

**Hydrogeology (WATR 383/583)**  
**Fall 2021**

**Location:** TNR 252

**Instructor:** Jen Dierauer Brand

**Office:** TNR 224C (inside the Groundwater Center)

**Office Hours:** via Zoom personal meeting room:

<https://wisconsin-edu.zoom.us/my/jbrand>

M 11:00 am – 11:50 am; F 1:00 pm – 1:50 pm

**Lecture time:** T / Th 10:00 am – 10:50 am

**Lab time:** Th 11:00 am – 12:50 PM

**Email:** [jbrand@uwsp.edu](mailto:jbrand@uwsp.edu)

**Phone:** 715-346-3190

**Course Description:**

This is an introductory course in applied hydrogeology. The objective of this course is to introduce the basic concepts and principles governing the flow of water in the subsurface environment, and to use these concepts to develop an understanding of aquifers and their physical properties. The emphasis of this class will be on relating these basic concepts to actual field conditions. At the completion of this course, students will be able to:

1. Calculate water budgets for groundwater basins
2. Use the concept of hydraulic head to determine groundwater flow direction
3. Understand the properties of porous media, the variation within the natural environment, and how these properties control groundwater movement
4. Understand how groundwater interacts with surface water
5. Use knowledge of common groundwater contaminants to determine source

**Required Course Materials:** None. The book assigned in the bookstore is recommended but not required. A dated, but classic, text on groundwater is available for free online:

“Groundwater” by R.A. Freeze and J.A. Cherry

<http://hydrogeologistswithoutborders.org/wordpress/textbook-project/>

**Grading:**

Grading is based on lab assignments, weekly Canvas quizzes, and unit tests. There are 8 lab assignments, including 5 lab activities / problem sets, and 3 short write-ups (3-5 pages) with presentations. The write-up and presentation assignments will be allocated two weeks and are worth 80 points each. All other lab assignments are worth 40 points each.

	Total Points	Percent of Grade
Weekly Quizzes (15)	300 pts (20 each)	30%
Lab Assignments (8)	400 pts (varies)	40%
Unit Tests (3)	300 pts (100 each)	30%

Grades are rounded to the nearest whole percent. For example, an 89.51% = A-, while an 89.49% = B+.

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

**Graduate students:** Grades for the course follow the above guidelines. An additional assignment will be given, and the completed assignment must be presented to the class.

## Tentative schedule

### Unit 1: Porous media and groundwater flow

Week	Lecture topics	Lab activity / Assignment
<b>1:</b> Sep 2-3	Course outline, skills review Week 1 Course Introduction Quiz	Optional review material
<b>2:</b> Sep 7-10	Aquifers and water budgets Week 2 Quiz	#1 (40 pts) Problem solving and water budgets
<b>3:</b> Sep 13-17	Hydraulic head; recharge and discharge areas Week 3 Quiz	#2 (40 pts): Hydraulic gradients
<b>4:</b> Sep 20-24	Aquifer properties Week 4 Quiz	#3 (40 pts): Confined versus unconfined aquifer storage
<b>5:</b> Sep 27-Oct 1	Hydrostratigraphy, anisotropy and heterogeneity Week 5 Quiz	#4 (80 pts): Unit 1 Presentation: Regional aquifer system
<b>6:</b> Oct 4-8	Flow nets; local and regional flow systems Week 6 Quiz	#4 continued

### Unit 2: Well hydraulics and field methods

Week	Lecture topics	Lab activity / Assignment
<b>7:</b> Oct 11-15	Well construction, Theis equation Week 7 Quiz	Presentations from Assignment #4; Unit 1 Test
<b>8:</b> Oct 18-22	Image well theory and superposition Week 8 Quiz	#5 (40 pts): Theis equation problem set
<b>9:</b> Oct 25-29	Groundwater as a resource – management problems Week 9 Quiz	#6 (80 pts): Unit 2 Presentation: Scientific journal article
<b>10:</b> Nov 1-5	Slug tests and permeameters Week 10 Quiz	#6 continued
<b>11:</b> Nov 8-12	Specific capacity and pumping tests Week 11 Quiz	Presentations from Assignment #6; Unit 2 test

### Unit 3: Groundwater – surface water interaction and groundwater contamination

Week	Lecture topics	Lab activity / Assignment
<b>12:</b> Nov 15-19	Vadose zone; lake and stream interactions Week 12 Quiz	#7 (40 pts): Groundwater contour mapping
<b>13:</b> Nov 22-24	Groundwater and climate Week 13 Quiz	None (Thanksgiving Vacation)
<b>14:</b> Nov 29-Dec 3	Contaminant sources; contaminant transport Week 14 Quiz	#8 (80 pts): Unit 3 Presentation: Superfund Case Study
<b>15:</b> Dec 6-10	Break-through curves; treatment methods Week 15 Quiz	#8 continued; Unit 3 Test
<b>16:</b> Dec 13-17	Final Exam Week	Presentations from Assignment #8,

