosystems change over time.**
- 8. explain the uniqueness of individual organisms as it relates to their adaptation to their environment.**
- 9. discuss how human populations have changed over time.**
- 10. discuss the eutrophication of aquatic systems and describe measures for control.**
- 11. explain how both indoor and outdoor air quality impact them as well as other living organisms.**
- 12. illustrate an understanding of how pests impact upon their lives and describe environmentally safe methods of control.**

13. demonstrate an understanding of the importance of wildlife.
14. describe how humans affect wildlife populations.
15. discuss the importance of habitat management for wildlife.
16. deliberate the importance of wise resource management as it relates to sustainable earth awareness.

IIIa. Course Outline: Lecture

- A. Introduction to Environmental Biology (1 lecture)**
- B. Ecosystems Large and Small (2 lectures)**
 - a. What is an ecosystem?
 - b. Biomes as Unique Functioning Systems
- C. Ecosystem Structure (2 lectures)**
 - a. Biotic
 - b. Abiotic
- D. Ecosystem Function (3 lectures)**
 - a. Energy Flow
 - b. Nutrient Cycling

[Exam I]

- E. Ecosystem Homeostasis (4 lectures)**
 - a. Population Dynamics
 - b. Predator-Prey Relationships
 - c. Parasite-Host Interactions
 - d. Other unique relationships
 - e. Ecological Succession
- F. Evolution of Populations and Ecosystems (1 lecture)**
- G. Human Population Trends (2 lectures)**
- H. Aquatic Habitats (2 lectures)**
 - a. Resource Value
 - b. Eutrophication
 - c. Protection

[Exam II]

- I. Value and Need for Preservation of Wetlands (1 lecture)**
- J. Air Pollution (3 lectures)**
 - a. Indoor
 - b. Outdoor
 - 1. Thermal Inversions
 - 2. Photochemical Smog
 - 3. Acid Deposition
 - 4. The Greenhouse Effect
 - 5. Ozone: Good and Bad of It
- K. Pests and Their Control (2 lectures)**
 - a. Case Study: Dichlorodiphenyltrichloroethane
 - b. Integrated Pest Management
- L. Wildlife (3 lectures)**
 - a. Endangerment and Extinction
 - b. Protection and Management

[Final Lecture Exam]

III b. Laboratory Program for SC 104

Note: Due to the fact that a majority of the laboratory program is field-oriented, it is necessary to provide flexibility in the program to allow for the weather peculiarities of a given semester or summer. The laboratory and field experiences will be selected from the following:

- a. Taxonomy of Common Trees of the Area
- b. Population I (Invertebrates or Yeast)
- c. Population II (Invertebrates or Yeast)
- d. Aquatic Biology
- e. Corn Depredation by Wildlife
- f. Ecological Succession
- g. Abiotic Factors of the Environment
- h. Water Treatment for Human Consumption
- i. Treatment of Waste Water
- j. Plant Propagation and Growth
- k. Microscope Techniques
- l. Micro-organisms
- m. Thermal Loading and Its Effects on Aquatic Systems
- n. Discussion of Supplementary Reading.
- o. Animals with Skeletons

IV. Evaluation Procedures:

- A. Understanding of lecture content will be determined via 3 exams consisting of a variety of question types. These exams will account for approximately three fifths of a student's grade.**
- B. Laboratory performance will be ascertained via a series of exams, written laboratory reports, and/or written reviews of current events or select supplementary readings. These evaluations will account for approximately two fifths of a student's grade.**
- C. A grade distribution will be derived for each evaluation experience.**
- D. A student's final grade will be determined by summing his or her individual scores.**
- E. The final letter grade will be derived from a curve established by a summation of the individual evaluation experience cut-offs.**

V. Texts: Nebel, Bernard J. Environmental Science: The Way the World Works. New Jersey: Prentice-Hall, Inc., 1990.

Watts, May Theilgaard. Master Tree Finder. New York: Warner Books, Inc., 1986.

Reid, George K. Pond Life. New York: Golden Press, 1987.

Supplementary Readings (One to be selected by the lecture professor):

Abbey, E. 1991. Desert Solitaire. A Season in the Wilderness. Ballantine Books, N.Y.

Angier V. and Angier B. 1985. At Home in the Woods. MacMillan Co., N.Y.

Beston, H. 1991. The Outermost House. Ballantine Books, N.Y.

Carson R. 1987. Silent Spring. Fawcett Publications. Greenwich, Conn.

Dethier, V, 1984. The Ecology of a Summer House. The University of Massachusetts Press. Amherst, Mass.

