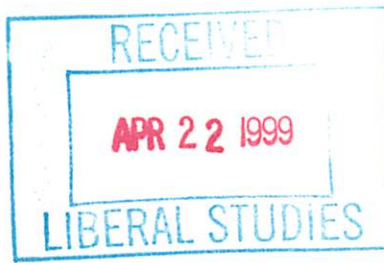


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CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. CONTACT

Contact Person Dr. Arthur C. Hulse Phone 72279

Department Biology

II. PROPOSAL TYPE (Check All Appropriate Lines)

COURSE Intro. to Marine Bio.

New Course* Introduction to Marine Biology (BI 116)

Course Revision _____

Liberal Studies Approval+ Introduction to Marine Biology (BI 116)
for new or existing course

Course Deletion _____

Number and/or Title Change _____

Course or Catalog Description Change _____

PROGRAM: Major Minor Track

New Program* _____

Program Revision* _____

Program Deletion* _____

Title Change _____

III. Approvals (signatures and date)

Arthur C. Hulse Feb 1 1999
Department Curriculum Committee

[Signature]
College Curriculum Committee

Mary Sadler 12-9-99
+Director of Liberal Studies (where applicable)

Barkley Butte 2/9/99
Department Chair

John D. Ed 4/20/99
College Dean

*Provost (where applicable)

SYLLABUS

INTRODUCTION TO MARINE BIOLOGY

BI 116

3 credit hours (3 hours of lecture)

An introduction to the world of marine biology. Topics covered will include a discussion of the major groups of plants and animals found in the marine environment and an examination of the major communities that make up the oceans of the world.

OBJECTIVES

1. The student will be able to understand the incredible diversity of plants, animals, and entire communities in the oceans of the world. In so doing it is hoped that the student will be able to appreciate the marine environment and the student's appreciation will extend for many years beyond the course.
2. The student will be able to understand the environmental factors that shape marine ecosystems and communities and thus have a greater awareness of technological practices that might act to the detriment of ocean systems. Hopefully this will also translate into a concern for protecting the oceans and seas.
3. The student will be able to understand the degradation and destruction of marine environments and what can be done to stop and/or mitigate this destruction.
4. The student will be able to understand the variety of adaptations that allow organisms to exist under specific and often extreme environmental regimes.
5. The student will be able to understand how short-term economic gains made at the expense of the oceans and seas should be avoided.

Over-all this course will attempt to instill in the student the ethical concept that the oceans and seas of the world are both an important resource and a rich legacy and that they should be preserved for future generations

LECTURE TOPIC OUTLINE

Note: This sequence is based on three one-hour lectures a week and an academic semester of 14 weeks. See attached appendix for list of subtopics in each section

Lecture 1. Organization

How are marine systems studied?

Lectures 2 and 3. The Geography of Oceans.

- a. How many Oceans are there?
- b. What are Seas?
- c. Continental Shelves
- d. The Ocean Floor
- e. Islands and Sea Mounts
- f. Zonation

Lecture 4. Physical Characteristics of Ocean Water and its significance to the plants and animals.

- a. Pressure and depth
- b. The Behavior of Light in Water
- c. Temperature
- d. Salinity

Lecture 5. Movement of water and its significance.

- a. Waves
- b. Currents
- c. Upwellings
- d. Tides

Lecture 6 and 7. The plants.

- a. Phytoplankton
- b. Large Algae
- c. Sea Grasses
- d. Mangroves

Lecture 8. Corals and jellyfish.

Lecture 9. Sponges and worms

Lecture 10. Exam Number One

Lecture 11. Molluscs: clams, snails and squid.

Lecture 12. Arthropods.

Lecture 13. Sea stars and their relatives.

Lecture 14 and 15. Sharks and Rays.

- a. General Characters
- b. The Bottom-feeders
- c. The mid-water Hunters
- d. Filter Feeding Giants

Lecture 16 and 17. Bony fishes.

- a. General Body Plans
- b. Buoyancy and Locomotion
- c. Feeding
- d. Schooling
- e. Symbiosis

Lectures 18 and 19. Marine reptiles.

- a. Sea Turtles
- b. Crocodylians
- c. Sea Snakes
- d. The Marine Iguana

Lecture 20. **Exam Number Two**

Lecture 21 and 22. Oceanic birds.

- a. Gulls and shore birds
- b. The waders
- c. Pelicans and Cormorants
- d. Birds of the Open Ocean
- e. Penguins and Puffins

Lecture 23 and 24. Marine Mammals.

