

NRES 422/622: Soil Physics, Spring 2016

Time: Tuesday/Thursdays 11 to 11:50, Thursday Lab 1-4

Room: Lecture: MSS101; Lab: AE 004 and others

Instructor: Dr. Benjamin (Ben) Sullivan

Office phone: 775.784.6374

Email: bsullivan@cabnr.unr.edu

Office location: In the back of FA 132. Knock hard if door is shut!

Office hours: Tuesdays 1-2; Fridays 10:30-11:30; *OR by appointment*

Website: Please use the course website on WebCampus to download handouts, assignments, and homework files. I will do my best to provide powerpoint or pdf files of my in-class lecture slides after class to improve note-taking. This is not a reason to skip class, and I provide them as a courtesy, not a guarantee. I will use MyNevada for e-mail announcements.

Course description: Soil physical properties as related to water and solute flow, texture, structure, specific surface, soil-water interaction, colloidal behavior.

Prerequisite: CHEM 121A, CHEM 121L, MATH 127, MATH 128

Text: The required text for this course is *Introduction to Environmental Soil Physics* by Daniel Hillel

Additional Reading will be supplied via handouts/WebCampus.

Meeting for labs: Please stay tuned for in-class/email announcements about meeting locations on the day of labs.

Student learning objectives:

1. Students will be able to communicate, in writing or verbally, an understanding of basic soil physical properties and processes related to water, gas, solute, and heat transport.
2. Students will be able to measure, calculate, and interpret soil physical processes using laboratory and field techniques, including texture, soil water retention, infiltration, and evaporation.
3. Students will be able to communicate, in writing or verbally, the ways that disturbances impact soil physical properties, and how these disturbances affect natural resources.
4. Students will be able to compare and contrast how changes in soil physical properties change as a result of soil morphological properties, such as horizons and orders.
5. Graduate Students (622) will be able to demonstrate, in writing and orally, an advanced understanding of the topics and will be able to relate soil physical properties or processes to their research area of interest.

Instructional approach & Graded assignments: Instruction consists of two components; lecture and laboratory. The lecture will emphasize basic and fundamental concepts pertinent to the science of Soil Physics. As an upper division/graduate level course, lecture presentation will be applied as well as theoretical in nature. The laboratory component shall consist of problems, examples, and practical application of soil physics concepts to field and laboratory conditions. Methods of measurement, data collection, analysis, and interpretation will be presented.

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Exams: There will be two midterm exams and one final exam. Each exam will be worth 50 points; the final will be worth 100 points. Exams will consist of multiple choice, short answer, and essay questions. Calculators will be allowed; cell phone calculators are strictly forbidden.

Homework and lab reports: Homework will generally be assigned weekly. Lab reports will consist of a write-up including the question, rationale, methodology, and results of the lab, plus answers to any additional questions posed in the lab assignment. Homework and lab reports will be due the following Tuesday and will be worth 10 points each.

Paper discussion: Each week, we will have one 25-minute discussion of a peer-reviewed paper related to soil physics. This discussion will be related to the lab or held at the end of Thursday's discussion, depending on the week. Each student will lead one discussion, and will be evaluated on the prompt selection of a manuscript and communication with me, and the discussion itself.

Exam Q/A's: Before each exam, every student must send me two exam questions AND their answers. Q/A's MUST be submitted to me by email in MS Word, .txt, or .rtf form. *I will not accept PDFs.* I will compile these Q/A's into a review document and share with the class after its due date. Each set of exam Q/A's will be worth 10 points.

Letter grades will be assigned as follows, based upon the average percent grade for homework, midterm, term paper (for 622 students, due the day of the final exam) and final:

<u>Grade</u>	<u>Semester Average (%)</u>
A+	97-100
A	92-96
A-	88-91
B+	84-87
B	79-84
B-	75-78
C+	72-74
C	68-71
C-	64-67
D+	60-63
D	56-59
D-	51-55
F	<50

Late assignments will have points deducted at the rate of 10% per day the assignment was late. There will be no retests. Missed exams, assignments, or presentations will receive 0 points. Makeup tests and assignments will only be administered when the student provides an official, documented medical excuse or when the student has notified the instructor, in writing, of exceptional circumstances that are mutually acceptable personal and/or professional reasons. This latter statement is provided as a courtesy to the students and should not be abused, but rather used in truly exceptional circumstances. Makeup assignments may deviate from the original exercise.

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NRES 622

The goal of NRES 622 is to provide graduate students an opportunity to achieve deeper understanding of the material presented to the combined group by allowing them to synthesize the ideas presented in class with their own research interests.

