Syllabus - SOIL 4683
Soil, Water, and Weather
Fall 2015

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Course website:  http://soilphysics.okstate.edu/teaching/soil-4683/

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Course meeting time and location:  9:30-10:20 a.m., MWF, Room 263 Agricultural Hall

Office hours:  The best time to talk with me will typically be immediately after class. If that
time does not work for you, you may call or e-mail to schedule an appointment. You are also
welcome to stop by my office at any time. I can usually make time to talk with you.

Course description:  This course provides an introduction to the physics of the soil-plant-
atmosphere continuum. The focus is on soil, its physical properties, and their interactions with
water and weather in terrestrial ecosystems. Processes examined include: precipitation,
infiltration, runoff, drainage, soil water storage, evaporation, transpiration, solar radiation
partitioning, and heat transfer near the land surface. Interactions of these processes with plant
growth, solute transport, water quality, and greenhouse gas emissions are considered.
Quantitative analysis is emphasized with applications in soil and environmental science,
agronomy, ecology, hydrology, and climatology.

Prerequisites:  General Physics (PHYS 1114) and Fundamentals of Soil Science (SOIL 2124)

Elsevier Science. ISBN 0-12-348655-6

Course objectives:  Students should develop and demonstrate the ability to —

1. Define the primary processes in the soil water balance, the primary processes in the surface
energy balance, and the fundamental physical properties of the soil.
2. **Relate** the processes in the soil water balance and the surface energy balance to each other and to the soil physical properties, and relate all of these components to issues of agricultural and environmental concern.

3. **Quantify** the magnitude and direction of water and energy flows in the soil-plant-atmosphere continuum and calculate values for soil physical properties.

**Methods:** Students' knowledge and skill will be developed through pre-class readings and videos, pre-class and in-class quizzes, peer instruction, homework, exams, lectures, demonstrations, and a semester project.

**Performance evaluation:** Student performance will be evaluated using frequent pre-class and in-class quizzes, homework assignments, two mid-term exams, a final exam, and a team project. Students taking the course for graduate credit will have extra responsibilities. Students enrolled for graduate credit will lead a team of students in the semester project (more information below). The maximum points that can be earned for each activity are listed below. To earn an overall grade of "A" for the course requires 450 points, a "B" requires 400 points, and so on.

<table>
<thead>
<tr>
<th>Possible points</th>
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<tbody>
<tr>
<td>Homework</td>
<td>100</td>
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<tr>
<td>Mid-term Exams</td>
<td>100</td>
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<tr>
<td>Final Exam</td>
<td>100</td>
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<td>Semester project</td>
<td>100</td>
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<tr>
<td>Quizzes</td>
<td>100</td>
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</tbody>
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**Class policies:**

1. It will be necessary to attend all scheduled class periods and take all exams at their assigned date and time in order to fulfill the requirements and receive an acceptable grade in this class.

2. Students missing any class period should make arrangements with other students enrolled in the class to obtain lecture notes.

3. Make-up exams will be available for officially permitted absences that occur on the scheduled exam dates and times. Valid reasons for absences include, but are not limited to, serious illnesses, death in the immediate family, and university-sanctioned extracurricular activities. Students are responsible for providing valid documentation of the permitted absence. This should be done prior to the date of the exam. If notification cannot be made before the exam date, then validation of the absence must be completed within two class periods of the original exam date.
4. There will be no make-up quizzes, and unexcused absences will result in a score of 0 for that day's quizzes. Excused absences will result in no score, and thus will not count against the student.

**Important dates:**

- **Exam 1**
  - Monday, September 21
  - 9:30 to 10:20 a.m.
  - 263 Ag Hall

- **Exam 2**
  - Wednesday, November 4
  - 9:30 to 10:20 a.m.
  - 263 Ag Hall

- **Semester project due**
  - Wednesday, November 25
  - 5:00 p.m.
  - electronic submission

- **Project presentations**
  - tbd

- **Final exam**
  - Wednesday, December 9
  - 8:00 to 9:50 a.m.
  - 263 Ag Hall

**Semester Project:**

This year semester projects will focus on the development of educational resources relevant to the course. Students will individually select and rank the five chapters from the textbook which are most relevant to them. Students will be assigned to teams based on common interests. Each team will be assigned one chapter for which they must develop an educational resource such as a video, web page, or classroom demonstration. The educational resource must be accompanied by a related homework problem set and answer key. Further details about the semester project assignment will be provided early in the semester.

If there is a graduate student(s) on the team, that student(s) will be responsible to provide effective leadership for the team. The grade a student receives for the semester project will be the sum of two components: the instructor's evaluation of the team's products (max. 60 points) and the fellow team members' evaluations of that student's contribution (max. 40 points).
Quizzes:

Most days students will be required to complete a short pre-class quiz over the assigned pre-class reading material or video or a topic from a prior class. Pre-class quizzes must be completed at least one hour before class. The pre-class responses are called “think” responses. At the beginning of most class periods, students will form pairs and discuss their answers to the pre-class quiz. If two students in a pair have different answers, each one must try to explain their answer. Then, students will complete the same quiz a second time. This is the "pair" response. Finally, the instructor will facilitate class discussion of the quiz. This is the "share" response.

Of the 100 total points which can be earned by quizzes, 1/2 can be earned by fully completing all the pre-class quizzes, 1/4 can be earned by correct "think" responses, and 1/4 can be earned by correct "pair" responses. Multiple in-class quizzes may be given during some class periods. If at least 80% of the pre-class “think” responses are correct, we will skip the “pair” response and everyone will receive full credit for the “pair” response in order to use class time efficiently.

Students will submit quiz responses by text message (to 22333), web browser (pollev.com/ochsner), or twitter (to @poll). Quiz results will be displayed on screen at the end of the quiz to inform the students and instructor about any common points of confusion. The aim is to let this data inform the content and emphasis of the day's class time, leading to more efficient use of class time.

What to bring to class:

Each student should bring the assigned reading material and a calculator to class.

Each student should also bring to class a mobile phone with texting capability or a laptop with wi-fi capability. If this poses a hardship for a student, special arrangements can be made with instructor.

Mobile phones and laptops are permitted in the classroom only to facilitate learning. Sending texts or tweets, receiving calls, and surfing the web for any other purposes are not allowed.