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	09-30 App-12/8/09 App 1/26/10

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person Dr. Tim Nuttle	Email Address nuttle@iup.edu
Proposing Department/Unit Biology	Phone 72750

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply) <input type="checkbox"/> New Course <input type="checkbox"/> Course Prefix Change <input type="checkbox"/> Course Deletion <input type="checkbox"/> Course Revision <input type="checkbox"/> Course Number and/or Title Change <input type="checkbox"/> Catalog Description Change	
<i>Current Course prefix, number and full title</i>	<i>Proposed course prefix, number and full title, if changing</i>
2. Additional Course Designations: check if appropriate <input type="checkbox"/> This course is also proposed as a Liberal Studies Course. <input type="checkbox"/> Other: (e.g., Women's Studies, Pan-African) <input type="checkbox"/> This course is also proposed as an Honors College Course.	
3. Program Proposals <input type="checkbox"/> New Degree Program <input type="checkbox"/> Catalog Description Change <input type="checkbox"/> Program Revision <input type="checkbox"/> New Minor Program <input type="checkbox"/> Program Title Change <input type="checkbox"/> Other <input type="checkbox"/> <u>XX</u> New Track	
<i>Current program name</i>	B. S. in Biology: Ecology, Conservation, and Environmental Biology Track <i>Proposed program name, if changing</i>
4. Approvals	
Department Curriculum Committee Chair(s)	<i>Sandra Howell</i> 11/6/08
Department Chair(s)	<i>Ally</i> 11/6/08
College Curriculum Committee Chair	<i>[Signature]</i> 09/22/09
College Dean	<i>[Signature]</i> 9/23/09
Director of Liberal Studies *	
Director of Honors College *	
Provost *	<i>Deirdre Johnson (m)</i> 9/23/09
Additional signatures as appropriate: (include title)	
UWUCC Co-Chairs	<i>Gail Sedquist</i> 12/8/09

Received
SEP 23 2009
Liberal Studies

Foreign Language:**0-6 cr**

Two courses beyond placement or intermediate level. In lieu of a foreign language the student may elect to take a sequence of courses in either Computer Science (exclusive of COSC/IFMG 101; COSC 110 and COSC 210 recommended) or Regional Planning from the list of controlled electives (or with permission of advisor.)

Free Electives:**2-9 cr****Total Degree Requirements:****120 cr****PART II. Detailed Description of the Ecology, Conservation, and Environmental Biology Track (B.S.)****Rationale and Justification for an Ecology, Conservation, and Environmental Biology Track (B.S.)**

The purpose of an Ecology, Conservation, and Environmental Biology (ECEB) Track is to allow students who are interested in all areas of ecological science to focus their studies into a program leading to a defined career path or advanced study. Students will develop skills in both laboratory and field biology. This track combines depth of study in biology with breadth of study in relevant natural and social sciences. Students who choose this track may concentrate on such fields as aquatic or terrestrial ecology or work toward a minor in areas such as geology, chemistry, or geography.

The Ecological Society of America (ESA) recommends that students obtain a broad background in the life and natural sciences, including geology, chemistry and physics. The society also recommends that students have a "working knowledge of mathematics, statistics, and computers." In addition to the natural sciences, the Ecological Society of America recommends that students develop communication skills and have background in relevant social sciences, such as economics, geography, and political science. These expectations have been formalized in ESA's professional certification program¹; another, more specified certification program is offered by The Wildlife Society². Students electing this track will fulfill all course requirements for certification as an Associate Ecologist from ESA and with careful selection of courses within the track can fulfill all requirements for certification as an Associate Wildlife Biologist by The Wildlife Society. Additionally, practical, hands-on experience is essential to successful placement in the job market or for advanced study in ECEB fields. A recent study funded by the National Science Foundation reported that nationwide, 73% of students majoring in the environmental sciences had undergraduate research experience.³ For this reason, the track requires a minimum of 3 cr research or internship experience.

The job market in ECEB is diverse and includes jobs at all levels of experience and education. Scanning the listings in <http://ecojobs.com> provides an overview of this market. Many jobs require highly trained individuals with advanced degrees. The ECEB track would be an initial step in working toward these types of positions because the track will prepare students for graduate programs in ecology or environmental science. Other positions require a bachelor's degree, and the ECEB track is designed to meet the needs of these employers (e.g., consulting agencies, environmental foundations, and federal, state and local government agencies). Fields that most closely match "Ecology, Conservation, and Environmental Biology" in The Bureau of Labor Statistics' *Occupational Outlook Handbook* reports are "Zoologists and Wildlife Biologists", "Conservation Scientists", and "Environmental scientists and specialists, including health". The *Handbook* projects for the period 2005-2016 that the number of jobs will grow by 9%, 5%, and 25% for "Zoologists and Wildlife Biologists", "Conservation Scientists", and "Environmental scientists and specialists, including health", respectively. This compares favorably with 4% projected growth for "Biological Sciences, all other areas", which most closely matches the undifferentiated BS in Biological Sciences (without a track), where the majority of majors are currently enrolled. The proposed track will allow students to make more choices in their coursework while providing guidance toward a specific career path. By identifying a specific job market and targeting a specific career goal, this track represents a valuable recruitment tool for attracting students to IUP.

