

# NRES 251: Introduction to Soil and Water Resources

## SYLLABUS – Spring 2020

### Course Information:

- Lecture
  - Meeting times: Tuesday, Thursday, and Friday at 9:00 am – 9:50 am
  - Meeting location: TNR 170
- Laboratory
  - Meeting times:
    - Section 1-1 – Wednesday 10:00 am – 11:50 am (Scharenbroch)
    - Section 1-3 – Tuesday 12:00 pm – 1:50 pm (Raabe)
    - Section 1-4 – Wednesday 12:00 pm – 1:50 pm (Raabe)
    - Section 1-5 – Wednesday 2:00 pm – 3:50 pm (Gunderson)
  - Meeting location: TNR 262
- Credits: 4
- Prerequisites: MATH 107 or instructor consent

### Instructors:

Dr. Kyle Herrman

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Office Hours: Thursday 10:00 am – 12:00 pm or by appointment

Dr. Bryant Scharenbroch

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Office Hours: Wednesday 12:00 pm – 2:00 pm or by appointment

Dr. Josh Raabe

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Office Phone: 715-346-2689

Office Hours: Wednesday 9:00 am – 11:00 am or by appointment

Ms. Alyssa Gunderson

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Office Phone: 715-346-3760

Office Hours: Thursday 11:00 am – 1:00 pm or by appointment

**Course Objective:**

The objective of this class is to expose students to the principles of soils and water resources. This will be accomplished using direct instruction methods during lecture and hands-on experience in the lab and in the field. After completing this course a student will be able to understand how water flows through the landscape, how specific aquatic ecosystems function, and where sources of water contamination are commonly found. Regarding soils, students will also be able to describe the formation and composition of soils. In addition, students will learn how water, organic matter, and elements are processed within soils and why this medium is critical for supporting life on Earth.

**Learning Objectives:**

- Describe the formation of soils
- Determine soil texture and interpret how texture will impact soil function
- Illustrate the connection between the physical properties of soil, soil chemistry, and the availability of macro and micronutrients
- Describe the hydrologic cycle in a watershed including groundwater interactions
- Demonstrate how streams/river, lakes, and wetlands function on the landscape
- Evaluate basic water chemistry data

**Required Textbooks:**

- Brady, NC and RR Weil. 2010. Elements of the Nature and Property of Soils (3rd ed). Prentice Hall. New Jersey.
- Pennington, KL and TV Cech. 2010. Introduction to Water Resources and Environmental Issues (1st ed). Cambridge University Press. New York.

**Grades:**

<i>Letter</i>	<i>Percent</i>	<i>Letter</i>	<i>Percent</i>
A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	<60

**Points:**

<i>Item</i>	<i>Points</i>	<i>Total</i>	<i>Percent of total grade</i>
Exams (4)	50	200	50%
Lab quizzes (2)	40	80	20%
Lab assignments (12)	10	120	30%

**Exams:**

Four exams will be given in class and consist of multiple choice questions. Exams will cover new material and will not be cumulative although some material in this class will carry over through the entire semester.

**Laboratory Assignments:**

Laboratory assignments are found in the lab manual or will be assigned during lab. Be sure the assignments are clearly written and all of your work can be followed. If asked create Excel graphs with all your axes labeled and be sure to include units. If asked for a brief explanation then please print out your assignment using a word processor and check all spelling/grammar.

**Laboratory Quizzes:**

Two lab quizzes will be given throughout the semester. These quizzes will cover only material introduced in your lab section. They could be short answer or multiple choice and will test you on the concepts you applied in the lab or field during lab time.

**Civility in the Classroom:**

To create and preserve a classroom atmosphere that optimizes teaching and learning, all participants share a responsibility in creating a civil and non-disruptive forum. Students are expected to conduct themselves at all times in this classroom in a manner that does not disrupt teaching or learning.

- You are expected to be on time. Class starts promptly at 9:00 am. You should be in your seat and ready to begin class at this time. Class ends at 9:50 am. Packing up your things early is disruptive to others around you and to myself.
- Cell phones must be turned off during class, unless you have informed me ahead of time that you are expecting an emergency message.
- Anyone using tablets and laptops to take notes must sit on the sides or back of the lecture hall. These devices can be distracting to people sitting near you. If I find that you are using these devices for non-class room related activities then I will ask you to not use them for the remainder of the semester.
- Classroom participation is an important part of our lectures and is crucial for labs. To participate you must attend class having prepared the materials for the day. Questions and comments must be relevant to the topic at hand.
- Raise your hand to be recognized.
- Classroom discussion should be civilized and respectful to everyone and relevant to the topic we are discussing. Classroom discussion is meant to allow us to hear a variety of viewpoints. This can only happen if we respect each other and our differences.

**Late Policy:**

Lab assignments are considered late if they are not turned in at the beginning of lab on the due date. Assignments can be turned in late, but 1 point will be taken off for each day the assignment is late. Exams cannot be made up unless there is a valid, documented excuse for missing class.

**Attendance:**

Students are responsible for all material covered in lectures and laboratory sessions. Scheduling of make-up examinations will be done only if an absence is due to personal illness, accident,

death in the family, or a circumstance deemed legitimate by the instructor. Make-ups for field trips are not available. Students wishing to attend alternate laboratory sections may do so with prior approval from the instructor.

