



Physical Hydrology

GEO 376S/382S

Fall 2018

COURSE SYLLABUS

Course description and objectives

Dr. Ashley M. Matheny

This course is an introduction to physical hydrological processes. The objectives of the course are:

- 1) To acquire process-based understanding of physical hydrological processes in order to support further study
- 2) To develop quantitative problem solving and scientific communication skills in hydrology and beyond

The course is divided into several modules:

- 1) Land-atmosphere interactions
- 2) Groundwater flow and flow in the unsaturated zone
- 3) Streamflow and surface water processes.

Course flags

Our course carries a **Quantitative Reasoning Flag**. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.



Stream flow

In this course we'll discuss ways to both measure and approximate water flow and discharge from both large and small channels. (Wailuku River, Hilo, Hawaii, 2018)



Rainfall

Duration and intensity of precipitation are expected to be altered with changes to climate. Understanding how rainfall interacts with land cover and the unsaturated zone is critical to the prediction of runoff and the potential for flooding. (Rainy season in Panama City, Panama)



in the reading – just do your best. My expectation is that you come to class ready to discuss the material, and to ask questions.

Prerequisites:

Enthusiasm and willingness to learn are the only prerequisites for this course. We will cover a broad variety of topics in hydrology, but will work together to build expertise.

Questions:

I strongly encourage you to ask questions and speak up in class and on Canvas.

Collaboration:

- I recommend that you self-organize into study groups and work collaboratively on problem sets. However, everyone is expected to contribute equally and **everyone is expected to turn in their own work.**
- Each student is expected to prepare their project reports individually, but are encouraged to discuss material and engage with other students as they do so.

Devices:

Because class participation is mandatory, personal/social calls and messages during class are prohibited. Feel free to use devices to supplement and enhance your learning, but do so while keeping in mind that it must be course-relevant.

Texts:

The primary textbook for this course will be **Dingman, S.L., Physical Hydrology (2015, 3rd edition).** Other required reading will be posted to Canvas. You are encouraged to supplement your reading with any of the following textbooks, which are on hold at the Geology library:

- Hornberger, G. M., J. P. Raffensperger, P. L. Wiberg, and K. N. Eshleman, Elements of Physical Hydrology (1999), JHU Press
- Brutsaert, W., Hydrology: An Introduction (2006).

Expectations

Attendance:

- This class will involve an **active participation component.** Because a portion of your grade is based on participation and in-class quizzes, attendance is strongly recommended.
- It is your job to complete any assigned readings before class. It is okay if you don't completely understand everything



YOUR INSTRUCTOR:

Dr. Ashley M. Matheny

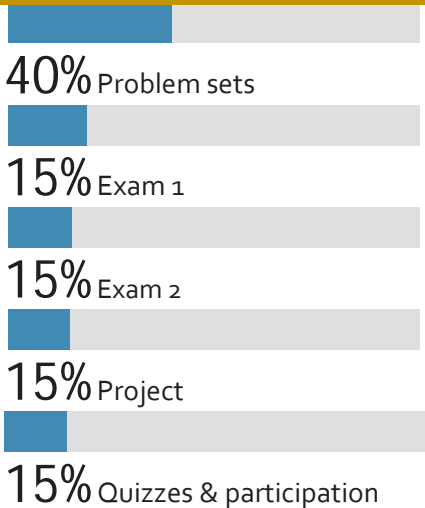
Office: EPS 3.162

Desk phone: (512)471-5855

ashley.matheny@jsg.utexas.edu

↑ Email is the best way to reach me

Office hours: Tu 4pm-5pm, W 3-5 pm and by appointment



Semester-long project:

The semester-long project is intended to provide students with experience analyzing real-world hydrologic datasets and processes. Detailed instructions on the final project will be available on Canvas within the first few weeks of the course. Students are encouraged to work on the final project throughout the entire semester and various deadlines for aspects of the project will be set throughout the semester.

Late work: Late work will be accepted with a penalty of -3% of the total value per day.

