

# Applied Hydrogeology

GEOL 4315 (CRN 25854), ESCI 4315 (CRN 28625), GEOL 5315 (CRN 27370)

Spring 2021, Hybrid



**Instructor:** Dr. Mark Engle ([maengle@utep.edu](mailto:maengle@utep.edu))

**Office:** Geology Building 302A

**Office hours:** Send me an e-mail and I'll do my best to respond or we can set up a meeting through Blackboard/Zoom.

## Course Description

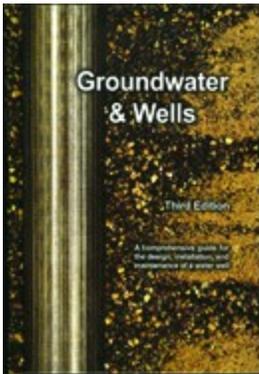
This course will provide you with practical knowledge and skills to perform investigations of aquifers, water-bearing units, and hydrogeologic systems. Topics covered include a review of hydrogeologic concepts, well drilling and coring, water level monitoring, water quality sampling, aquifer testing, well log interpretation, and report preparation. The project will include 4 trips to Rio Bosque to perform field investigations. By the end of the course you should have a basic skill set to allow you to perform hydrogeologic studies.

## Learning Outcomes

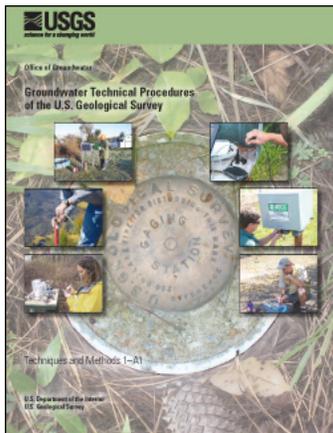
At the end of the course, students will:

- Understand key processes in groundwater systems
- Be knowledgeable of basic well drilling and coring techniques
- Perform basic field hydrogeology procedures
- Interpret geologic well log data
- Generate a hydrogeologic report

**Recommended textbooks (there is no required textbook for the course):**



**Groundwater & Wells**, 3<sup>rd</sup> edition by Robert Sterrett. Johnson Screens, 812 p. This (like its predecessors) is the bible for working hydrogeologists. If you anticipate working as a hydrogeologist, I strongly suggest that you buy this book (preferably from the National Groundwater Association).



**Groundwater Technical Procedures of the U.S. Geological Survey** by W. L. Cunningham and C. W. Schalk, U.S. Geological Survey Techniques and Methods 1–A1, 151 p. <https://pubs.usgs.gov/tm/1a1/>. It's free!

**Attendance/Lectures:**

Attendance, which is key to success in this class, is mandatory. Partly, because of the size of the class, I hope for quite a bit of discussion. This class will be taught synchronously at a time to be agreed upon by the students (Probably Friday mornings). In addition, we will have 4 trips to Rio Bosque park (2/5/21, 3/5/21, 4/2/21, 4/16/21) to perform fieldwork. On those dates we will meet at Rio Bosque at 9AM – if you need transportation, let me know.

**Course Communication:**

Because this is an online class, we won't see each other in the ways you may be accustomed to: during class time, small group meetings, and office hours. However, there are a number of ways we can keep the communication channels open:

- **Email:** UTEP e-mail is the best way to contact me ([maengle@utep.edu](mailto:maengle@utep.edu)). I will make every attempt to respond to your e-mail within 24-48 hours of receipt. Note

that I cannot provide some information if you email from a non-UTEP email address.

- **Office Hours:** I tried having “office hours” last semester and it doesn’t work very well because you just get automatically logged off if no one else joins, so just email me and we can set something up.
- **Announcements:** Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

### **Exam etiquette:**

There will be 2 exams. They will be take home style that are both open-note and open-book. You will have 1 week after I assign the exam to upload it to BlackBoard. Feel free to work together, if you wish, but you must turn in your own work.

### **Grading:**

Homework sets and field assignments: **25%**; Mid-term and final exam: **25%**;

Attendance: **25%**; Final presentation & report: **25%**.

A-100-85%; B- 84-75%; C-74-65%, D- 64-55%; F-below 55%.

