

**LAND and LIFE**

**SWS 2008**

**INSTRUCTOR:** Dr. Heather Enloe  
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**OFFICE HOURS:** By appointment

**COURSE OFFERED:** Every Spring Semester  
**CREDIT HOURS:** 3

**CLASS FORMAT:** Web-based (UF E-Learning Canvas).  
Lecture, articles to read and class materials are available via the class website in Canvas.

**TEXTBOOK:** None required.  
The following textbook is a useful reference for the course: Principles of Environmental Science: Inquiry and Applications, Seventh Edition by Cunningham, Cunningham, 2013.

**PREREQUISITES:** Basic knowledge of Windows/Mac operating system; web browsing; Power Point; robust/high-speed Internet connection.

**COURSE DESCRIPTION:**

The purpose of this class is to give you a sound foundation in biological principals and the characteristics of the land that make life possible. Land and Life is composed of four main topic areas: 1. fundamentals of land and life; 2. biological resources; 3. geologic resources; and 4. soils as a resource. Within each resource topic area, we will define each type of resource and then look into the consequences of resource use, as well as solutions to some of our most pressing problems in resource use. We will think about biological, geologic and soil resources through the ecosystem services they provide. There are no required prerequisites for the course, and it fulfills three credit hours of Biology Gen Ed credit.

**COURSE LEARNING OBJECTIVES:**

1. What are resources? What are ecosystem services? How do resources relate to ecosystem services?
2. How do humans use resources?
3. What are the challenges and consequences of resource use?
4. What are the possible futures/solutions to sustainable resource use?
5. Recognize choices/trade-offs and make your own informed decisions.

**TOPIC SCHEDULE:**

**Fundamentals of Land and Life** (Week 1 to Week 3): Basic definitions and introduction to concepts (including land use / land cover change, urbanization, ecosystem services).

**Biological Resources** (Week 4 to Week 8). The importance of crops, trees, grass and turfgrass as biological resources. What is the impact of urbanization and invasive species on biological resources? How have improvements in agriculture, turfgrass science and restoration ecology helped to manage biological resources while reducing environmental impacts?

**Geologic Resources** (Week 9 to 12). We cover topics such as fossil fuel resources, but also delve into topics that are critically important to our built environment, such as sand mining and the production of asphalt and steel. Additional lecture topics include consequences of geologic resource use: What can we learn from climate science and what do we know about sea level rise?

**Soils as a Resource** (Week 13 to 16). Soils are the interaction of biology and geology and wrap-up the final section of this class. We discuss the definition of soil, how soil can be degraded, and the role of soil in many aspects of life, such as medicine, water quality, plant productivity, anthropology, and space travel.

| Week   | Topic   |
|--|---|
| <b>Module 1: Fundamentals of Land and Life</b> |   |
| Week 1 & 2                                     | <ul style="list-style-type: none"> <li>• Class introduction: How life is connected to the land, how life has changed over time</li> <li>• <b>Fundamentals of Life</b>: populations, population pyramids</li> <li>• Fundamentals of Life: water, essential chemicals, energy/photosynthesis</li> <li>• Fundamentals of Life: climate basics and how life is organized</li> </ul> |
| Week 3   | <ul style="list-style-type: none"> <li>• <b>Fundamentals of Land</b>: basics, Global &amp; US Land Cover Types; Urban Land</li> <li>• Fundamentals of Land: Land Use Land Cover (LULC) Change</li> <li>• Fundamentals of Land &amp; Life: Resources and Ecosystem Services (soil science as a fundamental supporting ecosystem service)</li> </ul>                              |
| <b>Module 2: Biological Resources</b>          |   |
| Week 4   | <ul style="list-style-type: none"> <li>• <b>Plant Science Basics</b> and Applications (Endosperm and popcorn, tree rings and climate data, pollen and crime scene investigations)</li> <li>• <b>Supporting Ecosystem Services</b> (primary production)</li> </ul>   |
| Week 5   | <ul style="list-style-type: none"> <li>• <b>Forests</b>: major types and ecosystem services (cultural, provisioning, supporting, and regulating)</li> <li>• Forest soils: carbon storage and regulating ecosystem services</li> </ul>   |

