

MSYM 354 / WATS 354 / SOIL 354
Soil Conservation and Watershed Management
Fall 2021

Schedule: Lecture: 1-1:50 TuTh, CHA 116
Tuesday Lab Section: 2-5 Tu, CHA 149 & outdoors
Thursday Lab Section: 2-5 Th, CHA 112 & outdoors

INSTRUCTOR:

Dr. Aaron Mittelstet, room 245 Chase Hall
Office Hours: 10:00-11:00 M, 9:00-10:00 Th
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Teaching assistant: Yaser Kishawi, Jasreman Singh, Griff Nuzzo
Office Hours: 4:00-5:00 Tu & Th (in the lab)

TEXT:

Soil & Water Management Systems, 4th Edition, 1996, John Wiley & Sons, Inc.

PREREQUISITES:

AGRO/SOIL/HORT 153 Soil Resources
MSYM 109 Physical Principles in Agriculture and Life Sciences

OBJECTIVES:

Following the course, the students will be able to:

- Understand basic watershed hydrology and calculate runoff rates and amounts.
- Describe the impacts of agricultural, urban, and industrial development on watershed hydrology.
- Describe soil erosion mechanisms and the impacts of soil erosion on the environment.
- Quantify how tillage, cropping, construction, and structural practices impact soil erosion.
- Conduct topographic and profile surveys and be able to collect field data required to characterize watersheds and implement soil and water conservation practices.
- Describe water management practices for rural watersheds and understand the concepts of basin-wide water management.
- Understand the impact of fertilizer and pesticide management and land use practices on water quality.

METHOD:

The course is taught as a lecture/laboratory series. Lectures will be in Room 116 Chase Hall (CHA) at 1 p.m. Tuesdays and Thursdays. Tuesday Laboratories will meet in Room 149 CHA at 2 p.m. and Thursday Laboratories will meet in Room 112 CHA at 2:00 p.m. Outdoor field labs are scheduled and are listed on the class schedule. **Wear the appropriate clothing for field conditions.** We will apply a team-based learning approach in this course. Students will be expected to make a significant contribution to the success of their team. Your participation is important.

Email will be used as a form of communication for this course, so you will be expected to check your email daily during the week. Getting buried in your inbox is not an excuse for not reading course related emails.

GRADING AND ATTENDANCE:

In general, the following grading system will apply:

	<u>Percent of Grade</u>	<u>Letter Grade</u>	<u>Weighted Course Score</u>	<u>UNL Points</u>
Homework (10) and lab (11) reports	35	A+	97-100%	4.0
Examinations (3)	35	A	93-96	4.0
Readiness tests	5	A-	90-92	3.67
Team readiness tests	5	B+	87-89	3.33
Group report	10	B	83-86	3.0
Contribution to team	10	B-	80-82	2.67
		C+	77-79	2.33
Total	100	C	73-76	2.0
		C-	70-72	1.67
		D+	67-69	1.33
		D	63-66	1.0
		D-	60-62	0.67
		F	60<	0

Scientific electronic calculators are required for this course and for exams. The use of mobile devices such as smart phones and cell phones during exams is not permitted. If you are caught violating this rule, the assigned grade on your exam will be zero.

Mobile devices such as smartphones should not be used during lectures and only sparingly during labs. Please be respectful of others and avoid the annoyance of ring tones sounding during class. Laptops are encouraged for indoor laboratory exercises.

Missed examinations and laboratories must be cleared with the instructor ahead of time. No make-up exams will be given to students who have not notified the instructor ahead of the absence.

Due dates for homework will be included when assigned. Labs and homework assignments should be scanned and uploaded to Canvas. **Assignments are due at 1:00 PM. If turned in after 1:00, your grade will be reduced by 5 percentage points. If it is uploaded at 1:01 PM, then it is late. For each day the paper is late, your grade will be reduced by an additional 10 percentage points. No credit will be given on homework that is handed in after the homework set has been graded and returned to the other students.** Special circumstances regarding homework deadlines must be arranged with the instructor in advance when possible. All work should be well organized and neat. To encourage neatness, engineering paper should be used. Ten percent will be deducted if engineering paper is not used. If reports are poorly written, they may not be accepted. Spelling and grammar will be considered in grading reports. **Since a significant portion of the course grade is based on class participation and graded**

homework and reports, students should place priority on timely preparation of high quality homework and be an active participant in class.

