2-26-1998

Curricular Report No. 1997-98-5A from the Graduate Council to the Faculty Senate: Proposal for a Masters of Science in Environmental Sciences

University of Rhode Island Faculty Senate

Serial Number #97-98--18

UNIVERSITY OF RHODE ISLAND
Kingston, Rhode Island
FACULTY SENATE
BILL
Adopted by the Faculty Senate

TO: President Robert L. Carothers

FROM: Chairperson of the Faculty Senate

1. The attached BILL, titled Curricular Report No. 1997-98-5A from the Graduate Council to the Faculty Senate: Proposal for a Masters of Science in Environmental Sciences, is forwarded for your consideration.

2. The original and two copies for your use are included.

3. This BILL was adopted by vote of the Faculty Senate on February 26, 1998.

4. After considering this bill, will you please indicate your approval or disapproval. Return the original or forward it to the Board of Governors, completing the appropriate endorsement below.

5. In accordance with Section 10, paragraph 4 of the Senate's By-Laws, this bill will become effective March 19, 1998, three weeks after Senate approval, unless: (1) specific dates for implementation are written into the bill; (2) you return it disapproved; (3) you forward it to the Board of Governors for their approval; or (4) the University Faculty petitions for a referendum. If the bill is forwarded to the Board of Governors, it will not become effective until approved by the Board.

February 27, 1998
(date)

Leland Jackson
Chairperson of the Faculty Senate

ENDORSEMENT

TO: Chairperson of the Faculty Senate

FROM: President of the University

Returned.

a. Approved ____.

b. Approved subject to final approval by Board of Governors ✓. 3/18/99

c. Disapproved ____.

3.9.98
(date)

President

Form revised 9/91

UNIVERSITY OF RHODE ISLAND
The Graduate School

Curricular Report from the Graduate Council to the Faculty Senate
Report No. 1997-1998-5A

MASTERS OF SCIENCE DEGREE IN ENVIRONMENTAL SCIENCES

At Meeting No. 344 held on 23 January, 1998, the Graduate Council approved the following proposal which is now submitted to the Faculty Senate.

S E C T I O N I

BACKGROUND INFORMATION

ABSTRACT

The Graduate Council approved the proposal for a Masters of Science degree in Environmental Sciences and voted to recommend approval at the Class A level (the program is deemed to be of such merit as to justify the recommendation of the immediate allocation of funds for its implementation). The proposed multidisciplinary program would be offered through the College of Resource Development. The new program would replace four existing degree programs, admissions for the latter three of which were suspended in 1995: M.S. in Natural Resources, M.S. in Entomology, M.S. in Geology, and M.S. in Plant Science. The M.S. in Environmental Sciences would offer both thesis and non-thesis options.

BACKGROUND

The M.S. in Environmental Sciences is designed to prepare students to address the environmental issues of our region, the Nation, and the world through a more effective integration of existing programs. Consolidation of the four programs creates in a single degree program a diversity of environmental science graduate opportunities unlike any other in the Northeast.

The proposal was reviewed under the new process established by the Faculty Senate in which the Graduate Council serves as the Coordinating and Review Committee for new graduate program proposals. Announcements of the receipt of the proposal were sent to the President and the Joint Educational Policy Committee, the Provost and the Council of Deans, the Budget Office, and Department Chairs and Graduate Directors. Recommendations were sought from each of these groups. Received comments and recommendations are appended, have been kept on file in the Graduate School, and were considered in the Graduate Council's review.

The Budget Office concluded that the M.S. in Environmental Sciences would require no new resources. The proposal elicited no negative comments from the Council of Deans, and it was endorsed by the Joint Educational Policy Committee.

S E C T I O N II

RECOMMENDATION

The Graduate Council approved the following proposal for a new Masters of Science degree in Environmental Sciences, and presents it to the Faculty Senate with the recommendation that it be approved at the Class A level - the program is deemed to be of such merit as to justify the recommendation of the immediate allocation of funds for its implementation.

