

Curriculum Proposal Cover Sheet – form is available on-line as an interactive PDF

14-23

LSC Use Only Proposal No:	UWUCC Use Only Proposal No: 73-112	
LSC Action-Date: AP-1/30/14	UWUCC Action-Date: App 9/2/14	Senate Action Date: App 10/7/14

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

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Proposing Department/Unit Biology	Phone 7-2359

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

1. Course Proposals (check all that apply)

New Course Course Prefix Change Course Deletion
 Course Revision Course Number and/or Title Change Catalog Description Change

Current course prefix, number and full title: SCI 104 Fundamentals of Environmental Biology

Proposed course prefix, number and full title, if changing: NA

2. Liberal Studies Course Designations, as appropriate

This course is also proposed as a Liberal Studies Course (please mark the appropriate categories below)

Learning Skills Knowledge Area Global and Multicultural Awareness Writing Intensive (include W cover sheet)

Liberal Studies Elective (please mark the designation(s) that applies – must meet at least one)

Global Citizenship Information Literacy Oral Communication
 Quantitative Reasoning Scientific Literacy Technological Literacy

3. Other Designations, as appropriate

Honors College Course Other: (e.g. Women's Studies, Pan African)

4. Program Proposals

Catalog Description Change Program Revision Program Title Change New Track
 New Degree Program New Minor Program Liberal Studies Requirement Changes Other

Current program name:

Proposed program name, if changing:

5. Approvals	Signature	Date
Department Curriculum Committee Chair(s)	<i>Megan Knock</i>	11/7/13
Department Chairperson(s)	<i>[Signature]</i>	11/7/13
College Curriculum Committee Chair	<i>Anne Kerple</i>	11/15/13
College Dean	<i>[Signature]</i>	11/18/13
Director of Liberal Studies (as needed)	<i>[Signature]</i>	3/1/14
Director of Honors College (as needed)		
Provost (as needed)		
Additional signature (with title) as appropriate		
UWUCC Co-Chairs	<i>Gail Sedquist</i>	9/4/14

Received Received Received

SEP 4 2014 APR 30 2014 NOV 18 2013

Liberal Studies Liberal Studies Liberal Studies

Part II: Description of Curriculum Change

1. SYLLABUS OF RECORD

I. Catalog Description

SCI 104 Fundamentals of Environmental Biology

2c-2I-2.5cr

Prerequisite: ECSP major or instructor permission

Introduces the major concepts and principles of ecology and their application to modern living. Includes lecture and laboratory components with an emphasis on the content and processes of science. Laboratory exercises reinforce lecture topics as well as the use of laboratory equipment, measuring procedures, experimental design, and the organization, visual representation, and analysis of data.

II. A. Course Outcomes

At the conclusion of this course, students should be able to:

Objective 1

Use the scientific method to create and test hypotheses about biodiversity in different habitats, ecological succession, and the impacts of environmental variables.

Expected Student Learning Outcomes 1 and 2

Informed and Empowered Learners

Rationale

Students will not only learn what the scientific method is, they will also apply it in several ecology labs, both in laboratory and field settings. Students will also practice both inductive and deductive reasoning – observing some processes before generating a hypothesis while other processes are approached with a hypothesis first before making observations.

Objective 2

Evaluate the effects of natural and anthropogenic processes, including pollution, population management, species interactions, and resource use, on ecological systems.

Expected Student Learning Outcome 3

Responsible Learners

Rationale

Students will evaluate the effects of pollutants and resource use, both from natural sources and through human activities, on global ecological systems through discussion and laboratory activities.

Objective 3

Identify the major ecosystems and the factors that determine their global distribution, and recognize key plant and animal species, resources, and human impacts found in each.

Expected Student Learning Outcome 1

Informed Learners

Rationale

Students will learn how climate and topography interact to determine boundaries for locally, regionally and globally distributed ecosystems such as deserts, rain forests, and grasslands, and will understand the implications of resource distribution and human impacts on these ecosystems.

Objective 4

Connect the different parts of the Earth's water and nutrient cycles to each other, and understand how natural and artificial cycling of these nutrients impact living organisms.

Expected Student Learning Outcome 1

Informed Learners

Rationale:

Students will investigate how nutrients such as water, nitrogen and carbon cycle through living and non-living systems, and will recognize that these nutrients occur in finite quantities.