### **Care Team**

The University of Wisconsin-Stevens Point is committed to the safety and success of all students. The Office of the Dean of Students supports the campus community by reaching out and providing resources in areas where a student may be struggling or experiencing barriers to their success. Faculty and staff are asked to be proactive, supportive, and involved in facilitating the success of our students through early detection, reporting, and intervention. As your instructor, I may contact the Office of the Dean of Students if I sense you need additional support which, individually, I may not be able to provide. You may also share a concern if you or another member of our campus community needs support, is distressed, or exhibits concerning behavior that is interfering with the academic or personal success or the safety of others, by reporting here: <https://www.uwsp.edu/dos/Pages/Anonymous-Report.aspx>.

### **Title IX**

UW-Stevens Point is committed to fostering a safe, productive learning environment. Title IX and institutional policy prohibit discrimination based on sex, which includes harassment, domestic and dating violence, sexual assault, and stalking. If you choose to disclose information about having survived sexual violence, including harassment, rape, sexual assault, dating violence, domestic violence, or stalking, and specify that this violence occurred while a student at UWSP, federal and state laws mandate that I, as your instructor, notify the Title IX Coordinator/Office of the Dean of Students.

Please see the information on the Dean of Students webpage for information on making confidential reports of misconduct or interpersonal violence, as well as campus and community resources available to students.

Dean of Students: <https://www.uwsp.edu/DOS/sexualassault/Pages/default.aspx>

Title IX page: <https://www.uwsp.edu/hr/Pages/Affirmative%20Action/Title-IX.aspx>

### **Disability and Accommodations**

In accordance with federal law and UW System policies, UWSP strives to make all learning experiences as accessible as possible. If you need accommodations for a disability (including mental health, chronic or temporary medical conditions), please visit with the Disability and Assistive Technology Center to determine reasonable accommodations and notify faculty. After notification, please discuss your accommodations with me so that they may be implemented in a timely fashion.

DATC contact info: [datctr@uwsp.edu](mailto:datctr@uwsp.edu); 715/346-3365; 609 Albertson Hall, 900 Reserve Street

### **FERPA**

The Family Educational Rights and Privacy Act (FERPA) provides students with a right to protect, review, and correct their student records. Staff of the university with a clear educational need to know may also have to access to certain student records. Exceptions to the law include parental notification in cases of alcohol or drug use, and in case of a health or safety concern. FERPA also permits a school to disclose personally identifiable information from a student's education records, without consent, to another school in which the student seeks or intends to enroll.

### **Academic Integrity**

Academic Integrity is an expectation of each UW-Stevens Point student. Campus community members are responsible for fostering and upholding an environment in which student learning is fair, just, and honest. Through your studies as a student, it is essential to exhibit the highest level of personal honesty and respect for the intellectual property of others. Academic misconduct is unacceptable. It compromises and disrespects the integrity of our university and those who study here. To maintain academic integrity, a student must only claim work which is the authentic work solely of their own, providing correct citations and credit to others as needed. Cheating, fabrication, plagiarism, unauthorized collaboration, and/or helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. Failure to understand what constitutes academic misconduct does not exempt responsibility from engaging in it. For more information on UWS chapter 14 visit: <https://www.uwsp.edu/dos/Pages/Student-Conduct.aspx>

### **Reporting Incidents of Bias/Hate**

It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally, or for other students or student groups. If you have experienced a bias incident (an act of conduct, speech, or expression to which a bias motive is evident as a contributing factor regardless of whether the act is criminal) at UWSP, you have the right to report it: <https://www.uwsp.edu/dos/Pages/AnonymousReport.aspx>. You may also contact the Office of the Dean of Students directly at [dos@uwsp.edu](mailto:dos@uwsp.edu). Diversity and College Access is available for resources and support of all students: <https://www.uwsp.edu/dca>.

### **Clery Act**

The US Department of Education requires universities to disclose and publish campus crime statistics, security information, and fire safety information annually. Statistics for the three previous calendar years and policy statements are released on or before October 1st in our Annual Security Report. Another requirement of the Clery Act is that the campus community must be given timely warnings of ongoing safety threats and immediate/emergency notifications. For more information about when and how these notices will be sent out, please see our Jeanne Clery Act page at <https://www.uwsp.edu/dos/clery>.

The **Drug Free Schools and Communities Act (DFSCA)** requires institutions of higher education to establish policies that address unlawful possession, use, or distribution of alcohol and illicit drugs. The DFSCA also requires the establishment of a drug and alcohol prevention program. The Center for Prevention lists information about alcohol and drugs, their effects, and the legal consequences if found in possession of these substances. Center for Prevention – DFSCA: <https://www.uwsp.edu/dos/aoda-ipv/Pages/dfsc.aspx>

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