The engineering problem solving methodology must be used for each problem unless stated otherwise. Write out the problem completely and document any equations that are used. Put a box around your final answer. Include all units. Points will be deducted if units are not included. Write out your homework and labs neatly. If the graders cannot read it, the problem will be counted incorrect.

You can check your current grades on Canvas, URL <http://canvas.unl.edu>.

The attendance policy as listed in the schedule of classes for UNL will be adhered to. Students are responsible for the material presented in lecture or laboratory periods. It is your responsibility to acquire lecture notes, handouts or exercises for missed class periods.

ACADEMIC DISHONESTY:

Students are expected to adhere to guidelines concerning academic dishonesty outlined in Section 4.2 of the University's Student Code of Conduct (<http://stuafs.unl.edu/ja/code/>). The BSE Department process for grade and academic dishonesty appeals can be found at <http://bse.unl.edu/academicadvising-index>. Students are encouraged to contact the instructor for clarification of these guidelines if they have questions or concerns.

SPECIAL NEEDS:

Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. UNL's policy is to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

IMPORTANT DATES:

September 3	Last day for late registration
September 6	Last day to drop and remove course from student's record
November 9/15	Last day to drop course. Withdrawals between September 2 and November 10 result in a "W" on the student's record.

EMERGENCY RESPONSE:

- Fire Alarm (or other evacuation): In the event of a fire alarm, gather belongings (purse, keys, cellphone, N-Card, etc.) and use the nearest exit to leave the building. Do not use the elevators. After exiting notify emergency personnel of the location of persons unable to exit the building. Do not return to building unless told to do so by emergency personnel.
- Tornado Warning: When sirens sound, move to the lowest interior area of building or designated shelter. Stay away from windows and stay near an inside wall when possible.
- Active Shooter
 - Evacuate: if there is a safe escape path, leave belongings behind, keep hands visible and follow police officer instructions.
 - Hide out: If evacuation is impossible secure yourself in your space by turning out lights, staying quiet, closing blinds and barricading doors if possible.

- Take action: As a last resort, and only when your life is in imminent danger, attempt to disrupt and/or incapacitate the active shooter.
- UNL Alert: Notifications about serious incidents on campus are sent via text message, email, unl.edu website, and social media. For more information go to: <http://unlalert.unl.edu>.
- Additional Emergency Procedures can be found here:
 - http://emergency.unl.edu/doc/Emergency_Procedures_Quicklist.pdf

As things change throughout the semester, adjustments may be needed. Examples include the following: number of homework and lab assignments, homework and lab due dates and the date of coursework lectures and exams. I reserve the right to make changes to both the syllabus and class schedule, but will notify you and update the online documents after I do.

With COVID infections on the rise, we must be flexible with our schedule. Though masks are not required for lecture, they are required for lab.

Students in this course must work in close physical proximity to one another for extended periods of time in order to achieve the academic goals of the course. For this reason, the Department of Biological Systems Engineering and the College of Agricultural Sciences and Natural Resources have determined that face coverings will be required in this course. If you are unwilling to comply with this requirement, please visit with your advisor about possible alternative courses that you might take in lieu of this one.

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DATE	LECTURE TOPIC	LECTURE READING	LAB TOPIC	REMARKS
8-24	INTRODUCTION Course overview Discussion of conservation	Chapter 1	Tuesday Lab: Lab organization, teams, etc.	
8-26	Water quality		Thursday Lab: Lab organization, teams, etc.	Class Seating
8-31	LAND SURVEYING Distance and area measurement	Chapter 2	Tuesday Lab: Water Quality	Readiness Practice Test Mittelstet, Jasreman
9-2	Levels and leveling	Chapter 3	Thursday Lab: Water Quality	Mittelstet, Jasreman
9-7	Land surveys, mapping <i>(phosphorus, student presentation)</i>	Chapter 3	Tuesday Lab: Distance measure and differential leveling, campus, OUTDOORS	Readiness Test 1 Chapters 1-3 Mittelstet, Jasreman, Alan
9-9	Topographic maps <i>(pesticide/herbicide), student presentation)</i>	Chapter 4	Thursday Lab: Distance measure and differential leveling, campus, OUTDOORS	Mittelstet, Jasreman, Alan

