

## **Geo 3300 WATER PLANET, Spring 2023**

First Half: Monday, Wednesday, and Fridays, in person, 10:45 - 11:35, FASB 375, but some days will be via Zoom.

Second Half: Monday and Friday in person, 10:45-11:35, FASB 375  
Wednesdays, 10:45-11:35, Zoom

**Instructors:** First Half: Kip Solomon. 801-581-7231  
Office Hours: M,W 11:30-12:30  
email: kip.solomon@utah.edu

Second Half: Erica Brown Gaddis. 801-205-3769.  
Office Hours: F, 9:30 - 10:30 or by appointment.  
email: erica.gaddis@gmail.com

**TA:** None

**Textbook:** Selected readings.

**Grading:**  
50% homework and class discussions based on readings  
20% class project (outline and report)  
30% midterm 1, midterm 2, and lecture quizzes

### **Course Description:**

Why is Paris warmer than Boston in the winter? Is groundwater becoming deeper and saltier? How does land use affect the quality of our streams? Can water infrastructure mitigate water security concerns? This course will examine the physical and chemical properties of water in the context of societal problems and needs, and the role of water in shaping global climate and civilization. Important properties of water will be explored to understand topical issues. Class project is required. For non-science majors.

### **Course Objectives**

At the end of the course, students will understand the fundamental scientific principles that determine water distribution on Earth. Students learn the relationships between global and local water cycles, and how activities of humans can alter the distribution and chemical properties of water on Earth. Students will use spreadsheet calculations and mapping tools to evaluate physical and chemical properties of water.

Students will make a 5-minute professional presentation to their peers. The intent is for the students to have some professional presentation experience in this class.

Students will also develop research and writing skills through their class project.

### **Course Organization:**

The course will introduce topics related to water, and then develop them in the context of scientific, engineering, political, and legal issues. It will include discussions of the global hydrologic cycle, the role of oceans in determining earth's climate, biogeochemistry of lakes and rivers, properties and problems of drinking water, water problems in the western US, and global problems of water use and allocation.

### **Lectures**

Most lectures will be live in room 375 FASB, but occasionally either a zoom lecture or a recorded lecture will be given. Lecture quizzes will be administered via Canvas as indicated in the schedule.

### **Water in the News**

Most Wednesdays groups of three will present “water in the news”. Each group shall select a recent news article and present it to the class using a short (3-5 slide) powerpoint presentation (~10 minutes).

### **Course Field trip**

A field trip is scheduled for Saturday April 8. We will visit several sites along important river systems that supply Salt Lake City with water, and consider environmental problems associated with urban streams. We will collect water samples to be analyzed at the University and will use the results in a Field Trip Assignment.

### **Readings**

Readings will be required throughout the course. These will be primarily from the scientific literature. Students are expected to identify at least 2 questions about the article and 2 primary points that they learned from reading the article. The questions and main points will be used in discussion in small groups, typically on Wednesdays or Fridays.

### **Semester Project**

The semester project consists of a group research report with individual sections sole-authored by each student. Each student is required to choose one of the following general topics:

Great Salt Lake  
 Western drought  
 Abandoned mine discharge  
 Water related to sustainable development goals

Students will be placed in groups according to their desired topic and tasked with writing a report. The group will meet and define a series of subtopics that treat more specific aspects of the main topic. Each student in the group will sole author a section of the report. Approximately 30% of the grade for the final project will be from the group report (which will have an abstract, introduction and conclusions in addition to the individual sections), and 70% of the grade will be for your individual section. Each student will also make an in-class presentation regarding their section of the report.

**Course Outline:**

<b>Week (starting date)</b>	<b>Module</b>	<b>Homework/Reading/Lab</b>	<b>Notes</b>
1 (Jan 9)	Introduction and properties of water	Demo: Heat capacity of water. Assignment 1: Heat Capacity of water	
2 (Jan 16)	Water cycle and energy	Reading 1: Global water cycles; discussion on Friday	No class on Monday Jan 16. Form final project groups.
3 (Jan 23)	Atmospheric circulation, acid rain	pH of common items and acid rain, Assignment 2: Estimation	Quiz 1 on Friday
4 (Jan 30)	Oceans and global climate	Reading 2: Ocean circulation and climate; discussion on Friday	Quiz 2 on Friday Project outline due on Friday
5 (Feb 6)	Rivers/watersheds/acid mine drainage	Assignment 3: Watershed delineation with Google Earth	

6 (Feb 13)	Transpiration Groundwater	Reading 3: Global groundwater	Quiz 3 on Friday
7 (Feb 20)	Review and mid-term 1	Review.	No class on Monday Feb. 20  MID-TERM (Feb 24)
FINISH FIRST HALF			
8 (Feb 27)	Lakes	Assignment 4: Water balance for Great Salt Lake	Project presentation (Due: Feb 27)
9 (Mar 6)	SPRING BREAK		
10 (Mar 13)	Water Quality	Reading 4: WQ section of GEO	Quiz on Friday
11 (Mar 20)	Water Infrastructure	Assignment 5: Modeling stormwater	Quiz on Friday
12 (Mar 27)	Wasatch Water Aqueous Chemistry	Prep for field trip on Friday April 9th.	
13 (Apr 3)	Water in the West	Assignment 6: Field Trip Report	Field Trip, Sat. April 9th
14 (Apr 10)	Global Water Use and Security	Reading 5: Vorosomarty Assignment 7: Water Footprint	Discussion on Friday

15 (Apr 17)	Water Policy	Reading 6: choose either GEO Freshwater policy OR GEO Ocean and Coastal Policy	Mid-term 2 (April 21)
16 (Apr 23)	Last Day of Class		

### CLASS POLICIES:

**Makeups:** Sickness, employment, etc. may cause you to miss an exam, or homework assignment. Homework may be turned in late; your score will be reduced by some percentage because of lateness, regardless of the reason.

If you cannot make it to the scheduled midterm exam because of medical or outside-job reasons, you *may* be allowed to take a makeup exam, but only if you talk directly to the instructor (581-7231) or Dept. secretary (581-7062) before class the day of the exam (or final).

**Homework:** Each homework is due at midnight on the specified due dates (generally about a week after receiving the assignment). You are encouraged to work together on homework, but you must TURN IN YOUR OWN WORK. Homework will be accepted up to 1 week late with a reduction in available points of 20%.

### ADA Statement

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations ([www.hr.utah.edu/oeo/ada/guide/faculty/](http://www.hr.utah.edu/oeo/ada/guide/faculty/)).

### Faculty and Student Responsibilities

All students are expected to maintain professional behavior in the classroom setting (including on Zoom), according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the student behavior committee.”