Catalog Description: 3 credits. Application of ecological principles to natural resource management and problem solving.

Instructors: Dr. David Kaplan, 102 Phelps Lab, dkaplan@ufl.edu, www.watershedecology.org
TAs: Amy Langston (amylangston@ufl.edu), Kevin Henson (kevinh1212@ufl.edu), Alexa Mainella (mainelam@ufl.edu)

Contact: **Class website (UF e-Learning):** https://lss.at.ufl.edu
Course e-mail: Use e-Learning for ALL correspondence
Dr. K Office Hours: Immediately after class and by appointment
TA Office Hours: Tuesdays & Wednesdays 9:35 – 10:25 am (3rd period), Phelps Lab

Time and Location:

- Mondays 12:50 – 2:45 pm (6th/7th period), Fine Arts B (FAB) 105
- Wednesdays 12:50 – 1:40 pm (6th period), Fine Arts B (FAB) 105

Course Objectives: This course aims to provide students with: 1) a thorough understanding of ecosystems by describing the biotic and abiotic components, interactions, and physical drivers that define major ecosystem types and 2) an overview of how these systems are engineered and regulated. In order to understand any individual ecosystem, it is imperative to have a firm grasp on general ecological concepts that explain ecosystem organization and function. This course will begin by reviewing the concepts of succession, material cycles, and food and energy webs, and then use a systems ecology approach to describe specific ecosystem types (e.g., estuaries, lakes, rivers, forests, etc.). Within this framework, we will apply ecological theory through lab and field exercises; build, test, and apply ecological models; and develop independent research projects. Throughout the course, we will focus on ecosystem services, major ecosystem stresses (both natural and anthropogenic), and management considerations for each ecosystem. Throughout the course, we will cover specific applications of ecological engineering, including ecological restoration, the use of wetlands for wastewater treatment, and the application of ecological models to solve environmental problems.

Contribution of Course to Meeting the Professional Component for ABET:
This course contributes 2 credit hours toward meeting the minimum of 32 credit hours for Math and Basic Science Topics and 1 credit hour toward meeting the minimum of 48 credit hours of Engineering Topics required in the basic-level curriculum for the Bachelor of Science Degree in Environmental Engineering Sciences.

Relationship of Course to Program Outcomes:
This course addresses the following ABET program outcomes:

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct laboratory experiments and analyze and interpret data
- an ability to identify, formulate, and solve engineering problems
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context
- use the modern techniques, skills and engineering tools necessary for engineering practice

Course Supplies:

- Required Textbook: None.
- Assignments, readings, and announcements will be posted on the course website, so it is important to *regularly check the class homepage* (https://lss.at.ufl.edu).

Course Expectations:

- Attend class and **arrive on time**.
- Complete assigned readings **prior to the class for which they are assigned.**
- **Participate in class discussions**, including your thoughts on assigned readings and lecture topics. Learning is more than passive accumulation of information, and we will be asking a lot of questions in class.
- Bring a laptop or arrange to share a laptop for all Excel and modeling activities.

Grading Scale: A (≥93), A- (≥90 & <93), B+ (≥87 & <90), B (≥83 & <87), B- (≥80 & <83), C+ (≥77 & <80), C (≥73 & <77), C- (≥70 & <73), D+ (≥67 & <70), D (≥63 & <67), D- (≥60 & <63), E (<60).

Grade Point Policy: Please visit the following site for information on UF's policy for assigning grade points (https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx).

Grading Scheme and Assignments:

UNDERGRADUATE SECTION		*GRADUATE SECTION*	
Participation	10%	Participation	10%
Quizzes	10%	Quizzes	10%
Lab/Field trip reports	20%	Lab/Field trip reports	20%
Exams	30%	Exams	30%
Ecological Engineering Design	20%	Ecological Engineering Design	20%
Graduate Student Reviews	10%	Literature Presentation	10%
Total	100%	Total	100%

- **Participation**: You cannot receive an "A" in this course without actively participating. Earn your participation grade by consistently attending class, asking and answering questions, and offering your opinion on course topics and current events.
- **Quizzes**: There will be *approximately* 12 quizzes covering material from the lectures and readings. Your quiz grade will be based on your **ten best quiz scores**. Quizzes will be given in the beginning of class; *students entering late will not receive credit.*
- **Labs/Field Trips**: There will be three 'labs', usually on Mondays. Details on the format and expectations for your lab reports will be delivered at the first lab. Labs must be submitted on e-Learning, and late assignments will be penalized by one letter grade per day. One field trip will be organized to visit wetland ecosystems near Gainesville. You will need to provide your own transportation. Additional details will follow.
- **Exams**: Optional exam reviews will be held **outside of class** before each exam.
- **Ecological Engineering Design**: Student groups (*n*=4; one grad, three undergrad) will independently develop and investigate an ecological question or environmental problem, develop an ecologically inspired engineering design, prepare a written report, and deliver an in-class presentation during the Final Exam period. Details to follow after Exam 1.
- **Graduate Student Literature Presentations/Review**: Graduate students (groups of 2) will choose one or more scientific papers from the journal *Ecological Engineering* to review and present to the class on a topic relevant to the course. Undergraduate students will provide a review of each graduate student group summarizing the material presented and providing constructive feedback on each groups' presentation.

