

UNDERGRADUATE CURRICULUM PROPOSAL COVER SHEET

Title of Proposal – Must begin with Department Abbreviation:

Plant Ecology (BIOL 4XXX/ESC 4XXX) as a New Undergraduate Course

ESC 4730
 (BIOL 4730) 19 2011
 UTC

Check One: Full Proposal or Information Item

Effective Date for Curricular Offering: Spring 2013

FROM: Jennifer Boyd, Biological & Environmental Sciences, 425-5638, Jennifer-Boyd@utc.edu

(proposal originator: include spokesperson's name, department, office number, telephone, e-mail)

Does this require new resources from the originating department or other department? no

Please include an explanation if yes.

Faculty of the originating department approved this proposal on _____ (date),
 by a vote of 16 aye votes; _____ nay votes; _____ abstentions; 4 eligible voting members absent.

The following have examined this proposal:

Dept Head/Director: John Tucker [Signature] 10/19/11 Approve Neutral Disapprove*
 Printed name Signature, date

College Curriculum Committee Date: _____ Vote: _____ Signature of Chair: _____

Spokespersons for Affected Departments:

| Printed Name, Department | Signature, Date | Approve | Neutral | Disapprove* |
|--------------------------|-----------------|---------|---------|-------------|
| _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ |

Dean/Director: H. Burkenn [Signature] 10/19/11 Approve Neutral Disapprove*
 Printed name Signature, date

University Registrar: Linda Orth [Signature] 10/24/11 _____
 Printed name Signature, date Comments

Provost/Representative: J. Sanders [Signature] 10/1/11 Approve Neutral Disapprove*
 Printed name Signature, date

Lab/studio fee requested: [Signature] 11/21/11 Approve Disapprove*
 Provost: Phil Oldham Printed name Signature, date

*Those who disapprove may attach an explanation

| ACTIONS on this proposal: | Curriculum Committee | Faculty Senate |
|---|----------------------|----------------|
| Date the proposal was considered | <u>11-30-2011</u> | _____ |
| Vote of the body: | <u>12-0-0</u> | _____ |
| Accepted as information item (indicate date) | _____ | _____ |
| Approved as submitted (indicate date) | _____ | _____ |
| Approved with amendments (amendments indicated and transmitted to all signatories above, date): | <u>11-30-2011</u> | _____ |
| Signature of Chair: | <u>[Signature]</u> | _____ |

12.013-UG

To: Jim Hiestand, Chair, Curriculum Committee
From: Jennifer Boyd, Biological & Environmental Sciences Department
Re: Plant Ecology (BIOL 4XXX/ESC4XXX) as a New Undergraduate Course
Date: October 7, 2011

The Biological and Environmental Sciences Department requests a change to offer a new course, BIOL 4XXX/ESC 4XXX (Plant Ecology), for undergraduate students. We currently allow undergraduate students in the course via temporary BIOL 4999/ESC 4999 course offerings on a case-by-case basis.

A. PROPOSED CATALOG DESCRIPTION

For the Catalog (4730) STANDARD LETTER GRADED
BIOL 4XXX Plant Ecology (4) LECTURE (w LAB)
A study of relationships of plants with their living and non-living environment, explored from the levels of plant individuals, populations and communities. Laboratory component includes hands-on experimentation and field activities developed to assess plant responses to abiotic and biotic environmental conditions. Lecture 3 hours, laboratory 3 hours. *Prerequisites: Biology 1120 with a minimum grade of C and at least one 300-400 level course from Biology or Environmental Science with a minimum grade of C; junior standing. May be registered as ESC 4XXX. Credit not allowed in both Biology and Environmental Science 4XXX. Laboratory/studio course fee will be assessed.*
Corequisite: BIOL 4XXXL.

For the proposed New Catalog Description of how this change will affect courses available for the B.S. in Biology, see pages 4-6 of this proposal.

