



**COLLEGE CURRICULUM COMMITTEE**

Date of open hearing (if necessary) 11/30/99 Approved X Not Approved \_\_\_\_\_  
Comments: Passed subject to minor changes - grading policy should be less instructor specific. We are pleased the Dept is examining the issue of prerequisites for upper level courses  
Signature of College Chair/Date: M. O'H. 11/30/99

O.K. - M. O'H. 12/20/99

**UNIVERSITY CURRICULUM COMMITTEE**

Date Received/Processed 2/5/00  
Comments:  
Curriculum Chair Signature [Signature] Date Announced At Senate 2/14/00

**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] 2/9/00

**REGISTRAR**

Date Approved Course Description Received \_\_\_\_\_ Hegis Taxonomy & Course Number Assigned 0402.410  
Registrar Signature/Date Robert A. Kulot 2/15/00

**NOTIFICATION FORWARD**

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

**Rowan University**  
**Department Biological Sciences**

**New Course Proposal:**  
**Stream Ecology**

**1. DETAILS**

**1a. Course Title:** Stream Ecology 0402.410

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

**1c. Credit Hours:** 4 s.h.

**1d. Course Level:** Undergraduate (400-level HEGIS numbered requested)

**1e. Curricular Effect:** This course is the last of four series courses in aquatic ecology (Marine Biology, Limnology, and Estuarine Ecology), and will increase the diversity of courses offered within the Ecology track. The Department will offer this course every other year.

**1f. Prerequisites:** Biology I (0401.100), and II (0401.101).

**1g. Suggested Time and Scale of Implementation:** Fall 2000

**1h. Adequacy of present Staff, Resources, and Library Facilities:** adequate. This course will not increase the course offering each semester. This course will be taught instead of the other aquatic courses in certain semesters.

**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 three undergraduate courses on aquatic environments: Estuarine Ecology, Marine Biology and Limnology. This course is the last of the series to cover all aquatic environments. The number of students interested in Ecology/Environmental Sciences has been increasing in the last 10 years. Many of our students are interested in aquatic environments. Stream Ecology will either complete the series of aquatic courses for students interested in the Aquatic track within Ecology, or give another biology elective option to interested students.

Over the past three decades, stream ecology has emerged from its status as a subdiscipline of Limnology into an ecological discipline in its own right. Stream ecology is one of the most active areas of research in aquatic ecology, and nationwide there has been a rapid increase in teaching stream ecology at the upper undergraduate and graduate levels at major colleges and universities. The offering of this course here at Rowan will bring us to par with the educational trend in aquatic ecology.

### **3. ESSENCE OF THE COURSE:**

#### **3a. Objectives**

The objective of this course is to provide students with an understanding of the ecology of running waters. The diversity of running water environments is enormously broad. When one considers torrential mountain brooks, large rivers of lowlands, great rivers whose basins occupy subcontinents, and even small hidden creeks, it is apparent how location-specific environmental factors contribute to the uniqueness and diversity of running waters. At the same time, our understanding of ecological, hydrological and geomorphologic process provides insight into the functional and structural characteristics of river systems that brings a unifying framework to this area of study. And as it is true for every area of ecology during the closing years of the twentieth century, and the upcoming new millennium, the study of creeks, streams and rivers cannot be addressed excluding the role of human activities, nor can we ignore the urgent need for conservation.

#### **3b. Topical Outline/Content:**

Stream ecology is the area of study concerned with the physical, chemical, biological and ecosystems processes in creek, streams and rivers. The course is divided into four parts. Part one deals with the physical processes that create, shape and change catchment basins, stream reaches and channel units, as well as stream flow analysis. Part two deals with the major classes of inorganic and organic chemicals, their entry into the stream environment and their transport, storage and retention within the stream environment. Part three deals with the living organisms (algae, micro and macroinvertebrates, and fish) that live in creeks, streams and rivers, and their community interactions. Part four is a holistic approach to stream ecology, looking at ecosystem processes such as primary and secondary productivity, organic budgets, nutrient enrichments, and biotic indicators of environmental quality.

#### **Course Outline**

##### Part One

Introduction

Catchment Basins

Stream Reaches and Channel Units

Stream Geomorphology Lab

Streamflow analysis

Flow dynamics

Flow analysis Lab

Temperature, Light and Oxygen

Hyporheic Lab

##### Part Two

Suspended Sediments

Solute Dynamics

Suspended Sediment Lab

Nitrogen and Phosphorous

Nutrient Lab

Transport and Storage of FPOM

Transport and Retention of CPOM

Organic Matter Lab

### Part Three

Benthic Algae: Distribution, Structure and Biomass  
Microorganisms  
Bacteria, Algae and microinvertebrate Lab  
Meiofauna  
Macroinvertebrates  
Benthic macroinvertebrates Lab  
Fish Communities  
Plant-Herbivore Interactions  
Predator-Prey Interactions  
Trophic relationships of macroinvertebrates  
Trophic Lab  
Trophic Relationships of Fishes  
Stream Food Webs  
Fish Lab

### Part Four

Primary Productivity  
Secondary production  
Productivity Lab  
Organic Matter Budgets  
Nutrient Enrichment  
Enrichment Lab  
Surface Interactions  
Biotic Indicators of Environmental Quality  
Biomonitoring Lab  
Modification of running waters by humankind

### **Textbooks available:**

Hauer, F.R. and Lamberti, G.A. 1996. *Methods in Stream Ecology*. Academic Press. 674 pp. ISBN 012332906X.

Allan, J.D. 1996. *Stream Ecology*. Chapman & Hall Inc. 388 pp. ISBN 0412294303.

Naiman, R.J. and Bilby, R.E. 1988. *River Ecology and Management*. Springer Inc. 540 pp. ISBN 0387983236.

### **3c. Evaluation and Grading Procedure of Students:**

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 singly or in-groups of 3-4 students depending on the lab assignment. Students are expected to read the lab exercise prior to coming to the lab.

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: Students will conduct a hands-on research in a nearby creek, stream or river and will write a 15-20 page paper. Papers should have a minimum of five to seven references dated after 1990. The paper will follow the criteria of scientific research, a) Abstract, b) Introduction, c) Materials and methods, d) Analysis of results, e) Discussion of results, f) Conclusions and g) References.

**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 a course only for Biology majors within the Biological Science curriculum, no outside consultation was done. No other Rowan University department offers a course with a similar content.

**5. ADDITIONAL INFORMATION:** none

**6. CATALOG DESCRIPTION:** see next page

## **Catalog description**

0402.4XX

Stream Ecology

(Prerequisites: 0401.100, 0401.101)

This course covers topics in the area of study concerned with the physical, chemical, biological and ecosystems processes in creek, streams and rivers (so called lotic environments or related running waters). The course has a strong laboratory component with hands-on research in an effort to understand local stream ecology.