- a. Seals and Sea Lions
- b. Sea Otters
- c. Whales
- d. The manatee and other sirens
- e. Marine Mammals at risk and recovery

Lecture 25 and 26. Coastal Habitats.

- a. Estuaries
- b. Bays
- c. Salt Marshes
- d. Mangrove Swamps
- e. Anthropogenic impact on coastal habitats

Lecture 27 and 28. The Intertidal Zone.

- a. Rocky Shoreline
- b. Sandy Bottoms
- c. Mud Flats

Lecture 29 and 30. Continental Shelves

Lecture 31. Exam Number Three

Lecture 32, 33, 34 and 35. Reefs

- a. Coral Reefs
- b. Rocky reefs
- c. Artificial Reefs

Lecture 36. The Open Ocean.

Lecture 37. The Abyss and Beyond.

Lecture 38 and 39. Marine Fisheries

Lecture 40. Mariculture

Lecture 41. Pollution

Lecture 42. The Future of the Oceans (open discussion with the students)

Exam Number Four will be given during Final's Week

METHOD OF EVALUATION

1- There will be four examinations during the course. Each will cover approximately 25% of the course material. Each will be worth 20% of the students final grade. Exams will be a mixture of definitions, short answer essay

questions and longer essays. The fourth examination will constitute the final exam and will be given during final exam week.

2- Students will be expected to maintain a “scrapbook” of articles directly pertaining to marine biology and oceanography. The articles are to be gathered from sources usually available to a concerned and aware citizenry (e.g., newspapers, news magazines, and popular and semi-popular environmental magazines [e.g., National Wildlife, National Geographic, Audubon etc.]). Articles available exclusively on the internet will not be allowed to be submitted. The scrapbook will be worth 15% of the final grade. Each article should have associated with it a short commentary by the student with regard to the student's thoughts or impressions of the article. Scrapbooks should have a minimum of 14 articles. The majority of articles (at least 80%) should come from newspapers and/or news magazines.

3- Students will submit a critique (minimum of 2 pages and a maximum of five printed pages) of the non-textbook reading. The critique will be worth 5% of the final grade.

The Grading Scale for this course will be as follows:

90% or better is an A

80 to 89% is a B

70 to 79% is a C

69 to 69% is a D

A cumulative grade lower than 60% is an F

TEXTBOOK

Introduction to Marine Biology by George Karleskint. 1998. ISBN # 003-07-41912. Harcourt, Brace, and Javonovich College and School Division

NON-TEXTBOOK READING

One of the following:

- Under the Sea Wind by Rachel Carson. 1996 reprint. Penguin ISBN 0140253807
- Sea Change: A Message of the Oceans by Sylvia Earle. 1996 Fawcett ISBN0449910652
- Song of the Blue Ocean by Carl Safine. 1999 Owl Books ISBN 0805061223

SUGGESTED READINGS

- Alevizon, William S.. 1994. Caribbean Reef Ecology. Pices Books.
 Carr, Archie. 1986. So excellent a fishe. University of Texas Press.
 Gosner, Kenneth L. 1978. A field guide to the Atlantic Seashore. Peterson Field Guide. Houghton Mifflin Press
 Kaplan, Eugene H. 1982. Coral Reefs, Peterson Field Guide. Houghton Mifflin
 Kaplan, Eugene H. 1988. Southeastern and Caribbean seashores, Peterson Field Guide. Houghton Mifflin Press
 Wilson, Roberta and James Q. Wilson. 1992. Watching fishes. Understanding Coral Reef Fish Behavior. Pices Books

