

COLLEGE CURRICULUM COMMITTEE

Date of open hearing (if necessary) 2/98 Approved X Not Approved _____

Comments:

SEE ATTACHED FOR SIGNATURE

Signature of College Chair/Date: Kent P. Maguire

UNIVERSITY CURRICULUM COMMITTEE

Date Received/Processed 12/6/99

Comments:

Curriculum Chair Signature [Signature] Date Announced At Senate 12/7/99

EXECUTIVE VICE PRESIDENT/PROVOST

Approved _____ Not Approved _____ If no, reasons are as follows:

Student Credit Hours _____ Faculty Load Hours _____ Equalized Credit Hours _____

Official Copy & Approval Sheet Filed (Date): _____ Executive VP/Provost Signature/Date [Signature]

REGISTRAR

Date Approved Course Description Received 12/15/99 Hegis Taxonomy & Course Number Assigned 0401. 405

Registrar Signature/Date Robert A. Kulat

NOTIFICATION FORWARD

_____ Senate Curriculum Committee Chairperson _____ Academic Dean(s)
_____ Department Chairpersons _____ Registrar _____ Sponsor(s)

ROWAN UNIVERSITY CURRICULUM PROPOSAL

PROPOSAL TITLE: CONSERVATION BIOLOGY

CHECK APPROPRIATE: X UNDERGRADUATE GRADUATE SEMESTER HOURS

SPONSOR(S): L.S. Hales, Jr., J. Patt, P. Mosto

DEPARTMENT/TELEPHONE # 3555

CHECK ONE: X COURSE MINOR PROGRAM CONCENTRATION SPECIALIZATION ACHIEVEMENT CERTIFICATE CERTIFICATION PROGRAM MAJOR PROGRAM

Step #1 (Department) Step #2 (Receipt) Step #3 (School) - Includes signatures of E. J. Moore and dates like 2/26/98, 3/27/98, 3/27/98.

Step #4 (Academic Dean): Recommended NOT Recommended Conditionally Recommended (See Comments) - Includes Dean Signature/Date: [Signature] 5/26/99

Step #5 (Senate Curriculum Committee): Open Hearing Date Approved by Curriculum Committee Date Returned to Sponsor(s) for the following reason:

Step #6 (Senate) Date announced/voted on at Senate If voted on Approved NOT Approved forwarded to Executive Vice President/Provost Senate Curriculum Committee chair Signature/Date:

Step #7 (Executive Vice President/Provost): Date Received _____

___ Approved

___ NOT Approved If no, reasons are as follows:

Student Credit Hours _____

Faculty Load Hours _____

Equalized Credit Hours _____

Official Copy & Approval Sheet Filed (Date) _____

Executive Vice President/Provost Signature _____

Registrar

Date Approved Course Description Received _____

Hegis Taxonomy and Course Number Assigned _____

Date/Signature of Registrar _____

Notification Forward:

_____ Senate Curriculum Committee Chairperson

_____ Department Chairpersons

_____ Academic Dean(s)

_____ Registrar

_____ Sponsor(s)

NEW COURSE PROPOSAL
0401.4xx CONSERVATION BIOLOGY

1. Details:

- a. Course Title: Conservation biology
- b. Sponsors: Department of Biological Science
L. Stanton Hales, Jr., Ph.D., Assistant Professor
Patricia Mosto, Ph. D., Associate Professor
- c. Credit Hours: four s. h.
two weekly lectures or equivalent; additional weekly laboratory, field session, field trip or other assignment
- d. Course Level:
Junior and Senior; 400-level HEGIS numbers requested.
- e. Curricular Effect:
This course is designed to support the environmental study tracks in biology, and ease the classroom and laboratory demands on other environmental courses. This course will facilitate use of the Cape May County property, the PINES Institute (both of which are designed to be used by students in environmental field courses) and other on-campus resources (Sangree Greenhouse, the proposed Educational Display Garden and adjacent woodlands, the Mantua Creek and its floodplain). This course will increase the number and diversity of undergraduate environmental courses offered by the Department of Biological Sciences.
- f. Prerequisites:
Prerequisites for this course include Biology I (0401.100) and II (0401.101), Ecology (0420.310) and Genetics (0422.335); or permission of the instructor.
- g. Suggested Time and Scale of Implementation:
Effective Spring, 2000. This course incorporates both laboratory and field assignments and several field trips; thus, it can accommodate a maximum of only 24 students.
- h. Adequacy of Present Staff, Resources, Library Facilities:
New faculty recently hired in the Department of Biological Sciences have teaching and/or research experience in this area. Dr. Stan Hales has taught this course previously, and has conducted research on the biology of endangered and introduced animals. Dr. Patricia Mosto has extensive teaching experience in related courses.

Departmental resources for this course are adequate: the Cape May property, PINES Institute in Lebanon State Forest, and other campus resources (Sangree Greenhouse, the proposed Educational Display Garden and adjacent woodlands, the Mantua Creek and its floodplain) will be used for this course.

Library resources are adequate, and will be expanded to enhance this and related courses.
- i. Short-term Evaluation:
The success of this course will be evaluated in the same manner as all other courses in the department, by a variety of means including, but not limited to, student evaluations.

2. Rationale:

Conservation biology has emerged during the last ten years as a major new synthetic discipline addressing the alarming loss of biological diversity around the world. Conservation sciences remain one of the few growth areas in environmental biology: the Society for Conservation Biology is now the largest professional society in the United States and conservation and sustainable development are among the fastest growing degree programs in the world. The proposed course is designed to be a cornerstone of several revised tracks in environmental studies. The current course enhances the environmental offerings for upper-level students majoring in biology, and is likely to have broad appeal within the large number of biology majors that currently exists. This course will also generate student interest in other environmental course offerings, and will likely increase use of other Rowan departmental facilities, including the PINES Institute and the recently acquired property in Cape May County.

