Soil, Water, and Land Use

COURSE SYLLABUS

SWS 4231 (Undergraduate) | SWS 5234 (Graduate)

Instructor
Dr. Allan R. Bacon | allan.bacon@ufl.edu | 352-294-3119 (office) | G158 McCarty Hall A (office)
Office hours are Monday and Wednesday 9:00-10:00am or by appointment

Course Overview and Objectives
Humans are the primary drivers of change on Earth’s contemporary surface. Our decisions regarding land use are omnipresent mechanisms by which we enact these changes, and their consequences transcend terrestrial, atmospheric, aquatic, and marine boundaries. Sometimes our land use decisions work for our benefit, sometimes they do not, and sometimes a sound idea in the short-term turns out to have unforeseen and negative long-term results.

The objectives of this class are four-fold:
(1) to establish fundamental knowledge associated with the drivers, management, and environmental implications of common land uses,
(2) to develop the ability to compare and contrast how various land uses impact Earth Surface processes and thus humanities well-being,
(3) to gain direct exposure to environmental considerations and management of prominent land uses in Florida and elsewhere in the United States, and
(4) to enhance quantitative abilities as well as the student’s written and spoken voice.

To accomplish these goals this course will operate at the ecosystem scale with explicit consideration of how Earth’s terrestrial, atmospheric, aquatic, marine, and human systems are connected. The class will approximately be divided into three sections: forests, urban, and agricultural… but we’ll always keep an eye on relationships among these particular land uses. Tuesday meetings (50 minutes) will be dedicated to in class lectures and discussions. Thursday meetings (3 hours) will be dedicated to field trips to see and discuss firsthand the management, processes, and implications of a diversity of land uses. Often Thursday meetings will include interaction with guest speakers that have particular and specialized knowledge of the project or land use that we are visiting.

Class Motto
“That which can be learned sitting down is not worth learning.” –paraphrased from an Apache saying

Meeting Times
Tuesday 1:55-2:45pm (period 7) | Thursday 1:55-4:55pm (periods 7-9)

Meeting Places
All Tuesday meetings will take place in McCarty Hall A, room 3194
Most Thursdays we will be in the field and will meet for departure outside in between McCarty Halls A and C (unless otherwise noted on the Course Schedule below).

Required Reading
“Big World Small Planet: Abundance within Planetary Boundaries” by Johan Rockstrom and Mattias Klum (2014, Bokforlaget Max Strom)
Assignments (Undergraduate and Graduate Level)

**Special Topic Argument:** Students will write a one-page (single spaced) document, including one figure, arguing for the inclusion of a “special topic” lecture. This document should (1) sufficiently outline an environmental problem or process, (2) discuss its relationship to land use, and (3) construct a well-reasoned argument as to why this particular “special topic” should be included in our Tuesday lectures.

**Op-Ed:** Student will write an Op-Ed (a.k.a Letter to the Editor) on a topic of their choosing. The topic however must be related to soil, water, and/or land use. This document should be written in such a way that layperson can understand it, and perhaps even learn something from it. To receive credit for this assignment the document must be submitted for publication in an appropriate outlet. Depending on the outlet, Op-Eds are usually less than 750 words.

**Finger Exercises:** To develop/enhance quantitative abilities a total of 10 finger exercises (25 point each) will be assigned throughout the semester. These exercises will predominately be mathematical in nature, they are relatively simple, and are not designed to occupy inordinate amounts of your time. Rather, like the pianist who exercises fingers and develops muscle memory by playing the same song over and over, these exercises are aim to develop students “muscle memory” related to basic yet monumentally important quantification of soil and landscape properties. As long as particular exercise is turned in on time, right or wrong, you will never receive less than 15 points.

**Quizzes:** There will be two in-class quizzes. Anything covered in class or during field trips is fair game for these quizzes. These quizzes will be almost entirely short answer questions with some definitions. The second quiz will be quasi-cumulative. Meaning that students will be expected to recall and use information from the first half of the class (to answer short answer questions), but definitions will come from the second half of the class only.

Assignments (Graduate Level Only)

**Special Topics Lecture:** Based on the Special Topic Arguments (above), Special Topics will be selected. Graduate students will be placed into pairs, and each pair will be tasked with developing a Special Topics Lecture. Over the course of the semester each group will work together to research, compile, and ultimately deliver a 40 minute educational lecture to the class. Because each group will have more than half semester to construct their Special Topics Lectures, regardless of the topic, these lectures are expected to be of remarkably high quality. Students will be graded as a team.

**Participation / Attendance:** Considerably more than half of our class time will be spent in the field interacting with one another as well as natural resource managers and scientists in urban, agricultural, forested land uses. Accordingly, student participation and attendance is strongly encouraged.

**Late / Missing Assignments:** Late or missing assignments will not be accepted unless arrangements have been made with the instructor or medical justification has been authenticated. Similarly, make-up quizzes will not be authorized unless prior arrangements have been made with the instructor or medical justification has been authenticated.

