Surface and Ground Water Interactions
GLY5247; Class 23387, section 1111
Spring 2020

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Office Hours:	2-3 pm Mon./Wed. or by appointment (call or email first)
Meeting Place:	218 Williamson Hall
Meeting Time:	2 – 5 pm Tuesday's; note – time will be flexible depending on schedules

Objectives:

In this course we will read, discuss and critically evaluate papers that deal with environments where surface water and groundwater mixing is common. Papers will consist of classic or review papers, as well as papers that have been published within the last few years. Which environments we will focus on depends on interests of the students taking the class. Settings in which I have an interest, and some overlap between them exists, include: coastal zone, hyporheic zone of stream beds, carbonate karst aquifers and glacial systems.

The course has several objectives that include:

(1) becoming familiar with our current understanding of hydrologic and hydrogeologic environments, their chemical and hydrologic processes, and techniques used to observe them;
(2) learning how to read and critically evaluate scientific literature.
(3) gaining skills in how to participate in and contribute to group discussions
(4) honing your ability to compile information from the primary literature and synthesize it into a written document that clearly describes a scientific hypothesis and means to test the hypothesis.

Readings:

The attached bibliography includes papers we could read, although we will certainly not get through all of them. Further, this bibliography is not an exhaustive listing of the pertinent literature. Although the bibliography is broken into sections, there will be considerable flexibility as to which papers we will read and their sequence. We also may read papers not on the list, particularly if new ones appear during the semester. I welcome your suggestions for papers and especially encourage your suggestions for papers that deal with your thesis topic if it pertains to surface water and groundwater interactions. Typically papers will be assigned at least one week in advance of the class discussion. Papers and selected information will be posted on the class e-learning site.

Expectations and evaluations:

Since this is not a standard lecture/testing class, the expectations for your work and behavior in class may be a bit different from what you may have experienced previously. In particularly, I expect the following from you:

(1) Come to all classes. Absences must be excused by a note from a doctor or a mortician and unexcused absences will significantly impact your grade (see below).

(2) Read all of the assigned papers.

(3) Participate in the discussions. At the end of class I will assign you a value of 1, 2, or 3 where 1 = never said a word, 2 = briefly spoke one or two times, 3 = actively participated and contributed to the discussion. These points will contribute to your final grade according to the grading rubric below.

(4) Complete Readiness Assurance Tests (RAT) at the start of each class. These tests will consist of 10 (more or less) multiple choice questions that are related to that week's readings You will initially take the RAT as individuals (iRAT) and then immediately take the same RAT within a group. Groups will be determined during or soon after the first class. The questions on the RATs will lead to discussion in the class, which I will lead.

(5) Write and present to the class a short proposal (5 pages maximum, 1 inch margins, 12 point font, including figures, but not references) on a topic of your choice. I will evaluate the proposal according the rubric below. At some point during the semester, I may offer a lecture on "How to write a good proposal", but for the time being I've posted a description of information I would provide in the lecture. Various parts of the proposal will be due throughout the semester according to the following schedule. These due dates assume class will be on Wednesday.

Rubric for proposal

Section	**Topics that should be covered**	**Value (%)**
Introduction	Hypothesis introduced early	20
	Background information provided to explain unknowns	
Background	Detailed and thorough review of literature. Only information included that supports hypothesis and why important to test	20
Work plan	Description of how hypothesis will be tested – what will be done, what will be found, how results provide a test	20
Conclusion	Summary of timeline, next steps	10
Writing	Grammar, punctuation, spelling	15
	Clarity of thought	15

Schedule for proposal submissions

This schedule assumes class meeting time remains on Wednesdays.

January 22: short (2-3 sentences) description of proposal topic
February 26: Annotated bibliography for proposal
Week of March 2 Spring break, no classes
March 18: Extended abstract of proposal (1 page)
April 15: Proposal due, proposal presentations.

Grading:

Item	Total Value (%)
Attendance	Variable*
Class participation	50
iRAT (TBL stuff)	3
tRAT (TBL stuff)	12
Proposal	25
Proposal presentation	10
Total	**100**

* Each unexcused absence will lower your class score by 5 percentage points.

Some additional information

(1) Attendance is mandatory.

(2) No make-up work will be allowed.

(4) No textbook is required.

(5) Letter grades will include minus grades. The grading scale is $\geq$93 = A; 90-92 = A-; 87-89 = B+; 83-86 = B; 80-82 = B-, etc. Values will be rounded to nearest whole numbers

(6) Class demeanor:

a) Class will start on time. Please be punctual. Turn off cell phones.

b) I except lively discussions in this class, but demand respect for each other's views and backgrounds. Personal slights, either overt or covert, will not be tolerated. Everyone should talk and everyone should respect what others have to say.

(7) All students are expected to follow the University honor code: neither give nor receive unauthorized aid in doing any assignment. Not adhering to this policy will result in a failing grade for the class.

8) Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

9) Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Possible Readings:

Submarine groundwater discharge and sea level rise effects on coastal aquifers

Aller, R. C. (1980) Quantifying solute distributions in the bioturbated zone of marine sediments by defining an average micro-environment, *Geochim. Cosmochim. Acta* 44: 1955-1965.

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Beck, A., J. Cochran and S. Sañudo-Wilhelmy (2009) Temporal Trends of Dissolved Trace Metals in Jamaica Bay, NY: Importance of Wastewater Input and Submarine Groundwater Discharge in an Urban Estuary, *Estuaries and Coasts* 32(3): 535-550.

Beck, A. J., J. K. Cochran and S. A. Sañudo-Wilhelmy The distribution and speciation of dissolved trace metals in a shallow subterranean estuary, *Marine Chemistry* 121(1-4): 145-156.

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Cable, J. E., W. C. Burnett, J. P. Chanton and G. L. Weatherly (1996) Estimating groundwater discharge into the northeastern Gulf of Mexico using radon-222, *Earth Planet. Sci. Lett.* 144: 591-604.

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Cardenas, M. B., P. L. M. Cook, H. Jiang and P. Traykovski (2008) Constraining denitrification in permeable wave-influenced marine sediment using linked hydrodynamic and biogeochemical modeling, *Earth and Planetary Science Letters* 275: 127-137.

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Carreira, P. M, Marques, J.M., Nunes, D., 2013, source o fgroundwater sailinity in coastaline aquifers based on environmental isotopes (Portugal): natural vs. human interference. A review and reinterpretation, applied Geochem., doi:10.1016/j.apgeochem.2013.12.012.

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Holmden, C., D. A. Papanastassiou, P. Blanchon and S. Evans (2011) 44/40Ca variability in shallow water carbonates and the impact of submarine groundwater discharge on Ca-cycling in marine environments, *Geochimica et Cosmochimica Acta*(0).

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