Graduate students enrolled in NRES 622 are required 1) With assistance from the instructor to conduct a laboratory exercise for class participation. The instructor must approve all topics for laboratory activities. 2) Complete a literature review to address a topic of soil physics that pertains to the students' own research or area of interest. To complete the project assignment, 697 students will be required to meet with Dr. Sullivan by mid-semester (March 15th) to discuss ideas and interests. Two weeks after the meeting, they will be required to submit an outline with ten relevant references. The review is designed to be short and to the point: Therefore, there is a strict 10-page (plus references) double spaced format, with 1 inch margins and no smaller than 11 point Times New Roman font. This meeting and the outline will be evaluated (50 points) to ensure the proposal development is on track. The final review paper will be worth 50 points.

POLICIES AND STATEMENTS

Policy on Absence

I adhere to the new UNR policy on student absences:

There are no official absences from any university class. It is the personal responsibility of the student to consult with the professor regarding absence from class. In the event that a student misses a class because of an official university function or event or because of serious personal considerations, the Office of the Associate Vice President for Student Life Services may, at its discretion, send an explanation to the instructor involved or to the faculty in general. The instructor shall make the final determination on whether the missed work can be done at a time other than during the regularly scheduled class period.

In short, your attendance is your business, but attendance will be directly linked to success in the course. Consult with me on absences. Absences from exams or assignments will be treated as described in "Graded assignments & grading system." If you miss graded events, and I have no advance knowledge,

Academic Dishonesty

Academic dishonesty of any form is a serious offense: It is a waste of my time and yours. The UNR statement on academic dishonesty is as follows:

Cheating, plagiarism or otherwise obtaining grades under false pretenses constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include canceling a student's enrollment without a grade, giving an F for the course or for the assignment.

For more details, see the [University of Nevada, Reno General Catalog](#).

In this course, there will be opportunities in labs and classroom to work in groups. However, each student must turn in their own individual assignment, and copied language or ideas among students will be considered plagiarism and treated accordingly.

Disability Services

Any student with a disability needing academic adjustments or accommodations is requested to speak with me or the Disability Resource Center (Thompson Building, Suite 101) as soon as possible to arrange for appropriate accommodations.

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Academic Success Services

There's nothing I would like more than to see you succeed in the course. Please use any appropriate resources to ensure this result. Discuss concerns, ideas, or suggestions with me. Your student fees cover usage of the Math Center (784-4433 or www.unr.edu/mathcenter/), Tutoring Center (784-6801 or www.unr.edu/tutoring-center), and University Writing Center (784-6030 or <http://www.unr.edu/writing-center>). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

Audio and Video Recording

I adhere to the UNR policy on audio and video recording:

Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may be given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

Course calendar:

Week	Dates	Topics	Reading	Lab Topic
Part 1: Basic relationships and the solid phase				
1	1/19-1/21	Introduction to soil physics, soils in the environment	Preface, Ch. 1	No Lab
2	1/26-1/28	Particle sizes + clay	Ch. 3, 4	Soils "pre-review"
3	2/2-2/4	Clay + Structure	Ch. 4, 5	Sample collection, Valley Rd
Part 2: Liquid and gas phases				
4	2/9-2/11	Water properties, water content	Ch. 2, 6	Bulk Density
5	2/16-2/18	Water potential, saturated soil flow	Ch. 6, 7	Soil water, Field capacity
6	2/23-2/26	Exam 1 (Tuesday), unsaturated soil flow	Ch. 8	Soil texture
7	3/1-3/3	Solutes and salinity – esp in arid soils	Ch. 9	Water release curves
8	3/8-3/10	Water balance: Infiltration & ET	Ch. 14, 18	Infiltration
9	3/15-3/17	Retention of soil moisture; Exam 2 (Thursday)	Ch. 16, 17	No lab
10	3/22-3/25	No class, Spring Break; Enjoy!		
11	3/29-3/31	Erosion & Runoff	Ch. 14	Evaporation
Part 3: Soil gas, temperature, and plant relationships				
12	4/5-4/7	Soil Gases	Ch. 10	Lab gas sampling
13	4/12-4/14	Soil Gases	Ch. 11	Field gas flux samples
14	4/19-4/21	Soil temperature	Ch. 12	Temperature lab
15	4/26-4/28	Energy balance	Ch. 20	Review and synthesis of lab
16	5/3 + Finals week	Review and synthesis, evaluations, Final (May 5 8am)		N/A