PROPOSAL FOR A MASTERS OF SCIENCE DEGREE IN ENVIRONMENTAL SCIENCES (Thesis and Nonthesis Options)

A. PROGRAM INFORMATION

1. Name of Institution:

The University of Rhode Island

2. Departments and Colleges Involved:

Departments of Geology, Natural Resources Science, and Plant Sciences; College of Resource Development

3. Title of Proposed Program:

M.S. Environmental Sciences (Thesis and Nonthesis Options)

4. Effective Date of Change:

September 1998

5. Anticipated Date for First Degree Granted:

May 2000

6. Intended Location of Program:

Kingston Campus of the University of Rhode Island

7. Institutional Review and Approval Process:

	Date approved
Department of Geology	1/22/97
Department of Natural Resources Science	1/24/97
Department of Plant Sciences	10/20/97
College of Resource Development	11/19/97
Graduate Council	1/23/98
Faculty Senate	2/26/98
President of the University	

8. **Summary of the Proposed Program Change:** The Masters of Science in Environmental Sciences, which will be made available through the College of Resource Development, is proposed as a multidisciplinary degree program for those students who wish to pursue graduate education in environmental science or management. The new program would replace four existing degree programs, the latter three of which were suspended in 1995: M.S. in Natural Resources, M.S. in Entomology, M.S. in Geology, and M.S. in Plant Science. It is a comprehensive and multifaceted program that is designed to prepare students to address the challenging environmental issues of our region, the Nation, and the world through a more effective integration of existing programs. Consolidation of these four programs, along with their attendant faculty, research specializations, and course offerings will create, in one degree program, a diversity of environmental science graduate opportunities unparalleled in the Northeast.

9. **Statement on Resource Needs:** Implementation of the Masters of Science in Environmental Sciences degree program will require no new or additional resources.

10. **Signature of the President**

_____

Robert L. Carothers

11. **Persons to be Contacted During the Review**

Dean Margaret Leinen
College of Resource Development
Woodward Hall
874-2957

Blair M. Lord
Vice Provost
Academic Programs
874-2447

Associate Dean William Wright
College of Resource Development
Woodward Hall
874-2904

B. RATIONALE

In 1995, Masters of Science programs in Entomology, Geology, and Plant Science were suspended after the University's Program Contribution Analysis. For the last two years, these suspended programs have continued to enroll students under the aegis of the Masters of Science in Natural Resources. This situation has provided an opportunity for the participating faculty to explore new and exciting multidisciplinary research interactions and to collaborate on development of a new degree program. The proposed Masters of Science in Environmental Sciences degree program offers a long-term solution to the program suspensions and, at the same time, forges an interdepartmental alliance that could easily develop into one of the strongest, most diverse environmental science units in the Northeast.

The Masters of Science in Environmental Sciences program would replace existing Masters of Science degree programs in Entomology, Geology, Plant Science, and Natural Resources. Coupled with a new Ph.D. degree in Environmental Sciences (separate proposal attached), this new M.S. degree would make URI both more visible and more attractive to students from across the Nation who are planning careers in earth and ecological sciences and environmental management. Consolidation of existing programs has the added benefit of stimulating greater collaboration in teaching and research among the faculty and students from the three departments represented. The clientele attracted to this new program would be similar in background, training, and interests to those found in the existing programs; but, in addition, students who are interested in a more interdisciplinary approach to environmental science would also be attracted to the program.

The Departments of Geology, Natural Resources Science, and Plant Sciences have offered M.S. degrees with both thesis and nonthesis options for quite some time (e.g., about 14 years in NRS). Thesis and nonthesis options are retained under the proposed M.S. degree as well, in order to meet the needs of two very different groups of students. The first group is pursuing a research career; many of these students plan to go on for a Ph.D. degree or into environmental consulting positions where a research background is needed to qualify one as an expert witness. The second group is preparing mainly for positions in natural resource management, regulatory (government agency) work, science education, or public outreach. By continuing to offer both thesis and nonthesis options we can maximize the variety of student needs that we can satisfy.