|               |   |
|---------------|---|
|               | <ul style="list-style-type: none"> <li>• Forest change over time</li> </ul>   |
| <b>EXAM 1</b> |   |
| <b>Week 6</b> | <ul style="list-style-type: none"> <li>• <b>Grasslands</b>: major types, grassland soils and grassland ecosystem services</li> <li>• Is all green good? <b>Invasive species</b> in natural ecosystems</li> <li>• <b>Ecological restoration</b>: Challenges and success stories</li> </ul>   |
| <b>Week 7</b> | <ul style="list-style-type: none"> <li>• <b>Urban green space</b>: definitions and ecosystem services (includes case studies)</li> <li>• Urban green space: misconceptions and challenges</li> <li>• Urban green space: meeting challenges with turfgrass science and the Florida Friendly Landscaping Program</li> </ul>                                   |
| <b>Week 8</b> | <ul style="list-style-type: none"> <li>• <b>Cropland</b>: cultivation and culture; the green revolution</li> <li>• Cropland: world's major crops &amp; the importance of soil in agriculture</li> <li>• Cropland: world's major crops &amp; the importance of soil in agriculture</li> <li>• Solving problems: <b>experimental design</b> basics</li> </ul> |

### **Module 3: Geological Resources**

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|----------------|--|
| <b>Week 9</b>  | <ul style="list-style-type: none"> <li>• Introduction to Geological Resources (<b>energy, minerals and rocks, plate tectonics</b>)</li> <li>• Provisioning services of geological resources: overview</li> </ul>   |
| <b>Week 10</b> | <b>Spring Break</b>  |
| <b>Week 11</b> | <ul style="list-style-type: none"> <li>• Provisioning services of geological resources: <b>iron and sand</b></li> <li>• Provisioning services of geological resources: <b>petroleum</b></li> <li>• Provisioning services of geological resources: <b>coal</b></li> </ul> |

|                |  |
|----------------|--|
| <b>EXAM 2</b>  |  |
| <b>Week 12</b> | <ul style="list-style-type: none"> <li>• Resource use and <b>energy</b> supply</li> <li>• Consequence of resource use: <b>climate change and sea level rise</b></li> </ul> |

### **Module 4: Soil as a Resources**

|                         |   |
|-------------------------|---|
| <b>Week 13</b>          | <ul style="list-style-type: none"> <li>• <b>Soils sustain life</b> (Case study: antibiotics from the soil)</li> <li>• Definition of soil (Case study: Martian soils)</li> <li>• Soil forming factors (Case study: San Dimas Lysimeter soils)</li> <li>• Soils, culture and the products we use</li> </ul> |
| <b>Week 14</b>          | <ul style="list-style-type: none"> <li>• <b>Soil Quality</b>: inherent and dynamic properties</li> <li>• Soil Quality: inherent and dynamic properties (Case Study: urban soils)</li> <li>• Soil Quality: erosion, the Dust Bowl, and US solutions (Case Study: the USDA NRCS)</li> </ul>                 |
| <b>Week 15 &amp; 16</b> | <ul style="list-style-type: none"> <li>• Soil's role in the <b>carbon and nitrogen cycle</b></li> <li>• Human alteration of the carbon and nitrogen cycle</li> </ul>  |
| <b>Week 17</b>          | Final Exam  |

## STUDENT LEARNING OBJECTIVES

### ***UF General Education (B) Objectives:***

The biological sciences deal with the basic concepts, theories and terms of scientific methods. Courses focus on major scientific developments and their impacts on society, science and the environment. You will formulate hypotheses derived from the study of physical process and living things and you will apply logical reasoning skills through scientific criticism and argument.

### ***UF General Education (B) Student Learning Outcomes:***

#### Content:

- Know the basic concepts, theories and terminology of natural science and the scientific method within that discipline.
- Know the major scientific developments within that discipline and the impacts on society and the environment.
- Know relevant processes that govern biological and physical systems within that discipline.

