ESF Course Proposal
Committee on Curriculum - ESF Faculty Governance
Office of Instruction & Graduate Studies

This course proposal form should be completed when introducing a new course or a revision of an existing course. The proposal will be reviewed by the Committee on Curriculum, or, in the case of minor revisions, will be approved administratively by the Associate Provost for Instruction.

This Course Proposal must be completed according to the guidelines provided in Course Proposal Form – Instructions and Guidance. Please see the last page of Course Proposal Form – Instructions and Guidance, for instructions on how this Course Proposal should be submitted to the Committee on Curriculum for review.

Date: February 27, 2017

1. Course Information:

1.1 Course Prefix and Number: EFB 518
Course Title: Systems Ecology: Ecological Modeling and Design
(If a new or renumbered course, please check with the Registrar regarding the use or reuse of the course number)

1.2 □ This is a New Course.
OR
☒ This is a Major Course Revision
OR
□ This is a Minor Course Revision

If this is a Course Revision, please see Course Proposal Form – Instructions and Guidance to determine if your revision is major or minor. Indicate below the reason(s) for the revision.

(Please check all that apply)
□ Course Number/Division
☒ Title
☒ Credit hours
☒ Pre- or Co-requisite(s)
☒ Format
□ Learning Outcomes
☒ Concepts, Content
☒ Catalog Description
☒ Instructional Methods
□ General Education
□ Institutional Resources
□ Semester Offered
□ Course Inactivation
□ Course Reactivation

1.3 General Education knowledge and skills area (if applicable): If none, check here ☒
□ American History
□ The Arts
□ Basic Communication
□ Humanities
□ Mathematics
□ Natural Sciences
□ Other World Civilizations
□ Social Sciences
□ Western Civilization
2. Proposer Need Statement:

2.1 Describe why this course (or course revision) is needed to meet current or proposed goals and outcomes of the program or College, and, if a revision, provide an explanation of and justification for the revision. This course was last updated in 1989. Course revisions were made to meet current campus needs in course content related to: ecosystem restoration, ecological design, ecological engineering, and ecological modelling.

2.2 List the pre-requisite or co-requisite courses (taught within the home department or taught by another department) and explain their relationship to the proposed course. One course in ecology. A basic understanding of ecology will permit students to construct ecological models and use models for ecological design and engineering that meet basic rigor.

2.3 Explain the impact of this course in meeting the goals and outcomes of other Departments/programs (if any). This course will continue to provide a technical skills elective for majors in EFB. It will also provide additional ecological design content for students interested in ecosystem restoration and ecological engineering, such as in EFB, LA, and ERE.

2.4 If the proposed course is designed to fulfill SUNY General Education Requirements, the Associate Provost for Instruction must review this proposal to ensure that General Education Requirements will be met for the specified knowledge area (See Instructions and Guidance). Please provide an explanation of how this course fulfills SUNY General Education Requirements. Not applicable.

2.5 What are the staffing requirements (instructor, TA, Lab tech, etc.) for this course? If a new course, are there new staffing needs or are there adequate staff members already in place? If a revised course, are there additional staffing needs? This revision does not require additional staff.

2.6 What Department (or extra-Department) resources are or will be made available to support the course or course revision? This course will require the use of a computer cluster for lecture.

2.7 Anticipated Enrollment (enter where applicable)

<table>
<thead>
<tr>
<th>Semester</th>
<th>Enrollment</th>
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<tbody>
<tr>
<td>Fall Semester</td>
<td></td>
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<tr>
<td>Summer Semester</td>
<td></td>
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<tr>
<td>Spring Semester</td>
<td>25</td>
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</tbody>
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2.8 Anticipated frequency of class meetings. Three lectures per week.
3. DETAILED COURSE DESCRIPTION

3.1 COURSE IDENTIFICATION AND FORMAT:

3.1.1 Course Prefix and Number: EFB 518
3.1.2 Course Name: Systems Ecology: Ecological Modeling and Design
3.1.3 Credit Hours: 3
3.1.4 Semester (check all that apply): Fall ☐ Spring ☒ Summer ☐
3.1.5 Format (check as appropriate): Lecture ☒ Online ☐ Lab ☐ Field ☐
                                 Other ☐ (explain)
3.1.6 Contact hours per week: 3
3.1.7 Prerequisite(s) – if none, please enter "None" (Be specific, as Upper Division courses and Graduate courses will likely have some pre-requisite knowledge) One semester of ecology

3.2 SCOPE:

3.2.1 Level of Instruction (check one, or two if a shared resource course):
                                Lower Division ☐ Upper Division ☒
                                Beginning Graduate ☒ Advanced Graduate ☐

3.2.2 Relation to curriculum or to other ESF or Syracuse University courses:
    a. Is this a required course?    No ☐ Yes ☒.
       If Yes, please list the program(s) for which it is a requirement:
    b. Is this an elective course within your department?   No ☐ Yes ☒.
    c. Is enrollment in this course restricted?    No ☐ Yes ☒
       If Yes, please explain: Cannot exceed the maximum size of one computer cluster.
    d. Are other ESF or SU courses similar or identical to this course? No ☐ Yes ☒.
       If Yes, please identify the courses:
    e. Is this course a shared resource offering (i.e. is there a graduate or undergraduate concurrent offering)?    No ☐ Yes ☒.
       If Yes, what is the course number of the concurrent offering?

