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LIBERAL STUDIES

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Senate App 5/2/00

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

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LIBERAL STUDIES

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

+Director of Liberal Studies (where applicable)

Bartley Butte 2/19/99
Department Chair

John D. Egan 3/20/99
College Dean

*Provost (where applicable)

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SYLLABUS

INTRODUCTION TO MARINE BIOLOGY

BI 116

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

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

OBJECTIVES

- 1. The student will be able to understand the incredible diversity of plants, animals, and entire communities in the oceans of the world.**
- 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.**
- 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 impact marine biology.**

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 characteristics
- b. The bottom feeders
- c. The mid-water hunters
- d. Filter feeding giants

Lecture 16 and 17. Bony fishes.

- a. General body plan
- b. Buoyancy and locomotion
- c. Feeding
- d. Schooling
- e. Symbiosis

Lectures 18 and 19. Marine reptiles.

- a. Sea turtles
- b. Crocodilians
- 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

Lecture 25 and 26. Coastal Habitats.

- a. Estuaries
- b. Bays

- c. Salt marshes
- d. Mangals

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 be worth 20% of the students final grade. Exams will be a mixture of definitions, short answer essay questions and longer essays.

2- Students will be expected to maintain a "scrapbook" of articles directly pertaining to the 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). Articles available exclusively on the internet will not be allowed to be submitted. The scrapbook will be worth 15% of the final grade.

3- Students will submit a critique (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

60 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.
- Hallegrah , 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 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.

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Darlene S. Richards, 11:11 AM 10/27/99, BI 116 Marine Biology

Date: Wed, 27 Oct 1999 11:11:23 -0400
From: "Darlene S. Richardson" <drchrdsn@grove.iup.edu>
Subject: BI 116 Marine Biology
To: ntcc@grove.iup.edu
Cc: Darlene Richardson <Drchrdsn@grove.iup.edu>
X-MIMEOLE: Produced By Microsoft MimeOLE V5.00.2314.1300
X-Mailer: Microsoft Outlook Express 5.00.2314.1300
X-MSMail-priority: Normal

Steve Hovan and I reviewed the syllabus for proposed course BI 116 Marine Biology intended as a Liberal Studies non-lab science course. Both Steve and I teach our GS 141 Intro to Ocean Science course and we determined that there is an overlap of 20% or so (based on our reading of your syllabus). We both feel that a course in Marine Biology for non-science majors would be a good and appropriate choice for the general student population. Thus, we support BI 116.

*Letter of support from
Bioscience*

Liberal Studies Office
352 Sutton ext. 7-5715

Mary Sadler
email: msadler

Date: December 10, 1999

To: Dr. Arthur Hulse
Biology Department

From: Mary Sadler, Director Liberal Studies



Subject: BI 116 Introduction to Marine Biology

I am pleased to report that your proposal, BI 116 Introduction to Marine Biology, was approved as a non-lab science course at the December 9, 1999 Liberal Studies Committee meeting. We appreciate your willingness to attend the meeting and respond to our questions.

Our approval will be reported to the UWUCC at the December 14th meeting. Thank you for your commitment to the Liberal Studies program.

CC: Dr. Barkley Butler, Chair
Dr. John Eck, Dean
✓ Dr. Carol Tannous UWUCC