C. INSTITUTIONAL ROLE

As a result of a detailed examination of all University academic programs, President Carothers recently identified four major focus areas through which he believed the University had a clear opportunity to excel, both regionally and nationally; one of those areas was labeled the "Marine and Environmental Focus". Revamping of graduate degree programs within the College of Resource Development represents a major step toward the President's goal.

URI--and the College of Resource Development in particular --already has an excellent reputation in the environmental sciences, not only in research, but also in teaching and outreach. The diversity of environmentally related courses and fields of study represented on the Kingston and Narragansett Bay Campuses is outstanding. Creation of the Masters of Science in Environmental Sciences program is a formal way of harnessing that diversity and focusing it for the benefit of students and institution alike.

D. INTERINSTITUTIONAL CONSIDERATIONS

Development of the Masters of Science in Environmental Sciences program will have only a positive effect on other institutions of

higher education in this state. The strengthening of existing programs and enhanced visibility for environmental science at URI may provide attractive opportunities for graduates of the other state institutions who might wish to pursue graduate study in that field. The University of Rhode Island clearly leads the other institutions in the number of students who are taught in environmental curricula--graduate and undergraduate--and in the breadth and depth of environmental research. Creation of this new graduate degree program does not represent an expansion of our role, for the topics that we address will not change markedly; the new degree will only help us to do what we do in a more comprehensive and integrated fashion.

E. CONTENT

1. **Overview:** The proposed Masters of Science in Environmental Sciences is a multidisciplinary, interdepartmental degree featuring thesis and nonthesis research on a broad array of basic and applied environmental science topics, as well as a diversity of coursework centered primarily in the earth, ecological, and life sciences. Initially, this program will serve graduate students from the Departments of Geology, Natural Resources Science, and Plant Sciences; in future years, it may be expanded to accommodate other related disciplines as well.

   The Masters of Science in Environmental Sciences will replace the following programs:

   a. Masters of Science in Entomology, Thesis Option
   b. Masters of Science in Geology, Thesis and Nonthesis Options
   c. Masters of Science in Natural Resources, Thesis and Nonthesis Options
   d. Masters of Science in Plant Science, Thesis and Nonthesis Options

2. **Admission Requirements:** GRE and bachelor's degree in a biological science, a physical science, or engineering. Applicants with course deficiencies may be required to take appropriate undergraduate courses, for no program credit, and to demonstrate, by their performance in such coursework or through a qualifying exam, basic knowledge of the subject matter in the area(s) of deficiency.

3. **Program Requirements:** For thesis option, six credits of thesis and a minimum of 24 credits of coursework, including graduate seminar. An oral preliminary examination may be required for certain fields of study. For nonthesis option, a minimum of 36 credits of coursework, including graduate seminar and at least 14 credits of coursework from the home department, 3 credits of Nonthesis Master's Research (EVS 598), 3 credits of statistics, and a written comprehensive examination. An oral preliminary examination and advanced seminars may be required in certain fields of study.

4. **Fields of Study Represented:** The Masters of Science in Environmental Sciences will incorporate, at a minimum, the various fields of study listed below. (NOTE: Formal specializations will be far fewer in number, but given the urgent need to reinstate the CRD Master's degree programs that were suspended, specializations are not being proposed at this time. They will be proposed as soon as the Environmental Sciences Faculty have had full opportunity to draft and discuss them as a group. In the interim, decisions on specific program requirements will be made by each student's program committee).

sedimentology
stratigraphy/paleontology
coastal geomorphology
glacial geology
hydrogeology
applied geophysics
geoarchaeology
remote sensing
petrology
structure and tectonics
planetary geology
soil chemistry
soil biochemistry
soil genesis and classification
soil morphology & land use
water resources science
wildlife ecology and management
wetland ecology
forest science
microbial ecology
GIS and spatial analysis
landscape ecology
conservation biology
plant ecology and physiology
plant molecular biology and genetics
plant pathology
plant protection
environmental horticulture
environmental plant biology
sustainable agriculture
entomology
integrated pest management