3. Essence of the Course:

a. Objectives:

This is a laboratory course for upper-level students majoring in biology, and like some other environmental science courses, has been designed to incorporate different biological disciplines into the course. The objectives of this course are to familiarize students with fundamental and applied aspects of genetics, population and community ecology, paleontology and systematics, agriculture and forestry, wildlife biology and zoo management, and sociology and economics. Laboratory and field exercises are designed 1) to introduce students to local, regional and global conservation issues and 2) to emphasize synthetic and creative approaches to conservation problems.

b. Topical Outline/Content:

Introduction and conservation history
Global biodiversity: evolution, speciation & diversity loss
 Evolutionary history and the great extinction periods
 Speciation patterns and adaptive radiation
 Island biogeographic theory and diversity patterns
 Modern biodiversity loss and extinction vulnerability
Population genetic processes
 Genetic drift, genetic variation, and effective population size
 Genetic bottlenecks: unequal sex ratios, reproductive variation, and population fluctuations
Population demographic processes
 Allele and recruitment effects
 Age- and size- structured populations
 Environmental stochasticity and extinction vortices
Community and ecosystem processes
 Habitat destruction and fragmentation
 Habitat degradation
 Exotic species and disease introductions
 Global climate change
Conservation reserve design
 Areal considerations: the SLOSS debate and edge effects
 Habitat distinctiveness, endangerment and utility
 Habitat buffers and corridors
 Management tools
Conservation management principles & applications
 In situ strategies: Stocking, etc.
 Ex situ strategies: seed banks, zoos, and captive breeding programs
Ecological restoration & case studies
 Marsh restoration New Jersey

- Illinois prairie
- Costa Rican forests
- Ethics and economics
 - Direct and indirect value
 - Ethical arguments and deep ecology
- Policy, law, and sustainable development
 - National legislation: ESA
 - International legislation: CITES
 - Debt-for-nature swaps
- Human population growth and resource limitation
- Public education

Laboratory exercises will involve several laboratory and/or field-based projects designed to examine basic ecological and genetic processes and their importance to modern conservation biology. These empirical projects will allow students to increase their familiarity with the scientific method and problem-solving in biology. These projects will extensively utilize on-campus (Sangree Greenhouse, the proposed Educational Display Garden and adjacent woodlands, the Mantua Creek and its floodplain) and off-campus resources. Additional laboratory and field exercises may involve computer simulation and field trips (*e.g.*, PSEG Marsh Mitigation Banks, Waldor Orchids and Longwood Gardens, Philadelphia Zoo), and/or interaction with conservation professionals.

Examples of laboratory/field assignments includes the following ideas or topics. These are provided to give the committee an idea of typical topics; this is not a comprehensive list of assignments or topics that can be included in the course.

- 1) Determination of species-area relationships for various taxonomic groups. Species-area relationships are poorly known, but have been recognized as an important tool in deciding how large an area needs to be set aside to provide habitat for species of interest or concern.
- 2) Estimation of phenotypic and genetic variation in populations of different size. Conservation biology seeks to protect biological diversity; phenotypic and genetic variation are important components of biodiversity. Those population parameters usually vary among populations of different sizes.
- 3) Estimation and comparison of species diversity for selected taxa across different habitat types or landscapes. Many organismal communities are experiencing a variety of changes due to changes in the proximity of different habitat types spanning many spatial scales. This information has many applications: it can be used to determine land-use patterns to enhance migratory bird populations of special concern or even placement of crops to control noxious insects or enhance beneficial insects.
- 4) Determination of habitat "sinks" and "sources." One of the most prominent recent theoretical developments concerns identification of populations with surplus production (sources) and populations that are only sustained by immigration from other areas (sinks). This task requires determination of population vital rates.

c. Evaluation and Grading Procedure of Students:

Students will be graded on the basis of their class performance on a variety of assignments,

including but not limited to several hour-long tests, laboratory reports, and a final exam. In addition, students can be assigned one or more papers of varying lengths and an oral presentation. Class participation can also be used in student evaluation.

d. Course Evaluation:

The Department of Biological Sciences routinely reviews its courses to assess course success in meeting the goals and objectives of the course, department, and college.

4. Results of Consultation:

This course was designed by Drs. Hales and Mosto in consultation with other faculty in the Department of Biological Sciences. No other undergraduate courses in the Department of Biological Sciences or other departments have similar content.

5. Possible textbooks and laboratory manuals for this course:

There are a number of recently published texts that may be used for this course, including Richard Primack's (1993) Essentials of Conservation Biology, Gary Meffe and Ron Carol's (1994) Principles of Conservation Biology, and E. O. Wilson's (1992) The Diversity of Life.

6. Catalog Description:

See next page.

CATALOG DESCRIPTION

Conservation Biology

BIOL 0401.4xx

4 s. h.

(Prerequisites = Biology I (0401.100) and II (0401.101), Ecology (0420.310) and Genetics (0422.335); or permission of the instructor.)

This laboratory course for upper-level students majoring in biology is designed to familiarize students with the current crisis in global biodiversity. The objectives of this course are to examine fundamental and applied aspects of genetics, population and community ecology, paleontology and systematics, agriculture and forestry, wildlife biology and zoo management, and sociology and economics. Laboratory and field exercises are designed 1) to introduce students to local, regional and global conservation issues and 2) to emphasize synthesis and creativity in addressing conservation problems.