

Reasonable and Moderate Extension (RME) Format**

FORMAT FOR PROPOSED ADDITION/ABOLITION, REALLOCATION, OR
RE-ESTABLISHMENT OF AN EDUCATIONAL UNIT, CURRICULUM, OR DEGREE

I. Program inventory

A. Current

<u>CIP</u>	<u>Major</u>	<u>Specialization/ Concentration</u>	<u>Degree</u>	<u>Unit</u>
26.0701	Zoology	None	Ph.D.	Zoology

B. Proposed

<u>CIP</u>	<u>Major</u>	<u>Specialization/ Concentration</u>	<u>Degree</u>	<u>Unit</u>
26.0701	Zoology	Ecology	Ph.D.	Zoology

II. Reason for proposed action

The Department of Zoology at Southern Illinois University Carbondale proposes a new concentration in ecology for Ph.D. students. Ecology is a multi-disciplinary field that represents the study of organisms and their environment. It incorporates some elements of our traditional life sciences units and programs (Plant Biology, Microbiology, Anthropology, and Zoology [including the Fisheries and Wildlife programs]) as well as Agriculture (Department of Forestry, Department of Agribusiness Economics, and Department of Plant Soil and General Agriculture), Anthropology, Geology, and Geography. Ecology is a quantitative, interdisciplinary field that focuses on understanding interactions between organisms and the environment (basic ecology) and human interactions with nature (applied ecology).

The Department of Zoology, as well as SIUC in general, has an excellent track record in ecology, as evidenced by the successful development of an active Center for Ecology (currently 47 on campus faculty members are members of the Center for Ecology), high level of external funding for ecological research, the large number and high quality of ecological publications produced, and the number and quality of graduate students trained in the area of ecology. Although several departments including Zoology offer Ph.D. degrees, we currently do not offer a Ph.D. in ecology, even though many doctoral students are focused in this area. The Center for Ecology serves as a mechanism to promote ecological research and education at SIUC, but is not a degree granting entity. This concentration will allow students in the Department of Zoology who are being trained as ecologists to gain formal (and transcriptable) recognition of their training and expertise in the area of ecology. There are currently 30 Ph.D. students in the Department of Zoology; at least 1/3 of these have indicated they will pursue this concentration when it is offered.

Current Ph.D. programs in Zoology and other areas of the Life Sciences are successful, but they are limited in that they do not convey the multidisciplinary, ecological training that many students are receiving. We have many graduate students across numerous programs who are currently being trained as ecologist, but we do not recognize this with a formal degree in the field; a concentration in Ecology will more accurately reflect the breadth of their training. In addition, offering this concentration will improve our ability to recruit excellent graduate students and foster collaboration among faculty in different departments. In just the past year, Center for Ecology personnel were contacted by at least 12 prospective students considering graduate studies at SIUC who inquired about graduate degrees or degree tracks/concentrations in Ecology. This concentration will build on the strong existing level of ecological expertise and interdepartmental cooperation and collaboration that has been fostered through the Center for Ecology.

A concentration in ecology more accurately reflects a student's training in areas of the Biological Sciences beyond Zoology, such as Conservation Biology, Ecosystems Studies, Environmental Science, and Restoration Ecology. According to the Bureau of Labor and Statistics, the 10 yr job outlook for Zoologists should increase 13%. The 10 yr job outlook should increase by 21% for Biologists, 12% for Conservation Scientists, and 28% for Environmental Scientists, all of which are related to the field of Ecology. Two other programs, the Department of Plant Biology and Environmental Resources and Policy, are also in the process of adding this concentration to their doctoral programs.

The proposed concentration in Ecology will require only minor changes to the current Zoology Ph.D. degree program. Students pursuing this concentration will be required to have a graduate advisory committee with members from at least 2 different departments at SIU and/or institutions other than SIUC and will be required to take an interdisciplinary graduate readings in ecology course (currently listed as PLB 589a; this course will be cross-listed in Zoology as part of the development of this concentration).

III. Anticipated budgetary effects

None; this concentration draws on existing resources. However, it is anticipated that offering the concentration in Ecology will enhance graduate enrollment in the department, as an increasing number of prospective graduate students are seeking programs and degrees in ecology.