(4730) STANDARD LETTER GRADED
ESC 4XXX Plant Ecology (4) LECTURE (w LAB)
A study of relationships of plants with their living and non-living environment, explored from the levels of plant individuals, populations and communities. Laboratory component includes hands-on experimentation and field activities developed to assess plant responses to abiotic and biotic environmental conditions. Lecture 3 hours, laboratory 3 hours. *Prerequisites: Biology 1120 with a minimum grade of C and at least one 300-400 level course from Biology or Environmental Science with a minimum grade of C; junior standing. May be registered as BIOL 4XXX. Credit not allowed in both Environmental Science and Biology 4XXX. Laboratory/studio course fee will be assessed. Corequisite: ESC 4XXXL.*

For the proposed New Catalog Description of how this change will affect courses available for the B.S. in Environmental Science, see pages 7-8 of this proposal.

B. PEDAGOGICAL OBJECTIVES

- To establish foundational knowledge of plant morphology and physiology from an evolutionary perspective.
- To describe and exemplify basic ecological concepts related to plant individuals, populations and communities.
- To familiarize students with classic research studies that have shaped the modern field of plant ecology.

- To discuss readings from contemporary primary literature and draw conclusions about how these studies are contributing significantly to the field.
- To describe how human activities influence the abiotic and biotic environment with which plants interact
- To engage students in creative and independent thinking as they design, conduct and analyze plant ecological experiments in the laboratory and field.

C. SYLLABI

See pages 9-14 of this proposal.

D. EVALUATION METHODS

There will be three mid-term exams worth 100 points each, and one comprehensive final exam worth 150 points. All exams will consist of multiple choice, definitions, and essay questions based on lectures, readings, and related lecture materials. In addition, each student will be required to complete two short written assignments worth 25 points each focused on discussing selected primary research in plant ecology. Each student also will compose a final research paper on an approved topic in plant ecology worth 50 points. Research papers are to provide a synthesis of primary literature on the chosen topic in the style of a scientific review paper. Each student also will be required to find, present and lead class discussion of one research study relevant to one of the lecture topics in this course as a member of a small group. Presentations will include a brief (10-15 minutes) slideshow that presents the paper and necessary background in a general way, followed by a brief period of class discussion lead by the presenters. Laboratory activities will consist of small group development of several independent (yet guided) greenhouse- and field-based research projects in plant ecology. This laboratory experience will involve exploring laboratory and field resources, brainstorming and proposing project ideas, researching project topics, conducting projects, and communicating results.

Grading

| | |
|------------------------|------------------------------------|
| 3 Lecture Exams | 100 points each (300 points total) |
| Final Exam | 150 points |
| 2 Written Assignments | 25 points each (50 points total) |
| Final Research Paper | 50 points |
| Presentation | 25 points |
| General Participation | 25 points |
| <u>Lab Assignments</u> | <u>200 points</u> |
| Total | 800 points |

E. RATIONALE FOR CHANGE

This change will make it easier for our Biology majors in all concentrations (General Biology, Preprofessional, Ecology, Organismal Biology, Molecular, and UTeach) to satisfy their Botany *or* Ecology and Evolution requirement for a B.S. in Biology. Although it is proposed that the new Plant Ecology course be listed as a course fulfilling the Botany requirement and a course fulfilling the Ecology and Evolution requirement, students also would have to take another course from one of these requirements for their B.S. in Biology. In other words, students would not be able to have the new course count for *both* their required Botany course and their required Ecology and Evolution course.

For Biology majors in all concentrations, listing Plant Ecology as a Botany course will provide an additional course option for fulfilling that requirement, which currently includes only three regularly taught courses resulting in their typical high demand. Also listing Plant Ecology as an Ecology and Evolution course will provide an additional course option for fulfilling that requirement, which will help to alleviate some of the interest of our Biology majors in choosing our currently offered and always highly demanded General Ecology course to fulfill this area of their degree curriculum. The addition of this proposed new course offering will have a particular impact on undergraduate students seeking a B.S. degree in Biology with an Ecology concentration by providing them with a new course that is specific and relevant to their area of focus.

For Environmental Science majors in all concentrations, listing Plant Ecology as an Environmental Resources course will provide an additional course option for fulfilling that requirement. In addition, listing Plant Ecology as a new elective course offering for Environmental Science majors with a Biology concentration will provide them with an additional course option for completing their degree program.