Leopold, A. 1991. A Sand County Almanac. Ballantine Press, N.Y.

Teal, J. and Teal, M. 1991. Life and Death of the Salt Marsh. Ballantine Books, N.Y.

Warner, W. 1987. Beautiful Swimmers. Penguin Books. N.Y.

VI. Bibliography

Miller, G.T. 1990. Living in the Environment. Wadsworth Publishing Company. Belmont, California.

Owen, O.S. and Chiras, D.D. 1990. Resource Conservation. MacMillan Publishing Company. N.Y.

Course Analysis Questionnaire
SC 104 Environmental Biology (2.5 cr)

Section A: Details of the Course

- A1. This course is designed as a replacement for BI 311, Environmental Biology (4 cr). It is a non-majors course that is part of a four course sequence in science for majors in Elementary Education. The four courses, (SC 101, SC 102, SC 103, and SC 104), will be submitted for approval as another available Liberal Studies option in Natural Science.
- A2. This course will replace BI 311, Environmental Biology.
- A3. This course is a traditional type course.
- A4. No
- A5. No
- A6. This course is not available for variable credit.
- A7. Many other higher education institutions offer courses in Environmental Studies.
- A8. The objectives proposed for this course fall within the competencies listed under the Biological Sciences section of the K-6 science competency continuum proposed by the Pennsylvania Department of Education. This continuum is written as a guide for those in the Commonwealth who are designing science curricula for the elementary schools of the Commonwealth. The publication is entitled "A Recommended Science Competency Continuum for Grades K to 6 for Pennsylvania Schools." The content and skills required for teaching many of the competencies in the biological sciences had been incorporated into BI 311. With the reorganization of the Elementary Education Major, it was deemed essential by the faculty of the department of Professional Studies in Education that BI 311 be discontinued and be replaced with SC 104. The objectives of SC 104 are very much similar to those of BI 311.

Section B: Interdisciplinary Implications

- B1. This course will be taught by more than one instructor due to the fact that projected enrollments for the course are approximately 300 students per year. Lecture section size will be limited to a maximum of 72 students. Laboratory section size will be limited to a maximum of 24 students. The present plan is to offer two lecture sections and six laboratory sections each semester. An additional one or two lecture sections of 24 students each will be offered during the summer sessions as required by student demand.

- B2. This course is part of the four course sequence described under A1. The remaining courses will be taught by the departments of Chemistry, Geoscience, and Physics. SC 101 and SC 102 will serve as prerequisites to this course.
- B3. The four courses previously mentioned are being developed by faculty from the departments of Biology, Chemistry, Geoscience, and Physics. Proposals for all of the courses are being developed at the present time.
- B4. Not to my knowledge.

Section C: Implementation

- C1. Since SC 104 will replace BI 311, the faculty, space, equipment, and supplies that were available for teaching BI 311 will be made available for SC 104. Although SC 104 will only be a 2.5 credit course, the increased student enrollments expected for the course will result in a need for additional faculty input. Currently, the faculty load required for teaching BI 311 is 12 hours per week. It is anticipated that during the transition years BI 311 and SC 104 will require 24 hours per week. Once the new program is implemented, the faculty time required to teach the SC 104 will be 16 hours per week. If the BI 311 was going to be offered to 300 students per year, the faculty time allotment per week would be 24 hours per week. Consequently, the SC 104 will require 8 hours less faculty time per week once the transition period is completed. Similarly, the SC 104 will require less space, equipment, and supplies than the BI 311 would require if the same number of students were served. Library facilities are adequate for the new course. Since Biology Department vans will be available, it is not expected that transportation expenses for field work will be a problem. Regarding travel funds for faculty, they have been inadequate for the faculty teaching BI 311 and will continue to be inadequate for faculty teaching SC 104.
- C2. No
- C3. Every semester plus summer.
- C4. 2 lecture sections and 6 laboratory sections
- C5. A maximum of 72 students in a lecture section and a maximum of 24 students in a laboratory section. Lecture size is limited by available lecture halls as well as for pedagogical reasons. Laboratory size is limited by space availability as well as by concerns for safety and for pedagogical concerns. The increased enrollments in this course will result in a need for increased expenses for materials supplies, and equipment. A thirty percent increase in the budget allotment for the course should be appropriate.
- C6. No

- C7. As mentioned previously, this course is part of a four course package in the sciences being developed to serve the majors in Elementary Education. The existing requirement was a twelve credit sequence including SC 105, SC 106, and BI 311. The new requirement will be a ten credit sequence including SC 101, SC 102, SC 103, and SC 104. This will actually eliminate 2 credits from the program and thereby lower the credit requirements for the major.