#### Critical Thinking:

- Formulate empirically-testable hypotheses derived from the study of physical processes and living things within that discipline.
- Apply logical reasoning skills effectively through scientific criticism and argument within that discipline.
- Apply techniques of discovery and critical thinking effectively to solve experiments and to evaluate outcomes.

#### Communication:

- Communicate scientific findings clearly and effectively using oral, written and/or graphic forms.
- Write effectively in several forms, such as research papers and laboratory reports.

### **E-LEARNING:**

**E-learning Canvas.** The course is managed through E-Learning Canvas, the centrally supported course management system at UF. For a link to the tutorial regarding E-Learning Canvas functionality, go to the class home page on canvas. Students enrolled in the course should login to Canvas on the first day of the course at: <http://elearning.ufl.edu/> You will use your Gatorlink name and password to login to Canvas.

**EVALUATION OF STUDENTS:**

The class is graded on weighted percentages:

- 3 exams. **Each exam is 20 % of your total grade. 3 exams comprise a total of 60% of your grade.**
- Final paper on a biological, geological, or soil resource in a peer-reviewed journal article. Details will be provided in a Canvas Assignment by the second week of class. **20 % of your total grade.**
- Class assignments. Eight class assignments will be assigned throughout the semester. A reading assignment and/or video will be associated with each assignment. Details for each assignment will be given in Canvas. **20 % of total grade.**

**GRADING SCALE:**

- A 94 – 100%
- A- 90 – 93%
- B+ 87 – 89%
- B 83 – 86%
- B- 80 – 82%
- C+ 77 – 79%
- C 73 – 76%
- C- 70 – 72%
- D+ 67 – 69%
- D 63 – 66%
- D- 60 – 62%
- E < 60%

**Grades and Grade Points Effective May 11, 2009 - Summer**

A <http://registrar.ufl.edu/catalog/policies/regulationgrades.html>

|                     |     |      |      |     |      |      |     |      |      |     |     |   |    |   |    |     |
|---------------------|-----|------|------|-----|------|------|-----|------|------|-----|-----|---|----|---|----|-----|
| <b>Letter Grade</b> | A   | A-   | B+   | B   | B-   | C+   | C   | C-   | D+   | D   | D-  | E | WF | I | NG | S-U |
| <b>Grade Points</b> | 4.0 | 3.67 | 3.33 | 3.0 | 2.67 | 2.33 | 2.0 | 1.67 | 1.33 | 1.0 | .67 | 0 | 0  | 0 | 0  | 0   |

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

**CLASS PARTICIPATION AND ATTENDANCE:**

Class attendance and participation is based upon completion of assignments and exams.

**MAKE-UP POLICY**

Late final papers and assignments will be accepted within one day after their due date. A late penalty of 50 % will be applied to all late assignments.

Make-up exams will be approved only due to illness or extreme family needs, or important excused activities required by another class. Make-up exams must be approved prior to the regularly scheduled exam, and must be made-up within two class periods. If you are unable to take the exam due to illness, contact the instructor prior to the exam to confirm your absence.

Excused absences are consistent with university policies in the UF undergraduate catalog and require proper documentation:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

### **STUDENT RESPONSIBILITIES AND EXPECTATIONS:**

Students are expected to read class materials and watch all pre-recorded lectures. We expect a level of synthesis of all class materials on exams and discussion beyond just description. Additional specific expectations are outlined in the Evaluation of Students section of the syllabus.

### **CLASSROOM ETIQUETTE AND Demeanor:**

Before you begin the course, be sure you understand UF's Honor Code and how you should conduct yourself in an online course (see UF's Netiquette Guide for online courses).

### **Academic Honesty, Software Use, Campus Helping Resources, Services for Students with Disabilities**

#### **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 JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)*

### **SERVICES FOR STUDENTS WITH DISABILITIES:**

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

### **COURSE EVALUATION**

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/>.