3.3 STUDENT LEARNING OUTCOMES:

Identify the student learning outcomes associated with this course.

At the completion of this course, students will have the ability to:

1) Conceptualize and diagram natural and human systems

2) Use field and literature data to develop dynamic computer models of natural and human systems

3) Develop and evaluate designs for environmental systems (e.g., landscape design, ecological engineering, and ecosystem restoration) using ecological modelling

4) Evaluate system sustainability using emergy
3.4 MAJOR CONCEPTS, PROCESSES or TOOLS:

Identify the course content and themes (e.g. Table of Contents) consistent with the learning domains and outcomes.

1. System conceptualization and diagramming
2. Human and natural systems: approaches, scale, and integration
3. Ecological modelling techniques (e.g., using STELLA to construct environmental models and evaluate systems)
4. Ecological modelling for landscape design, ecological engineering and ecosystem restoration
5. Emergy evaluation

3.5 INSTRUCTIONAL METHODS:

Identify the methods used to meet the course outcomes, as well as the principal instructional methods. Instruction will be in a computer cluster. The instruction will include teaching tools such as the use of STELLA software for ecological modeling, and spreadsheets for emergy evaluation. Students will also work in groups at white boards and develop systems diagrams at multiple scales. Students will work with human systems and natural systems, and the interaction among them. Students will develop their own dynamic ecological models using data from their own work and work of others. They will write a scientific article about their model and findings.

3.6 CATALOG DESCRIPTION

Provide the course description using the precise format to be included in the ESF catalog (i.e. course number and title; format; brief description; semester(s) offered; and pre-/co-requisites). Please do not exceed 1000 characters.

Three hours of lecture per week. Survey of systems ecology literature and techniques for ecological modeling and design. Students will computer simulate natural and human systems. They will explore how ecological modeling can contribute to landscape design, ecological engineering and ecosystem restoration.

Spring

Prerequisite: one course in ecology

3.7 COURSE HISTORY:

Provide the dates of prior approval of this course, and its revision history. Course approved by faculty May 14, 1989.
3.7.1 Relationship to current ESF courses

This course is replacing a current ESF course  ☒ YES  ☐ NO

If NO, then proceed to section 4 below.

If YES, then provide below the number and name of the course to be deactivated and removed from the catalog once this course proposal has been approved:

Course Number (of the course to be replaced)  EFB 518
Course Name (of the course to be replaced)  Systems Ecology

If the course to be replaced is used by departments other than the department sponsoring this proposal, please indicate below which departments are affected and the date they were notified about the course replacement.

Department:  Date of Notification:
Department:  Date of Notification:
Department:  Date of Notification:
Department:  Date of Notification:
4. Institutional Impacts:

This section pertains to forecasting institutional resource needs to support the course or course revision. Provide clear statements regarding the needs and current availability (or absence) of resources. Note that, if this is a course revision, only the impacts of the revision should be included.

Staffing needs: 1 instructor, same as current offering (SCO)

Classroom resources (e.g. physical facilities in a laboratory, lecture hall, flexible space, academic computing): 1 computer cluster for lecture

Technology Resources: None

Computing Resources (software licensing, hardware, access): 25 computers with STELLA software - software is already available on all campus computers

Library Resources (subscriptions, services): No new subscriptions

Transportation Requirements (budget, fees, fleet vehicles): None

Forest Properties or Field Practicum Facilities: None
5. Health and Safety Considerations:

Will any of the conditions or situations outlined below be present in association with the course?  
Yes / No

5.1. Will substances with any of the following properties be used during instruction: flammability, toxicity, corrosivity, reactivity, registered pesticide, legally controlled, or other characteristics with the potential to cause harm or injury?  
☐ / ☒

5.2. Will any physical hazards be present during instruction? (e.g., machines that need safety guards; razor blades or syringes; compressed gases, etc.).  
☐ / ☒

5.3. Will any biological hazards be present during instruction? (e.g., handling animals (rabies or hantavirus); cultures or stocks of infectious agents (fungal spores, viruses, bacteria, etc.).  
☐ / ☒