BIBLIOGRAPHY

- Alevizon, William S.. 1994. Caribbean Reef Ecology. Pices Books
 Allen, Gerald R.. 1996. Marine Life of the Pacific and Indian oceans. Periplus Editions.
 Anon. 1993. Cetacean Behavior: Mechanisms and Function. Krieger
 Barnhart, Diana, Vicki Leon, and Frank Balthis. 1993. Tidepools. Blake Publishing.
 Bjorndal, Karen. 1995. Biology and Conservation of Sea Turtles. Smithsonian Inst. Press.
 Brusca, Richard C. and Gary J. Brusca. 1990. Invertebrates. Sinauer
 Dawes, Clinton J.. 1998. Marine Botany. John Wiley and Sons.
 Dunson, William A. 1975 . The biology of sea snakes.
 Ellis, Richard. 1996. Deep Atlantic: Life, Death, and Exploration in the Abyss. Knopf.
 Galbraith Robert and Ted Boehler. 1986. Subtidal Marine Biology of California. Naturegraph.
 Gosner, Kenneth L.. 1978. A field guide to the Atlantic Seashore. Peterson Field Guide. Houghton Mifflin Press.
 Fagerson. 1987. The evaluation of reef communities. John Wiley and Sons.
 Hallegraph , Gustaaf. 1997. Plankton: A microscopic world. Brill Academic.
 Hendler, Gordon, et.al. 1995. Sea Stars, Sea Urchins, and their allies. Smithsonian Institution Press
 Kaplan, Eugene H.. 1982. Coral Reefs, Peterson Field Guide. Houghton Mifflin
 Kaplan, Eugene H. 1988. Southeastern and Caribbean seashores, Peterson Field Guide. Houghton Mifflin Press.
 Katona, Steve K. and Rough. 1993. A field guide to Whales, porpoises, and seals from Cape Cod to Newfoundland. Smithsonian Inst. Press.
 Lutz, Peter L. 1996. The biology of sea turtles. CRC Press.
 Mathieson, A. C. and P. H. Nienhues. 1992. Intertidal and littoral ecosystems (Ecosystems of the World). Elsevier.

- Meglitsch, Paul A. and Fredrick R. Schram. 1991. *Invertebrate Zoology*. Oxford University Press
- Moyle, Peter B and Joseph R. Cech. 1996. *Fishes. An introduction to Ichthyology*
- Nybakken, James W.. 1996. *Marine Biology. An Ecological Approach*. Harper and Row.
- Paxton, John R.. 1998. *Encyclopedia of Fishes*. Academic Press.
- Postma, H. and J. J. Zylstra. 1988. *Continental Shelves (Ecosystems of the World)*. Elsevier
- Riedman, Marianne. 1991. *The Pinnipeds. Seals, sea lions, and Walruses*. Univ. of CA Press
- Robins, C. Richard, C. Carleton Ray and John Douglass. 1986. *Atlantic Coast Fishes, Peterson Field Guide*. Houghton Mifflin
- Rupert, Edward E. and Robert D. Barnes. 1994. *Invertebrate Zoology*. Saunders
- Schevill, William E.. 1974. *The whale problem*. Harvard University Press.
- Tait, R. V. and Frances Dipper. 1998. *Elements of Marine Ecology*. Butterworth-Heinemann.
- Thompson, Donald A., Lloyd T. Findley and Alex N. Kerstitch. 1987. *Reef Fishes of the Sea of Cortez*. University of Arizona Press
- Gall, G. A. E. and John E. Thorpe. 1995. *Conservation of Fish and Shellfish Resources*. Academic Press.
- Weiss. 1995. *Marine Animals of southeastern New England and New York*. State Geological and Natural History Survey of Connecticut.
- Wilson, Roberta and James Q. Wilson. 1992. *Watching fishes. Understanding Coral Reef Fish Behavior*. Pices Books

ANSWERS TO LIBERAL STUDIES QUESTIONS

- A. Not applicable. This course will be taught by a single instructor.
- B. The course is designed to introduce the student to the plants and animals of the marine environment and to show them how they interact with the non-living components of the environment to form a rich diversity of communities and habitats. As a consequence no real mention of human race or gender will enter into the subjects discussed in class. However the contributions of women to the field of marine biology should become apparent to the students since two of the most eloquent writers on the subject are women (i.e. Rachel Carson and Sylvia Earle) and their books are two of the three possible non-textbook reading to be used for this course.
- C. Students will select one of the three non-textbook readings as listed earlier. The books were chosen primarily for their content and easy style of writing, but also show the contributions that women have made to the field of marine biology.
- D. This course is not intended as an introduction to the field of biology, but rather is designed to introduce the interested non-biology major to the realm of the ocean

ANSWERS TO COURSE ANALYSIS QUESTIONNAIRE

- A1. The course is designed to be a three credit non-laboratory science course that students may elect to take to fulfill part of their liberal studies requirements for the 4 - 3 - 3 science option. It is designed exclusively for non-biology or non-biology education majors.
- A2. This course does not require a change in any existing course or program.
- A3. This will be a traditional lecture oriented course.
- A4. This course has never been offered at IUP (Note however that a majors course in Marine Biology has been offered). This course will not be listed as dual-level
- A5. The course will not be offered for variable credit.
- A6. While some other schools offer a majors course in Marine Biology, none in the area offer an introductory course for non-majors

A7. No. The content of this course is not required by any professional agency or organization.