F. ECONOMIC AND PEDAGOGICAL ANALYSIS OF PROPOSAL

This proposed change will offer another Botany course for the Botany requirement and another Ecology and Evolution course for the Ecology and Evolution requirement to undergraduate students completing a BS degree in Biology. Since the course has been taught as a temporary BIOL 4999 course by demand, there is minimal change to the curriculum or economics of running departmental courses.

Dr. Jennifer Boyd will be the primary instructor of the proposed Plant Ecology course. In addition to teaching Plant Ecology, Dr. Boyd is responsible for teaching the lecture component of Introduction to Environmental Science I (ESC 1500) and General Ecology and its associated laboratory (BIOL 3060/3070), and is offering a new Global Change Biology course (temporarily BIOL 4999/ESC5300) by demand. Dr. Boyd provides sufficient expertise and interest in the development of a course in Plant Ecology and is committed to maintaining Plant Ecology as a regular departmental course offering.

G. RELATION OF PROPOSAL TO REQUIREMENTS AND RESOURCES IN OTHER DEPARTMENTS OR PROGRAMS

Not applicable.

Modification to Catalog Description of the Biology, B.S. Curriculum:

We request the addition of Plant Ecology to the General Biology, Preprofessional, Ecology, Organismal Biology, Molecular, and UTeach concentration for the B.S. in Biology.

The following modifications to the degree requirements (2011-2012 UTC Undergraduate Catalog) are requested:

Current Undergraduate Catalog Description:

Each biology major must also complete the requirements for one of the following:

Biology: General Biology

...

Botany (select 1 course): 2070, 3510, 3520

Ecology and Evolution (select 1 course): BIOL 3060 and BIOL 3070, BIOL 3150, BIOL 4060, BIOL 4160, BIOL4400, BIOL 4500

Biology: Preprofessional

...

Botany (select 1 course): 2070, 3510, 3520

Ecology and Evolution (select 1 course): BIOL 3060, BIOL 3150, BIOL 4060, BIOL 4160, BIOL 4400, BIOL 4500

Biology: Ecology

...

Botany (select 1 course): 2070, 3510, 3520

Ecology and Evolution (select 1 course): BIOL 3060 and BIOL 3070, BIOL 3150, BIOL 4060, BIOL 4160, BIOL 4400, BIOL 4500

Biology: Organismal Biology

...

Botany and Zoology (select 4 courses): 2070, 3120, 3130, 3200, 3420, 3510, 3520, 4030, 4080, 4450, 4560, 4570, 4580

(A minimum of one botany and one zoology course must be taken...)

Ecology and Evolution (select 1 course): BIOL 3060 and BIOL 3070, BIOL 3150, BIOL 4060, BIOL 4160, BIOL 4400, BIOL 4500

Biology: Molecular

...

Botany (select 1 course): 2070, 3510, 3520

Ecology and Evolution (select 1 course): BIOL 3060, BIOL 3150, BIOL 4060, BIOL 4160, BIOL 4400, BIOL 4500

Biology: UTeach

...

Botany (select 1 course): 2070, 3510, 3520

Ecology and Evolution (select 1 course): BIOL 3060, BIOL 3070, BIOL 3150 or BIOL 4160 or BIOL 4500

Proposed New Text for Undergraduate Catalog Description with new course numbers:

Each biology major must also complete the requirements for one of the following:

Biology: General Biology

...

Botany (select 1 course): 2070, 3510, 3520 – ADD 4XXX (Plant Ecology)

Ecology and Evolution (select 1 course): BIOL 3060 and BIOL 3070, BIOL 3150, BIOL 4060, BIOL 4160, BIOL 4400, BIOL 4500 – ADD 4XXX (Plant Ecology)

Biology: Preprofessional

...

Botany (select 1 course): 2070, 3510, 3520 – ADD 4XXX (Plant Ecology)

Ecology and Evolution (select 1 course): BIOL 3060, BIOL 3150, BIOL 4060, BIOL 4160, BIOL 4400, BIOL 4500 – ADD 4XXX (Plant Ecology)

Biology: Ecology

...