Objective 5

Recognize the effect of adaptation and evolution on diversity, classification, behavior, and survival.

Expected Student Learning Outcomes 1 and 2

Informed and Empowered Learners

Rationale:

Students will discover how adaptations can have benefits and disadvantages to survival of individuals and species in changing environments. They will also examine ways to classify diverse organisms and will discuss how variation functions as a basis for natural selection.

Objective 6

Analyze processes and technologies to determine their impact on individuals, populations, communities, and ecosystems.

Expected Student Learning Outcomes 1 and 2

Informed and Empowered Learners

Rationale:

Students will discuss biotechnology applications and compare risks and benefits as they relate to human health and ecological sustainability. Students will also recognize physiological processes related to human health, nutrition, and food production.

II. B. Student Outcomes Assessment Matrix

Danielson Domains	NSTA Program Objectives	Course Objectives	Assessment Technique
I, II, III	1.a., 1.b.	1	Lab Investigations, Exam 1*
I, II, III	1.a., 1.b.	2	Lab Investigations, Exams 1-4
I, II, III	1.a., 1.b.	3	Lab Investigations, Exam 1
I, II, III	1.a., 1.b.	4	Lab Investigations, Exam 3*
I, II, III	1.a., 1.b.	5	Lab Investigations, Exams 1, 2
I, II, III	1.a., 1.b.	6	Lab Investigations, Exams 3, 4

***Exams 1 and 3 will be used as Key Assessments for this course.**

III. Course Outline

Lecture Outline

- Study of Biology 1 hour
- Ecology 6 hours
 - Community Interactions
 - Ecosystem Dynamics
 - Population Ecology
 - Evolutionary and Ecological Aspects of Behavior

<ul style="list-style-type: none"> ○ Diversity Within Species and Population Genetics ○ Evolution and Natural Selection ○ Formation of Species and Evolutionary Change 	1 hour
<ul style="list-style-type: none"> • Origin and Classification of Life <ul style="list-style-type: none"> ○ The Classification and Evolution of Organisms ○ The Nature of Microorganisms ○ The Plant Kingdom ○ The Animal Kingdom 	4 hours
Exam 1	
Exam 2	1 hour
<ul style="list-style-type: none"> • Molecular Biology <ul style="list-style-type: none"> ○ Applications of Biotechnology • Physiological Processes <ul style="list-style-type: none"> ○ Nutrition • Natural Resources 	2 hours 2 hours 5 hours
Exam 3	1 hour
<ul style="list-style-type: none"> • Agriculture • Humans and the Environment 	3 hours 2 hours
Culminating Activity	2 hours

Laboratory Outline

This environmental biology course for pre-service early childhood education majors will introduce the major concepts and principles of ecology and their application to modern living. This course includes lecture and laboratory components with an emphasis on the content and processes of science. The laboratory exercises will reinforce lecture topics as well as the use of laboratory equipment, measuring procedures, experimental design, and the organization, visual representation, and analysis of data.

○ Outdoor Education and Laboratory Safety	4 hours (2 labs)
○ Stream Ecosystems	2 hours (1 lab)
○ Pond Ecosystems	2 hours (1 lab)
○ Terrestrial Ecosystems	4 hours (2 labs)
○ Secondary Succession	2 hours (1 lab)
○ Plant Behavior and Toxicology	4 hours (2 labs)
○ Environmental Policy and Owls: Form & Function	2 hours (1 lab)
○ Indoor Air Quality	2 hours (1 lab)
○ Animal Behavior	4 hours (2 labs)
○ Recycling and Waste Management	2 hours (1 lab)

IV. Evaluation Methods

Each component of the course will contribute to the final grade according to:

Lecture:	200 points (4 exams x 50 pts ea.)
Unit I Exam	
Unit II Exam	
Unit III Exam	
Culminating Activity	

Laboratory: 200 points
Laboratory Investigations (10 x 10pts)
Innovative Projects (4 x 25pts)

V. Example Grading Scale

The final grade for this course will be determined using the following schedule:

A=90-100%; B=80-89%, C=70-79%, D=60-69%, F=<60%

VI. Attendance Policy

The attendance policy will conform to IUP's undergraduate course attendance policy as outlined in the Undergraduate catalog.

