GLY 5827: Groundwater Geology
Prof. Liz Screaton, screaton@ufl.edu. WM 221 Office hours: T 1:55-2:45 pm; Weds 10-11 am
TA Stephanie James, srjames88@ufl.edu WM 375 Office hours: M: 11-noon; F 10-11 am

Course Objectives

- Students will understand the basic concepts of groundwater flow and its relationship to the subsurface geology.
- Students will be able to apply these concepts and develop problem solving ability.

Textbook: *Groundwater Science (Fitts)*

Class Organization

The class is organized in 10 modules. In each module, there will be:

- A background reading assignment to introduce the concepts, terms, and skills. This reading will generally be from the text but will sometimes include outside reading.
- A quiz which consists of 10 multiple choice questions. Quizzes are not timed, are open book and open notes, and you can seek help from classmates and the prof/TA. Quizzes will be scored immediately and you can take a second attempt. The highest grade will be counted. Quiz questions are randomly drawn from pools of questions of similar topic and difficulty.
- A 20-point assignment in each module will provide practice with the concepts and skills**.** The assignment will often include calculations and drawings. For calculations, you will "show your work" on paper and submit. If you submit online, take a clear photo and add to your word document. Unless otherwise specified, working with other students on assignments is encouraged, but **all answers must be written in your own words, all shown work must be yours, and all figures must be created by you.**
- The class meetings are an important part of your learning, and participation is ~7% of your class total grade. During the class meetings, we will pose questions for you to answer. This is also your opportunity to ask questions of the Prof/TA and your classmates. To prepare for the class, you will need to have read the background reading, viewed the videos, and begun the quiz and assignment. I suggest bringing a calculator for practice problems. You will not be allowed to use a phone's calculator during exams, so it good to get familiar with your calculator.
    - You will assess your participation in the class each week. The lowest two class participation grades will be dropped. If we (TA and/or prof) observe significant discrepancies between our observations and yours, we will let you know and adjust your total. Repeated discrepancies will result in loss of all class participation points.
    - Texting, email checking, and web browsing are not part of class participation or learning. Furthermore, these activities are distracting for those sitting nearby or behind you. If your behavior is distracting to others (including TA or prof), you will be warned and may not be allowed any use of electronic devices (other than a calculator) during the remaining classes. A second incident may result in you being asked to leave the class and loss of all class participation points.

During the semester, there will also be:

- Two 7-10 minute **presentations** for your classmates during a class meeting. We'll provide some topic ideas before each class meeting, but you are also welcome to suggest your own. You should notify us by the Friday before the class meeting that you plan to present.
- Three **reports**, which will integrate skills learned and provide experience in technical writing. The reports will be evaluated using Turnitin to determine the originality of your work. Turnitin is an online service to help prevent and identify student plagiarism.
- Three 90-minute **exams**. During the exam, you will be allowed to use a calculator and scratch paper. As you proceed through the modules, you will be alerted as to which equations should be memorized and which will be provided on the exam. If you have any questions, just ask!

This course is co-listed and may be co-taught with GLY 4930. The differences between the two courses are as follows:

- The undergraduate presentations are shorter (3-5 minutes) and can be based on USGS fact sheets or similar-level material. The graduate presentations are longer (7-10 minutes) and must be based on scientific research publications.
- For the three reports, additional analyses are required at the graduate level. Interpretation and written communication will be assessed at a higher level.
- The three exams are shorter (80 pts each) for the undergraduate course than for the graduate course (90 pts each).

Grading (730 pts total):

- Presentations (2@10 pts): 20 pts
- Quizzes (best 9 of 10@10 pts): 90 pts
- Participation/Discussion (best 10@5 pts): 50 pts
- Exams 270 pts (3@90 pts)
- Reports 120 pts (3@40 pts)
- Assignments (best 9 of 10@20 pts): 180 pts

These grade criteria are firm. A: ≥93%; A- 90.0-92.9%; B+ 87– 89.9%, B: 83 – 86.9 %, B-: 80.0 – 82.9%, C+ 77 – 79.9 %; C: 73 – 76.9%, C-: 70.0 – 72.9 %, D+: 67 – 69.9%, D: 63 – 66.9%, D- 60.0 – 62.9%; E 59.9% and below**.** *Information on how UF calculates GPA based on letter grades can be found at:* https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Course Schedule