Botany (select 1 course): 2070, 3510, 3520 – ADD 4XXX (Plant Ecology)

Ecology and Evolution (select 1 course): BIOL 3060 and BIOL 3070, BIOL 3150, BIOL 4060, BIOL 4160, BIOL 4400, BIOL 4500 – ADD 4XXX (Plant Ecology)

Biology: Organismal Biology

...

Botany and Zoology (select 4 courses): 2070, 3120, 3130, 3200, 3420, 3510, 3520, 4030, 4080, 4450, 4560, 4570, 4580 – ADD 4XXX (Plant Ecology)

(A minimum of one botany and one zoology course must be taken...)

Ecology and Evolution (select 1 course): BIOL 3060 and BIOL 3070, BIOL 3150, BIOL 4060, BIOL 4160, BIOL 4400, BIOL 4500 – ADD 4XXX (Plant Ecology)

Biology: Molecular

...

Botany (select 1 course): 2070, 3510, 3520 – ADD 4XXX (Plant Ecology)

Ecology and Evolution (select 1 course): BIOL 3060, BIOL 3150, BIOL 4060, BIOL 4160, BIOL 4400, BIOL 4500 – ADD 4XXX (Plant Ecology)

Biology: UTeach

...

Botany (select 1 course): 2070, 3510, 3520 – ADD 4XXX (Plant Ecology)

Ecology and Evolution (select 1 course): BIOL 3060, BIOL 3070, BIOL 3150 or BIOL 4160 or BIOL 4500 ADD 4xxx (Plant Ecology)

**Modification to Catalog Description of the Environmental Science, B.S.
Curriculum:**

We request the addition of Plant Ecology to the Major and Related Courses and the Biology concentration for the B.S. in Environmental Science.

The following modifications to the degree requirements (2011-2012 UTC Undergraduate Catalog) are requested:

Current Undergraduate Catalog Description:

The following core requirement must be completed by all Environmental Science majors.

...

33 hours including:

...

Courses from the areas:

...

Environmental Resources (select 1 course): BIOL 2510, ESC 2400, ESC 2500, ESC 4060, ESC 4400, ESC 4600, ESC 2250, GEOL 2250, GEOL 4360, GEOL 4450

Each Environmental Science major must also complete the requirements for one of the following concentrations:

Environmental Science: Biology

...

Two courses from: Environmental Science 4060, 4400, ESC 4600, ESC 2250/ GEOL 2250

Proposed New Text for Undergraduate Catalog Description with new course numbers:

The following core requirement must be completed by all Environmental Science majors.

...

33 hours including:

...

Courses from the areas:

...

Environmental Resources (select 1 course): BIOL 2510, ESC 2400, ESC 2500, ESC 4060, ESC 4400, ESC 4600, ESC 2250, GEOL 2250, GEOL 4360, GEOL 4450 – ADD ESC 4XXX (Plant Ecology)

Each Environmental Science major must also complete the requirements for one of the following concentrations:

Environmental Science: Biology

...

Two courses from: Environmental Science 4060, 4400, ESC 4600, ESC 2250/ GEOL 2250 – ADD ESC 4XXX (Plant Ecology)

Biology/Environmental Science 4XXX – Plant Ecology
University of Tennessee at Chattanooga
Spring 2013

Instructor Jennifer Boyd
317H Holt Hall
425-5638
jennifer-boyd@utc.edu

Office Hours XXX

Prerequisites

Biology 1120/1120L with a minimum grade of C and at least one 300-400 level course from Biology or Environmental Science with a minimum grade of C; junior standing.

Corequisite

Biology 4XXXXL

Required Text

Gurevich J, Scheiner SM, Fox GA (2006) *The Ecology of Plants*, 2nd Edition. Sinauer Associates, Inc., Sunderland, MA.

Additional Readings

Required weekly readings consisting of recent research articles will be posted as electronic files on a class Blackboard site.

Course Description

Plant ecology is the study of relationships of plants with their living and non-living environment, explored from the levels of plant individuals, populations and communities. Emphasis will be given to factors that influence and are influenced by plant distribution and abundance, such as resource availability, biotic interactions, disturbance regimes, community diversity, and ecosystem functioning. Specific topics will include those unique to plants, such as photosynthesis and herbivory, while more general topics will focus on the distinct ways that plants interact with their environment as immobile organisms.