Credit Requirements for Ecology, Conservation, and Environmental Biology Track (B.S.)

Overview: The ECEB Track includes the required courses of the B.S. in Biology. However, there are additional specific required courses, a research thesis or internship, and controlled electives (see below). Controlled electives are used to focus the track on relevant coursework in biology or fields allied with the environmental sciences or conservation. The student's choice of controlled electives will depend on his or her career goals and/or whether he or she wishes to seek professional certification. The track is compatible with two professional certification programs (see below). The track meets the liberal studies requirements and for this track the liberal studies mathematics, natural sciences, elective, and one of the social science courses are specified. The foreign language requirement matches that of the B.S. in Biology. Free electives range from 3-9 cr depending on the choice of foreign language credits. The total degree requirement is 120 cr.

Required Majors Courses: The total number of required credits in BIOL courses is 35. Students may choose to take additional BIOL courses as controlled electives. There are two main groupings of courses required of students completing the ECEB Track. These are (1) courses required of all Biology majors and (2) additional requirements for ECEB majors. The additional courses are justified to achieve a well structured curriculum as well as to meet the requirements of optional individual certification by the Ecological Society of America and The Wildlife Society (see below).

Requirements for individual professional certification:

Following completion of the BS in Biology ECEB Track, students may elect to apply for certification (directly to the certifying professional organization) under one or both of the following programs.

Associate Ecologist: The Ecological Society of America is a professional society representing ecologists. Their certification requires a bachelor's degree with a minimum of 30 cr in biological sciences, of which 9 cr must be ecology, and 12 cr of physical and mathematical sciences¹. The 9 cr of ecology are satisfied with BIOL 362, 272, and 490. Physical and mathematical science courses are satisfied by required CHEM, PHYS, and MATH courses. In addition to the course requirements, one year of post-graduation professional experience is required. Additional education and experience can qualify students for Ecologist and Senior Ecologist levels of certification.

Wildlife Biologist: The Wildlife Society is a professional society representing wildlife biologists. Their certification as an Associate Wildlife Biologist² can be met with course requirements upon graduation and as Certified Wildlife Biologist with 5 yr post-graduation professional experience. To qualify for certification under this program, students must use their controlled and free electives judiciously. Requirements for certification are listed below along with how they can be met within the ECEB BS track. Other courses may fill the requirements of both programs, but the following will do so with least number of credit hours taken:

Wildlife Management (6 cr): BIOL 272 Conservation of Plant and Animal Resources and GEOG 440 Conservation: Environmental Analysis. An additional course in this area—tailored specifically to Wildlife Management—may be warranted for the future.

Wildlife Biology (6 cr): two of the following must be taken: BIOL 262 Ornithology, BIOL 252 Field Zoology, BIOL 425 Herpetology, BIOL 475 Mammalogy.

Ecology (3 cr): BIOL 362 Ecology.

Zoology (9 cr): BIOL 220 General Zoology, BIOL 263 Genetics, BIOL 250 Principles of Microbiology.

Botany (9 cr): BIOL 210 Botany, and two of the following: BIOL 471 Dendrology, BIOL 251 Field Botany, BIOL 473 Seedless Vascular Plants.

Physical Sciences (9 cr): CHEM 111, CHEM 112, PHYS 111

Basic Statistics (3 cr): MATH 216 or MATH 217 Probability and Statistics [for Natural Sciences]

Quantitative Sciences (6 cr): MATH 121 Calculus I for Natural and Social Sciences and another advanced MATH (e.g. MATH 122) or computer science course.

Humanities and Social Sciences (9 cr): met within normal Liberal Studies requirements

Communications (12 cr): ENGL 101 and ENGL 202 plus two Writing Intensive-designated courses not counted in another category.

Policy, Administration, and Law (6 cr): two of the following: RGPL 350 Introduction to Planning, RGPL 458 Land Use Law, GEOG/RGPL 464 Land Use Policy.