5. **Existing Program Courses:** Course selections for the Masters of Science in Environmental Sciences will come primarily from existing offerings by the Departments of Geology (GEL), Natural Resources Science (NRS), and Plant Sciences (PLS, ENT); a complete listing appears below. These courses will be supplemented by other graduate courses from related departments, both in and out of the College, such as Biological Sciences; Civil and Environmental Engineering; Biochemistry, Microbiology, and Molecular Genetics; Fisheries, Animal and Veterinary Science; Food Science and Nutrition; Oceanography; Statistics; Community Planning and Area Development; Environmental and Natural Resource Economics; and Marine Affairs.

ENT 519 Insect Biological Control
ENT 520 Insect Morphology and Physiology
ENT 529 Systems Science for Ecologists
ENT 533 Graduate Writing in Life Sciences
ENT 544 Insect Ecology
ENT 550 Insect Taxonomy and Systematics
ENT 555 Insect Pest Management
ENT 561 Aquatic Entomology
ENT 571 Insect Microbiology
ENT 591, 592 Special Problems in Entomology

GEL 401 Ore Deposits
GEL 421 Geochemistry

GEL 450 Introduction to Sedimentary Geology
GEL 465 Introduction to Geophysics
GEL 468 Ground-Water Chemistry
GEL 483 Hydrogeology
GEL 485 Environmental Engineering Geophysics
GEL 488 Geological Evolution of North America
GEL 515 Glacial Geology
GEL 530 Igneous Petrology
GEL 531 Metamorphic Petrology
GEL 550 Sedimentary Processes and Environments
GEL 554 Sedimentary Petrology
GEL 565 Geophysical Models
GEL 568 Isotopes in Hydrogeology
GEL 577 Coastal Geologic Hazards
GEL 580 New England Geology
GEL 581 Topics in Tectonic Geology
GEL 583 Ground-Water Modeling
GEL 590, 591 Special Problems

NRS 402 Wildlife Biometrics
NRS 406 Wetland Wildlife
NRS 407 Nongame and Endangered Species Management
NRS 409 Concepts in GIS
NRS 410 Fundamentals of GIS
NRS 412 Soil-Water Chemistry
NRS 423 Wetland Ecology
NRS 424 Wetlands and Land Use
NRS 425/525 Wetland Field Investigations
NRS 426 Soil Microbiology
NRS 440 Ecosystem Processes in Land and Water Management
NRS 441 Methods in Ecosystem Analysis
NRS 450 Soil Conservation and Land Use
NRS 451 Soil and Water Conservation Technology
NRS 461 Hydrology and Water Management
NRS 471 Soil Morphology and Mapping
NRS 500 Graduate Seminar in Natural Resources
NRS 505 Biology and Management of Migratory Birds
NRS 509 Concepts of GIS and Applications in Environmental Science
NRS 510 Soil-Water Relations
NRS 522 Advanced GIS Analysis of Environmental Data
NRS 523 Water Pollution Microbiology
NRS 526 Microbial Ecology of Soils and Sediments
NRS 532 Conservation Biology
NRS 534 Ecology of Fragmented Landscapes
NRS 555 Applied Coastal Ecology
NRS 567 Soil Genesis and Classification
NRS 568 Recent Advances in Natural Resources Science
NRS 582 Seminar in Soil Ecology and Biochemistry
NRS 591, 592 Special Problems

PLS 405 Propagation of Plant Materials
PLS 436 Floriculture and Greenhouse Crop Production
PLS 440 Diseases of Turfgrasses, Trees, Shrubs, and Ornamental Shrubs
PLS 441 Plant Disease Laboratory
PLS 442 Professional Turfgrass Management
PLS 461 Weed Science

