Date: March 4, 2013
Course Number: FOR 332
Course Title: Forest Ecology

☐ New Course  OR  ☑ Changes in existing course (check all that apply):

☐ Prefix  ☐ Description  ☐ Shared Resources
☐ Number  ☐ Pre-requisite(s)  ☐ Course Format
☒ Credits  ☐ Co-requisite(s)  ☐ Content
☐ Title  ☐ Semester Offered

For new courses only, indicate if you would like approval as a course meeting the General Education standards in the following knowledge and skills area (check all that apply):

☐ American History  ☐ Humanities  ☐ Other World Civilizations
☐ The Arts  ☐ Mathematics  ☐ Social Sciences
☐ Basic Communication  ☐ Natural Sciences  ☐ Western Civilization

If changing an existing course, describe the change(s):

I am proposing to increase the credit load from 3 to 4, due to increased breadth and depth of content covered in lectures, and addition of learning objectives. 3 hours lecture and 3 hours lab per week.

List any pre- or co-requisites here: Pre – FOR 232 Natural Resources Ecology; or EFB 101 and 102; or equivalent by permission of instructor.

Institutional Impact:

Anticipated Enrollment: 25-30 per semester

Technology and Classroom Resource Demands: Digital projection equipment and, if possible, multiple screens for class sizes over 30. Internet access is required.

Computing Resources: One lab session (3 hours) will require use of GIS workstations. Students may independently require access to computing labs for lab exercises.

Library Resources: Course reader will be provided. Several books placed on reserve and access to scholarly journals.

Transportation Requirements: A bus or several vans for travel to field sites for laboratories.

Forest Properties or Field Practicum Facilities Required: Heiberg Forest (roads, restroom facilities) and Huntington Forest (dorms, office/lab, roads, boats).

Proposer Contact Information:

Name: Colin Beier  Department: FNRM
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Health and Safety Considerations:

Conditions or situations present in association with the course?

Yes / No

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? No

2. Will any physical hazards be present during instruction? (e.g., machines that need safety guards; razor blades or syringes; compressed gases, etc.). No

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.). No

4. Will any radiation hazards be present during instruction? (e.g., radioisotopes, X-rays, ultraviolet rays, lasers, etc.). No

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.). No

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.). Yes

7. Will any students be driving official state or research sponsored land or water vehicles during any class or instructional exercise? No

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.) Yes

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

For (6) and (8): Other than the conditions normal to forest settings, students will not be exposed to any special hazardous conditions. Due to the potential for falling debris (e.g., stems and branches) in forested settings, students will be required to wear hardhats that meet or exceed the ANSI Z89.1-1986, Class A and B standards. Due to uneven terrain encountered in many forest laboratory sites, students will be required to wear boots that provide ankle support and protection. Due to the abrasion from low-growing forest vegetation, students will be required to wear long pants during all forest exercises. Use of hardhats, boots and long pants during forest laboratories is policy in the Department of Forest and Natural Resources Management.

A detailed course description must accompany the Course Proposal Form.
DETAILED COURSE DESCRIPTION

COURSE: FOR 332 – Forest Ecology

4 Credit Hours – Fall Semester
3 Hours Lecture Per Week
1 Hour Laboratory Per Week

Prerequisite(s): FOR 232 Natural Resources Ecology, or EFB 101 and 102, or equivalent by permission of instructor

SCOPE:

1. Level of Instruction:
   a. FOR 332 is an introductory course intended to fulfill core or elective requirements.

2. Relation to curriculum or to other ESF or Syracuse University courses:
   a. FOR 332 is a requirement for the FRM and FES concentrations within FNRM. It is also an elective suitable for EFB students in several concentrations. It is open to all students at ESF and SU as space allows.
   b. Shared resource requirements: a graduate course (FOR 532 – Forest Ecology) is taught in conjunction with the lecture and lab components of this course

STUDENT LEARNING OUTCOMES:

After completing this course the student should be able to:

