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10/30/90
Approved

LSC Use Only

Number: 133
Action: Approved
Date: 6-27-90

Number: _____
Action: _____
Date: _____

CURRICULUM PROPOSAL COVER SHEET
University Wide Undergraduate Curriculum Committee

I. Title/Author of Change

Course/Program Title: Environmental Science
Suggested 20 Character Course Title: BI 114 Environ. Science
Department: Biology
Contact Person: Thomas Lord

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

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

III. Approvals

Michael H. Kiser
Robert P. Henderson
Department Curriculum Committee

Allan T. Andrews
Department Chairperson

Ann Ha...
College Curriculum Committee

W. J. Cal...
College Dean*

Charles D. ...
Director of Liberal Studies

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: _____

Semester to be Implemented: _____

Published in Catalog: _____

to UWUCC: _____

V. Description of curriculum change

1. Catalog description

An introduction to environmental science with an emphasis on human impacts. The course uses an interdisciplinary approach to the consideration of population growth, pollution, preservation of species, and establishment of public policy. Students will learn basic principles in ecology as the basis for understanding problems of the environment.

2. Course syllabus - see Appendix

3. Course Analysis Questionnaire

A1. The course is designed to introduce students to the principles of environmental science. The course is intended for non-science majors and will satisfy a non-laboratory science requirement under the new liberal studies program. Departments outside of Biology that typically recommend a life science course to their majors may wish to review their requirements to determine if this new course is better suited to their purposes.

A2. The development of this course will not alter the content of another course in the Biology Department. It is being designed to provide non-science students a background in issues that concern today's environment.

A3. The course follows a rather non-traditional format from one that is generally observed in the Biology Department. This is primarily due to the removal of a two to three hour a week lab investigation. In addition, the course will incorporate numerous videotapes or films into its scheme to give students a better appreciation of the impact new ideas and technologies are having on the environment.

A4. The course has never been offered at IUP on a trial basis.

A5. The course is not a dual-level course.

A6. The course will not be taken for variable credit.

A7. Many colleges and universities in the United States offer a semester long environmental science course for their non-majors.

A8. No professional society, accrediting authority, law, or other external agency mandates the contents of the course.

Section B. Interdisciplinary Implications

- B1. Initially the course will be handled by a single instructor in the Biology Department. Other instructors maybe involved depending on demand and scheduling constraints.
- B2. No additional or corollary subjects are required to be taken with this course during the semester or in future semesters.
- B3. To my knowledge, there are no overlaps between this course and courses taught in other departments. Some of the topics covered in this course, however, are discussed in several laboratory based courses taught in the Biology Department. These courses are designed, however, for specific majors and are focused toward specific skills required of the students. The lab-based Ecology course, for example, is designed for life science and environmental science majors and is much more specific in its coverage.
- B4. Seats in this course can be made available to students in the School of Continuing Education.

Section C. Implementation

C1. Resources

- a. Faculty currently in the Biology Department can teach this course.
 - b. Since this course does not require a laboratory, it can be easily scheduled in an existing lecture facility.
 - c. This course will require the use of video monitors, movie projectors and slide viewers.
 - d. No laboratory supplies will be needed for this course.
 - e. Although it would be beneficial to have more current environmental listings in the Stapleton Library, the materials presently on hand are sufficient.
 - f. No additional travel funds are anticipated for this course.
- C2. None of the resources for this course are from a grant.

- C3. It is anticipated that two sections will be offered each academic year. Offerings may increase depending on demand.
- C4. Two sections of this course are presently being offered for the fall semester. Since there is no laboratory component to this course, sections of this course can easily be opened as needed.
- C5. It is expected that 100 to 150 students will be taking this course in the autumn. With the addition of other non-laboratory liberal studies courses it is hoped enrollment can be lowered to approximately 48.
- C6. No professional society mandates any component of this course.
- C7. This course will be offered as a non-laboratory based science course in the Liberal Studies program. It is for general education and is not designed for a particular curriculum.

