

**CRSS/FANR 3060: Soils and Hydrology****M date:**

- 
- |  |                     |
|--|---------------------|
| <b>1. Landscapes</b>   | 8/17                |
| <ul style="list-style-type: none"> <li>a. Landscapes: soil, water, rock</li> <li>b. Views of a Landscape</li> <li>c. Watersheds and landscape formation</li> </ul>                             |                     |
| <b>Lab 1:</b> <i>Maps; Rocks and Soil Profiles</i> (in 1201 Plant Sci.)  |                     |
| <b>2. Soil Profiles and Their Formation</b>  | 8/24                |
| <ul style="list-style-type: none"> <li>a. Weathering of rocks</li> <li>b. Soil profile formation</li> <li>c. Soil horizons</li> </ul>  |                     |
| <b>Lab 2:</b> <i>Soil Properties and Profiles</i> (in 1201 Plant Sci.)   |                     |
| <b>3. Soil Horizons and Classification</b>   | 8/31                |
| <ul style="list-style-type: none"> <li>a. The soil taxonomy system</li> <li>b. Diagnostic horizons</li> <li>c. Soil orders</li> </ul>  |                     |
| <b>Lab 3:</b> <i>Soil Profiles and Classification</i> (field trip, Whitehall Forest)   |                     |
| <b>4. Physical Properties of Soils</b>   | 9/7<br>(No class M) |
| <ul style="list-style-type: none"> <li>a. Soil texture</li> <li>b. Soil density and porosity</li> <li>c. Managing soil physical properties</li> </ul>  |                     |
| <b>Lab 4:</b> <i>Soil and Landscape Interpretation</i> (field trip, Whitehall Forest)  |                     |
| <b>5. Chemical Properties of Soils</b>   | 9/14                |
| <ul style="list-style-type: none"> <li>a. Soil mineralogy</li> <li>b. pH and ion exchange</li> <li>c. Acidity and salinity</li> </ul>  |                     |
| <b>Lab 5:</b> <i>Measuring Soil Physical Properties</i> (in 1201 Plant Sci.)   |                     |
| <i>Exam 1</i> (Wks 1-4)  |                     |
| <b>6. Plant Nutrients</b>  | 9/21                |
| <ul style="list-style-type: none"> <li>a. Plant nutrition and essential elements</li> <li>b. N, P, and K in soils</li> <li>c. Microelements</li> </ul>   |                     |
| <b>Lab 6:</b> <i>Cation Exchange Capacity</i> (in 1201 Plant Sci.)   |                     |
| <b>7. Soil Biology and Productivity</b>  | 9/28                |
| <ul style="list-style-type: none"> <li>a. Soil organisms</li> <li>b. Roles of soil organisms (humus and nutrient cycling)</li> <li>c. Productivity of agricultural and forest soils</li> </ul> |                     |
| <b>Lab 7:</b> <i>Soil Sampling</i> (field trip)  |                     |
| <b>8. Fertilization</b>  | 10/5                |
| <ul style="list-style-type: none"> <li>a. Fertilizers</li> <li>b. Nutrient and soil management</li> <li>c. Sustainability</li> </ul>   |                     |
| <b>Lab 8:</b> <i>Soil Testing and Organic Matter</i> (in 1201 Plant Sci.)  |                     |

- 9. Soil Water** 10/12  
 a. Interaction of water with soil  
 b. Storage capacity of soils and profiles  
 c. Water flow in soils  
**Lab 9: Soil Water** (in 1201 Plant Sci.) *Exam 2* (Wks 5-8)
- 10. Precipitation and Evapotranspiration** 10/19  
 a. Precipitation forms, storm events and measurement  
 b. Evapotranspiration  
 c. Field water budgets *(Fall Break: No class F)*  
**Lab 10: Water Movement** (in 1201 Plant Sci.)
- 11. Infiltration, Streamflow, and Ground Water** 10/26  
 a. Infiltration (forest and cropland)  
 b. Sources of stream flow  
 c. Aquifers  
**Lab 11: Rainfall and Runoff** (field trip--Greenhouse Complex)
- 12. Hydrologic Statistics and Hydraulics** 11/2  
 a. Hydrographs  
 b. Basic hydraulics  
 c. Management effects on hydrology  
**Lab 12: Measuring Streamflow** (field trip) *Exam 3* (Wks 9-11)
- 13. Erosion and Sedimentation** 11/9  
 a. Importance of erosion  
 b. Erosion mechanics  
 c. Erosion control  
**Lab 13: Discharge and Soil Erosion** (in 1201 Plant Sci.)
- 14. Soil Quality and Contamination** 11/16  
 a. Soil contamination— kinds, sources  
 b. Movement of contaminants in the landscape  
 c. Risk assessment and soil management  
**Lab 14: Heavy Metals in Soils** (in 1201 Plant Sci.)
- [Thanksgiving Break]** (No classes M thru F, 11/23-11/27)
- 15. Issues in Water Quality** 11/30  
 a. Water quality regulations  
 b. Components of water quality  
 c. Managing landscapes for water quality *Exam 4* (Wks 12-14)  
**Lab 15: A Walk in the Woods** (*State Botanical Gardens*)
- Class held M, 12/7; T, 12/8 has F schedule** (Review for Final Exam)
- Final Exam** (Wk 15 + comprehensive) Th, Dec 10, 12:00 pm