Absences: In the case of religious holidays and extenuating circumstances, absences will be considered on a case-by-case basis.

There will not be a final examination for this course.

Grade	Cutoff
A	94%
A-	90%
B+	87%
B	84%
B-	80%
C+	77%
C	74%
C-	70%
D	65%
F	<65%



- You have a right to privacy and confidentiality.
- You have a right to meaningful and equal participation.

With these rights come responsibilities:

- You are responsible for taking care of yourself, managing your time, and **communicating with me if things start to feel out of control or overwhelming.**
- You are responsible for acting in a way that is worthy of respect and always respectful of others.
- Your experience with this course is directly related to the quality of the energy that you bring to it, and your energy help shape the quality of your peers' experiences.
- You are responsible for creating an inclusive environment and for speaking up when someone is excluded.
- You are responsible for holding yourself accountable to these standards, holding each other to these standards, and holding the teaching team accountable as well.

Personal Pronoun Preference

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with only the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.

University Policies

Academic Integrity

Each student in this course is expected to abide by the University of Texas Honor Code: "As a student of The University

of Texas at Austin, I shall abide by the core values of the University and uphold academic integrity." **Plagiarism is taken very seriously at UT and in my classroom.** Therefore, if you use words or ideas that are not your own, you must cite your sources. Otherwise you will be guilty of plagiarism and subject to academic disciplinary action, including failure of the course. You are responsible for understanding UT's Academic Honesty and the University Honor Code which can be found here: http://deanofstudents.utexas.edu/sjs/acint_student.php

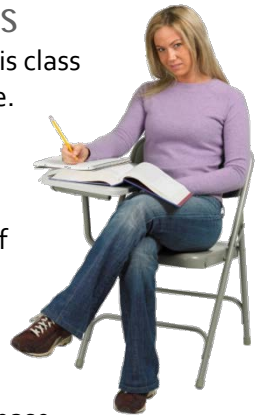
Q Drop Policy

If you want to drop a class after the 12th class day, you'll need to execute a Q drop before the Q-drop deadline, which typically occurs near the middle of the semester. Under Texas law, you are only allowed six Q drops while you are in college at any public Texas institution. For more information, see:

<http://www.utexas.edu/ugs/csacc/academic/adddrop/qdrop>

University Resources for Students

Your success in this class is important to me. We will all need accommodations because we all learn differently. If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course. There are also a range of resources on campus:



Student Rights & Responsibilities

- You have a right to learn in an environment that is welcoming to all people. No student shall be isolated, excluded, or diminished in any way.
- You have a right to a learning environment that supports mental and physical wellness.
- You have a right to respect.
- You have a right to be assessed and graded fairly.
- You have a right to freedom of opinion and expression.

Services for Students with Disabilities

This class respects and welcomes students of all backgrounds, identities, and abilities. If there are circumstances that make our learning environment and activities difficult, if you have medical information that you need to share with me, or if you need specific arrangements in case the building needs to be evacuated, please let me know. I am committed to creating an effective learning environment for all students, but I can only do so if you discuss your needs with me as early as possible. I promise to maintain the confidentiality of these discussions. If appropriate, also contact Services for Students with Disabilities, 512-471-6259 (voice) or 1-866-329-3986 (video phone). <http://ddce.utexas.edu/disability/about/>

Counseling and Mental Health Center

All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful.

If you, or anyone you know, experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. <http://www.cmhc.utexas.edu/individualcounseling.html>

The Sanger Learning Center

Did you know that more than one-third of UT undergraduate students use the

Sanger Learning Center each year to improve their academic performance? All students are welcome to take advantage of Sanger Center's classes and workshops, private learning specialist appointments, peer academic coaching, and tutoring for more than 70 courses in 15 different subject areas. For more information, please visit <http://www.utexas.edu/ugs/slc> or call 512-471-3614 (JES A332).

