TO: The Senate

From: Talia Bugel, Chair
Curriculum Review Subcommittee

Date: January 27, 2014

Subj: Bachelor of Science in Biology: Concentration in Ecology and Evolutionary Biology.

The Curriculum Review Subcommittee met on January 17, 2014 to review the attached proposal for an Ecology and Evolutionary Biology Concentration for the Bachelor of Science in Biology.

The committee finds that the proposed concentrations require no Senate review.

Approving	Non-approving	Absent
Talia Bugel		Nancy Jackson (Sabbatical leave)
Ron Duchovic		
Craig Hill		
Rebecca Jensen		
Myeong Hwan Kim		
Susan Skekloff		
Steve Sarratore (*ex officio*)		

Pre-Proposal for a Concentration in Ecology and Evolutionary Biology
Indiana University – Purdue University Fort Wayne
October 7, 2013

Prepared by:
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1. Name of proposed new program

Bachelor of Science in Biology with a concentration in Ecology and Evolutionary Biology

2. Title of degree to be conferred

Bachelor of Science

3. Field of study, department, and school involved

Ecology and Evolutionary Biology, Department of Biology, COAS

4. Objectives of the proposed concentration

Ecology and Evolutionary Biology are fundamental to the study of the environment, an area of broad societal concern precipitated by the rapid changes associated with human activity (A New Biology for the 21st Century, NRC 2009, http://www.nap.edu/). The Ecology and Evolutionary Biology (EEB) concentration will serve students with an interest in the complex of interactions between organisms and the surrounding environment. It will prepare students for professions in environmental monitoring, research, and education for positions within governmental agencies, academic institutions, non-governmental organizations, and private industry. This concentration also provides students with fundamental knowledge and skills in preparation for graduate study in the area. There is an emphasis on terrestrial and aquatic ecosystems in the EEB curriculum, as well as theoretical and applied ecology.

The concentration will benefit both students and the university. Students completing the requirements will have an additional tool for presenting their undergraduate credentials to potential employers and graduate schools. The university is expected to benefit by attracting and retaining students interested in Ecology and Evolutionary Biology as a career path within the broad field of Biology.

5. Proposed date of initiation of the new program

Fall 2014

6. A statement describing the relationship of the proposed program to the mission and scope of the campus

Department Mission – "The Department of Biology is committed to offering high quality undergraduate and graduate educational opportunities" . . . . "The Bachelor's and Master's degrees provide students

with the education and training needed to enhance their career opportunities, or to pursue further graduate studies."

The proposed concentration supports the Department mission by providing students with an opportunity to enrich their academic program in a major discipline of biology in preparation for graduate study. Additionally, the concentration will provide students with skills and abilities in preparation for careers in environmental science, natural resources, and education.

College Mission – "[T]he college provides students with a breadth of knowledge about the global environment and fosters an appreciation and respect for diversity. The College of Arts and Sciences equips students to think critically, communicate effectively, and develop creative solutions to future challenges."

The proposed concentration supports the College mission by providing students with knowledge of global environment issues, and provides opportunities to develop creative solutions to environmental problems and the management of natural resources.

University Mission – "We offer a broad range of high-quality undergraduate, graduate, and continuing education programs that meet regional needs …"

The proposed concentration supports the University mission by significantly enhancing the biology degree by offering students a specialized focus of study. The concentration will also prepare students with skills and abilities to seek graduate study or career opportunities in environmental science and education, and natural resource management in the Midwest.

7. A statement describing the relationship of the proposed program to already existing programs at the campus

The proposed concentration would be within the existing Biology major, where most students with professional interests in ecology and evolutionary biology are already enrolled. There are no other academic programs that focus on these disciplines on campus. A program with minor overlap would be the Bachelor of Science in Public Affairs with a major in Environmental Policy offered in the Department of Public Policy. However, that degree is mainly centered on legal aspects of environmental regulation.

A related, though non-curricular, entity on campus is the Environmental Resources Center. The mission of the ERC is to "promote the understanding and conservation of the natural resources of the region through scientific research, educational opportunities and outreach." Faculty that would be involved in the EEB concentration are also engaged in the ERC. The ERC provides opportunities for students relating to behavior, ecology and evolutionary biology are possible with those faculty and their community partners.

8. A statement describing the relationship of this program to similar programs in other regional and Indiana post-secondary educational institutions

Purdue offers an Ecology, Evolution, and Environmental Biology major within the Department of Biological Sciences in West Lafayette similar to the proposed concentration. Indiana University offers an Environmental Science major within the School of Public and Environmental Affairs in Bloomington.

While the IU major does have a plan of study for an ecology focus, it lacks requirements in evolutionary biology. Regionally, a comparable program of Ecology and Evolutionary Biology is not offered.

9. A statement describing cooperative endeavors explored and/or intended with other institutions particularly those located in the same geographic region

Mutually beneficial relationships with local and regional institutions are an existing feature of several of the courses included within the concentration. Courses that have field based labs rely on organizations for property access. Meanwhile, data collection by the labs assists the organizations in monitoring ecological variables that assist with land and water management. Institutions that have relationships with a course include: ACRES Land Trust, Allen County Parks, Fort Wayne Parks and Recreation, Indiana Department of Natural Resources, and The Little River Wetlands Project.