PLS 463 Principles of Plant Disease Control
PLS 471 Plant Improvement I
PLS 472 Plant Improvement II
PLS 475 Plant Nutrition and Soil Fertility
PLS 476 Environmental Plant Physiology
PLS 501, 502 Graduate Seminar in Plant Sciences
PLS 511 The Nature of Plant Disease
PLS 512 Plant Growth and Development
PLS 513 Laboratory Plant Tissue Culture
PLS 572 Plant Biochemistry
PLS 576 Environmental Plant Physiology
PLS 591, 592 Nonthesis Research in Plant Sciences

6. **New Program Courses:**

EVS 598 Nonthesis Master's Research (I and II) Independent investigation to satisfy research requirement under nonthesis option of M.S. degree in Environmental Sciences. Substantial paper required. (Independent Study)

EVS 599 Master's Thesis Research (I and II) To be taken by students in the Masters of Science in Environmental Sciences degree program. Number of credits is determined each semester in consultation with the major professor or program committee. (Independent Study) S/U credit.

7. **Program Faculty:** Initially, all tenure-track Graduate Faculty in the Departments of Geology, Natural Resources Science, and Plant Sciences would be eligible to supervise, or serve on the committees of, graduate students enrolled in the Masters of Science in Environmental Sciences degree program. Those faculty are listed below along with adjunct faculty, who also may serve on graduate student committees. In future years, other faculty from the College of Resource Development may be added to the list, provided that their training and research expertise are within the field of environmental science.

Steven R. Alm, Associate Professor, PLS
Jose A. Amador, Assistant Professor, NRS
Peter V. August, Professor and Chair, NRS
Carl H. Beckman, Professor Emeritus, PLS
Jon C. Boothroyd, Professor, GEL
James H. Brown, Professor Emeritus, NRS
P.A. Buckley, Adjunct Professor, NRS
J. Allen Cain, Professor, GEL
Richard A. Casagrande, Professor, ENT (PLS)
Joel M. Chandlee, Associate Professor, PLS
Jana E. Compton, Assistant Professor, NRS
Stephen L. Dellaporta, Adjunct Assistant Professor, PLS
D. Thomas Duff, Associate Professor Emeritus, PLS
Larry Englander, Associate Professor, PLS
David E. Fastovsky, Professor, GEL
Reinhard K. Frohlich, Associate Professor, GEL
Alan D. Gettman, Adjunct Assistant Professor, ENT (PLS)
Howard S. Ginsberg, Adjunct Associate Professor, ENT (PLS)

Arthur J. Gold, Professor, NRS
Francis C. Golet, Professor, NRS
Josef Gorres, Adjunct Assistant Professor, NRS
0. Don Hermes, Professor and Chair, GEL
Richard J. Hull, Professor, PLS
Thomas P. Husband, Professor, NRS
Noel Jackson, Professor, PLS
William R. Krul, Associate Professor, PLS
Roger A. LeBrun, Professor, ENT (PLS)
Patrick A. Logan, AES Director and Professor, ENT (PLS)
Thomas N. Mather, Associate Professor, ENT (PLS)
Brian K. Maynard, Assistant Professor, PLS
Walter C. Mueller, Professor Emeritus, PLS
Daniel P. Murray, Professor, GEL
Peter W.C. Paton, Assistant Professor, NRS
Eric M. Roberts, Adjunct Assistant Professor, PLS
Bridget A. Ruemmele, Associate Professor, PLS
Richard J. Shaw, Associate Professor, PLS
Mark H. Stolt, Assistant Professor, NRS
W. Michael Sullivan, Associate Professor and Chair, PLS
Raymond B. Taylorson, Adjunct Professor, PLS
Anne I. Veeger, Associate Professor, GEL

F. EVALUATION

The program will be evaluated annually by the College of Resource Development's Graduate Programs Committee and by the University as part of the annual program review. Key criteria at the College level will be total enrollment and number of graduates. If enrollments are low despite vigorous recruitment efforts, the viability of the program will be reviewed and changes will be made to remedy the problem.