

OCT 95

CURRICULUM PROPOSAL FORM 1999-2000

RECEIVED
NON-GENERAL EDUCATION PROCESS A

*DEADLINES: Deadline dates for 1999/2000 submissions: Regular proposals: October 22, 1999 to be implemented in Fall 2000; Short-Term proposals: December 10, 1999 to be implemented in Fall, 2000; Regular proposals February 18, 2000 to be implemented in Spring, 2001; March 24, 2000 for short-term courses to be implemented in Spring 2001.

0420.525

PROPOSAL TITLE: ENVIRONMENTAL Toxicology - GRADUATE

SPONSOR(S): DR. PATRICIA MOSTO - Dept Bio. Sci

DEPARTMENT: Depart Biological Sciences

COLLEGE: LAS

IF LAS CHECK ONE: History/Humanities Math/Sciences Social/Behavioral Sciences

Check one: Undergraduate Graduate

THE ATTACHED NON-GEN-ED PROPOSAL IS BEST DESCRIBED BY THE ITEM(S) CHECKED.

New non-gen-ed course

Short-term non-gen-ed course

Minor curricular changes (fewer than three) to:

- existing non-gen-ed course
- non-gen-ed degree requirements
- major
- minor, specialization, concentration, track, certificate program

RECEIVED
OCT 1999

DEPARTMENT
(Signature indicates approval)

Dept. Curriculum Chair / Date

Dept. Chairperson / Date

ACADEMIC DEAN

Approved Not Approved Comments:

Dean's Signature/Date *[Signature]* 10.22.99

COLLEGE CURRICULUM COMMITTEE

Date of open hearing (if necessary) 11/30/99 Approved x Not Approved _____

Comments: Check course description + title to clarify graduate content. Check grading policy. Attach results of consultations.

Signature of College Chair/Date: [Signature] 11/30/99 OK - M.O.H.
We are pleased the Dept is examining the issue of pre-requisites

UNIVERSITY CURRICULUM COMMITTEE

Date Received/Processed 3/3/00

Comments:

Curriculum Chair Signature [Signature] Date Announced At Senate 2/4/00

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] 2/4/00

REGISTRAR

Date Approved Course Description Received _____ Hegis Taxonomy & Course Number Assigned 0470.525

Registrar Signature/Date Robert A. Kulat 2/15/00

NOTIFICATION FORWARD

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

11/1/06

Rowan University
Department Biological Sciences

Request for cross-listed 400 & 500 level HEGIS numbers:
Environmental Toxicology
New as Graduate Course

1. DETAILS

1a. Course Title: Environmental Toxicology 0420.525

1b. Sponsors: Department Biological Sciences
Dr. Patricia Mosto, Associate Professor

1c. Credit Hours: 4 s.h.

1d. Course Level: 500-level HEGIS numbered requested for graduate standing

1e. Curricular Effect: This course will help to alleviate a critical need for environmental classes that can be offered to graduate students in the MA programs in Conservation & Environmental Education and Subject Matter Teaching. The Department offers this course every other year in the fall semester

1f. Prerequisites: Biology I and II (0401.100, 0401.101), Chemistry I or Advanced Chemistry I & Chemistry II or Advanced Chemistry II (1906.100, 1906.101), Organic Chemistry (1907.200) and Ecology (0420.310).

1g. Suggested Time and Scale of Implementation: fall 2001

1h. Adequacy of present Staff, Resources, and Library Facilities: adequate

1i. Short-Term Evaluation: the Department Curricular Committee and the Entire Department routinely evaluate all of the Biological Science courses.

2. RATIONALE

Currently, we offer the undergraduate course Environmental Toxicology 0420.425. Cross-listing this course will help to alleviate a critical need for environmental classes that can be offered to graduate students in the MA programs in Conservation & Environmental Education and Subject Matter Teaching. No "additional" sections of the course needed to be offered, since graduate and undergraduate courses will meet together. Environmental Toxicology is a senior level class that by its nature presents an excellent opportunity for graduate work. Graduate students enrolled in the course will be given additional assignments (i.e. hands-on research project besides the library research project, managers of the team lab work, etc.). The Department strongly believes that graduate students should be required to do more independent work for a course than undergraduate students do. This can be done in a "two-level" course as the one we are proposing, even though the class itself will be mixed.

3. ESSENCE OF THE COURSE:

3a. Objectives

The objective of this course is to provide students with an understanding of the problems associated with indiscriminate use of chemicals worldwide, to give hand-on experience in toxicity testing, and to bring ethical awareness in relation to environmental degradation. Even though all of Rachel Carson's (*Silent Spring, 1962*) predictions have not come to be true, her book was able to give a clear focus to the problems associated with environmental pollution. As responsible citizens of this world, we need to look at these problems in an educated manner, so we can press government to address them in a new legislative light taking ecotoxicology very seriously. We need to understand that our earth can not cope unaffected with all the waste chemical products from agriculture and industry. Those major environmental reforms need to take place, and we play a role, as scientists and world citizens, in these reforms. We have a moral responsibility to our only environment: *the earth*.