Appendix: Course Syllabus

I. Catalog Description

BI 114 Environmental Science

3 credits

3 lecture hours

An introduction to environmental science with an emphasis on human impacts. The course uses an interdisciplinary approach to the consideration of population growth, pollution, preservation of species and establishment of public policy. Students will learn basic principles in ecology as the basis for understanding problems of the environment.

II. Course Objectives

Upon successful completion of this course, students will:

- understand how human impacts on the earth have changed through history and why environmental concerns have recently become so prominent.
- recognize the major environmental challenges facing modern societies and understand the choices and trade-offs these challenges pose.
- grasp the scientific principles underlying basic phenomenon of environmental change.
- understand technologies associated with major environmental problems and the technologies that may help solve these problems.
- distinguish the environmental impacts of industrial and developing societies, and understand why different types of societies perceive different problems and pursue different solutions.
- broaden their familiarity with world geography and international affairs.

III. Course Themes

Four major themes will be built into the course.

- Rate of change - the rapidly increasing rate at which environmental problems are taking place and the factors they are setting in motion in the biosphere.
- Reinforcing problems - most environmental problems cannot be treated in isolation. They have multiple effects that are linked together in a complex array.

- Distribution Dimensions - although most environmental issues affect everyone, neither the responsibility for the cause or the vulnerability to the consequences are equally shared.
- Role of the individual - each one of us can make a difference in bringing positive changes to our global environment.

IV. Course Outline

- A. Introduction, course objectives, class expectations, and review (1 session)
- B. A look at global change (1 session)
 - 1. overview of environmental impacts
- C. Understanding ecosystems (3 sessions)
 - 1. energy flow
 - 2. material cycles
 - 3. terrestrial, aquatic, marine ecosystems
 - 4. abiotic factors
- D. Environmental revolution (3 sessions)
 - 1. agriculture
 - 2. industry
- E. Exam #1 (1 session)
- F. Atmosphere (3 sessions)
 - 1. ozone damage
 - 2. greenhouse effect
 - 3. pollution
- G. Pollution problems (3 sessions)
 - 1. Southern California
 - 2. Central Europe
 - 3. Pennsylvania & northeast U.S.
- H. Third world (3 sessions)
 - 1. population growth
 - 2. industries
 - 3. pollution
- I. Exam #2 (1 session)
- J. Human role in ecosystems (3 sessions)
 - 1. animal diversity
 - 2. wide spread extinction
 - 3. protection
- K. Energy (3 sessions)
 - 1. fossil fuels
 - 2. alternatives

- L. World food production (3 sessions)
 - 1. agricultural improvement
 - 2. pesticides
 - 3. fertilizers
- M. Waste disposal (3 sessions)
 - 1. solid wastes
 - 2. toxic waste
 - 3. sewage
- N. Exam #3 (1 session)
- O. Political interaction (3 sessions)
 - 1. maintaining
 - 2. improving
- P. Assuring sustainability (3 sessions)
 - 1. facing global problems
 - 2. redefining goals
- Q. Reviewing the challenge (3 sessions)
 - 1. discussion of involvement
 - 2. "how can I help"
- R. Exam #4 (1 session)

V. Evaluation

The final grade in this course will be determined by:

- 50% Four tests, one given each quarter of the semester will be used to evaluate overall comprehension. These tests will include short answer, multiple choice, and essay style questions. ~~20 points each.~~ *20% each of final grade.*
- 20% Working alone or in a small group, each student will lead a class discussion on an environmental problem of his/her choosing. The student will submit an outline of this or her class plan a week ahead. Student leaders will be encouraged to include contemporary and local environmental issues in the discussion. 20 points.

VI. Required purchase

Textbooks: Miller G. Tyler, Environmental Science: An Introduction, Wadsworth Publishing Company, Belmont, California, 1988.