IV. Arrangements to be made for (a) affected faculty, staff and students; and (b) affected equipment and physical facilities

- a. Affected faculty members. The only affected faculty members will be those who rotate through overseeing the graduate readings in ecology course with a faculty member from Plant Biology. This is a 1 credit hour course that meets once a week; participation by Zoology will require that one faculty member from the department help oversee this course each semester that it is offered. This will be accomplished through a volunteer basis and/or assignment of the 1 credit hour teaching assignment at the Chair's discretion. Students and staff will not be affected, except for doctoral students who choose to pursue this concentration (see requirements for concentration in Section II).
- b. Equipment and physical facilities will not be affected.

V. Will other educational units, curricula, or degrees be affected by this action

Other units, curricula, or degree programs will not be affected by this action. However, we anticipate that some other departments and programs, including but not limited to Plant Biology, Microbiology, and Forestry, will also develop a similar concentration in Ecology for their respective doctoral degree programs.

VI. Any other relevant information

VII. Catalog copy to be deleted or added

VIII. The requested effective date of implementation

August 15, 2012

****This request is required to go through the office of the Associate Provost for Academic Affairs before approval of the Faculty Senate and/or Graduate Council.**

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MAR 04 2011



DEAN'S OFFICE
College of Science

(Form 90-A)

Notice of Change of Academic Requirements
Southern Illinois University Carbondale

This form should be used for requesting changes in requirements of a degree granting unit, major, minor, concentration, specialization, certificate program and miscellaneous changes of any academic program. (See instructions)

1. This change is for: Graduate Catalog

(Please submit two forms if change relates to both graduate and undergraduate programs)

2. Name of units, department:

a. Degree granting academic unit (College or School) College of Science

b. Department or Division Zoology

c. Degree Type (BS, MS etc) PhD

d. Major

e. Minor

f. Concentration Ecology

g. Specialization Ecology

3. Brief Summary of Change (use additional page if necessary):

Addition of an Ecology ^{Concentration} Specialization for students pursuing the Ph.D. in Zoology. This addition requires no additional resources and provides students in the Zoology department who are being trained as ecologists to formally specialize in Ecology and earn a degree that reflects that specialization. ~~Concentration~~.

4. Specific Changes:

If changes are editorial and minor, please make a copy of the actual catalog page(s) with corrections made on the copy and attach to this form. If changes are extensive, please type new catalog copy on white bond paper, double-spaced, outlining what you recommend for the appropriate catalog and attach to this form.

5. Effective term will be the next published catalog: (Academic Support Programs use only).

6. Approved:

a. Departmental Executive Officer William M. Lock 3/4/11
Date

b. Dean Prof. McMan 11-2-11
Date

c. Dean of the Graduate School
(for graduate programs) _____
Date

d. Associate Provost (Academic Affairs) _____
Date

7. Academic Support Programs:

Date

DISTRIBUTION IS MADE AFTER ACTION IS RECORDED BY ACADEMIC SUPPORT PROGRAMS (ASP) Copies to ASP; Dept; Office of Provost & VC; Dean
Revised May 2006

NOV 03 2011 MP

no
Concentration

~~Specialization in Ecology~~. Students opting to declare Ecology as a ~~specialization~~ ^{concentration} shall follow the same program as students in the Zoology Ph.D. degree program that do not declare a ~~specialization~~ ^{concentration} subject to the following: The Seminar in Ecology (PLB 589a) or equivalent (equivalent agreed upon by the student's committee) must be taken once each year until a student achieves candidacy. The research tool shall be statistics. The student's advisory committee shall consist of at least two members from outside the Department of Zoology.

Note that PLB 589a will be cross-listed with Zoology

534-3 Wildlife Habitat Analysis. Physical, biological and behavioral factors that influence habitat use and selection by wild vertebrate populations. Landscape level analysis of wildlife habitats. Modeling habitat suitability, environmental impact and wildlife population dynamics with habitat data. Application and use of remote sensing and geographic information systems in natural resource management and habitat evaluation. One two-hour lecture and one two-hour laboratory per week. Prerequisite: consent of instructor.

545-3 Ecosystem Ecology. (Same as PLB 545) Fundamentals of and human modification to atmospheric chemistry and cycling of major nutrients in terrestrial ecosystems are covered in the context of global change. Laboratory exercises provide methodology and analytical approaches to studying ecosystem structure and function. Two lectures a week and one four-hour lab alternate weeks.