Attendance: Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Materials and Supplies Fee: There will be a $45 materials and supplies fee to support lab activities for this course. (This fee may not be charged in Spring 2016)

Course Evaluation: Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. Evaluations are online 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.

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/
  - 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

Students with Disabilities Act: The Dean of Students Office coordinates the needed accommodations of students with disabilities. This includes the registration of disabilities, academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services, and mediating faulty-student disability related issues. *Dean of Students Office*, 202 Peabody Hall, 392-7066, www.dso.ufl.edu.

Course Topics and Schedule: This schedule is tentative and subject to change. Readings are posted in the "Resources" section of the e-Learning site. ***Complete assigned readings prior to the class for which they are assigned, so we can discuss them in class; they will also be covered on quizzes.***

- Note assignment due dates
- Note days when **laptops** required
- Note **exam** dates
- Note **field trip** date

Week	Date	Topic	Due Dates/Readings/Laptop?
1	1/2/2017	No Class	---
	1/4/2017	Course Introduction (Lab 1) ***OUTSIDE***	---
2	1/9/2016	Introduction to Ecological Engineering	Mitsch & Jorgensen 2003
	1/9/2017	Forest Structure Lab (Lab 2) ***OUTSIDE***	Forest Structure Lab
	1/11/2017	Ecology and the Ecosystem Concept	Ricklefs Ch. 9; **Lab 1 Due**
3	1/16/2017	No Class: Martin Luther King's Birthday	---
	1/18/2017	Ecosystem Services	MEA, 2005 (**Baby #2 Due**)
4	1/23/2017	Biodiversity	---
	1/23/2017	Introduction to Excel: Forest Structure Data	"Using Excel" Handbook; **LAPTOP**
	1/25/2017	Ecosystem Metabolism	Crain 2007
5	1/30/2017	Material Cycles – Carbon	US National Climate Assessment
	1/30/2017	Carbon, Climate Change, and Mitigation	pp. 396-407; **Lab 2 Report Due**
	2/1/2017	Material Cycles – N and P	Hobbie 1992
6	2/6/2017	Hydrology I – Water and Life	Aloisio 2015
	2/6/2017	Hydrology II – Water Budgets and Fluxes	---
	2/8/2017	Exam Review	---
7	**2/13/2017**	**Exam 1 (In-Class)**	---
	2/13/2017	Design Project Intro and Team Selection	---
	2/15/2017	Wetland Design Lab (Lab 3) ***INSIDE***	Wetland Design Lab; **LAPTOP**
8	2/20/2017	Energy Flows, Trophic Levels, Food Webs	Estes et al. 2011
	2/20/2017	Competition, Predation, and Trophic Cascades	
	2/22/2017	Succession and Self-Organization	Odum 1969; **Lab 3 Due**
9	2/27/2017	*Eco. Eng. 1: Intro to Ecological Restoration*	SER 2004
	2/27/2017	Video: Restoring the Everglades	---
	3/1/2017	Wetland Ecosystems	Mitsch and Gosselink 2000
10	**3/6/2017**	**Spring Break, NO CLASS**	---
	3/8/2017	**Spring Break, NO CLASS**	---
11	3/13/2017	*Eco. Eng. 2: Wetland Treatment System Design*	Tanner 2001; **LAPTOP**
	3/13/2017	*(lecture + design example)*	
	3/15/2017	Systems Diagrams	---
12	3/20/2017	*Eco. Eng. 3: Watershed Ecology*	Bell et al. 2016
	3/20/2017	*Eco. Eng. 4: Grad Student Presentations I*	---
	3/22/2017	Estuarine Ecosystems	Angelini et al. 2015
13	3/27/2017	Lake Ecosystems	---
	3/27/2017	*Eco. Eng. 5: Grad Student Presentations II*	---
	3/29/2017	Lakes, Part II	---
14	4/3/2017	*Eco. Eng. 6: Grad Student Presentations III*	---
	4/3/2017	River, Stream, and Spring Ecosystems	Ward et al. 2001
	4/5/2017	**Field Trip: Green Roof**	---
15	4/10/2017	*Eco. Eng. 7: Environmental Flows, Dams, and*	Poff and Zimmerman 2010;
		Dam Removal (lecture + software demo)	**LAPTOP**
	4/12/2017	Forest Ecosystems and Land-Use Change	McLaughlin et al., 2013
16	4/17/2017	*Eco. Eng. 8: Ecological Engineers of the Future*	Barot et al. 2017
	4/17/2017	Catch-Up and Exam 2 Review	---
	4/19/2017	**Exam 2 (In-Class)**	---
17	**4/26/2017**	**Design Project Group Presentations During "FINAL EXAM" Period 12:30 – 2:30 PM**	