9-14	WATERSHED HYDROLOGY Hydrology and rainfall frequency (<i>nitrate, student presentation</i>)	Chapter 5 Handouts	Tuesday Lab: Distance measure and differential leveling, campus, OUTDOORS	Mittelstet, Jasreman, Alan
9-16	Runoff volume (<i>E coli, student presentation</i>) End of Exam 1 Material	Chapter 5 Handouts	Thursday Lab: Distance measure and differential leveling, campus, OUTDOORS	Mittelstet, Jasreman, Alan
9-21	Review for Exam 1		Tuesday lab: Profile surveying & topographic mapping, OUTDOORS	Readiness Test 2 Chapter 4-5 Mittelstet, Yaser, Alan
9-23	Test 1		Thursday lab: Profile surveying & topographic mapping, OUTDOORS	Mittelstet, Yaser, Alan
9-28	Soil erosion by water: principles Calculating erosion rates (<i>sediment erosion, student presentation</i>)	Chapters 6 Handouts	Tuesday lab: Profile surveying & topographic mapping, OUTDOORS	Mittelstet, Yaser, Alan

DATE	LECTURE TOPIC	LECTURE READING	LAB TOPIC	REMARKS
9-30	USLE/RUSLE (<i>sediment erosion, student presentation</i>) Discuss Tests	Chapters 6 Handouts	Thursday lab: Profile surveying & topographic mapping, OUTDOORS	Mittelstet, Yaser, Alan
10-5	Contouring, strip cropping (<i>conservation practices, student presentation</i>)	Chapter 7 Handouts	Tuesday Lab: Rate and mass runoff curves for water, sediment, and chemicals	Yaser, Alan
10-7	Terraces (<i>conservation practices, student presentation, student presentation</i>)		Thursday Lab: Rate and mass runoff curves for water, sediment, and chemicals	Yaser, Alan
10-12	Residue management and conservation tillage	Chapter 7	Tuesday Lab: Residue measurement, no-till planting, tour of structural practices, Rogers Farm, OUTDOORS	Lecture Paul Jasa Yaser, Griff, Alan
10-14	Wind erosion and control (<i>wind erosion, student presentation</i>)	Chapter 9 Handouts	Thursday Lab: Residue measurement, no-till planting, tour of structural practices, Rogers Farm, OUTDOORS	Yaser, Griff, Alan

10-19	Fall Break		No Lab	
10-21	Stream channel erosion Rapid Geomorphic Assessment <i>(streambank erosion, student presentation)</i>	Chapter 8 Handouts	Thursday Lab: Wind Erosion Lab Finish rate and mass runoff	Griff
10-26	Stream channel erosion Rapid Geomorphic Assessment <i>(streambank erosion, student presentation)</i>	Chapter 8 Handouts	Tuesday Lab: Wind Erosion Lab Finish rate and mass runoff	Griff
10-28	Review for exam		Thursday Lab: Tour of Holmes Lake and stream restoration sites, OUTDOORS	Readiness Test 3 Chapter 6, 7 Griff, Matt, Mittelstet
11-2	EXAM 2		Tuesday Lab: Tour of Holmes Lake and stream restoration sites, OUTDOORS	Chapters 6, 7, 9, residue management and erosion control Griff, Matt, Mittelstet

DATE	LECTURE TOPIC	LECTURE READING	LAB TOPIC	REMARKS
11-4	Watershed management/GIS	Handouts	Thursday Lab: GIS	Yaser Kishawi lecture Mittelstet
11-9	Channel flow and erosion control <i>(riparian buffers, student presentation)</i>	Chapter 8	Tuesday Lab: GIS	Mittelstet
11-11	WATER MANAGEMENT Reservoirs (qualitative) <i>(reservoirs/student presentation)</i> Review Exams	Chapter 11	Erosion Lab/Web Soil Survey	Mittelstet
11-16	WATER MANAGEMENT Reservoirs (qualitative)	Chapter 11 Chapter 10 (p. 162-165) Handouts	Erosion Lab/Web Soil Survey	Mittelstet Readiness Test 4 Chapter 8, 11
11-18	Surface water quality	Handouts	Finish lab 1	Dr. Messer lecture
11-23	Precision Ag		Finish lab 1	Joe Luck lecture

11-25	Thanksgiving Holiday		No Lab	
11-30	Groundwater/surface water interactions (<i>groundwater, student presentation</i>)	Chapter 10	Infiltration/groundwater lab	Mittelstet
12-2	Management of water resources at the watershed scale (<i>climate change, student presentation</i>)		Infiltration/groundwater lab	Mittelstet
12-7	Catch up		No Lab	
12-9	Review for Final		No Lab	
12-17	Final Exam 1-3 p.m. -----			Cumulative