**Academic Misconduct:**

Violations of academic integrity will result in automatic failure of the class and referral to the proper university officials. The work a student submits in class is expected to be the student's own work and must be work completed for that particular class and assignment. Students wishing to build on an old project or work on a similar topic in two classes must discuss this with the professor. Academic dishonesty includes but is not limited to cheating on an examination and submitting an assignment as your own work when all or part of the assignment is the work of another without proper citation. Sanctions can be applied whether the violation was intentional or not so please know how to properly cite references for a scientific paper.

For further information regarding UWSP policy please refer to Chapter 14 in the University Handbook (<http://www.uwsp.edu/admin/stuaffairs/rights/rightsChap14.pdf>)

**Emergency procedures:**

In the event of a medical emergency, call 911 or use the red emergency phones located throughout the campus. Offer assistance if trained and willing to do so. Guide emergency responders to victim. In the event of a tornado warning, proceed to the lowest level interior room without window exposure. Avoid wide-span rooms and buildings. In the event of a fire alarm, evacuate the building in a calm manner and meet outside the building. Notify instructor or emergency command personnel of any missing individuals. In the event of an active shooter, run, escape, hide and fight. If trapped hide, lock doors, turn off lights, spread out and remain quiet. Follow instructions of emergency responders. See UW-Stevens Point Emergency Management Plan at [www.uwsp.edu/rmgt](http://www.uwsp.edu/rmgt) for details on all emergency response at UW-Stevens Point.

**Lecture Schedule (could change as semester progresses):**

<i>Week</i>	<i>Date</i>	<i>Topic</i>	<i>Reading</i>
1	1/21	Soil functions and composition	Ch.1 Brady and Weil
	1/23	Soil formation	Ch. 2 Brady and Weil
	1/24		
2	1/28	Soil classification	Ch. 3 Brady and Weil
	1/30		
	1/31	Soil physics – architecture	Ch. 4 Brady and Weil
3	2/4	Soil physics – water, air, and temperature	Ch. 5 and 7 Brady and Weil
	2/6		
	2/7		
4	2/11	Soil organic matter	Ch. 11 Brady and Weil
	2/13		
	2/14	<b>EXAM 1</b>	
5	2/18	Soil chemistry – colloids	Ch. 8 Brady and Weil
	2/20		
	2/21	Soil chemistry – acidity and alkalinity	Ch. 9 Brady and Weil
6	2/25	Soil biology – organisms	Ch. 10 Brady and Weil
	2/27		
	2/28		
7	3/3	Soil management – erosion	Ch. 14 Brady and Weil
	3/5		
	3/6	Soil management – fertilization	Ch. 12 and 13 Brady and Weil
8	3/10	Soil management – contamination	Ch. 15 Brady and Weil
	3/12		
	3/13		
9	3/17	<b>SPRING BREAK</b>	
	3/19		
	3/20		
10	3/24	Hydrologic Cycle	Ch. 3 Pennington and Cech
	3/26		
	3/27		
11	3/31	Watersheds	Ch. 5 Pennington and Cech
	4/2		
	4/3		
12	4/7	Water Use	Pgs 17-32, Ch. 11 Pennington and Cech
	4/9		
	4/10		
13	4/14	<b>EXAM 3</b>	
	4/16	Groundwater	Ch. 6 Pennington and Cech
	4/17		
14	4/21	Water Quality	Ch. 4 Pennington and Cech
	4/23		
	4/24	Nitrogen and Phosphorus	Additional readings will be posted on Canvas
4/28			
4/30			
15	5/1	Lakes	Ch. 8 Pennington and Cech
	5/5		
	5/7		
16	5/7	Streams and Rivers	Ch. 7 Pennington and Cech
	5/8	Wetlands	Ch. 9 Pennington and Cech
Final	5/13	<b>EXAM 4 (during final exam period on 5/13/20 at 1230-1430)</b>	

**Laboratory Schedule (could change as semester progresses):**

<i>Week</i>	<i>Date</i>	<i>Topic</i>	<i>Lab. manual</i>
1	1/21-1/22	<b>NO CLASS</b>	
2	1/28-1/29	Soil horizons, soil forming factors, and soil texture	p. 3
3	2/4-2/5	Soil density, porosity, and volumetric moisture content	p. 19
4	2/11-2/12	Soil cation exchange capacity	p. 41
5	2/18-2/19	<b>FIELD TRIP:</b> Physical and chemical lake characteristics	p. 59
6	2/25-2/26	Principles of ground water hydrology	p. 83
7	3/3-3/4	Watershed analysis – GIS	p. 100
8	3/10-3/11	<b>FIELD TRIP:</b> Water supply and wastewater treatment <b>LABORATORY QUIZ 1</b>	p.75
9	3/17-3/18	<b>SPRING BREAK</b>	
10	3/24-3/25	<b>FIELD TRIP:</b> Water and heat in a soil profile	p. 37
11	3/31-4/1	<b>FIELD TRIP:</b> Wetlands and water quality	p. 67
12	4/7-4/8	<b>FIELD TRIP:</b> Groundwater and surface water connection	p. 90
13	4/14-4/15	Ground water resource evaluation – GIS	p. 95
14	4/21-4/22	<b>FIELD TRIP:</b> Soil profile description writing	p. 45
15	4/28-4/29	<b>FIELD TRIP:</b> Stream flow measurements and formation	p. 53
16	5/5-5/6	Soil survey and interpretation for land use planning <b>LABORATORY QUIZ 2</b>	p. 123