**There will be no make-up exams or extensions on assignments, unless you have a documented health issue.**

Getting dropped from class: If you are severely failing the class (grade <40%) at the Drop Date or miss 3 or more assignments/lectures in a row, I may drop you course. If you would like to remain in the class and are under one or more of those conditions, please contact me prior to the drop date (April 1<sup>st</sup>).

### **Students with Disabilities**

If you have a disability or if you are experiencing learning difficulties, please contact the Center for Accommodations and Support Services (CASS) or visit their portal ([cassportal.utep.edu](http://cassportal.utep.edu)). You may contact them Monday through Friday 8:00a.m.-5:00p.m. Phone:(915) 747-5148. Union Building East Room 106 [cass@utep.edu](mailto:cass@utep.edu). They provide any necessary accommodations. You should also meet with me in order to facilitate your needs. You are expected to provide documentation of your disability in order to make special arrangements in this class.

### **Academic Misconduct**

Academic dishonesty will be not tolerated in this class (please refer to the student conduct code handbook for details regarding university policy and definitions). Dishonesty includes, but is not limited to, plagiarism on term papers, unauthorized notes brought into an exam; copying answers from another student or letting another student copy your answers. The penalty for the first offense will be a grade of zero points on the exam or assignment. Penalty for the second offense will be an F for the course.

### **Helpful Hints:**

- Attend the lectures!

- Review material regularly - multiple short study sessions over a period of weeks are more effective than a single "cram" the night before an exam.
- Form a study group. Each member should study material on their own before meeting with the group for discussion and comparison.
- Ask questions if you don't know or are confused.
- Combine class notes, textbook, and web materials when studying. Each provides a different perspective.

### **Campus Carry**

Persons holding a Concealed Handgun License can lawfully carry their handgun into a UTEP classroom as long as the gun remains concealed. Open carry remains prohibited on campus. In other words, none of us should see (or be able to tell that there is) a gun at UTEP. Call the University Police at 747-5611 or dial 911 if you see any individual on campus with a handgun or other type of weapon. For more information on campus carry, see [<http://sa.utep.edu/campuscarry/>]; for more information on overall campus safety, see [<http://admin.utep.edu/emergency/>].

### **Rio Bosque Wetlands Park**

The Rio Bosque Wetlands Park is a 372-acre park owed by the city of El Paso but is managed by the UTEP Center for Environmental Resource Manager. There are several shallow monitoring wells which we can utilize and at least one pumping well, to allow us to perform a pump test. It is located off Americas Ave. and is about a 20-minute drive from UTEP. See <https://www.utep.edu/cerm/rio-bosque/location-and-hours.html> for directions.



## TENTATIVE COURSE OUTLINE

Week (date indicates Monday of that week)	Topic	Location
Week 1 (1/22)	Intro to the course - class outline, hydrogeologic concepts	On-line
Week 2 (1/29)	Planning a hydrogeologic field investigation	On-line
Week 3 (2/5)	Water level monitoring and hydraulic head mapping	<b>Rio Bosque Park</b>
Week 4 (2/12)	Overview of well drilling, construction, and coring techniques	On-line
Week 5 (2/19)	Introduction to water quality and requirements	On-line
Week 6 (2/26)	Methods for water sampling, field parameters	On-line
Week 7 (3/5)	Groundwater sampling in the field	<b>Rio Bosque Park</b>
Week 8 (3/12)	<b>Exam 1</b> Reporting geochemical data	On-line
Week 9 (3/19)	Spring Break (no class)	--
Week 10 (3/26)	Conductivity, transmissivity, and slug testing (class date/time TBA due to Cesar Chavez day)*	On-line
Week 11 (4/2)	Slug testing in the field	<b>Rio Bosque Park</b>
Week 12 (4/9)	<b>Exam 2</b> Preparing a hydrogeologic report	On-line
Week 13 (4/16)	Pump testing in the field	<b>Rio Bosque Park</b>
Week 14 (4/23)	Well log interpretation + building a hydrogeologic framework model (part 1)	On-line
Week 15 (4/30)	Geophysical well logs + building a hydrogeologic framework model (part 2)	On-line
Final Exam	Present/Submit Hydrogeologic Report	On-line

\* Spring drop date is April 1<sup>st</sup>.

UPDATED 12/15/20