Additional requirements for the ECEB track:

Several courses are required for the BS Track in ECEB to prepare students with the necessary background for successful careers in ECEB. Most of these overlap with requirements for professional certification in one or both of the programs described above.

Specific courses: Eight courses have been selected that provide the necessary foundation for a degree in ECEB. These include BIOL 271 Evolution, BIOL 272 Conservation of Plant and Animal Resources, BIOL 362 Ecology, GEOS 201 Foundations of Geology, and MATH 216/217 Probability and Statistics for Natural Sciences. Geoscience is an essential addition to the ancillary sciences in ECEB and provides background necessary for field biologists. In the proposed program this need will be filled by GEOS 201 Foundations of Geology. However, an option for the future would be to develop a new, cross-listed BIOL/GEOS course focusing on climate, biogeochemical cycles, and environmental issues, which might better meet the needs of both the ECEB and Environmental Geology tracks.

Research or Internship: The ECEB track is designed to cultivate an academic culture that exposes students to and involves them in ECEB research and hands-on practical training. Practical training and/or involvement in research is essential for competitiveness in the job market or pursuit of an advanced degree³, so providing this experience within the ECEB track will enhance IUP students' competitiveness. The research/internship component of the program is designed as follows:

1. In Fall Semester of the junior year, students enroll in BIOL 490 Field Studies, in a section on Field and Research Methods. This prepares them with the necessary skills and background to be competitive applicants for summer internship and research positions.
2. In the Spring Semester of the junior year, students enroll in BIOL 480 Biology Seminar, ECEB Capstone 1 section. This section focuses on student preparation for internships and research by inviting internship and research hosts to present opportunities to students. Additionally, students will learn about past internship and research experiences from senior ECEB students. This section meets concurrently with another section of BIOL 480, Capstone 2 (see point 4 below).
3. In the summer between the junior and senior years, students complete their internship or research experience. Students interested in pursuing an advanced degree are encouraged to complete Biology Research (BIOL 499, 3 cr) or Honors Thesis/Independent Study (BIOL 483, 2 cr) (each of these courses require a thesis). Students may elect to enroll for additional independent research credits (BIOL 482 or 483) in the Fall semester of their senior year to complete their research. Students interested in entering the job market following graduation are encouraged to complete an internship (BIOL 493, 3 cr). Internships may be with state, local, or federal government agencies, NGOs, or private companies, but must be approved by the advisor to receive credit for this category.
4. In the Spring Semester of the senior year, students enroll in BIOL 480, ECEB Capstone 2. Students present their results from their completed internship or research and mentor junior-level students.

Controlled electives: There are 18 cr of controlled electives that allow students to pursue specialized interests within fields related to environmental sciences or satisfying requirements for a minor in chemistry, geosciences, or geography. The choice of courses was restricted to those that are relevant to ECEB per se. To qualify under this category, special topics, independent study, or seminars, etc. must be relevant to ECEB and approved by the advisor. Other courses more broadly suitable to environmental studies (e.g., law, sociology, literature) may be taken as free electives.

Specification of Liberal Studies Courses: In the liberal studies the mathematics requirement is met with MATH 121 Calculus I, the natural science requirement with CHEM 111-112 General Chemistry I & II, and the elective requirement with MATH 216 or 217 Probability and Statistics [for Natural Sciences]. The humanities/philosophy requirement is left open. Two of the required social sciences courses are also open, with ECON 101 Basic Economics required. Non-western courses are left open to the student.

¹ "ESA Certification: Guidelines & Requirements".

http://www.esa.org/careers_certification/guidelines_print.php. Accessed 26 March 2008.

² "The Wildlife Society Program for Certification of Professional Wildlife Biologists". <http://www.wildlife.org>. Accessed 26 March 2008.

³ Webb, S. 2007. The Importance of Undergraduate Research. *Science*. July 06, 2007

Sequencing of Ecology, Conservation, and Environmental Biology Track

B.S. in Biology (Ecology, Conservation, and Environmental Biology Track)
(revised February 2009)

First Semester				Second Semester			
BIOL	111	Principles of Biology I	4	BIOL	112	Principles of Biology II	4
CHEM	111	General Chemistry I	4	CHEM	112	General Chemistry II	4
ENGL	101	College Writing	4	HIST	195	The Modern Era	3
—	—	<i>Health and Wellness req.</i>	3	—	—	<i>Fine Arts req.</i>	3
			<u>15</u>				<u>14</u>