Objectives

- To gain foundational knowledge of plant morphology and physiology from an evolutionary perspective.
- To learn basic ecological concepts related to plant individuals, populations and communities.
- To become familiar with classic research studies that have shaped the modern field of plant ecology.
- To discuss readings from contemporary primary literature and draw conclusions about how these studies are contributing significantly to the field.

- To understand how human activities influence the abiotic and biotic environment with which plants interact
- To think creatively and independently as you design, conduct and analyze plant ecological experiments in the laboratory and field.

Grades

Your grade will be based on the number of points you earn on exams and lab assignments as outlined below. No extra credit will be awarded.

| | |
|------------------------|------------------------------------|
| 3 Lecture Exams | 100 points each (300 points total) |
| Final Exam | 150 points |
| 2 Written Assignments | 25 points each (50 points total) |
| Final Research Paper | 50 points |
| Presentation | 25 points |
| General Participation | 25 points |
| <u>Lab Assignments</u> | <u>200 points</u> |
| Total | 800 points |

Lecture Format

Each topic covered in lecture will comprise two class meetings. During the first meeting, I will present background information on the week's topic based on your textbook reading assignment. During the second meeting, we will focus on and discuss recent research articles based on that week's topic. Research articles will be posted on the Blackboard site the week prior to their discussion dates. You are expected to read the papers, take notes and listing questions that you have while reading them, and actively participate in class discussions about them.

Exams

There will be three mid-term exams worth 100 points each, and one comprehensive final exam worth 150 points. All exams will consist of multiple choice, definitions, and essay questions based on lectures, readings, and related lecture materials.

Assignments

You will be required to complete two written assignments worth 25 points each focused on discussing selected primary research in plant ecology. You also will compose a final research paper on an approved topic in plant ecology worth 50 points. Research papers are to provide a synthesis of primary literature on the chosen topic in the style of a scientific review paper.

Presentations

You also will be required to find, present and lead class discussion of one research study relevant to one of the lecture topics in this course as a member of a small group. Presentations will include a brief (10-15 minutes) slideshow that presents the paper and necessary background in a general way, followed by a brief period of class discussion lead by the student presenters.

Attendance

Regular attendance is essential for this course. Plant ecology is *not* an easy subject to memorize. If you miss class for any reason, you are responsible for learning about any missing material from other students in class. Make-up exams will be permitted only for legitimate absences that are explained by a note from your doctor, dean or athletic director. If you know ahead of time that you will miss an exam (such as if you are on an athletic team), you must let me know before your absence so that we can arrange another time to take the exam.

Disabilities

If you have a physical or mental disability, either hidden or visible, which may require special assistance or accommodation in this class or any other class, please notify the Office for Students with Disabilities at 425-4006 or visit the office in 110 Frist Hall.

Difficulties

If you find that personal problems, career indecision, or study and time management difficulties are adversely affecting your successful progress in this course and/or others at UTC, please contact the Counseling and Career Planning Center at 425-4438 or visit the center in 338 University Center.

Topic Schedule

Section 1: The Individual and its Environment

| | | |
|--------|----------------------------------|-----------|
| T & Th | Photosynthesis is Fundamental | Chapter 2 |
| T & Th | Water Relations & Energy Balance | Chapter 3 |
| T & Th | Soils & Mineral Nutrition | Chapter 4 |
| T | EXAM 1 | |

Section 2: Plant Populations

| | | |
|--------|--------------------------------|--------------|
| Th & T | Evolution Processes & Outcomes | Chaps. 5 & 6 |
| Th & T | Population Dynamics | Chapter 7 |
| Th & T | Growth & Reproduction | Chapter 8 |
| Th & T | Life Histories | Chapter 9 |
| Th | EXAM 2 | |
| T & Th | NO CLASS: SPRING BREAK | |