Study guide: Wolf, Edward C., Race to Save the Planet, Wadsworth Publishing Company, Belmont, California, 1990.

VII. Supplementary Reading
Book: Carson, Rachel. Silent Spring. Houghton Mifflin,
Boston, 1962.

VIII. Bibliography

- Attenborough, David, The Living Planet, Little Brown,
Boston, 1984.
- *Borgese, Elisabeth, Mines of Neptune: Minerals and Metals
from the Sea, Abrams Pub., New York, 1985.
- Brown, Lester R., et al, The State of the World 1990,
W.W. Norton and Company, Inc. New York, 1990.
- *Dotto, Linda, Planet Earth in Jeopardy, Wiley, New York,
1986.
- *Douglas, Mary, Risk and Culture, University of California
Press, Berkeley, 1982.
- *Durrell, Lee, State of the Ark, Doubleday, Garden City,
New York, 1986.
- Ehrlich, Paul R., The Machinery for Life: The Living
World Around Us and How it Works, Simon and Schuster, New
York, 1986.
- *Huls, Jan and Neil Seldman, Waste to Wealth, Institute
for Local Self-reliance, Washington, D.C., 1985.
- Leopold, Aldo, A Sand County Almanac, New York, Oxford
University Press, 1949.
- *Menken, Jane, World Population and US Policy, W.W.
Norton, New York, 1986.
- *Odum, Howard and Elizabeth Odum, Energy Basis for Man and
Nature, McGraw-Hill, New York, 1980.
- *Postel, Sandra, Conserving Water: The Untapped
Alternative, Worldwatch, Washington, D.C., 1985.
- Purcell, Arthur, Waste Watchers: A Citizen's Handbook for
Conserving Energy and Resources, Garden City, New York
Anchor Press, 1988.
- Westing, Arthur, Global Resources and International
Conflict, Oxford University Press, New York, 1986.

*Noted works by women authors

IX. Special Resource Requirements

None

LIBERAL STUDIES COURSE APPROVAL FORM

About this form: Use this form only if you wish to have a course included for Liberal Studies credit. The course is intended to assist you in developing your course to meet the University's Criteria for Liberal Studies and to arrange your proposal in a standard order for consideration by the LSC and the UWUCC. If you have questions, contact the Liberal Studies Office, 353 Sutton Hall; telephone 357-5715.

Do not use this form for technical, professional or pre-professional courses or for remedial courses, none of which is eligible for Liberal Studies. Do not use this form for sections of the synthesis course or for writing-intensive sections; different forms will be available for those.

PART I. BASIC INFORMATION

- A. For which category(ies) are you proposing the course? List all that apply.

LEARNING SKILLS

- First English Composition Course
 Second English Composition Course
 Mathematics

KNOWLEDGE AREAS

- Humanities: History
 Humanities: Philosophy/Religious Studies
 Humanities: Literature
 Fine Arts
 Natural Sciences: Laboratory Course
 Natural Sciences: Non-laboratory Course
 Social Sciences
 Health and Wellness
 Non-Western Cultures
 Liberal Studies Elective

- B. During the transition from General Education to Liberal Studies, should this course be listed as an approved substitute for current General Education course, thus allowing it to meet any remaining General Education needs?

If so, which General Education course(s)?

PART II. WHICH LIBERAL STUDIES GOALS WILL YOUR COURSE MEET?

Indicate by number all that apply, specify whether the goal is primary or secondary, and include an explanation for each.

All Liberal Studies courses must contribute to at least one of these goals: most will meet more than one. As you identify them by number, please indicate whether you consider them to be primary

or secondary goals of the course and include an explanation for each. (For example, a history course might assume "historical consciousness" and "acquiring a body of knowledge" as its primary goals but it might also enhance inquiry skills or literacy of library skills.) Keep in mind that no single course is expected to shoulder all by itself the responsibility for meeting these goals; our work is supported and enhanced by that of our colleagues teaching other courses.

