



## WATR 383 Hydrogeology

3 credit hours

Fall 2023

### Instructor Contact Information

- Kevin Masarik
  - Email: kmasarik@uwsp.edu
  - Office phone: 715-346-4276
  - Office: TNR 0224E (inside the Groundwater Center)
  - Office Hours: Tuesdays & Thursdays, 9am-10am. (Office or Zoom)

### Semester Schedule (16 weeks)

- **Lecture**
  - Time: Tuesdays & Thursdays, 8:00 am – 8:50 am
  - Location: TNR 252
- **Lab**
  - Time: Tuesdays, 2:00 pm – 3:50 pm
  - Location: TNR 252 & TNR 356

### Catalog Description

This is an introductory course in applied hydrogeology. The objective is to introduce basic concepts and principles governing the flow of water in the subsurface environment, use the concepts to develop an understanding of the physical properties of aquifers, and to gain a better understanding real-world applications of hydrogeology.

### Prerequisites

Either GEOL 104 or NRES 251, or Instructor Consent

### Course Materials

- Applied Hydrogeology 4<sup>th</sup> Edition. C.W. Fetter
- 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:

- Calculate water budgets for groundwater basins
- Use the concept of hydraulic head to determine groundwater flow direction
- Understand the properties of porous media and variations in the environment
- Understand how aquifer properties control groundwater movement
- Understand how groundwater interacts with surface water
- Use knowledge of aquifer properties to determine susceptibility of groundwater to contamination
- Understand how aquifer materials and land use can influence groundwater quality

## 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		Percent	
	Undergrad	Graduate	Undergrad	Graduate
Homework Assignments	5	5	25%	25%
Lab Assignments	8	8	20%	20%
Final Project	1 (Group)	1 (Individual)	10%	10%
Exams	3	3	45%	45%
Total			100%	100%

### Assignments

- Homework and lab assignments will be submitted individually on [Canvas](#).

### 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.

### Final Project

- The final project will consist of a report and in-class presentation to be done in your assigned lab group.
- If taking for graduate credit, the final project will be performed individually.

### 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	Lab	Due
9/5/2023	T	Module 1	Wk 1: Review syllabus, course intro, review of hydrologic cycle	No Lab	
9/7/2023	TH				
9/12/2023	T		Wk 2: Precipitation/Evapotranspiration	Sand-tank groundwater model	
9/14/2023	TH				
9/19/2023	T		Wk 3: Infiltration/Vadose zone/recharge	Field Measurements	
9/21/2023	TH				
9/26/2023	T		Wk 4: Aquifer properties; porosity, specific yield, hydraulic conductivity	Field Measurements	Homework #1 Due
9/28/2023	TH				
10/3/2023	T		Wk 5: Aquifers properties: water table, potentiometric surface	Field Measurements	
10/5/2023	TH				
10/3/2023	T		Wk 6: Hydraulic head, hydraulic gradients, Darcy's law	Sand-tank ground-water model cont.	
10/5/2023	TH				Homework #2 Due
10/10/2023	T	Module 2	Wk 7: Hydrostratigraphy, anisotropy, and heterogeneity	Intro to R: Computer Lab #1	
10/12/2023	TH				Exam 1 (10/12)
10/17/2023	T		Wk 8: Groundwater flow, flow nets, local and regional flow systems	TBD	
10/19/2023	TH				
10/24/2023	T		Wk 9: Well Construction and Theis equation	Computer Lab #2	
10/26/2023	TH				Homework #3 Due
10/31/2023	T		Wk 10: Slug tests, pump tests, and well pumping effects	Computer Lab #3	
11/2/2023	TH				
11/7/2023	T		Wk 11: Image well theory and superposition	Computer Lab #4	
11/9/2023	TH				Homework #4 Due
11/14/2023	T	Module 3	Wk 12: Groundwater-surface water interactions; case studies from Wisconsin	Computer Lab #5	
11/16/2023	TH				Exam 2 (11/16)
11/21/2023	T		Wk 13: Groundwater-surface water interactions continued	No Lab	
11/23/2023	TH				
11/28/2023	T		Wk 14: Wellhead/Source Water Protection; Introduce Final Project	Final Project Time	
11/30/2023	TH				Homework #5 Due
12/5/2023	T		Wk 15: Groundwater Contaminants	Final Project Time	
12/7/2023	TH				
12/12/2023	T		Wk 16: Class Presentations	No Lab	
12/14/2023	TH				
12/18/2023	M		Final Exam		TNR 252