1. Define the major levels of organization of forest ecosystems, sub-disciplines of forest ecology, and their key concepts relating to ecosystem structure, composition, function and responses to change;
2. Describe the primary functions of trees, including production, respiration, transpiration, growth, reproduction, regeneration and defense, and their responses to stimuli;
3. Identify the major forest biomes of the world and the climatic, edaphic, biogeographic and anthropogenic factors shaping their distribution;
4. Define the niche concept, distinguish among the major types of species interactions, and provide examples of how each type of interaction shapes forest communities;
5. Describe the major forest ecosystem processes governing flows of water, energy and nutrients, and give examples of how these both affect, and are affected by, global environmental change;
6. Identify the major types of forest disturbance, as well as adaptations and responses to change;
7. Explain the processes of gap-phase replacement and succession;
8. Give examples of the ecological impacts of forest management at multiple levels of organization, and identify key principles and challenges to sustainable ecosystem management;
9. Explain the importance of landscape context, heterogeneity, and scale in forest ecology;
10. Apply ecological concepts to interpret aspects of forest or site history based on field observations.

MAJOR CONCEPTS OR METHODOLOGIES:

The objective of this course is to develop a foundation in forest ecology that will enable advanced study in several disciplines related to forest ecosystems, including both basic (plant ecology, wildlife biology) and applied (silviculture, watershed management) disciplines. An integrated set of lectures and laboratory activities, including field trips and guided data analysis sessions, will contribute to the learning process.

This course will provide an overview of the structure, function and dynamics of forest ecosystems at multiple levels of organization, from individual trees to entire landscapes. A holistic approach includes physiological, population, community, ecosystem and landscape ecology sub-disciplines, their approaches, key concepts, and interrelationship, which will be explored with respect to both natural and managed forest ecosystems. While all major forest biomes will be defined and discussed in lectures, field experiences and the real-world application of concepts and principles will focus on eastern US forests. An emphasis on
human interactions and forest responses to disturbance at multiple scales will include contemporary topics such as forest management, land use change, invasive species and global environmental change.

Lectures emphasize concepts, principles and critical thinking, and the application of this intellectual foundation to real-world situations and examples. Breadth of topics and integration across concepts and examples is emphasized over depth of coverage of any particular topic. Lectures are designed to provide real-world examples of abstract concepts, and to promote in-class discussion and exploration. Readings associated with lectures include extracts from textbooks and refereed journal articles. Examinations are based on short-answer questions and emphasize critical thinking using ecological concepts.

Laboratory activities link thematically with lecture topics and greatly enrich the lecture material. Labs during the first two-thirds of the semester are field trips to sites with varying forest types and land use histories. The initial labs will serve to orient students to the forest environment and develop experience identifying species and gathering visual evidence of different forest components and conditions. The following labs will involve active data collection in four teams: vegetation, soils, forest floor fauna and dendrochronology. Students will be divided into four groups that will rotate each week to gain experience with a different sampling methodology. Data collected during these labs will be summarized and statistically analyzed during labs in the last third of the semester, comparing observations across sites. Students will provide lab write-ups, a final report and a field notebook for examination purposes.

CATALOG DESCRIPTION (Please provide using the precise format to be included in the ESF catalog, please do not exceed 50 words)

FOR 332. Forest Ecology (4 credit hours)

Three hours of lecture/discussion and three hours of laboratory per week. Structure, function and dynamics of forest ecosystems at multiple scales, from trees to landscapes, including human interactions. Topics include ecophysiology, disturbance, succession, carbon and nutrient cycling, forest management, invasive species and climate change. Field data collection and analysis. Fall.

Prerequisite(s): FOR 232, or EFB 101 and 102, or equivalent by permission of instructor

COURSE HISTORY:

FOR 332 has been taught as a 3-credit course since 1995, and was revised in 2004 to reflect different course objectives and the addition of FOR 532 as a shared resource. Previous versions of this course have been taught under various numbers, including ERM 332, Silvi 421 and Silvi 101.

Last approved: 14 Sep 2004

Revised Draft: 3 Jan 2013 (form in protected format: 3/4/13)