- *Undergraduate Writing Center:* <http://uwc.utexas.edu/>
- *Libraries:* <http://www.lib.utexas.edu/>
- *ITS:* <http://www.utexas.edu/its/>
- *Student Emergency Services:* <http://deanofstudents.utexas.edu/emergency/>

Important Safety Information:

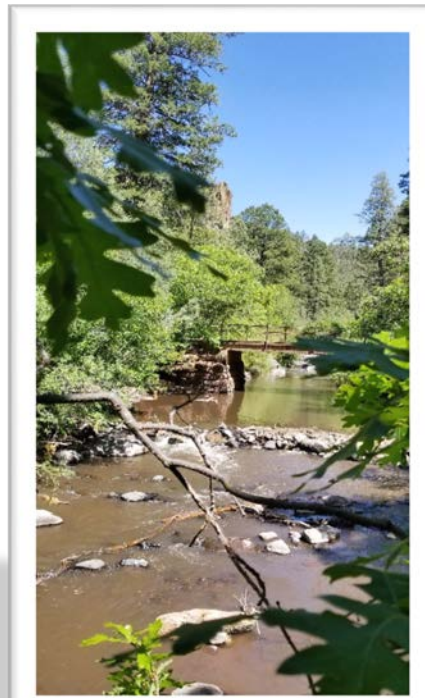
If you have concerns about the safety or behavior of fellow students, TAs or Professors, call BCAL (the Behavior Concerns Advice Line): 512-232-5050. Your call can be anonymous. If something doesn't feel right – it probably isn't. Trust your instincts and share your concerns.

The following recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, <http://www.utexas.edu/safety/>

Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling

outside.

- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors. Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
- Link to information regarding emergency evacuation routes and emergency procedures can be found at: www.utexas.edu/emergency



Course Outline

All instructions, assignments, readings, and essential information will be on the Canvas website at <https://utexas.instructure.com>. Check this site regularly and use it to ask questions about the course schedule.

This is a living document and changes may be made at my discretion if circumstances require. It is your responsibility to note these changes when announced (although I will do my best to ensure that you receive the changes with as much advanced notice as possible).

Week	Date	Class Topic	Readings	Assignments due
1	8/30	Syllabus, Course Intro		
2	9/4	Climate	Dingman Ch 1, 2	
2	9/6	Matlab Tutorial	Dingman Ch 2, 3	Bring your laptop to class, have matlab installed.
3	9/11	Climate / Precipitation	Dingman Ch 4,5	HW 1 Due
3	9/13	Precipitation	Dingman Ch 4,5	
4	9/18	Precipitation	Dingman Ch 4,5	HW 2 Due
4	9/20	Evapotranspiration	Dingman Ch 6	
5	9/25	Evapotranspiration	Dingman Ch 6	Project topic ideas due
5	9/27	Evapotranspiration	Dingman Ch 6	
6	10/2	Unsaturated Zone	Dingman Ch 7,8	HW 3 Due
6	10/4	Unsaturated Zone	Dingman Ch 7,8	
7	10/9	Unsaturated Zone	Dingman Ch 7,8	Project prospectus due
7	10/11	Review for Exam 1		HW 4 Due
8	10/16	Exam 1		
8	10/18	Group work on Projects		Bring laptop to class
9	10/23	Groundwater	Dingman Ch 8	

9	10/25	Groundwater	Dingman Ch 8	
10	10/30	Groundwater	Dingman Ch 8	
10	11/1	Rainfall Runoff	Dingman Ch 9	Project outline due
11	11/6	Rainfall Runoff	Dingman Ch 9	
11	11/8	Rainfall Runoff	Dingman Ch 9	
12	11/13	Streamflow	Dingman Ch 9, 10	HW 5 due
12	11/15	Streamflow	Dingman Ch 9, 10	
13	11/20	Streamflow	Dingman Ch 9, 10	HW 6 Due
13	11/22	THANKSGIVING – NO CLASS		
14	11/27	Groundwater-Surface water	Dingman Ch 9, 10	
14	11/29	Project presentations		Projects due, beginning of class
15	12/4	Project presentations		
15	12/6	Exam 2		

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