5.4. Will any radiation hazards be present during instruction? (e.g., radioisotopes, X-rays, ultraviolet rays, lasers, etc.).  
☐ / ☒

5.5. Will any electrical equipment that, due to its design, location, or method of use, pose any threat to safety during instruction? (Give considerable thought to electrical use outdoors, or any potentially wet location.).  
☐ / ☒

5.6. Will there be any personal safety issues related to the class? (e.g., due to time of day or location, at the end of any organized class exercise, will students be in danger of physical assault, etc.).  
☐ / ☒

5.7. Will any students be driving official state or research sponsored land or water vehicles during any class or instructional exercise?  
☐ / ☒

5.8. Will any type of personal protective equipment be necessary during class exercises? (e.g., hard-hats, eye/face protection, hearing protection, hand/foot protection, lab coat, visibility clothing, etc.)  
☐ / ☒

If the answer was "Yes" to any of the HEALTH AND SAFETY questions, please explain:

For lab and field courses to which all answers are "no", you should explain that here, also. Normally, we would expect some safety precautions for such courses.
6. Coordination and Consultation

Emails/letters, as noted below and attached to this proposal, or signatures below, indicate that the affected departments, programs or units have been notified of this proposal and have had an opportunity to assess the impact of the proposal on their respective units.

Affected Academic Department(s) or Program(s) – other than the sponsoring department:

Department/Program 1

Chair Signature

Name of Chair/Program Director

Or letter attached

Date

Department/Program 2

Chair Signature

Name of Chair/Program Director

Or letter attached

Date

Department/Program 3

Chair Signature

Name of Chair/Program Director

Or letter attached

Date

[If more than three Departments/Programs, please continue on a separate page]

Other Units:

Associate Provost for Instruction & Dean of the Graduate School (for Gen Ed courses only)

Date

Or letter attached

Registrar

Date

Or letter attached

Library Director

Date

Or letter attached

Computing and Network Services

Date

Or letter attached

Physical Plant

Date

Or letter attached

Forest Properties

Date

Or letter attached

Environmental Health and Safety

Date

Or letter attached
7. Proposer Information and Sponsoring Department Chair Affirmation:

Contact Person:
Name: Stev Diemont          Department: EFB
Email: sdiemont@esd.edu     Phone: x-4707

This proposal has been reviewed and approved by the sponsoring Department. Affected departments have been notified and given the opportunity to provide feedback. Department resources are or will be made available to support the course, or a plan is in place to meet the resource needs as identified in the Institutional Impacts section of this proposal (see Section 4, above).

Name: ___________________________ Date: ________
Department Chair (or designated curriculum representative)

Signature: __________________________ Or letter attached □
Department Chair (or designated curriculum representative)

8. Approvals:

Curriculum Committee

Date

Faculty Governance

Date

Provost

Date
DETAILED COURSE DESCRIPTION

COURSE: EFB 518 - SYSTEMS ECOLOGY
FALL SEMESTER - 4 CREDIT HOURS

OBJECTIVES:

The objectives of this course are to learn the skills of developing computer code and especially in learning the techniques of relating field data and experiments to computer simulation code. An additional objective is to introduce the student to "systems thinking", that is to the conceptual linking together and formal analysis of multiple cause and effect.

SCOPE:

The audience for systems ecology includes ecology majors interested in a "systems" perspective to their work, fish and wildlife majors who are interested in learning how to model the populations they might manage, resource managers and planners interested in learning techniques for projecting land use patterns into the future and human health majors interested in demography and/or disease spread.

MATERIALS AND METHODS:

The class has two 1 1/2 hour lectures each week, a weekend field trip at the beginning of the semester, tutorials from instructor and teaching assistant, and intensive computer assignments. The assignments are given as weekly class exercises using the field data collected by the student. The instructor and the teaching assistant are available regularly to assist the student in completing the homework.

INSTITUTIONAL RESOURCES:

The course will not require new equipment except for the continued reasonable availability of personal computer and transportation for the first weekend of the semester.

HAZARDOUS CONDITIONS AND WASTES:

There are no hazardous conditions or wastes involved.

RELATIONSHIP TO OTHER COURSES:

The course has a prerequisite of at least one course in ecology and (highly recommended) some previous experience with computing.
Catalog Description:

EFB 518 Systems Ecology               4 Credit Hours

Three hours of lecture and three hours of lab/field experience.

Survey of history, literature, and techniques of systems ecology including especially the teaching of intellectual, basic mathematic and computer skills that allow the student to take an environmental problem and simulate it on a computer.

Prerequisites: One course in ecology and some experience with computers. Weekend field trip required. Fall.

Course History:

Approved by faculty action 5/14/89.