



## SOIL 465 Soil Physics

3 credit hours

Spring 2024

### Instructors Contact Information

- **Kevin Masarik (Lecture)**
  - Email: [kmasarik@uwsp.edu](mailto:kmasarik@uwsp.edu)
  - Office phone: 715-346-4276
  - Office: TNR 0224E (inside the Groundwater Center)
  - Office Hours: Tuesdays & Thursdays, 9am-10am. (Office or Zoom)
- **Alyssa Gunderson (Lab)**
  - Email: [agunders@uwsp.edu](mailto:agunders@uwsp.edu)
  - Office: TNR 275
  - Office Hours: Wednesdays, 10am-12pm

### Semester Schedule (16 weeks)

- **Lecture**
  - Time: Tuesdays & Thursdays, 8:00 am – 8:50 am
  - Location: TNR 255
- **Lab**
  - Time:
    - (Section 1) Wednesday, 8:00 am – 9:50 am
    - (Section 2) Wednesday, 2:00 pm – 3:50 pm
  - Location: TNR 255
- **Final Exam**
  - Time: Tuesday, May 14, 2024, 2:45 pm – 4:45 pm
  - Location: TNR 255

### Course Description

Soil Physics, as a scientific endeavor, deals with the state and movement of matter and with the fluxes and transformations of energy in the soil and related porous media (Soil Science Society of America). It involves the physical measurement and mathematical quantification of soil physical properties and processes. In layman's terms...the arrangement of soil materials and the movement of air, water, chemicals, and heat in soil.

### Prerequisites

Either MATH 111 or MATH 225, and either PHYS 101 or PHYS 201, Summer Field Experience and CNR major; or Instructor Consent

### Course Materials

- Soil Physics 6th edition, by W. Jury and R. Horton, John Wiley and Sons Inc., 2004. You will be tested on material in this book, so I strongly recommend that you get a copy and do the readings.
- Other materials used throughout the course will be accessible via Canvas or handouts

## Course Learning Outcomes

At the completion of this course students will be able to:

- 1: Be able to define and explain basic concepts of soil physics
- 2: Be able to apply soil physics concepts as appropriate
- 3: Be able to recognize and describe soil physics when you see it outside the classroom
- 4: Enhance their overall scientific, quantitative, and computer skills

## How to be successful in this course

- **Study the assigned readings, take notes in class, review or rewrite your notes after class.** You will learn more if you familiarize yourself with the concepts covered before asking for help.
- Actively **contribute to the learning activities** (Labs, in class discussions, raise your hand)
- **Complete your assignments on time** (Do not procrastinate).
- **Attend office hours if you have questions**

## Communication policies

- Announcements, handouts, supplemental readings, assignments, and grades will be posted on the course's learning environment ([canvas](#)).
- If you have a question about a grade, please reach out to me. **If you send an email, please identify yourself by your full name and the course identification number.**
- For emails, I will do my best to respond within 24 hours during work-week, and 48 hours on weekends. For questions or help with assignments, please plan ahead. If you wait until the last minute, I may not be able to respond in time.

## Learning environment

To provide a stimulating and effective learning environment, everyone is expected to follow shared codes of conduct. To foster fruitful discussions, we should all strive to create an environment of mutual respect. All-in class, field, and group work interactions should be civil, respectful, and supportive of an inclusive learning environment for all students. If you have any concerns about classroom participation or classroom dynamics, I encourage you to speak with me, the Department chair, or your advisor. You may also share your concerns with the University at <https://www3.uwsp.edu/dos/Pages/resources.aspx>.

## Academic Integrity

**Ethics and Academic Honesty Policy:** When you choose to take a course with an instructor, we enter an ethical contract with each other. We should assume that I will design course activities and act in good faith to help you learn, and that you, as the student, will complete the course work yourself and to the best of your ability. That means that all course assignments should reflect your own, independent work. **I am obligated to refer any incidences of plagiarism or cheating, including failing to appropriately cite source materials, representing the work of other students as your own, or submitting work written for previous courses in this course, to the Dean of Students office for disciplinary action.** To avoid any problems, please make sure that you appropriately cite all information you use in course assignments, and that you complete all individual course work independently. If you are unsure of how to cite your information or what requires citation, I and others are here to help! For more information, please refer to the text of UW System's Academic Integrity Policy:

[http://docs.legis.wisconsin.gov/code/admin\\_code/uws/14/](http://docs.legis.wisconsin.gov/code/admin_code/uws/14/) .

## Disability Resource Center:

Consistent with federal laws and the policies of the University of Wisconsin, it is the policy of UW-Stevens Point to provide appropriate and necessary accommodations to students with disabilities. If you require any academic accommodation due to a disability, please contact the Disability Resource Center (DRC) Director (phone: 715-346-3365; email: [drc@uwsp.edu](mailto:drc@uwsp.edu); website: <https://www.uwsp.edu/drc/>) to register and/or request services. If you have already established accommodation through the Disability Resource Center, please communicate your approved accommodation with me at your earliest convenience so we can discuss your needs in this course.