B1. The course will be offered by one instructor.

B2. The content of this course does not overlap that of any courses offered in other departments. The Geoscience Department does offer a course entitled "Introduction to Ocean Science" that this course would compliment.

B3. There will be seats in this course for continuing education.

C1. Faculty resources are currently adequate

C2. Resources for this course are available.

- a. Space. Classroom space is adequate.
- b. Equipment. Overhead projectors and slide projectors are available
- c. Laboratory Supplies. Not applicable since this is a lecture course.
- d. Library Materials. There is an adequate supply of reading materials in Stapleton library to support this course
- e. Travel Funds. No travel funds are necessary.

C3. Not applicable. The course is not being funded by a grant.

C4. Every fall semester.

C5. One section.

C6. Student enrollment will be limited by the size of the room where the class is given.

C7. No professional society recommends enrollment limits.

C7. This course is designed for non-biology majors and as such will not affect the curriculum requirements for biology majors.

BI 116. Introduction to Marine Biology 3c - 0l -3sh

Prerequisite: Non- biology and non-biology education majors and minors only.

An introduction to the world of marine biology. Topics covered will include a discussion of the major groups of plants and animals found in the marine environment and a discussion of the major communities that make up the oceans of the world.

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

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<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | <p>A. Intellectual Skills and Modes of Thinking:</p> <ol style="list-style-type: none"> 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). 7. Aesthetic mode of thinking. <p>B. Acquiring a Body of Knowledge or Understanding Essential to an Educated Person</p> <p>C. Understanding the Physical Nature of Human Beings</p> <p>D. Collateral Skills:</p> <ol style="list-style-type: none"> 1. Use of the library. 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.

Liberal Studies Course Approval Form Instruction Sheet

Use this form only if you wish to have a course included in a Liberal Studies Learning Skill or Knowledge Area category. Do not use this form for synthesis or writing-intensive sections; different forms are available for these. If you have questions, contact the Liberal Studies Office, 352 Sutton Hall, telephone 357-5715.

This form is intended to assist you in developing your course to meet IUP's Criteria for Liberal Studies and to arrange your proposal in a standard order for consideration by the Liberal Studies Committee (LSC) and the University-wide Undergraduate Curriculum Committee. When you have finished, your proposal will have these parts:

- Standard UWUCC Course Proposal Cover Sheet, with signatures (one page)
- Completed copy of LS General Information Check-List--Parts 1-3 of this form (one page)
- One sheet of paper for your answers to the four questions in Part IV of this form (one page)
- Completed check-list for each curriculum category in which your course is to be listed--e.g. Non-Western Cultures, Fine Arts, etc. (one page each) [Check-lists are found in the appendix to this Handbook.]
- Course syllabus in UWUCC format.

Note: If this is a new course not previously approved by the University Senate, you will also need answers to the UWUCC Course Analysis Questionnaire. These are not considered by the LSC but will be forwarded to the UWUCC along with the rest of the proposal after the LSC completes its review. For information on UWUCC procedures for new courses or course revisions, see appropriate sections of this Handbook.

Submit one (1) copy of the completed proposal to the Liberal Studies Office (352 Sutton Hall.) The Liberal Studies Committee will make its own copies from your original; the committee does reserve the right to return excessively long proposals for editing before they are duplicated. (If you happen to have extra copies of the proposal, you are invited to send multiple copies to the LSC to save unnecessary copying.)

Please Number All Pages

CHECK LIST -- LIBERAL STUDIES ELECTIVES

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 Areas of Liberal Studies.

Liberal Studies Elective Criteria which the course must meet:

- Meet the "General Criteria Which Apply to All Liberal Studies Courses."
- Not be a technical, professional or pre-professional course.

Explanation: Appropriate courses are to be characterized by learning in its broad, liberal sense rather than in the sense of technique or preprofessional proficiency.. For instance, assuming it met all the other criteria for Liberal Studies, a course in "Theater History" might be appropriate, while one in "The Craft of Set Construction" probably would not; or, a course in "Modern American Poetry" might be appropriate, while one in "New Techniques for Teaching Writing in Secondary Schools" probably would not; or, a course on "Mass Media and American Society" might be appropriate, while one in "Television Production Skills" probably would not; or, a course in "Human Anatomy" might be appropriate, while one in "Strategies for Biological Field Work" probably would not; or, a course in "Intermediate French" might be appropriate, while one in "Practical Methods for Professional Translators" probably would not.

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 hypotheses in the absence of contradictory evidence.