

# Applied Water Resources

## GEO 5334, Fall 2016

**Instructor:** Dr. Jason Julian  
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Office Hours: T & R 1:50–2:50 pm, or by appointment

**Lecture with Lab:** Tuesday 6:30 – 9:20 pm in ELA 121

**Course Description:** Application of techniques employed in water resources management including flood hazards, water supply assessment, and water management strategies. Students will apply principles to specific watersheds and water problems including the analysis of various physical, land use, and legal parameters.

### Learning Outcomes:

Knowledge:

1. Students will learn and discuss the major biophysical, legal, social, and economic factors of water resources.
2. Students will synthesize different professional sources of data on water resources and demonstrate an empirical understanding of watershed dynamics.

Skills:

1. Students will analyze hydrologic data and combine with socioeconomic data to assess water resource supply vs. demand.
2. Develop professional-style reports to explain aspects of water resources management.

**Philosophy of the Course:** Water is one of the most important and most disputed resources across the globe, and affects everybody's daily lives. This critical role is a result of the fact that water sustains virtually all life, supports almost all economic activities, and is one of the most valuable and desirable aesthetic resources. In this course, we will study the science, management, socioeconomics, and politics of water resources from an applied perspective. Thus, lectures and labs will be combined so that students can apply water resources knowledge to real-world problems. This will be a rigorous course that will provide you with professional-level experience in water resources. You will get your feet wet (literally and figuratively) by measuring hydrology, accessing and analyzing water resources data, and producing professional reports on these analyses.

**Required Text** (additional readings will be provided by Instructor):

Cech, T., 2010, *Principles of Water Resources: History, Development, Management, & Policy*.

\*\*The 3<sup>rd</sup> edition is the recommended edition and the one used by the instructor; however, the 2<sup>nd</sup> edition is also acceptable.

### Suggested Readings:

Sansom, Andrew. 2008, *Water in Texas, an Introduction*.

Thompson, S.A., 1999, *Water Use, Management, and Planning in the United States*.

-This book is on reserve (2 hour in-library use) at Alkek circulation

Texas Water Development Board, 2012. *Water for Texas 2012*, Available as a PDF from:

<http://www.twdb.state.tx.us/waterplanning/swp/2012/>.

## **Course Work Requirements**

### **Course Participation & Current Events – 10%**

Course participation measures how much of an active interest you take in the course and includes your participation in in-class discussions. Keeping up to date on water resource issues requires you to find and post relevant media weekly, for at least 10 weeks of the semester. I have set up a closed group within the Texas State University group on Facebook: “**Water Resources for Bobcats**”. Because it is a closed group, you will have to ask permission to join, which I will grant. Once you are in the group, you are expected to post at least one water resources related story/link/event every week for at least 10 weeks of the semester. Under the post, you are required to comment/summarize the story/link/event. Duplicate postings will not count. Therefore, you are responsible for looking at all postings, which will prevent you from posting something that has already been posted. For every week less than 10 that you do not make an original posting and comment, one point will be deducted from your course participation grade. Postings from previous classes can serve as examples of what I expect. Because this is a closed group (including my other water resources courses), only members within the group will see your postings, so feel free to be creative in your postings and comments. Since this is an “.edu” group, no friend requests are needed to join the group, which means your personal profiles will be protected as you see fit. All that is required to be in the Texas State University group is that you create a profile with an XX@txstate.edu email address and join “Groups at Texas State” first. You can set up a dummy profile if you choose, but make sure your name is recognizable by me, so I can keep track of your posts for your grade. This Facebook group is my preferred method of sharing water resource topics with the class because it is easy to use, convenient, can easily be linked to a wide variety of sources, and can use multi-media. If for some reason, you do not want to use Facebook, you can email me your weekly postings, which I will then post to the group.

### **Midterm Exam – 20%**

The midterm exam (worth 20 pts) will be short answer format. The date of the **midterm will be October 25**. All material (including readings, lectures, in-class assignments, videos, and labs) covered up to this date is fair game for the midterm. There is no final exam for this course. Instead, you will demonstrate your knowledge of course material in your final report, detailed below. Make-up exams will only be permitted for significant, verifiable reasons that are described in the *Texas State Student Handbook*. Make-up exams will consist of essay and/or mathematical calculation questions.

