

Syllabus

SWS 4231C/5234 – Soil, Water, and Land Use

Fall Semester, 2015

Instructor:

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Office Hours: 10:00 - 11:30 am, Tuesday and Thursday

Time and Place:

Tuesday, Period 7 (1:55 -2:45 PM) in room 210 Rinker Hall

Thursday, Periods 7-9 (1:55- 4:55 PM) in room 3096 McCarty Hall B

Skill Sets Targeted:

1. Ability to describe soils using standard criteria.
2. Ability to infer soil properties from morphology.
3. Ability to relate soil properties to water quality and land-use suitability.
4. Ability to effectively acquire soil information pertinent land-use decisions.

Knowledge Base Enhancement Goals:

1. Fundamental understanding of soils.
2. Fundamental understanding of how water (possibly with nutrients, contaminants, pathogens, etc.) moves from soil to groundwater and water bodies.
3. Awareness of threats to groundwater- and surface-water quality and availability.
4. Familiarity with regulatory criteria applied to land use and water management decisions.
5. Awareness of land-use impacts on the environment at local, regional, and global scales.

Student Responsibilities: Students will be tested on materials presented in class and on assigned readings. Grades will be based on test scores and other criteria approximately as follows:

| | |
|-------------------------------|-----|
| Midterm Exam: | 30% |
| Final Exam: | 30% |
| Lab Punctuality: | 5% |
| Lab Exercises and Attendance: | 15% |
| Land Use Assessment Report: | 15% |
| Article Interpretation: | 5% |

For “Punctuality”, a point will be deducted for each incidence when a student is late for lab by 5 minutes or more. Full credit will be received for “Article Interpretation” if instructions are followed, the article clearly pertains to land use issues (student can check with me in advance if in doubt), and salient points of the article are summarized via class presentation.

Reading Materials: No traditional textbook will be used. However, readings, course notes, and other materials will be made available online via the course webpage (see below).and UF library course reserves.

Webpage Address: <http://soils.ifas.ufl.edu/wgharris/SEED/SWLU.HTML>

Graduate and Undergraduate Accountability:

All students will be presented with the same materials and experiences. However, graduate students will be evaluated more rigorously on tests and assignments. Tests will have certain questions that are mandatory for graduate

students but optional for undergraduates. The mandatory questions will pertain to challenging aspects of the course that invoke graduate-level understanding of basic sciences. I don't discount or assume any limit on the talent of undergraduates but am making an accountability distinction for those receiving graduate credit.

Grade Scale:

| | |
|----|-------------|
| A | = 94 to 100 |
| A- | = 90 to 93 |
| B+ | = 86 to 89 |
| B | = 82 to 85 |
| B- | = 78 to 81 |
| C+ | = 74 to 77 |
| C | = 70 to 73 |
| C- | = 66 to 69 |
| D+ | = 62 to 65 |
| D | = 58 to 61 |
| D- | = 54 to 57 |
| E | < 54 |

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: <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>

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 wellbeing are encouraged to utilize the university’s counseling resources. The UF Counseling and 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. The Center is located at 3190 Radio Road.

- **Career Resource Center**, CR-100 JWRU, 392-1601, www.crc.ufl.edu/
- **Student Health Care Center**, 392-1161, <http://shcc.ufl.edu/>
- **University Counseling & Wellness Center**, 352-392-1575, <http://www.counseling.ufl.edu/cwc/>

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, 392-8565, <http://www.dso.ufl.edu/drc/>

Lecture Outline

- A. Course Introduction:
 - 1. Objectives & subject matter
 - 2. Initial perspectives on the “human footprint”
- B. Soil & Water Fundamentals
 - 1. Basic soil composition & chemical concepts
 - 2. Soil forming factors
 - 3. Properties used in describing soil layers
 - 4. Moisture retention & plant-available water
 - 5. Infiltration, hydraulic conductivity, & soil drainage
 - 6. Soil horizons: formation and standard designations
 - 7. Concepts relating to the mapping of soils
 - 8. Genetic and interpretive significance of soil morphology
- C. Soil-Water-Landform Relations
 - 1. Scenarios of water movement from soils to aquifers & surface waters
 - 2. Leaching & runoff risk assessment (soil-water-nutrient/contaminant interactions)
 - 3. Erosion risk assessment
 - 4. Ecosystem services: wetlands & forests
- D. Suitability Criteria & Challenges for Common Land Uses
 - 1. Agriculture – e.g., crop needs & environmental considerations
 - 2. Urbanization – e.g., effects of runoff from impervious surfaces
 - 3. Waste disposal – landfills, biosolids land application, on-site residential (septic) systems
 - 4. Building construction – “engineering” properties of soils
 - 5. Exploiting useful local data in county soil survey reports
- E. Challenges of Water Supply & Quality (Water Management)
 - 1. Sustainable water use with growing population
 - 2. Conflicting interests in water allocations
 - 3. Promoting/enforcing water conservation
 - 4. Minimizing nutrient & contaminant transport to ground- & surface water
 - 5. “Minimum flows and levels” & “total maximum daily loads”
- F. Global Concomitants of Land-Use Decisions
 - 1. Balancing consumption with sustainable supply
 - 2. Reckoning with climate impacts
- G. Toward Solutions

Laboratory Outline:

Notes: *Laboratory attendance is a requirement* for this course. Failure to attend in the absence of an acceptable excuse will result in a grade penalty. *Please be punctual!* Specific details of each lab will be provided in advance via the course website.

- I. Soil morphology: description and interpretation of soils** (approximately 3 lab periods)
 - A. Demonstration of standard equipment and techniques
 - B. Practice in field description and interpretation

- II. Examining soil-landscape-hydrology-vegetation relationships** (approximately 3 lab periods)
 - A. Genetic interpretations
 - B. Land-use interpretations

- III. Understanding and effectively using soil survey data**
 - A. Nature of soil survey report content
(1 lab period)
 - B. Field exercise in use of soil survey report
(1 lab period)
 - C. Field exercise demonstrating soil mapping cues (1 lab period)

- IV. Analytical techniques used in soil characterization** (1 lab period)

- V. Practical land-use assessment training** (approximately 4 labs)
 - A. Wetlands delineation & hydric soils ID
 - B. On-site waste disposal
 - C. On-farm animal waste application
 - D. Building construction
 - D. Others, as time permits