UF Attendance Policies [https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)
Grading

<table>
<thead>
<tr>
<th>Undergraduate (points)</th>
<th>Graduate (points)</th>
</tr>
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<tbody>
<tr>
<td>Special Topic Argument</td>
<td>75</td>
</tr>
<tr>
<td>Op-Ed</td>
<td>75</td>
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<tr>
<td>Finger Exercises (10 in total)</td>
<td>250</td>
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<tr>
<td>Quiz #1</td>
<td>100</td>
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<tr>
<td>Quiz #2</td>
<td>100</td>
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<tr>
<td>Participation/Attendance</td>
<td>25</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>625</strong></td>
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<tr>
<td>Special Topic Argument</td>
<td>75</td>
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<tr>
<td>Op-Ed</td>
<td>75</td>
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<tr>
<td>Finger Exercises (10 in total)</td>
<td>250</td>
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<tr>
<td>Quiz #1</td>
<td>100</td>
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<td>Quiz #2</td>
<td>100</td>
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<tr>
<td>Participation/Attendance</td>
<td>25</td>
</tr>
<tr>
<td>Special Topics Lecture</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>725</strong></td>
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Final letter grades will be determined by summing all points accumulated by each student, dividing by the total number of points possible, and multiplying by 100%. Letter grades will be assigned as follows on a final percentage (%) basis:

- 100-94=A
- 89-87=B+
- 87-84=B
- 79-77=C+
- 77-74=C
- 73-70=C-
- 69-60=D
- <59=E

Things You Will Need

Unless hazardous weather is upon us, our field activities will not be interrupted by rain, heat, or wind. Accordingly, students will need to be prepared to spend time outdoors at a time and will need to be equipped with (at a minimum) the following:

- Water bottle
- Close toed shoes
- Rain gear
- Hat
- Long pants

Additionally, students should keep in mind that often they will be auguring and handling soil, so please do not were cloths into the field that you don’t want to get dirty.

Academic Honesty

We have committed to uphold the University of Florida Honor Code. It can be found here, https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code.
## Tuesday Lecture Topics

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Aug 22</td>
<td>Class Introduction</td>
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<tr>
<td>Aug 29</td>
<td>Things we hold to be self-evident: primer for soils, water, and land use change</td>
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<tr>
<td>Sept 5</td>
<td>Global trajectories, drivers, and implications of land use change</td>
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<tr>
<td>Sept 12</td>
<td>Regional trajectories, drivers, and implications of land use change</td>
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<tr>
<td>Sept 19</td>
<td>Soil and water in the Forest Ecosystem I</td>
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<tr>
<td>Sept 26</td>
<td>Soil and water in the Forest Ecosystem II</td>
</tr>
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<td>Oct 3</td>
<td>Quiz #1</td>
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<tr>
<td>Oct 10</td>
<td>Soil and Water in the Urban Ecosystem I</td>
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<tr>
<td>Oct 17</td>
<td>Soil and Water in the Urban Ecosystem II</td>
</tr>
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<td>Oct 24</td>
<td>NO CLASS</td>
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<td>Oct 31</td>
<td>Soil and Water in the Ag. Ecosystem I</td>
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<tr>
<td>Nov 7</td>
<td>Soil and Water in the Ag. Ecosystem II</td>
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<td>Nov 14</td>
<td>Class discussion of Big World Small Planet</td>
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<td>Nov 21</td>
<td>Special Topic Lecture #1</td>
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<td>Nov 28</td>
<td>Special Topic Lecture #2</td>
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<tr>
<td>Dec 5</td>
<td>Quiz #2</td>
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Thursday Case Studies
Things we hold to be self-evident: a conceptual primer for soils, water, and land use change
UF Plant Science Research and Education Unit
Guide: Allan Bacon

The Cody Scarp as a regional control on soil water and land use
San Felasco Hammock State Preserve
Guide: Allan Bacon

Managing and measuring water cycles in southern pine plantations
Austin Cary Forest
Guide: Dr. Rosvel Bracho, School of Forest Resources and Conservation, University of Florida

Water table drawdown and remediation through vegetative management
Ordway Swisher Biological Station
Guide: Allan Bacon

The nutrient and carbon cycle of southern pine plantations
Gainesville wellfield
Guide: Allan Bacon

Urban water quantity and sediment management in Gainesville
Hogtown Creek, NW 34th St Bridge
Guide: Steven Scanlan P.E., Maintenance Program Engineer, Florida Department of Transportation

Taking Back the Urban Ecosystem in Downtown Gainesville
Depot Park
Guide: Allan Bacon

The Good, the Bad, and the Ugly of manure spray fields
UF Dairy Research Unit
Guide: Allan Bacon

Heavy mineral mining and reclamation in north Florida
Chemours Florida Plant
Guide: Kristen Woods, Geologist, Chemours

Soil and water considerations in recreational management
The Florida Trail
Guide: Jeff Glenn, North Florida Regional Representative, Florida Trail Association

Stormwater retention ponds and drainage basins
Various locals around Gainesville
Guide: Dr. Eban Bean, Agricultural and Biological Engineering, University of Florida

Soil chemical and hydrologic properties of Urban Lawns
On Top of the World active Adult community
Guide: Allan Bacon