Dates	Topic	Reading	Due Dates
Aug 24 Aug 26	**Introduction** provides class logistics and reviews geology basics most relevant to groundwater flow.	Syllabus Outside reading	
Sep 2	**Module 1 Basic Principles** introduces Darcy's Law and the basics of groundwater flow.	Ch 2 and 3.1-3.4	Q1
Sep 9	**Module 2 Hydraulic Conductivity and Permeability** examines controls on	Ch. 3.5 to 3.9 Outside reading	A1 and Q2

	permeability and how it is measured. Mapping of hydraulic head is introduced.		
Sep 16	**Module 3 Geologic Information for Groundwater Studies** covers how geologic information is obtained and interpreted and how geophysics can be applied to groundwater studies.	Ch. 4	A2 and Q3
Sep 23	**Module 4 Geology of Groundwater and Florida's Hydrogeology** examines how major aquifer characteristics are controlled by their geologic setting. Current state of knowledge about Florida's aquifers.	Ch 5.3-5.6 Outside reading	A3 and Q4
Sep 30	**Exam 1**		A4
Oct 7	**Module 5 Storage and Groundwater Flow equations** focuses on how water is stored in confined and unconfined aquifers and develops groundwater flow equations from Darcy's law and conservation of mass.	Ch. 6.1-6.3, 6.7-6.9.2	**REPORT 1** and Q5
Oct 14	**Module 6 Potentiometric surface maps and Groundwater/surface water exchange** covers how water levels from wells can be contoured and interpreted to understand groundwater flow directions and exchange of water between surface and subsurface.	Ch. 5.1.1, 5.1.3, 5.2.1 to 5.2.3	A5 and Q6
Oct 21	**Module 7 Recharge and Groundwater Flow Patterns** examines how recharge occurs and is quantified and how topography and heterogeneity impact flow directions.	Ch. 1.4.1, 1.4.2, 3.10, 5.1.2, 5.1.4, 5.2.5, 5.2.6, and 10.10.2	A6 and Q7
Oct 28	**Exam 2**		A7
Nov 4 and 9 (Mon)	**Module 8: Flow to Wells** introduces the prediction of drawdown due to pumping and use of aquifer tests to determine aquifer properties.	Ch 7.2.2, Ch. 8.2-8.5	**REPORT 2** and Q8
Nov 18	**Module 9: Freshwater/Saltwater and Groundwater Modeling** covers two topics: 1) How density differences and mixing affect groundwater at the coast and 2) how numerical models are used for groundwater flow problems.	Ch 3.11, 9.1-9.3, 9.5-9.6	A8 and Q9
Nov 23	**Module 10: Groundwater Contamination** focuses on the movement of solutes and non-aqueous phase liquids in groundwater and how contaminated sites are investigated.	Ch 11	A9 and Q10
Dec 2	**Exam 3**		A10
Dec 9	**Presentations (if any remaining)**		**REPORT 3**

Academic Honor Code: As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity. " You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.php

Getting answers to your questions: This class is at a 5000 level, which means it is aimed at graduate students (although open to upper level undergraduates). **Expect to have questions** as you read the course notes, work through the assignments, and prepare for the exams. Questions are part of the learning process! Therefore it is very important to begin assignments well before the deadline.

- For content questions on each module, bring your questions to the class discussion. You can also pose questions on the module's Discussion board. First check whether other students have asked the same question and, if not, pose the question to the class. Help your classmates, increase your learning, and keep the discussion moving by answering questions. Discussion posts will be reviewed by the TA/professor daily M-F and additional information may be added.
- For problems with Canvas: call 352-392-4357 or via e-mail at helpdesk@ufl.edu.
- To report course-specific errors (a typo in an assignment or a bad link), notify both the TA (TBA@ufl.edu) and professor (screaton@ufl.edu).
- An email to the TA or the prof is the best way to ask questions that are specific to you, such as about your grade or an upcoming conflict with a deadline.

Course announcements and email: When you log in to Canvas, please ensure that your Notification Preferences are set to "ASAP" for Announcements and for Conversation Messages. These tools will be used to inform you of any updates or changes in the course.

Attendance and conflicts: *Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx*

Exams:

- For pre-existing conflicts (e.g., athletic, religious, academic), you are responsible for providing notification no later than 1 week in advance, and making arrangements for an alternate date within one week of the exam date.

- With documentation of sudden illness or other unexpected major event, you may make up the exam if you notify TA/prof prior to exam time (or as soon as you are physically able) and arrange a makeup within a reasonable time frame (generally 1 week).
- Without documentation of sudden illness or other unexpected major event, exams can only be made up within 1 day and 20% will be deducted.

Quizzes and Assignments:

Because quizzes and assignments are available for at least 1 week and you can drop the lowest grade of each, only very major and lengthy conflicts will be considered to allow deadline extensions or make-ups.

- For *pre-existing conflicts* (e.g., athletic, religious, academic), **you are responsible** for providing me with email or written notification and making arrangements with me (screaton@ufl.edu) for an alternate date as soon as you are aware of the conflict, **but no later than 1 week before a deadline.**
- For *sudden, unexpected **major** issues that cause you to need additional time* **you are responsible** for providing me (screaton@ufl.edu) with written notification and making arrangements. Documentation will be requested.
- **Deadlines** on quizzes and assignments are firm and are your responsibility. Assignment and quizzes are due **at 1 pm on the due dates**. **We *strongly* recommend you aim to complete these at least a day ahead of time.** This leaves you time to ask questions and for unexpected computer/network problems. ***Problems encountered during the last 2 hours before a deadline are not considered valid reasons for incomplete work.***

Accommodations for Disabilities: Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be provided to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluations: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at http://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results