Geology 4418/5404 – Groundwater Hydrology

Spring, 2026
Class: MWF 9-9:50, WSB 310
Lab R 2-5, WSB 310

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Office Hours: MWF 10-11; W 2-4; R 8:30-10:30

Course description: This course is designed to present a comprehensive introduction to hydrogeology and to provide the student with a knowledge of the hydrogeologic aspects of the Trans-Pecos region.

Texts: Basic Hydrogeology – An Introduction to the Fundamentals of Groundwater Science by Matthew M. Uliana, ISBN: 978-1-77470-106-5;
Practical Problems in Groundwater Hydrology by Bair and Lahm (ISBN 0-13-145667-9), optional text: Applied Hydrogeology, 4th edition, by C.W. Fetter (ISBN 0-13-088239-9)

Grading: Grading will be based upon:

Lab/FT	30
Homework	15
Ex1	10
Ex2	10
Ex3	10
In class	10
term project	15
Total	100

Lab projects will consist of work taken from the lab manual (Lee et al.) with additional material assigned as needed. Each assigned chapter in the lab manual (and occasional additional material) will be given one week of lab time to complete.

Homework will be assigned on a weekly basis. This work will be pertinent to the current lecture material. These assignments are designed to encourage the student to read the course material in advance.

In-class work will be required periodically throughout the semester.

2 Midterms and a Final exam will be given to assess the student's progress towards understanding the concepts of the class. 5404 students will have additional questions on the exams.

The **Term Project** will include an analysis of a hydrologic system to be chosen by the student.

5404 students will choose a process as a topic. Examples:

- Groundwater flow through various aquifer types
- Rock/water geochemical reactions
- How recharge works

4418 students will choose an aquifer to describe.

Field trips are scheduled to provide the student with basic field experience. Dates to be determined. Possible destinations:

- Independence creek – spring system from the Edwards-Trinity aquifer
- Sunny Glenn – City of Alpine and other water supply wells
- Black Gap: measure discharge at multiple locations where springs provide base flow increase to the Rio Grande.
- Alamito creek. Study hydrogeologic parameters and assist with a topographic survey
- Terlingua creek at O2 ranch. Work on a topographic survey for geomorphic change detection analysis and determine fluvial aquifer hydrogeologic parameters to compare to the Alamito creek system.

These will require a written summary and analysis that will be incorporated into the lab.

Assignment submission: Most assignments (homework, labs …) are to be submitted via OneNote.

Attendance: Attendance will be tracked and will be factored into the final grade. I follow the "first one is free" philosophy for this: you can miss a class or a lab and it will not count against you, but beyond that missing a lab or class (for unexcused reasons) will result in a loss of points.

Upon successful completion of this course, **the student will be able to**:

- Understand the basic principles of hydrology including the hydrologic cycle, recharge, groundwater flow and discharge
- Measure stream discharge using modern equipment including: Marsh McBirney, Sontek Flow Tracker ADV and Teledyne ADCP
- Collect topographic data necessary to assess temporal changes in a river/stream system

- Design a pumping test to assess the quality of an aquifer, and to interpret the results of this test
- Interpret water chemistry data and determine aquifer inputs to water chemistry; and to understand water quality standards and concerns associated with water pollution
- Interpret lab and field data in order to propose a development plan for an aquifer for a water supply; understand water law and implications toward developing the aquifer

Classroom Conduct:
The Student handbook states under Student Misconduct, number 21," Such prohibition includes disorderly classroom conduct that obstructs, interferes with, inhibits and/or disrupts teaching and/or classroom activities." Behavior which is included in this category: 1) persistent talking to ones' neighbors during lecture, 2) coming to class late or leaving early, 3) the use of cellular phones or MP3 devices in the classroom. CELL PHONES MUST BE TURNED OFF IN CLASS. This includes texting, emailing and social networking. (*If you are a member of an EMS/VFD group or have a child in day care and they must be able to reach you, let me know and we will discuss.*) Offenders of this policy will be asked once to stop and 5 points will be taken from their grade. If it occurs a second time, the offender will be instructed to leave the classroom, and there will be a meeting with the Dean of Student Life. If there are further incidents, UDPS will be called and offenders will be physically ejected from the classroom and will likely be expelled from the University.