Third Semester				Fourth Semester			
BIOL	—	Botany or Zoo or Micro	3	BIOL	—	Botany or Zoo or Micro	3
GEOS	201	Foundations of Geology	4	BIOL	—	Botany or Zoo or Micro	3
MATH	121	Calculus I (Nat./Soc. Sci.)	4	ECON	101	Basic Economics	3
PHYS	111	Physics I Lecture	3	MATH	216	Prob. and Statistics/ Nat. Sci.	3
PHYS	121	Physics I Lab	1	—	—	<i>Humanities: Literature</i>	3
			<u>15</u>				<u>15</u>

Fifth Semester				Sixth Semester			
ENGL	202	Research Writing	3	BIOL	480	Biology Seminar (Capstone 1)	1
BIOL	272	Cons. Plant & Animal Res.	3	BIOL	271	Evolution	3
BIOL	490	Field Studies (Field/Research Methods section)	3	—	—	<i>Controlled elective</i>	3
BIOL	263	Genetics (W)	3	—	—	<i>Controlled elective</i>	3
—	—	<i>Foreign Language/Free elective</i>	3	—	—	<i>Social Science req.</i>	3
			<u>15</u>	—	—	<i>Foreign Language/Free elective</i>	3
							<u>16</u>

Summer semester

BIOL 483/493/499 Honors Thesis/Independent Study OR Internship OR Biology Research 3 cr
(Note: BIOL 483 students will take 2 cr during summer and an additional 2 cr during the seventh semester, which affects credit counts below for controlled and free electives; refer to Biology Honors Program requirements)

Seventh Semester				Eighth Semester			
BIOL	362	Ecology	3	BIOL	480	Biology Seminar (Capstone 2)	1
—	—	<i>Controlled elective</i>	3	LBST	499	Synthesis	3
—	—	<i>Controlled elective</i>	3	—	—	<i>Controlled elective</i>	3
—	—	<i>Humanities req.</i>	3	—	—	<i>Controlled elective</i>	3
—	—	<i>Social Science req. NW</i>	3	—	—	<i>Free elective</i>	2
			<u>15</u>				<u>12</u>

PART III. Implementation of the Ecology, Conservation, and Environmental Biology Track

1. How will the proposed new track affect students already in the existing program?

The proposed track will provide expanded opportunities for existing students, allowing those who are interested in Ecology, Conservation, and Environmental Biology (ECEB) to focus their program of study. Implementation of this track will enhance employment outlook for students by providing them with a program of study that is closely allied to a defined career path (see above statistics in Part II). We expect many of our current majors will switch from a BS in Biology (no track) to this BS track.

We can identify no detrimental effect.

2. Are faculty resources adequate?

Faculty resources in the biology department are adequate for the proposed track because it is based on courses that already exist. To guarantee that students in the proposed track have access to the required and elective courses in a timely fashion we will need to establish a strict course rotation scheme that meets the needs of all students enrolled in Biology courses. In some cases it may be necessary to form enrollment cohorts all of whose members take the same courses in sequence.

Overall teaching loads within the biology department will not be affected by the proposed track other than by reduced flexibility to accommodate the strict course rotation or cohort system because the track is based on existing courses. We specified required courses for the proposed track with the objective of minimal disruption in mind. Advisors and students will need to work carefully to minimize confusion and scheduling conflicts within the strict course rotation in order to schedule required and elective courses in such a way as to promote timely completion of the track. Students who must repeat courses will have difficulty staying on schedule. No additional seats are needed in the courses of the proposed track.

3. Are other resources adequate?

Overall the current level of support provided by IUP is adequate to support the proposed track. The library is moving toward adequacy with regard to scientific journals. They are in the process of getting more full-text electronic materials

The proposed Environmental Biology track is based on existing courses, and impact on personnel resources is expected to be minimal. BIOL 493 Internship and BIOL 499 Biology Research will be taken primarily during summer session. It is expected that annually 15 credits will be generated in independent study or research supervision (5 students per year at 3 credits).

Automotive support (passenger vans) for travel to field sites is adequate for the proposed track. Van use will be scheduled using established department procedures. No travel funds are requested. Classroom space expressed in square feet is adequate for the proposed track because the Biology Department has recently adopted a new space plan to make more efficient use of classroom resources. We will use equipment and supplies from existing courses to support the proposed track. Computer and other electronic facilities are adequate for the proposed track.

4. Do you expect an increase or decrease in the number of students as a result of these revisions? If so, how will the department adjust?

By providing clear guidelines to careers in ECEB, we hope to recruit high-quality students. Informal surveys at recruiting events indicate that ECEB ranks high in terms of student interest, second to pre-health studies interest within the Biology Department. Additionally, by providing a structured curriculum leading to a defined area of employment or advance study, the track should reduce attrition of students to other majors or to dropping out.