### **Exercises – 30%**

In order to provide you with “hands on” experience in water resources, you will work on a diverse set of exercises during and outside of class. These exercises are intended to provide you with real professional experience in water resources. There will be 3 exercises, each worth 10 points. You may work alone or in 2-person groups. It is **your** responsibility to choose your teammate and work out a schedule for the two of you to complete the assignments. Each member of the team is expected to contribute equally to the project. You will receive detailed instructions and assistance on these projects in class, but you are also expected to spend a considerable amount of your own time on these assignments. All of the projects require a working knowledge of *Microsoft Excel*. If you need extra help, the Student Learning Assistance Center (SLAC) at Alkek Library is a great resource. No project may be resubmitted for a new grade. All projects are to be typed, neat, and presented in an attractive, professional manner following the referencing format used by the *Journal of American Water Resources Association*. Points will be deducted for work that does not meet this standard. For your reports, use a 12 pt. font size. All tables and figures should have a title and caption.

### **Field Trips – 10%**

There will be two field trips, each worth 5 points. During these field trips, we will learn about various aspects of water resources management. If you are not able to attend a field trip, I will give you an

alternate assignment.

### **Final Report and Oral Presentation – 30%**

Your final report will be a watershed management plan using information from the three exercises. The purpose of this exercise is to provide you with experience in planning and managing water resources, and also for you to demonstrate that you can synthesize everything you learned in this course. More details of this report will be provided the first two weeks of class. The format of the report should be as follows: double-spaced with 1” margins, 12-point Times New Roman font), which does not include references, tables, or figures. Place tables and figures (respectively) after references, and make sure that every Figure and Table is numbered with a caption. Use these numbers to reference Figures and Tables in the text. This report is worth 20% of your grade and will be evaluated by the quality and accuracy of the report. During the final class, you will give an oral presentation of your watershed management plan, followed by a question and answer session. This presentation is worth 10% of your grade and will be evaluated by the quality of the presentation, as well as your ability to answer my questions about your presentation and relevant water resource concepts.

**Grading:** Your grade in the course will be determined by how many points you accrue out of the total possible 100 points. The final letter grades will be assigned as follows: A = 90-100, B = 80-89, C = 70-79, D = 60-69, F = <60. The points are allocated as follows:

Course Participation & Current Events	10 points
Field Trips (2 @ 5 pts each)	10 points
Exercises (3 @ 10 pts each)	30 points
Midterm Exam	20 points
Final Oral Presentation	10 points
<u>Final Report</u>	<u>20 points</u>
TOTAL	100 points

**Late Assignments:** Late work will be accepted but there will be a grade penalty that increases with each day past the due date.

**Extra credit:** There will be no extra credit in this course, but you are encouraged to pursue interests related to Water Resources throughout the course and the rest of your career.

### **Course Policies**

**Attendance Policy:** You are required to attend all classes. Unexcused absences will result in deductions from your Course Participation grade. You are responsible for all materials and announcements made in class. If absent, make sure you check the lecture on TRACS for announcements you missed in class.

**Electronic Devices:** Electronic devices such as laptops and tablets are allowed in class as long as they are being used for viewing class materials and taking notes. Smartphones are not allowed. If you are caught using electronic devices for any other reason, then you will forfeit your right to use electronic devices in class for the rest of the semester. These other reasons include, but are not limited to, social networking, texting, email, and viewing non-GEO 5334 material. If I find that your electronic device is distracting or prevents you from paying attention in class, I will ask you to refrain from its use. If you are expecting a life and death announcement from an immediate family member, please notify me before class of that situation.

**Learning Outcomes:** The Department of Geography's Student Learning Outcomes for all departmental programs may be reviewed at: <http://www.geo.txstate.edu/about/apr.html>.