Section 3: Communities & Landscapes

| | | |
|--------|--------------------------------|------------|
| T & Th | Competition | Chapter 10 |
| T & Th | Herbivory & Pathogens | Chapter 11 |
| T & Th | Disturbance & Succession | Chapter 12 |
| T & Th | Diversity & Rarity | Chapter 13 |
| T & Th | Global Change: Humans & Plants | Chapter 21 |
| T | EXAM 3 | |
| Th | Cumulative Review for Final | |

TBA FINAL EXAM

Biology/Environmental Science 4XXXL – Plant Ecology Laboratory
University of Tennessee at Chattanooga
Spring 2013

Instructor Jennifer Boyd
317H Holt Hall
425-5638
jennifer-boyd@utc.edu

Office Hours XXX

Prerequisites

Biology 1120/1120L with a minimum grade of C and at least one 300-400 level course from Biology or Environmental Science with a minimum grade of C; junior standing.

Corequisite

Biology 4XXX

Course Description

Plant ecology is the study of relationships of plants with their living and non-living environment, explored from the levels of plant individuals, populations and communities. The lab component of this course will include hands-on experimentation and field activities developed to assess plant responses to abiotic and biotic environmental conditions.

Objectives

- To gain experience observing the natural world and testing related hypotheses
- To learn methods that plant ecologists use to conduct greenhouse- and field-based research
- To learn to analyze and interpret scientific data
- To practice effectively communicating scientific information
- To think creatively and independently as you design, conduct and analyze plant ecological experiments in the laboratory and field.

Readings

There is no lab manual for this course. Lab handouts will be distributed during lab meetings as appropriate and posted electronically on a class Blackboard site. You should keep these hand-outs in a binder for reference when writing your assignments. You also should record important information in a lab notebook that you can refer to when writing your assignments.

Lab Format

Laboratory activities will consist of small group development of several independent (yet guided) research projects in plant ecology. These activities will include brainstorming and proposing project ideas, researching project topics, conducting projects, and

communicating your results in the form of written progress reports, final reports, and presentations.

Grades

Your grade in laboratory will comprise 25 percent of your final grade in the Plant Ecology course. The laboratory component of your course grade will be based on the number of points you earn on your lab assignments as follows:

| | |
|----------------------|---------------------------|
| Lab Reports | (4 total, 25 points each) |
| Project Proposal | (40 points) |
| Project Presentation | (25 points) |
| Project Report | (60 points) |

Assignments

You will be compiling laboratory reports describing your lab activities and findings, as well as proposing, presenting, and reporting the results of a semester-long community-based plant ecology project. The details of these assignments will be described during lab. Each assignment will be due when specified. No late assignments will be accepted except in the event of *legitimate* absences as described in the attendance policy below. Unexcused late assignments and missed assignments will earn zero points.

Attendance

Participation is an inherent part of laboratory courses. Make-up labs will not be given under any circumstances. If you miss lab and your absence cannot be explained as *legitimate* by a note from your doctor, dean or athletic director, you will receive a zero for any assignment or portion of assignment associated with that lab's activities.

Lab Rules

Standard laboratory safety rules are to be followed. Eating and drinking in the lab are not permitted. Wash your hands after class. Handle and dispose of supplies as instructed. Clean up your lab area before you leave class.

Field Activities

Some lab activities will require you to spend time outdoors on campus and at local field sites. You should come to lab dressed appropriately and wearing long pants and closed-toed shoes. Extreme temperatures, sun, rain, biting insects, irritating plants, and snakes are all part of the fun of the natural world. Consequently, you should be prepared to encounter any or all of these conditions.

Class Conduct

Arrive to class on time. Participate in group activities. Remain until all members of your group have completed those activities. Turn off your cell phone. I realize that this is a Friday afternoon class, but it is still a class, so work thoughtfully and be considerate!

Disabilities

If you have a physical or mental disability, either hidden or visible, which may require special assistance or accommodation in this class or any other class, please notify the Office for Students with Disabilities at 425-4006 or visit the office in 110 Frist Hall.

Difficulties

If you find that personal problems, career indecision, study and time management difficulties, etc. are adversely affecting your successful progress in this course and/or others at UTC, please contact the Counseling and Career Planning Center at 425-4438 or visit the center in 338 University Center.