**Reading assignments for each week are the correspondingly numbered chapters in the course text book, *Readings in Soils and Hydrology*.**

*The course syllabus is a general plan for the course; deviations announced to the class by the instructors may be necessary.*

**Course Introduction:** This is a junior level course designed as an introduction to soil science and hydrology; it will hopefully provide you with sufficient basic information to serve as a sole course in these topics, or form an introduction for later courses in soil science and/or hydrology. The subject matter is oriented towards students majoring in soil science, hydrology, environmental sciences, plant sciences and related fields. The lecture and laboratory will be complimentary in presenting information of both a theoretical and practical nature. Prerequisites for the course include introductory chemistry course and college algebra.

**Course Objectives:** The overall objective of the course is to give students a basic background in soil science and hydrology, including key concepts in these fields such as:

- > how to describe and interpret landscape and soil profile information in the field and from soil maps;
- > how to read and interpret topographic and hydrologic information within a landscape and watershed framework;
- > basic familiarity with key soil properties and how they relate to soil management and productivity;
- > understanding of the hydrologic cycle and how management affects hydrologic processes in forest and agricultural settings;
- > the effect of management on environmental quality in terms of soil productivity and water quality.

**Class Meetings:** Lecture meets at 11:15 am M, W, and F in Rm. 2401 Plant Sciences; two-hour labs meet on Wednesday and Thursday in Rm. 1201, Plant Sciences Bldg. Attendance in lecture will not be taken, but is highly advised, as most important material for the course will be covered in lecture. Attendance at your assigned lab is mandatory; unexcused absences will result in a 0 grade for lab handins for that laboratory. Lab handin sheets will be due at the end of lab, or if outside work is required, by the next Monday lecture; labs that are late, or are disorganized or messy, will be penalized.

**Course Materials:** The text for the course is available in an unbound, loose-leaf format for purchase at the Baxter Street Bookstore. Please purchase by the second lecture. You should read over the assigned chapter carefully by Wednesday of each week, and have read the lab materials before coming to your assigned lab. Material for quizzes and exams will come from the reading, labs, and lecture notes, combined; you are responsible for the week's reading, whether it is discussed in the lecture or not.

**Course Grading:** The course will be graded on a 90/80/70/60% basis, corresponding to A/B/C/D/F. Plus/minus grades will be given for grades 2% above or below these cutoffs. Exams and quizzes will be combined multiple choice, fill-ins, definitions, short essay, and problems. Quizzes will usually be given weekly in lecture, but may be given in lab, either announced or unannounced; hourly exams will be given in the evenings according to a schedule to be announced. All lab and lecture grades will be incorporated into a single final course grade, based on the following:

4 hourly exams	4 @ 100 pts	400 (54%)
Lab handin sheets	14 @ 10 pts	140 (18%)
Quizzes	13 @ 5 pts	65 ( 8%)
Final exam	1 @ 150 pts	<u>150 (20%)</u>
		755 (100%)

**Course Instructors:**

Prof. William Miller	3107 Plant Sciences	542-0896	wmiller@uga.edu
Prof. Rhett Jackson	117 Forestry Bldg.# 4	542-1772	rjackson@warnell.uga.edu
Jon Flaishans	4111B Plant Science	542-0916	jonflash@uga.edu
Shadi Ashjaei	4111B Plant Science	542-0916	sashjaei@uga.edu
Brandon Crouch			bcrouch@uga.edu
Kara Nitschke			nitschkek@warnell.uga.edu
David Shaw			dshaw13@uga.edu

NOTE: The course has a website at <http://www.cropsoil.uga.edu/soilsandhydrology>

*All academic work must meet the standards contained in "A Culture of Honesty". All students are responsible to inform themselves about those standards before performing any academic work.*