3b. Topical Outline/Content:

Environmental toxicology is the area of study concerned with harmful effects of chemicals upon ecosystems. The course is divided in three parts. Part one deals with the major classes of inorganic and organic pollutants, their entry into the environment and their movement, storage and transformation within the environment. It deals with the fate of pollutants in air, water, soils and sediments, and through food chains, with their chemical transformation and biotransformation. Part two deals with the effects of pollutants upon living organisms at different organizational levels (molecular, cellular and whole organism). Toxicity data will be used for the purpose of risk assessment. Effects of pollutants are studied as an approach that can lead to the development of biomarkers and biomonitoring. Part three is a holistic approach to ecotoxicology. It deals with the effects of pollutants at the level of populations, communities, and whole ecosystems. This section illustrates the truly interdisciplinary character of environmental toxicology.

Course Outline

Introduction/Toxicological Concepts

Major pollutants

Routes and Transport

Q/A and Q/C Lab

Fate of pollutants

Toxicity testing

Biochemical effects

Acute Toxicity Lab

Physiological effects

Organism Biomarkers

Biological Monitoring

Chronic Toxicity Lab

Population dynamics

Population Lab

Resistance

Microbiology /Microtox Lab

Ecosystem changes

Radioactivity

Ecosystem Biomarkers

Wildlife/Landscape Toxicology

Research topics:

Chemical pollutants: - Organochloride pesticides
- PAH's (polycyclic aromatic hydrocarbons)
- Lead
- Mercury
- Cadmium and Zinc
- PCB's (polychlorinated biphenyl's)
- Dioxin (TCDD's)

Acid deposition

Nuclear Toxicity

Thermal Toxicity

Urban runoff

Pathogenic organisms

Major Case Studies (i.e. Chernobyl/ Love Canal)

Modeling: - Global deposition

- Bioaccumulation

- Population genetics

Risk Assessment

Laws and regulations

(or any topic of student choice with approval of the instructor)

Textbooks available:

Walker, C.H. et al. 1996. *Principles of Ecotoxicology*. Taylor & Francis. Inc. 321 pp. ISBN 0748402217.

Shaw, I. and J. Chadwick. 1998. *Principles of Environmental Toxicology*. Taylor & Francis. Inc. 216 pp. ISBN 0748403557.

Moriarty, F. 1986, *Ecotoxicology*. Academic Press. 289 pp. ISBN 0125067623

Baird, D.J. et al. 1996. *ECOTOxicology: Ecological Dimensions*. Chapman & Hall Inc. 89 pp. ISBN 0412754908.

Hoffman, D. et al. 1995. *Handbook of Ecotoxicology*. Lewis Publishers. 755 pp. ISBN 0873715853.

Peterle, T. 1991. *Wildlife Toxicology*. Van Nostrand Reinhold Inc. 322 pp. ISBN 0442004621.

3c. Evaluation and Grading Procedure

The specifics of grading will be left up to the instructor teaching the course, but typically students will be evaluated by their participation in class discussions, laboratory reports, exams and a research paper with an oral presentation.

Class participation: Students are expected to actively participate in class, read the chapters ahead of time, come prepared to ask questions, answer questions, and make critical and relevant comments.

Laboratory reports: Students will write formal lab reports. Students will work in-groups of 3-4 students. Graduate students will be the "group coordinators". Each group will be given a water sample that will be tested for acute, chronic population changes and

microbiology toxicity during the semester. There will be one long-term (chronic toxicity) lab project and 4-5 short-term (acute/population/microbiology) lab projects.

Exams: The major points of each reading assignment will be discussed in class, as well as difficult concepts, and will constitute the core of the exams.

Research paper: Undergraduate students will write a seven to ten pages library research paper on one of the selected topics. Graduate students will conduct a hands-on research and will write a 15-20 page paper. Undergraduate papers should have a minimum of five to seven references dated after 1990. Graduate papers should have a minimum of eight to twelve references dated after 1990.

3d. Course evaluation:

The Biological Science Department, as a whole, routinely reviews the Department's courses to assess the courses' success in meeting the goals and objectives of the College and the program.

4. RESULTS OF CONSULTATION:

Since this is essentially a "split" of a currently existing course, no outside consultation was done. No other Rowan University department offers a course with a similar content. Consultation with the College of Engineering was done at the time the undergraduate course was approved.

5. ADDITIONAL INFORMATION: none

6. CATALOG DESCRIPTION: see next page

This course covers topics related to the fate and impact of pollutants in the environment. This course deals with laws and regulations regarding pollutant discharges, the kinds of chemical pollutants, the transport and distribution of such chemicals into the environment, and their effect on population and communities as well as individual organisms. The acute and chronic effect of these pollutants, the principles of environmental monitoring and assessment, and special examples and case studies will be analyzed. Hands-on research will be carried out in toxicological testing during the semester.