A. Intellectual Skills and Modes of Thinking:

- *1. Inquiry, abstract logical thinking, critical analysis, synthesis, decision making and other aspects of the critical process.
- *2. Literacy - writing, reading, speaking, listening
- 3. Understanding numerical data
- 4. Historical consciousness
- *5. Scientific inquiry
- *6. Values (ethical mode of thinking or application of ethical perception)
- 07. Aesthetic mode of thinking

B. Acquiring a Body of Knowledge or Understanding Essential to an Educated Person

0C. Understanding the Physical Nature of Human Beings

D. Certain Collateral Skills:

- 1. Use of the library
- 2. Use of computing technology

(* = primary goal, 0 = secondary goal)

PART III. DOES YOUR COURSE MEET THE GENERAL CRITERIA FOR LIBERAL STUDIES? Please answer these questions.

- A. If this is a multiple-section, multiple-instructor course, there should be a basic equivalency (though not necessarily uniformity) among the sections in such things as objectives, content, assignments and evaluation. Note: this should not be interpreted to mean that all professors must make the same assignments or teach the same way; departments are encouraged to develop their courses to allow flexibility which contributes to imaginative, committed teaching and capitalizes on the strengths of individual faculty.

What are the strategies that your department will use to assure that basic equivalency exists? Examples might be the establishment of departmental guidelines, assignment of responsibility to a coordinating committee, exchange and discussion of individual instructor syllabi, periodic meetings among instructors, etc.

- B. Liberal Studies courses must include the perspectives and contributions of ethnic and racial minorities and of women whenever appropriate to the subject matter. If your attached syllabus does not make explicit that the course meets this criterion, please explain how it will.
- C. Liberal Studies courses require the reading and use by students of at least one but preferably more substantial works of fiction or nonfiction (as distinguished from textbooks, anthologies, workbooks or manuals). Your attached syllabus must make explicit that the course meets this criterion.

(The only exception is for courses whose primary purpose is the development of higher level quantitative skills; such courses are encouraged to include such reading but are not expected to do so at the expense of other course objectives. If you are exercising this exception, please justify here.)

- D. If this is an introductory course intended for a general student audience, it should be designed to reflect the reality that it may well be the only formal college instruction these students will have in that discipline, instead of being designed as the first course in a major sequence. That is, it should introduce the discipline to students rather than introduce students into the discipline. If this is such an introductory course, how is it different from what is provided for beginning majors?

- E. The Liberal Studies Criteria indicate six ways in which all courses should contribute to students' abilities. To which of the six ways will your course contribute? Indicate by number all that apply and include an explanation for each.

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.

PART IV. DOES YOUR COURSE MEET THE CRITERIA FOR THE CURRICULUM CATEGORY IN WHICH IT IS TO BE LISTED?

Each curriculum category has its own set of specific criteria in addition to those generally applicable. The LSC provides copies of these criteria arranged in a convenient, check-list format. Select the one(s) that apply, mark them appropriately, and include them with your proposal. The attached syllabus should indicate how your course meets each criterion you check. If it does not do so explicitly, please attach an explanation.

A copy of this form can be found on electronic mail as well as on floppy disk in the main office of each academic department.

CHECK LIST - NATURAL SCIENCES (Non-laboratory)

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 coverage 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 Area 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.

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 science 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 hypothesis in the absence of contradictory evidence.

Part II. WHICH LIBERAL STUDIES GOALS WILL YOUR COURSE MEET?