**Texas State University Honor Code** (<http://www.txstate.edu/effective/upps/upps-07-10-01.html>)

*Learning and teaching take place best in an atmosphere of intellectual fair-minded openness. All members of the academic community are responsible for supporting freedom and openness through rigorous personal standards of honesty and fairness. Plagiarism and other forms of academic dishonesty undermine the very purpose of the university and diminish the value of an education. Specific sanctions for academic dishonesty are outlined in **Texas State Student Handbook**.*

**Students with Special Needs/Disabilities:** If you have a condition that requires special accommodation (as documented by the Office of Disability Services) in order to successfully complete the course, you must notify the Office of Disability Services (located at LBJ 5-5.1; ph. 512.245.3451) **AND the instructor** in a written memo (or email) before the end of the second week of classes. Failure to do so may result in the necessary accommodations not being made. *Texas State University San Marcos is dedicated to providing these students with necessary academic adjustments and auxiliary aids to facilitate their participation and performance in the classroom* (<http://www.txstate.edu/effective/upps/upps-07-11-01.html>).

**Academic Testing for Students with Disabilities** (<http://www.txstate.edu/trec/attd/accessAttdTS.html>).

*Students who are approved for testing accommodations have the option of using Academic Testing for Students with Disabilities (ATSD) office to take in-class tests or quizzes with their accommodations. Any student who schedules a test(s) with ATSD must schedule tests during the in-class scheduled test time (or seek an exception from the instructor) and are expected to take the test at ATSD. If a student schedules to take test with ATSD but decides that they will take the test in the classroom, the student will be responsible for notifying the ATSD and the instructor prior to the class start time.*

**Professionalism:** Our society considers a “professional” as a person who is responsible for the quality, integrity, and implications of his/her work. In the Department of Geography, we consider our students to be “professionals in training.” Course requirements are intended to bring the conduct and the quality of work of students in our programs up to professional standards. Students are responsible for attending class on time, reading the assignments, and completing the assigned projects on time in an aesthetic and thorough manner. We assume that students are aware of, and practice common courtesy and the consideration of others that are necessary for a civil society and that are expected of professional persons. For additional information on Texas State University policy on student conduct, we encourage you to consult the university Policy and Procedures Statement on: Courteous Behavior, Classroom Civility, Classroom Disruption, Suspension from Class and Sexual Harassment. <http://www.provost.txstate.edu/pps/policy-and-procedure-statements/4-teaching/pps4-02.html>.

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## TENTATIVE SCHEDULE AND READINGS

Date	Topic	Readings (before class)
Aug. 30	Introductions Map library tour Project 1 (due Oct 4)	
Sep. 6	Water Resources Intro Hydrologic Cycle	Cech: Preface, Ch 1, & Ch 2
<b>Sep 13</b>	<b>Hydrology &amp; Stream Metrics - Meet at 6:00p in SMR below Salt Grass</b>	
Sep 20	Surface Water Hydrology & Channel Roughness	Cech: Ch 3
<b>Sep 23 (F)</b>	<b>Bamberger Ranch Field Trip (8:00a – 2:30pm)</b>	
Sep 27	Land for Water Initiative, Texas Land Conservancy Project 2 (Due Oct 4)	
Oct 4	Groundwater Hydrology Project 3 (Due Nov 1)	Cech: Ch 4
Oct. 11	Water Quality	Cech: Ch 5 & Ch 11
Oct 18	Land Use, Dams and Water	Cech: Ch 6 & 7
<b>Oct 25</b>	<b>Midterm Exam</b>	
Nov 1	Water Law and Water Management	Cech: Ch 8, Ch 9 & Ch 10
Nov. 8	Water and Politics	Cech: Ch 14
Nov. 15	Water Economics	Cech: Ch 13
<b>Nov. 22</b>	<b>Work on Final Project; No Class</b>	
Nov. 29	Aquatic Ecosystems	Cech: Ch 12
Dec. 6	Ecosystem Services	
<b>TBD (F)</b>	<b>Wastewater Field Trip 9:00am</b>	
<b>Dec. 11 (Su)</b>	<b>Final Reports due by 5:00pm</b>	
<b>Dec. 13</b>	<b>Final Oral Presentations</b>	