10. A statement indicating need for the concentration in terms of manpower supply and demand.

Graduates with a concentration in ecology and evolutionary biology would be positioned for a range of "green jobs" that involve addressing environmental impacts, the management and restoration of ecosystems, and sustainability issues in communities. Job growth in the field is expected to occur in private companies, non-governmental organizations, and pre-college schools. For example, the U.S. Bureau of Labor Statistics (http://stats.bls.gov) projects that Environmental Scientists and Specialists with a Bachelor of Science will experience job growth of 19% from 2010 to 2020, exceeding both the growth in all occupations and "Life, Physical, and Social Science Occupations". According to the Indiana Department of Workforce Development (http://hoosierdata.in.gov) growth in the occupation will be 22% in the state over the same period.

11. A statement describing resources over and above present levels required to initiate the program.

The proposed concentration does not require additional resources to be successfully delivered.

12. Proposed curriculum

Students are required to complete the existing Biology B.S. requirements (see included Bingo Sheet), but with upper level electives selected from a specific sub-set. In addition to the core courses common to all biology students, a total of 15 credit hours in electives would be required. Two courses must include laboratory sections so that students obtain relevant hands-on experiences in the area, and at least one course is required in evolution and systematics to insure representation in that area. The remainder of the elective credit hours may be filled by choice from the list of courses to provide a depth of knowledge in the field. Requirements and courses include:

Evolution and Systematics	BIOL 52410	Prokaryotic Diversity and Molecular Identification	3
	BIOL 58000	Evolution	3
	FNR 50500	Molecular Ecology and Evolution	3
Ecology and Diversity	BIOL 33500	Animal Behavior	3
	BIOL 34500*	Vertebrate Biology	4
	BIOL 43400*	Marine Community Ecology	3

BIOL 44500*	Aquatic Biology	3
BIOL 50100*	Field Botany	4
BIOL 50200	Conservation Biology	3
BIOL 50500*	Invertebrate Biology	4
BIOL 52000	Contemporary Parasitology	3
BIOL 54300*	Population Ecology	4
BIOL 55600	Physiology I	3
BIOL 58200	Ecotoxicology	3
BIOL 58600	Natural Resource Management	3
BIOL 59500	Insect Vector Borne Disease	3
BIOL 59800*	Biology of Fish	4
ENTM 20600/20700*	General Applied Entomology and Lab	3

*courses with labs

13. Four Year Plan

Year/Semester		**Credits**
Freshman Year		**31**
First Semester	**Course**	**17**
BIOL 11700 w/ Lab	Principles of Ecology and Evolution	4
CHM 11500 w/ Lab	General Chemistry I	4
ENG W131	Elementary Composition I	3
MA 22900 (P: MA 15300)	Calculus I	3
COM 11400	Fundamentals of Speech	3
Second Semester	**Course**	**14**
BIOL 11900 w/ Lab	Principles of Structure and Function	4
CHM 11600 w/ Lab	General Chemistry II	4
ENG W233	Intermediate Expository Writing	3
Gen Ed Cat B.5 or B.6		3

Sophomore Year		**29**
First Semester	**Course**	**14**
BIOL 21700 w/ Lab	Intermediate Ecology	3
CHM 25500/25400	Organic Chemistry w/ Lab	4
Foreign Language I		4
Gen Ed Cat B.5 or B.6		3
Second Semester	**Course**	**15**
BIOL 21800 w/ Lab	Genetics and Molecular Biology	4
CHM 25600/25800	Organic Chemistry w/ Lab	4
Foreign Language II		4
STAT 24000	Statistical Methods for Biology	3

Year/Semester		Credits
Junior Year		**28-30**
First Semester	**Course**	**14-15**
PHYS 22000 w/ Lab	General Physics I	4
BIOL 21900 w/ Lab	Principles of Functional Biology	4
STAT 340	Elementary Statistical Methods II	3
BIOL 44500*, 50100*, 50200, 55600, 58600, 59500, 59800, ENTM 20600/20700*	Ecology and Diversity Elective (1 course)	3-4
Free Elective		3
Second Semester	**Course**	**14-15**
PHYS 22100 w/ Lab	General Physics II	4
Gen Ed Cat A or B (to complete learning outcomes)		3
BIOL 33500, 34500*, 43400*, 52000, 52400, 54300*,58000, 58200, or FNR 50500	Evolution and Systematics, Ecology and Diversity Electives (2 courses)	7-8

Senior Year		28-30
First Semester	**Course**	**15-16**
Gen Ed Cat A or B (to complete learning outcomes)	(2 courses)	6
BIOL 44500*, 50100*, 50200, 55600, 58600, 59500, 59800, ENTM 20600/20700*	Ecology and Diversity Elective (1 course)	3-4
Free Electives		6
Second Semester	**Course**	**13-14**
BIOL 49100	Senior Biology Seminar	1
BIOL 33500, 34500*, 43400*, 52000, 52400, 54300*,58000, 58200, or FNR 50500	Evolution and Systematics, Ecology and Diversity Elective (1 course)	3-4
Free Electives		9
Total Credits		**120**