NRM 380 - SOILS AND THE ENVIRONMENT SYLLABUS

Fall - 2018

Course outline: The course offers fundamental knowledge in soil sciences, which include soil taxonomy, soil physics, soil chemistry, and soil biology and biochemistry both in theory and in applications. Briefly, five areas are covered in the lecture and labs, 1) soil physics and soil formation, 2) soil chemistry, 3) soil biology, 4) soil and plant nutrients and their management; and 5) soil contamination and erosion control. Lectures and laboratory work compromise each other so that what students learned in the lecture can be applied in the laboratory experiments. It is a step stone for students who are pursing degrees in plant, animal and soil sciences, forestry science, biology, ecology, geography, natural resource management, and environmental sciences.

Lecture methods: Face to face or distance delivery through zoom. Online laboratory video is available in Blackboard.

Objective: NRM 380 introduces the fundamentals of soil science. Most examples and applications will be targeted toward non-agricultural areas, but agricultural consequences also will be outlined in the text and in lecture.

Lecture: Monday and Wednesday 8:00-9:00 AM (Arctic Health Research Building Room 183)

Lab: Wednesday 2:15-5:00 PM (O'Neill Room 359)

Text: Brady NC, Weil RR. 2008. The Nature and Properties of Soils, 14th edition. New Jersey: Prentice Hall. An expensive text, but an excellent reference now and into the future. Lecture notes are available in the Blackboard.

Lab Manual: Van Veldhuizen, M. Zhang, D.W. Valentine, and C. Knight R., Knight, 2014. Soils and the Environment: NRM-380 Laboratory Handbook.

Prerequisite: Chemistry CHEM 105x, ENGL 111, ENGL 211 or ENGL 213.

Instructor	Office	Phone	E-mail	Office hours
Dr. Mingchu Zhang	O'Neill 321	474-7004	mzhang3@alaska.edu	MW 2:00-5:00 PM & by appointment
Stephen Harvey		TBA		

Students are expected to read, understand, and adhere to the academic honor code detailed in the UAF Catalog. The University of Alaska is committed to providing equal access for students with disabilities. If you have a disability requiring special accommodations, please notify me during the first two weeks of class.

In order to save copying costs, these handouts and all lecture materials will be available through the UAF Blackboard site at http://classes.uaf.edu. If you cannot access these notes, please let me know.

Student outcome:

Upon completion of the class, students should:

- *Have a deep understanding the complexity of soil as a natural resource for food production and as an important component in natural ecosystem.*
- *Understand soil physical properties, and laboratory methods to measure those properties.*
- *Understand soil chemical properties and laboratory methods to measure those properties.*
- *Understand soil biological properties and laboratory methods to measure those properties.*
- *Have knowledge to differentiate a good soil management plan from improper ones.*
- *Be able to use soil web survey to collect soil information and use learned soil knowledge to develop soil management plans for different land uses.*
- *Be able to write a integrated soil technical report for a given area in US.*

NRM-380 SOILS GRADING POLICY

This is a "writing-intensive" course, meaning that a majority of the 768 total points available is based on written assignments and questions. One third of the grade for weekly lab reports and 20% of the final project grade will be determined by the student's ability to write in a clear, concise and correct manner. Each student will be responsible for scheduling at least one personal conference with the instructor concerning his/her writing ability and whether he/she should seek help from the Writing Center. Individual conferences should be scheduled following the first hour exam. Students are required to attend the classes and labs, which will be used to evaluate student performance. Grade will be deducted for late submission of assignments. Plagiarism or academic misconduct is zero tolerance in the class.

Points	Basis
300	Hour Exams (3 @ 100 points). Questions will include true-false, multiple choice, problems, and short answer essay. Hour exams generally will not be graded for writing proficiency unless otherwise indicated.
30	Pop quizzes (4 @ 10 points). These unannounced quizzes are to provide an extra incentive to keep up with reading (text and lab) and class participation. Quizzes will not be graded for writing proficiency unless otherwise indicated.
30	Problem sets (3 @ 10 points). These are to give you familiarity with certain kinds of calculations.
180	Lab Reports (11 @ 18 points). Of the 14 labs, 11 will require written reports. Each will be due at the beginning of the next lab, and will be graded 67% on content and 33% on writing. After lab reports have been graded and returned, students will have one week in which they may correct errors in content and/or writing to earn credit for up to 50% of the lost points.
200	Final Problem (8-10 page written report in lieu of exam). The paper will be assigned and discussed in lab on November 5, and will be graded 80% on content and 20% on writing proficiency. See lab materials for details.
740	Total possible points

Course grade assignments		
Percentage	**Total points**	**Grade**
$\geq$ 97%		A+
92 - 96.9%		A
90 – 91.9%		A-

60-69%		D
87 – 89.9%		B+
82 – 86.9%		B
80 – 81.9%		B-
77 – 79.9%		C+
72 – 76.9%		C
70 – 71.9%		C-

Passing grade for the class is C-

Student protection and service

Every qualified student is welcome in my classroom. As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc. to find reasonable accommodations. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. As required, if I notice or am informed of certain types of misconduct, then I am required to report it to the appropriate authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook/ OR GRADUATE STUDENT VERSION: Student protections and services statement: Every qualified student is welcome in my classroom. As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc. to find reasonable accommodations. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook/

Lecture, exam, and homework schedule

Date	Lecture	Topic	Brady & Weil Chapter		Problems
27-Aug	1	Introduction to course and soils	1	The Soils Around Us	
29-Aug	2	Soil Formation	2	Formation of Soils From Parent Materials	
05-Sep	3	Soil Structure	4	Soil Architecture and Physical Properties	
10-Sep	4	Soil Water	5	Soil Water: Characteristics and Behavior	
12-Sep	5	Water Relations & Hydrologic Cycle	6	Soil and the Hydrologic Cycle	
17-Sep	6	Atmosphere & Temperature	7	Soil Aeration and Temperature	1
19-Sep	7	Soil Classification	3	Soil Classification	
24-Sep	7	Soil Classification			
26-Sep		Catch up and review			
01-Oct	EXAM 1	Lectures 1-7, Chapters 1-7			
03-Oct	8	Soil Colloids and Clay Minerals	8	Soil Colloids: Seat of Soil Chemical and Physical Activity	
08-Oct	8	Soil Colloids and Clay Minerals			
10-Oct	9	Soil Acidity	9	Soil Acidity	
15-Oct	9	Soil Acidity	9/10	Soils of Dry Regions: Alkalinity, Salinity, and Sodicity	
17-Oct	10	Soil Biology	10/11	Organisms and Ecology of the Soil	
22-Oct	11	Soil Organic Matter	11/12	Soil Organic Matter	2
24-Oct	11	Soil Organic Matter			
29-Oct		Catch up and review			
31-Oct	EXAM 2	Lectures 7-11, Chapters 8-12			
05-Nov	12	Nutrient Cycling--N & S	12/13	Nitrogen and Sulfur of Soils	
07-Nov	13	Nutrient Cycling--P & K	13/14	Soil Phosphorus and Potassium	
12-Nov	14	Nutrient Cycling--Micronutrients	13/15	Micronutrients and Other Trace Elements	
14-Nov		Nutrient management	14/16	Practical Nutrient Management	
19-Nov	15	Soil Erosion	15/17	Soil Erosion and Its Control	
21-Nov	16	Soils & Pollution	18	Soils and Chemical Pollution	
26-Nov	17	Permafrost	19		3
28-Nov	18	Catch up and review, course evaluation	20		
03-Dec		Exam #3 Lecture 9 - 17			