Hence, we anticipate the new track will increase student enrollment in the Biology Department. Modest increases in number can be accommodated with existing resources. If the program is highly successful, additional faculty will need to be hired.

The track may have some impact on other departments. Geoscience Department may see additional students in Foundations of Geology (GEOS 201) since it is required of students in this track.. Each student will take five controlled electives. We anticipate Geography and Regional Planning will be popular choice for students in their selection of controlled electives, due to requirements of Wildlife Society certification, so this department is likely to see additional biology students. Other departments with courses in the controlled electives will see an occasional biology student in their upper level classes.

5. Intended Implementation Date

We plan to implement the track in Fall 2010.

Part IV. Periodic Assessment

We plan a two-pronged method of evaluation of the program. This will involve a survey of graduating seniors as well as a five-year evaluation of the program by the Department of Biology. Upon submission of their graduation application to their advisors, students will be given a Senior Survey that they will be required to complete and return to their advisor in a sealed envelope bearing the letterhead of the Department of Biology. These sealed envelopes will be given to the department secretary and not opened until after graduation (either Fall or Spring). The department secretary will then transcribe the results and distribute the results to the entire faculty of the Department of Biology. If students so choose, they may identify themselves on the survey form for follow-up interviews by phone or email. At the end of the first five years of the program and every five years thereafter the appropriate committee of the Department of Biology will evaluate all of the Senior Surveys for the last five years. In addition, enrollment trends during each five-year period will be examined and included in the evaluation. All faculty within the Department of Biology will also be asked to submit their individual evaluations regarding the success of the program. This assessment plan is consistent with the assessment plan of the Department of Biology.

Part V. Course Proposals

No new or revised courses are proposed as part of this curriculum.

Part VI. Letters of Support from Affected Departments (attached below)

Geography and Regional Planning
Geoscience

----- Original Message -----

Subject:Re: support for new Environmental Biology BS track

Date:Thu, 8 Jan 2009 15:47:18 -0500

From:John Benhart <jbenhart@iup.edu>

To:Tim Nuttle <nuttle@iup.edu>

References:<4936FB89.5060900@iup.edu>

Tim,

We have reviewed your department's proposal for a bachelor of science track in Environmental Biology, and my colleagues and I fully support the proposal. If you need an official letter from me, or require any further feedback, please let me know. John

John Benhart, Jr., Ph.D.

Professor and Chair

Dept. of Geography & Regional Planning

Indiana University of Pennsylvania (IUP)

Indiana, PA 15705-1087

E-Mail: jbenhart@iup.edu

Voice: 724.357.7652

Web: www.iup.edu/geography

"Take the first step in faith...you don't have to see the whole staircase...just take the first step

Martin Luther King, Jr.

----- Original Message -----

From:"Tim Nuttle" <nuttle@iup.edu>

To:<jbenhart@iup.edu>

Sent: Wednesday, December 03, 2008 4:35 PM

Subject: support for new Environmental Biology BS track

> Dear Dr. Benhart,

>

> We are proposing a new BS track in Environmental Biology (attached) that

> potentially would increase enrollment in several Geography/Regional

> Planning courses. The proposal has been approved by our department and

> now is in review at the College level. Because this proposal is likely

> to impact your department, we would very much appreciate your review of

> (and hopefully support for) the proposed track.

> Could you please review the attached proposal and let me know if you

> have any comments, concerns, or suggestions. I would be happy to meet in

> person to go over the proposal, if you wish.

>

> Best regards,

> Tim Nuttle

> Asst. Professor, Biology

>

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Tim Nuttle, PhD

Assistant Professor, Ecology

Department of Biology

Indiana University of Pennsylvania

114 Weyandt Hall

Indiana, PA 15705

<http://nsm1.nsm.iup.edu/nuttle/>

September 17, 2009

To: Tim Nuttle, Biology Department

From: Steve Hovan, Geoscience Dept

RE: proposed track, B.S. Environmental Biology

Dr. Nuttle,

Thank you contacting us about the proposed B.S. in Environmental Biology offered by the Biology Department. The Geoscience faculty reviewed the proposal and support the new track you want to offer. One caveat you may want to consider is that the proposal currently requires GEOS201 – Fundamental of Geoscience, a new course that is proposed by our department. We believe this course is very well-suited for your proposed track and while we have every intention and hope of being able to offer this course, we do not currently have approval to offer this course because our program revision package (which includes this new course) has not been approved by TECC. If TECC approves our proposal, then the UWUCC and University Senate will consider it. I expect this will happen during Sp'09.

I wish you and the department all the best with your new track. It sounds like an exciting opportunity for students.

Sincerely,

Steve Hovan

Chair, Geoscience Department