554-1 to 4 (1 per semester) Evolution Seminar. (Same as Anthropology 554, Molecular Biology, Microbiology and Biochemistry 554, Plant Biology 554) Advanced topics in evolutionary biology including genetics & development, evolutionary ecology, phylogeny, paleontology, biogeography, population genetics, molecular ecology, speciation, molecular evolution, and macroevolution. Topics will vary each semester. Seminar format with group discussions and student presentations. Graded S/U. Prerequisite: consent of instructor.

556-3 Phylogenetics. (Same as ANTH 556, MBMB 556, and PLB 554) An advanced introduction to modern methods of phylogenetic inference, emphasizing both theoretical background concepts and numerical approaches to data analysis. Topics include properties of morphological and molecular characters, models of character evolution, tree estimation procedures, and tree-based testing of evolutionary hypotheses. Prerequisite: consent of instructor.

557-4 Biostatistics. (Same as Plant Biology 557) Basic biostatistics procedures used by researchers in life sciences and related fields. Topics include descriptive statistics, probability and distributions, statistical models, likelihood methods, experimental design, analysis of variance, regression, correlation, and the use of statistical software.

558-4 Advanced Biostatistics. (Same as Plant Biology 558) Advanced biostatistical procedures used by researchers in life sciences and related fields. Topics include multiple and logistic regression, randomization tests, jackknife and bootstrap, Mantel tests, BACI designs, MANOVA, repeated measures analysis and the use of statistical software. Prerequisite: 557, Plant Biology 557 or equivalent.

564-1 to 2 Aquaculture Techniques. Practical experience in aquaculture techniques. Course consists of modules which require student participation in hands-on experience, (e.g., spawning, induction of spawning, production of fry, operation and grading, diagnosis and treatment of parasites and diseases, and transporting of fish). One credit for completion of two modules. Register any semester, one year to complete elected number of modules. Written report and examination required for each module. Cost incurred by student varies with modules selected. Prerequisite: 477 or consent of instructor.

565-3 Environmental Physiology of Fish. Synthesis of effects of pollutants on physiological processes of fish. Course begins with an overview of fish physiology. Topics include: concepts, methods, and measurements in aquatic toxicology; histopathological, physiological, and behavioral responses to pollutants; and toxicity of heavy metals, organics, particulates and other pollutants. Three lectures per week. Prerequisite: 465 or consent of instructor.

568-2 Fish Stock Assessment. Methods of characterizing fish populations including mortality rates, age growth analysis, population sampling, yield models, habitat evaluation procedures and creel survey techniques. Two one-hour meetings per week. Prerequisite: 466 or consent of instructor.

569-3 Advanced Fisheries Management. Advanced topics related to the management of fisheries including urban fisheries, native American fisheries, freshwater commercial fisheries, Great Lakes fisheries, impact of power generating plants on fishes, and in-depth consideration of indices of community structure and current topics in fish management. Three lectures per week. Prerequisite: 466 or consent of instructor.

570-3 Advanced Aquaculture. Special topics in aquaculture and practical methods for the production of coldwater, coolwater, warmwater, and tropical aquatic species. Three lectures per week and one weekend field trip. Prerequisite: 477 or equivalent.

573-3 Physiological Ecology. The role of physiological, morphological, and behavioral adaptations and adjustments in the ecology of vertebrate organisms with special emphasis on examining the energy balance and environment as it influences vertebrate ecology. Two hours of lecture and one two-hour laboratory. Prerequisite: Biology 307 or equivalent, and consent of instructor.

576-1 Seminar in Ecology. (Same as PLB 589a.) Discussions of current and historical research and literature in various subject areas of ecology. 1-12 hours; 1 per semester.

577-2 Population Ecology. Principles of population dynamics as related to animals, with application to management and conservation of animal populations. Areas of emphasis include (A) an introduction to mathematical models and graphical theory of population dynamics, (B) application of theory to population management & Conservation, and (C) empirical approaches to studying population and regulation. Prerequisites: BIOL 307 or consent of instructor.

578-3 Population Genetics. (Same as Plant Biology 578) Genetic structure of populations, factors causing changes and principles governing rate and direction of change. Three lectures per week. Prerequisite: 304 or equivalent and Biology 305 or equivalent.

579-3 Molecular Genetics Techniques. Practical experience in molecular genetics techniques currently used in zoology for population genetic analysis and for molecular systematics. Emphasis will be on methods for allozyme, mtDNA and nuclear DNA analysis. Class projects will focus

578-3 Population Genetics. (Same as Zoology 578) Genetic structure of populations, factors causing changes and principles governing rate and direction of change. Three lectures per week. Prerequisite: Zoology 304 or equivalent, and Biology 305 or equivalent.

