

# Ecosystem Engineers

ENV 6932 (Section 3B44)– Fall 2019



**Catalog Description:** 3 credits. Review and synthesis of organisms that create and modify habitat emphasizing their effect on ecosystem functions and services.

**Instructor:** Dr. Andrew Altieri, Environmental Engineering Sciences  
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**Contact:** Class website (UF e-Learning): <https://lss.at.ufl.edu>  
Course e-mail: use e-Learning for correspondence  
Office Hours: after class and by appointment

**Prerequisite:** Instructor permission

**Time and Location:** Monday 3-4 (9:35 - 11:30am), Phelps Lab 101  
Wednesday 3 (9:35- 10:25am), Phelps Lab 101

**Course Description:** The structure and function of many ecosystems are defined by ecosystem engineers. Ecosystem engineers are species that modify, maintain, or create habitat. By transforming resources, controlling the flow of energy and materials through an ecosystem, and interacting directly with other species through non-trophic mechanisms, ecosystem engineering can have profound effects on the natural world, including biodiversity patterns, biogeochemical fluxes, and geomorphological features. Understanding the role of ecosystems engineers is therefore crucial for predicting ecological responses to global change factors and is essential for the implementation of restoration, mitigation, management, and environmental design projects.

The course will center on group discussion of the scientific literature built on student leadership and contribution. Over the course of the semester students will specialize on a topic of interest within the ecosystem engineer theme relevant to their own research and interests, and then prepare a professional presentation and manuscript on that topic. Students will thus develop a broad understanding of ecosystems engineers from both a conceptual and applied perspective while integrating class themes into their own research pursuits and professional development.

## **Course Materials:**

Readings will come from the scientific literature and will be assigned and made available weekly

through the class homepage (<https://lss.at.ufl.edu>).

### **Course Expectations:**

- Attend class and arrive on time. Details on university attendance policy are available at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.
- Complete assigned readings and distribute reading guides prior to the class for which they are assigned.
- Participate thoughtfully in class discussions, including your thoughts on the assigned readings. Students will have the opportunity to lead a component of the discussion weekly. The success of the class is dependent on the regular contribution of all students.
- Prepare, present, and offer feedback on class presentation and writing assignments.
- Engage with instructor, students, and leaders on field trips.

### **Grading Scheme and Assignments:**

Discussion leadership and participation:	20%
Reading guides:	10%
Research manuscript:	40%
Presentation to class:	30%

Grading scale: A ( $\geq 93$ ), A- ( $\geq 90$  &  $< 93$ ), B+ ( $\geq 87$  &  $< 90$ ), B ( $\geq 83$  &  $< 87$ ), B- ( $\geq 80$  &  $< 83$ ), C+ ( $\geq 77$  &  $< 80$ ), C ( $\geq 73$  &  $< 77$ ), C- ( $\geq 70$  &  $< 73$ ), D+ ( $\geq 67$  &  $< 70$ ), D ( $\geq 63$  &  $< 67$ ), D- ( $\geq 60$  &  $< 63$ ), E ( $< 60$ ). GPA information can be found: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

Discussion leadership and participation: Real-life in-person attendance in class is required. Students will volunteer to lead discussion on a chosen scientific article from each of the weekly reading lists. Each week, students will choose the article from the following week's reading list for which they will be responsible. They will be expected to read and develop a nuanced understanding of their chosen article prior to class. Students will be responsible for briefly summarizing their paper, prompting discussion with thoughtful and provocative comments/questions, and relating their paper to the other weekly readings in class. Students are also expected to participate in the class discussion based on their understanding of all weekly readings as well as outside literature and resources.

Reading guides: Students will prepare a written one-page summary of their chosen article and distribute to the class by 5pm on the Friday prior to the week during which it will be discussed.

Research manuscript: Over the semester, each student will develop a manuscript, formatted for peer-reviewed publication, on an ecosystem engineering topic of their choice. For thesis masters and PhD students, this manuscript should be on their own research results. Non-thesis masters students will collaborate with a thesis/dissertation graduate student by developing a complimentary line of research.

Presentation to class: Students will prepare and give an oral presentation suitable for a scientific conference. The content of the presentation will be based on the topic of the research manuscript. Presenters should be prepared for an extended Q&A / feedback period, and other students will be earn participation points for their involvement in those follow-up discussions. Other formats and/or intended audiences for the presentation may be pursued with instructor approval.

**Course Topics and Schedule:** This schedule is tentative and subject to change based on the timing of fieldtrips, guest lecturer schedules, student interests, and current events.

**Field trips:** The class will venture on 2-3 field trips to explore the ecological significance of ecosystem engineers in the natural world. Trip locations and dates will be finalized in the first few weeks of class.

Week	Date	Topic	Manuscript Assignment
1	21Aug19	Introduction to EEs	
2	26Aug19	Definitions & related concepts	
2	28Aug19	Definitions & related concepts	
3	02Sept19	<b>No class–Labor Day</b>	
3	04Sept19	Classic examples	Outline
4	09Sept19	<b>Field trip TBD</b>	
4	11Sept19	Classic examples	
5	16Sept19	Trait-dependent effects	
5	18Sept19	Trait-dependent effects	Methods: Draft 1
6	23Sept19	Spatial heterogeneity	
6	25Sept19	Spatial heterogeneity	
7	30Sept19	Environmental gradients	
7	02Oct19	Environmental gradients	Figures & Results: Draft 1
8	07Oct19	Feedbacks	
8	09Oct19	Feedbacks	
9	14Oct19	Scale-dependent interactions	
9	16Oct19	Scale-dependent interactions	Abstract & Introduction: Draft 1
10	21Oct19	<b>Field trip TBD</b>	
10	23Oct19	Evolution	
11	28Oct19	<b>Field trip TBD</b>	
11	30Oct19	Evolution	Discussion: Draft 1
12	04Nov19	Multiple EEs	
12	06Nov19	Multiple EEs	
13	11Nov19	<b>No Class–Veterans Day</b>	
13	13Nov19	Threats and restoration	
14	18Nov19	Threats and restoration	Intro- Discussion: Draft 2
14	20Nov19	Invasive species	
15	25Nov19	Invasive species	
15	27Nov19	<b>No Class–Thanksgiving</b>	
16	02Dec19	Student presentations	
16	03Dec19	Student presentations	Final Draft
17	09Dec19 3-5pm	Student presentations	

**Academic Honesty:** As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."* It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. **It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code.** Violations of the Honor Code at the University of Florida will not be tolerated. **Violations will be reported to the Dean of Students Office for consideration of disciplinary action.** For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.php>.

**Software Use:** All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

**Campus Helping Resources:** Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance:

- *University Counseling & Wellness Center*, 3190 Radio Road, 352-392-1575, [www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)
  - Counseling Services
  - Groups and Workshops
  - Outreach and Consultation
  - Self-Help Library
  - Training Programs
  - Community Provider Database
- *Career Resource Center*, First Floor, J. Wayne Reitz Union, 392-1601, [www.crc.ufl.edu](http://www.crc.ufl.edu)

**Students with Disabilities Act:** Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)) by providing appropriate documentation. Once registered, students will receive an accommodation letter, which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Evaluations:** Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.