VII. Required textbooks, supplemental books and readings

Texts:

Lecture- Enger, E.D., Ross, F.C., Bailey, D.B. (2012). Concepts in Biology. New York: McGraw Hill

Laboratory - ScienceSaurus: A Student Handbook; Great Source Education Group, Houghton Mifflin

Supplemental readings:

Science-based children's literature such as The Very Hungry Caterpillar by Eric Carle, A Year of Birds by Ashley Wolff, Bringing the Rain to Kapiti Plain by Verna Aardema, In the Small, Small Pond by Denise Fleming, Who Hops? By Katie Davis, and Chipmunk at Hollow Tree Lane by Victoria Sherrow.

VIII. Special resource requirements

There are no special resource requirements for this course.

IX. Bibliography

In addition to the required textbooks and supplemental readings from science journals, the following will be used to develop the course curriculum:

Ansberry, Karen and Emily Morgan, 2007, More Picture-Perfect Science Lessons: Using Children's Books to Guide Inquiry, K-4: NSTA Press, Arlington, VA: 238 pages.

Ansberry, Karen and Emily Morgan, 2010, Picture-Perfect Science Lessons, Expanded 2nd Edition: Using Children's Books to Guide Inquiry, 3-6: NSTA Press, Arlington, VA: 403 pages.

Ansberry, Karen and Emily Morgan, 2013, Even More Picture-Perfect Science Lessons: Using Children's Books to Guide Inquiry, K-5: NSTA Press, Arlington, VA: 265 pages.

Carson, Rachel, 1965. Silent Spring: Houghton Mifflin, 378 pages.

Harlow, Rosie and Gareth Morgan, 1991, 175 Amazing nature Experiments: Random House, NY: 172 pages.

Lord, Thomas and Holly Travis, 2011, Schoolyard Science: 101 Easy and Inexpensive Activities: NSTA Press, VA: 136 pages.

Louv, Richard, 2006, Last Child in the Woods: Algonquin Books of Chapel Hill, 334 pages.

Sisson, Edith, 1982, Nature with Children of All Ages: Prentice-Hall, NJ: 195 pages.

2. SUMMARY OF PROPOSED REVISIONS

1. Removed pre-requisite courses to better meet the needs of ECSP students in their new curriculum and to allow more flexibility in taking their science courses.
2. Updated the course description to better reflect the nature of this class.
3. Objectives – course objectives were modified from the most recent syllabus of record and aligned with the Expected Undergraduate Student Learning Outcomes (EUSLO).
4. Common Learning Objectives for a Laboratory Natural Science course were incorporated into the content of the course. These objectives include: understand a body of knowledge in a science domain; understand that science knowledge is generated by an empirical approach to nature and analyze problems from the perspective of a natural scientist; demonstrate an understanding of intellectual honesty in the context of scientific methodology, and contrast science with pseudoscience; understand how science knowledge is relevant to non-scientists and use critical thinking skills and scientific methodology.
5. Updated text to a more current book and updated the bibliography to reflect current resources used to develop this course.

3. JUSTIFICATION/RATIONALE FOR REVISIONS

The course is currently approved for Liberal Studies Laboratory Natural Science (in conjunction with two additional companion courses selected from SCI 101, 102 and 103). This sequence of three 2.5 credit courses only satisfies the Liberal Studies requirement for ECSP students. Changes in the Liberal Studies curriculum and in the ECSP program demanded that this course be adjusted to meet new needs and expectations.

4. OLD SYLLABUS OF RECORD

See attached sheets.

Assignment Instructions for a major course assignment
Science 104 Laboratory

Bird Foraging Behavior

Name: _____

Date: _____

Objective: Determine how cover and food quality affect bird foraging behavior

Materials:

field guide: *Peterson First Guide to Birds of North America*
counters/clickers
clip boards
data sheets
graph paper
posters: Birds of the Garden – Winter I and Winter II
bird feeders: tube feeders
sunflower seed – seeds with and without shells
binoculars

Bird Feeders:

feeder 1	cover	hearts
feeder 2	open	shells
feeder 3	cover	shells
feeder 4	open	hearts

Woodland Birds:

black-capped chickadees
tufted titmice
white-breasted nuthatches

Sunflower Seeds:

shells: seeds with shells
hearts: seeds without shells

Study Site:

The study site is located at the IUP Co-op Farm. Four bird feeders have been erected at the study site, two are close to trees and dense cover (#1 and #3), and two are further from cover and placed out in the open field (#2 and #4). The feeders are full of sunflower seed hearts or sunflower seeds with the shells on the seed.