580-1 to 6 Departmental Seminar. Student presentations and critiques of original research, including presentations by occasional invited speakers. Graded *S/U* only. Required of all graduate students in residence, when offered.

589-1 to 12 (1 per topic per semester) Seminars in Plant Biology-Ecology. (Same as ZOOL 576) Discussions of current and historical research and literature in various subject areas of plant biology. (a) Ecology, (b) Molecular and Biochemical Physiology and (c) Systematics and Biodiversity. Graded *S/U* only.

590-1 to 3 Introduction to Research. General introduction to research techniques. Techniques to be determined by instructor and students. Summer only. Graded *S/U* only. Special approval needed from the instructor and the department.

591-2 to 9 Research. Assignments involving research and individual problems. (a) Anatomy; (b) Bryology; (c) Ecology; (d) Morphology; (e) Mycology; (f) Paleobotany; (g) Pathology; (h) Photography; (i) Phycology; (j) Physiology; (k) Systematics. Master's students may use this for their research for their thesis. Summer only. Graded *S/U*. Special approval needed from the instructor and the department.

599-2 to 9 Thesis. Course to be taken in the preparation of the Master's thesis. Every semester. Special approval needed from the instructor. Graded *S/U* only.

600-1 to 36 (1 to 12 per semester) Dissertation. Course to be taken in the research for and in writing of the doctoral dissertation. Every semester. Graded *S/U* only. Special approval needed from the instructor.

601-1 per semester Continuing Enrollment. For those graduate students who have not finished their degree programs and who are in the process of working on their dissertation, thesis, or research paper. The student must have completed a minimum of 24 hours of dissertation research, or the minimum thesis, or research hours before being eligible to register for this course. Concurrent enrollment in any other course is not permitted. Graded *S/U* or *DEF* only.

March 14, 2012

MEMO TO: Scott Ishman
Graduate Council

FROM: John A. Koropchak
Vice Chancellor for Research
and Graduate Dean

SUBJECT: RME: Addition of Ecology Concentration to PhD in Zoology

Attached is a copy of the Reasonable and Moderate Extension (RME) proposing for the addition of an Ecology concentration to PhD in Zoology for consideration by the Graduate Council. Please forward to the New Programs Committee for review.

Thank you.

JAK/jlw

Attachment

C: David Wilson
Ruth O'Rourke

Approval Form for Curricular Changes

Southern Illinois University Carbondale

1. Department faculty of the unit originating the request						
Outcome of Formal Vote: Votes For <u>19</u> Against <u>0</u>	Date <u>08 Apr 2010</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Responsible Official (Print)	Signature		
2. Appropriate body/official representing the department/unit where the request originated						
Outcome of Formal Vote: Votes For <u>19</u> Against <u>0</u>	Date <u>08 Apr 2010</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Responsible Official (Print)	Signature		
3. College Curriculum Committee or other college-wide faculty bodies where appropriate						
Outcome of Formal Vote: Votes For <u>9</u> Against <u>0</u>	Date <u>10-31-11</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Responsible Official (Print)	Signature		
4. Dean of the unit originating the request						
	Date <u>11-2-11</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Dean (Print)	Signature		
5. Faculty Senate (undergraduate programs)						
	Date	<input type="checkbox"/> Yes <input type="checkbox"/> No	Faculty Senate (Print)	Signature		
6. Graduate Council (graduate programs)						
	Date	<input type="checkbox"/> Yes <input type="checkbox"/> No	Graduate Council (Print)	Signature		
7. Faculty Association						
	Date	<input type="checkbox"/> Yes <input type="checkbox"/> No	Faculty Association (Print)	Signature		
8. Provost and Vice Chancellor						
	Date	<input type="checkbox"/> Yes <input type="checkbox"/> No	Provost and VC (Print)	Signature		
9. Chancellor						
	Date	<input type="checkbox"/> Yes <input type="checkbox"/> No	Chancellor (Print)	Signature		
10. President						
	Date	<input type="checkbox"/> Yes <input type="checkbox"/> No	President (Print)	Signature		
11. Illinois Board of Higher Education (if necessary)						
	Date	<input type="checkbox"/> Yes <input type="checkbox"/> No	IBHE (Print)	Signature		
12. Higher Learning Commission (if necessary)						
	Date	<input type="checkbox"/> Yes <input type="checkbox"/> No	Higher Learning Comm (Print)	Signature		

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