## Changes to Syllabus

***Instructor reserves the right to modify syllabus and assignments as needed based on faculty, student and/or environmental circumstances.***

## Student Resources

If you have a concern or need help addressing any issues, including academic performance, health and social problems, financial and food resources, housing problems, personal safety, **do not hesitate to approach the instructor**. There are a variety of campus resources that you can access to help get the support you need (<https://www3.uwsp.edu/dos/Pages/stu-personal.aspx>).

## Course Organization

### *Instruction organization*

- Primary delivery of course content and instructions will be in person
- Students have the responsibility to use canvas for the accessing of any course materials
- Assignments should be submitted through Canvas.
- Participation in course learning activities is strongly encouraged.

### *Learning assessment*

Letter-grade scale, grades are rounded to nearest whole percent. (89.51% = A-, while an 89.49% = B-)

Grade	Percent
A	100-92%
A-	91-90%
B+	89-88%
B	87-82%
B-	81-80%
C+	79-78%
C	77-72%
C-	71-70%
D+	69-68%
D	67-62%
D-	61-60%
F	59-0%

## Assessment Schedule

Assignment type	Number of assignments		Points (%)	
	Undergrad	Graduate	Undergrad	Graduate
Homework Assignments	4	4	180 (18%)	180 (16%)
Lecture Quizzes	7	7	70 (7%)	70 (6%)
Lab Assignments	10	10	200 (20%)	200 (18%)
Lab Quizzes	10	10	100 (10%)	100 (9%)
Review Article	-	1	-	100 (9%)
Exams	3	3	450 (45%)	450 (41%)
Total			1000 (100%)	1100 (100%)

Difference between Soil 465 and 665: 465 is for undergraduates; 665 is for graduate students. Specifically, (a) their exams will have one or two additional questions, and (b) they must write a critical review article, and present it to the class, on a soil physics topic (mutually agreed upon by the student and the instructor).

### *Assignments*

- Homework will be submitted individually on [Canvas](#), this allows you and I to have a record of when and what was submitted and provide greater flexibility for when you turn it in.
- Homework may be done with others: this is often a good way to learn. Each person must submit their own assignment.

### *Exams*

- Three exams will be given to assess learning.
- Exams will be in-person and you will be allowed one-note card for notes/equations.
- Students with a conflicting final examination schedule or an unusual circumstance should arrange to take a substitute examination.

### *Late assignment submission*

- Assignments and due dates are listed on the course schedule and will be confirmed in class. **Assignments are due at the end of the due date (11:59 pm).**
- Late assignments will be accepted in special circumstances; please **be aware that scores will drop by 10% for each day late**, unless:
  - You have asked for an extension (**via email**) more than **12 hours before the due deadline**.
  - You have obtained an official note from a doctor or the registrar.

Tentative Schedule (changes may occur throughout the semester at the discretion of the instructor)

Date	Day		Lecture & Reading	Lab (Wednesday)	Due
1/23/2024	T	Module 1	Wk 1: Introduction	No Lab	
1/25/2024	TH				
1/30/2024	T		Wk 2: Soil as a porous medium / mass volume relationships (p. 1-28)	Lab 1: Bulk Density & Particle Size	
2/1/2024	TH				
2/6/2024	T		Wk 3: Water / soil wetness, and soil water (p. 37-52)	Lab 2: Specific Surface Area	HW#1
2/8/2024	TH				
2/13/2024	T		Wk 4: Capillarity / measuring particle size (p. 52-61)	Lab 3: Particle size distribution	
2/15/2024	TH				
2/20/2024	T		Wk 5: Particle size distribution / Clay	Lab 4: Soil Compaction	
2/22/2024	TH				HW#2
2/27/2024	T	Wk 6: Geotechnics	No Lab		
2/29/2024	TH			Exam I	
3/5/2024	T	Module 2	Wk 7: Soil Structure I & Saturated flow (p. 74-88)	Lab 5: Hydraulic Conductivity	
3/7/2024	TH				
3/12/2024	T		Wk 8: Capillarity II & Water and Energy I (p. 61-73)	Lab 6: Water Retention	
3/14/2024	TH				
3/19/2024	T		Spring Break (no class)	(3/20) No Lab	
3/21/2024	TH				
3/26/2024	T		Wk 9: Pressure and Saturation / Hysteresis	Lab 6: Water Retention (continued)	
3/28/2024	TH				
4/2/2024	T		Wk 10: Measuring potential / unsaturated flow (p. 88-117)	Lab 7: Soil Temperature and Thermal Properties	
4/4/2024	TH				HW#3
4/9/2024	T	Wk 11: Infiltration (p. 118-135)	No Lab		
4/11/2024	TH			Exam II	
4/16/2024	T	Module 3	Wk 12: Soil Structure II / Aeration and Permeability (p. 135-153; 201-209)	Lab 8: Infiltration	
4/18/2024	TH				
4/23/2024	T		Wk 13: Air permeability / Gas Diffusion (p. 209-223)	Lab 9: Water potential and Content	
4/25/2024	TH				
4/30/2024	T		Wk 14: Liquid – phase diffusion / Heat Flow Thermal Properties (p. 170-172; 161-173; 176-197)	Lab 10: Solute Transport	
5/2/2024	TH				HW#4
5/7/2024	T		Wk 15: Evaporation / Solute Movement (p. 155-158; 173-175; 225-273))	No Lab	
5/9/2024	TH				
5/14/2024	T		Final Exam		TNR 252