I. Primary

- A-1 Environmental issues are everyone's concern. Whether it's a local landfill or the warming of the atmosphere, living things are impacted. Economic progress must also be allowed to occur. The question is how quickly and to what extent should progress take place. The world's people must be educated to the point of being able to analyze issues from all sides.
- A-2 Students taking environmental science are required to orally discuss with the class an environmental issue particularly disturbing to them. As such, students will develop their reading and speaking abilities.
- A-6 Environmental issues are often intertwined with ethical and moral values. Where does humankind fit into nature's grand scheme? Do we have the right to the earth for our comfort and vanity? What responsibilities do we have to future plant and animal populations? These issues will be addressed in the course.
- A-5&6 Natural environments are complicated conglomerations of biotic and abiotic events finely tuned and balanced. Spring rains awakens dormant seeds, expanded day light hours triggers nest building, storms replenish aquatic minerals, chilly autumn evenings initiate wintering behaviors. Environmental events tend to be interrelated in complex ways. A major focus of this course is to bring to light the important interrelationships of the natural world. Students will squarely face questions that impact on the environment and draw conclusions from varied studies on the issue.

Secondary

- A-7 This course will develop an appreciation for the beauty and harmony of the natural world. Through weekly presentations, discussions, and audiovisuals, students will begin to realize an aesthetic value of nature.
- C The polluted air we breath, the contaminants in our drinking water, pesticides on our foods, radiation in our soils: nature's ill's impact on human health. This course will cover some of the potential physiologic consequences of human exposure to harmful elements in our surroundings.

Part III. DOES YOUR COURSE MEET THE GENERAL CRITERIA FOR LIBERAL STUDIES?

- A. It is not anticipated that this course will be taught by more than one professor in any one semester. If, however, more than one professor is assigned the course during the semester both will follow the department approved syllabus for the course. Although definite in its purpose and direction, the syllabus allows enough flexibility to allow differences in faculty expertise. For example, contemporary issues discussed in class may vary depending on the interest of the instructor, both the concepts and facts that pertain to the issue will be covered by both. This method has proven successful in other multi-instructor courses in the department.
- B. This course does not have as a primary goal a historical approach to the content. Hundreds of scientists have contributed pieces to the expanding scientific understanding of nature. A few of these pieces, however, have made enormous contributions. These contributions will be discussed during the semester. Rachel Carson's Silent Spring, for example, is one of the most important publications in environmental studies since it awakened 30 years ago the worlds' mind to nature's plight with the ravages of pesticides. Every effort will be made to bring into the class discussion these landmark contributions, especially those made by women and minorities. In an attempt to incorporate such contributions into the course several important publications (* asterisked) by women and minorities are listed in the bibliography.
- C. In addition to the textbook and study guide, the students are required to read Rachel Carson's Silent Spring.
- D. This course introduces students to contemporary environmental concerns. It provides an introductory, general education of the outstanding environmental problems in the world. It does not delve into the issues to the depth a major's course would.
- E. This course contributes to the student's abilities in several ways. Most outstandingly it (1) will force students to confront ethical issues that relate to the environment, and (2) will encourage students to incorporate the knowledge of the class with the environmental events that are taking place.

Part IV.

A. Knowledge Area Criteria

The course focuses on a number of issues that are greatly impacting the environment. The topics are carefully

chosen to represent important contemporary issues that students can easily review in present day journals, newspapers and magazines. Not only will the topics be presented by the course instructor each week, but students will have a turn directing an indepth discussion on an issue that is particularly important to them.

B. Natural Science Criteria

In addition to examining a body of knowledge (i.e. ecological cycles, prey-predator relationships) students will actively participate in hypothesis formation and evoke cause and effect relations in the course. By using scenarios of environmental issues students will brainstorm potential outcomes. Thus they will gain an appreciation of the dynamic nature of science.

C. Additional Science Criteria

Because this course is oriented toward issues of importance to everyone, students will quickly appreciate the complex interrelationships of environmental issues. Through classroom presentation and discussion, students will learn to evaluate potential consequences of technological advancements on the environment.

Appendix: Course Syllabus

I. Catalog Description

BI 114 Environmental Science

3 credits

3 lecture hours

An introduction to environmental science with an emphasis on human impacts. The course uses an interdisciplinary approach to the consideration of population growth, pollution, preservation of species and establishment of public policy. Students will learn basic principles in ecology as the basis for understanding problems of the environment.