Students Needing Special Accommodations:
SRSU Disability Services. Sul Ross State University (SRSU) is committed to equal access in compliance with Americans with Disabilities Act of 1973. It is SRSU policy to provide reasonable accommodations to students with documented disabilities. It is the student's responsibility to initiate a request each semester for each class. Students seeking accessibility/accommodations services must contact Rebecca Greathouse Wren, LPC-S, SRSU's Accessibility Services Coordinator at 432-837-8203 (please leave a message and we'll get back to you as soon as we can during working hours), or email rebecca.wren@sulross.edu. Our office is located on the first floor of Ferguson Hall (Suite 112), and our mailing address is P.O. Box C-122, SUI Ross State University, Alpine. Texas, 79832.

Distance Education Statement: Students enrolled in distance education courses have equal access to the university's academic support services, library resources, and instructional technology support. For more information about accessing these resources, visit the SRSU website. Students should submit online assignments through Blackboard or SRSU email, which require secure login information to verify students' identities and to protect students' information. The procedures for filing a student complaint are included in the student handbook. Students enrolled in distance

education courses at Sul Ross are expected to adhere to all policies pertaining to academic honesty and appropriate student conduct, as described in the student handbook. Students in web-based courses must maintain appropriate equipment and software, according to the needs and requirements of the course, as outlined on the SRSU website.

week	date	Topic		Lab
1	1/14/2026	Ch1 Intro		
	1/16/2026			
2	1/19/2026	MLK - no class		
	1/21/2026	Ch2 - Energy Considerations		1. Mono lake 1
	1/23/2026			
3	1/26/2026	Ch3 - Porous Media		
	1/28/2026			2. Mono lake 2
	1/30/2026			
4	2/2/2026	Ch4 - Flow Equations		
	2/4/2026			3. Ch1 - Hydrogeology
	2/6/2026			
5	2/9/2026	Ch5 - Storage Parameters		
	2/11/2026		WID	4. Ch2 - Regional Groundwater Flow
	2/13/2026		WID	
6	2/16/2026	Ch6 - Flow Equations		
	2/18/2026			5. Ch3 - Radial Flow to Wells
	2/20/2026		Pecos	
7	2/23/2026	Exam 1	Pecos	
	2/25/2026	Ch7 - Well Hydraulics	Pecos	lab catch up week
	2/27/2026			
8	3/2/2026	Ch8 - Aquifer Testing		
	3/4/2026			Lab Midterm
	3/6/2026			
SB		Spring Break 3/9 to 3/13		Spring Break
9	3/16/2026	Ch9,10 - Flow systms and Modeling		
	3/18/2026			6. Ch4 - Stream / Aquifer Interactions
	3/20/2026			
10	3/23/2026	Ch11. - GW Chemistry / Draft Term Paper Due		
	3/25/2026			7. Ch5 - Aquifer Testing
	3/27/2026			
11	3/30/2026	Ch12 - Mass Transport		
	4/1/2026			8. Ch6 - Contaminant Transport
	4/3/2026			
12	4/6/2026	Ch13 - Surface Water		
	4/8/2026			9. Ch7 - Groundwater Chemistry
	4/10/2026	Exam 2		
13	4/13/2026	Ch14 - Unsaturated Zone		
	4/15/2026			10. local well tour
	4/17/2026			
14	4/20/2026	Ch15,16 Consolidation and Non-Porous		
	4/22/2026			11. TBD
	4/24/2026			
16	4/27/2026	Ch17 Groundwater in Various Settings		
	4/29/2026		Last class	Lab Final
		Final Exam		???