Background Information:

Animals make behavioral decisions that are effected by ecological factors. Where and in what types of habitats should they search for food? How long should they remain foraging in a particular area before leaving and moving on to another patch? What kinds of food should they eat, and what kinds should they reject? How safe is it to forage in an area that is close to trees and under dense cover versus an area that is further from cover and in an open field? How much time should they devote to foraging, and how much time should they devote to other activities such as breeding, resting, and avoiding predators? These are behavioral decisions that animals must make on a regular basis. In this investigation, birds will choose between the behavioral options of foraging at a relatively safe site versus foraging on a relatively profitable food item.

Question: _____

Hypotheses:

H¹: _____

H²: _____

Overall H: _____

"Birds of a feather, flock together."

Procedure:

1. As a class, you will record the number of times a bird visits each feeder. A "visit" is defined by a bird landing on a feeder and taking a seed. Birds taking more than one seed per landing should be counted as one visit. Use a counter to tally the number of visits by the birds.
2. Complete the data sheet.
3. On graph paper, construct a bar graph to display your data.
4. Answer the synthesis and analysis questions.

Data Sheet:

Actual start time: _____ Start temperature (°F): _____

Actual end time: _____ End temperature (°F): _____

Abiotic factors: _____

Feeder	Type of cover	Type of seed	Number of visits
1	cover	heart	
2	open	shell	
3	cover	shell	
4	open	heart	

Synthesis and Analysis Questions:

1. Describe the advantages for birds traveling in flocks.
2. Explain the foraging behavior of birds in relation to cover.
3. Explain the foraging behavior of birds in relation to the selection of food.
4. Which do you think is more important, the location of the feeder or the quality of the food?
5. Did you accept or reject your overall hypothesis?
6. What surprised you by participating in this investigation about bird foraging behavior?
7. Describe how you can provide opportunities for your students to observe bird foraging behavior.

Answers to Liberal Studies Questions

- 1) If multiple instructors are needed for lab sections, the department chairperson will appoint one of the professors assigned to teach the course as the course coordinator. The coordinator is responsible for preparing a lab schedule, in cooperation with other faculty who teach the course, for supervising work-study students, for ordering supplies for all lab sections, and for maintaining the supplies and equipment stores. The coordinator is in charge of organizing a meeting with all of the instructors prior to the beginning of each semester the course is being offered. This meeting will ensure syllabi and scheduled activities are basically equivalent among faculty assigned to this course. The coordinator will also distribute the laboratory preparation and cleanup equitably among all faculty members teaching the course in any given semester. The coordinator will insure that any faculty members who have not previously taught the course are adequately mentored to provide the best possible experience for the students. This may involve weekly meetings to discuss each lab exercise or other mentoring activities.
- 2) Women and members of under-represented groups have made substantial contributions to ecology and education, and these will be addressed. For example, the course will highlight Rachel Carson, Ellen Richards and Margaret Fontaine's contributions to ecology as well as Eugenie Clark's contributions to ichthyology. Students will also examine how environmental problems differentially affect disadvantaged groups, who are often racial minorities in this country, as well as residents of developing countries. The problems of human population growth are directly relevant to the treatment of and opportunities for women and these will be addressed.
- 3) Students will be required to read and use fiction and non-fiction children's books for a laboratory assignment, in addition to the required texts for the course. These books will provide the ECSP students with an ability to relate common children's books to science content. Additionally, one of the required texts is not a text book in the traditional sense but rather serves to link teaching strategies, assessment techniques, and content standards to course information.
- 4) This is one of a series of science courses designed specifically for Early Childhood Pre-K-4/Special Education majors. Rather than having the primary aim to educate students about particular scientifically derived knowledge in preparation for more advanced study, the current course has the aim of exposing students to a particular body of scientific content so that they can effectively teach young children about the impacts of their own decisions and behaviors on the natural world.