SYLLABUS
ESCI 5490.001 Advanced Topics: Hydrogeology Fall 2014

INSTRUCTOR
Dr. Dorina Murgulet
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LECTURES
TR 8:00-9:15 AM; CS-103

LABS
R 7:00-8:50 PM.; OCNR-240

OFFICE HOURS
TR 9:30-10:30 and/or by appointment

Prerequisites
Prerequisite course required are:
GEOL1403, MATH2413, and PHYS1401 or PHYS2425.
An understanding of algebra, the basic principles of chemistry and physics are highly recommended.

Course Description
Advanced study of hydrogeology concepts necessary to understand and question the hydrologic cycle, and specifically, surface water flow; groundwater flow; groundwater-surface water interaction; groundwater sources, occurrence, movement, contamination, and resources; and environmental topics of interest related to water resources.

Objectives of the Course
The primary objectives of GEOL-4444.001 are to provide the student with the fundamental knowledge and tools necessary to understand and examine the following basic components:
- Fundamentals of groundwater and surface water flow;
- Well hydraulics and evaluation of groundwater as a resource;
- Chemical properties of groundwater and groundwater contamination;
- Groundwater and the environment;
- Groundwater modeling.
This course will examine techniques associated with field hydrogeology, and laboratory methods in hydrogeology.

Text books
Supplementary text and handouts will be provided as necessary.
Supplies Needed
1) Scientific Calculator
2) A USB-thumb-flash drive
3) Pencil, eraser and ruler (calculation problems must be done in pencil).

Course Grading

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Two Midterm Exams</td>
<td>15% (each)</td>
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<tr>
<td>Assignments (homework &amp; laboratories)</td>
<td>20%</td>
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<tr>
<td>Independent Project</td>
<td>15%</td>
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<td>Project</td>
<td>15%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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Grading Scale
A: 90-100%; B: 80-89.9%; C: 70-79.9%; D: 60-69.9%; F: 0-59.9%

Attendance Policy
- Lecture attendance is not required but it is strongly advised. Poor attendance will result in missed lecture material and may reflect in less than desired class performance and/or unsuccessful class completion. It is the students’ responsibility to acquire class notes from peers if class is missed.
- Lab attendance is mandatory. One excused absence (with documentation) will be allowed but will result in the removal of that grade from the average. Unexcused absences result in a zero. It is the students’ responsibility to acquire the missed material from their peers.

Exams
Each student is expected to take all exams at the designated time and place. Students who miss an exam will receive a grade of zero for that exam. Make-up exams will be given only on presentation of approved medical excuse, or by pre-excused permission of the instructor. No exceptions! The format of make-up exams may differ from that of the regular exam. All exams are closed book; however, the use of a calculator is permitted. Students who want to appeal a grade should do it in writing, at latest one day after the exam was returned. Please note the date of the final exam. No final exam will be given at an earlier date. Disability accommodations must be documented and approved by the Office of Disability Services.

Assignments
Homework will be assigned throughout the semester. Students are encouraged to work in groups; however, each student is expected to submit their own individual work. If need be, reference materials are reserved in the university’s library. All homework (problem sets) must be completed by the due date and in a professional manner. Care should be taken to assure that a neat, organized, understandable, and concise product is the result of your work. Late work will not be accepted.

Independent Project
Students will be required to submit a synthesis and report (oral and written) on any topic related to groundwater or surface water (Details will be provided in class).

Project
- Students will conduct a hydrogeologic investigation of a field site using information provided in class. Students will be required to turn in a formally organized written report synthesizing the results of their investigation. (Details will be provided in class).
**Academic Integrity/Plagiarism:** Please review the University policies on academic integrity and honesty listed in the Graduate Catalog under the Academic Honesty section. University students are expected to conduct themselves in accordance with the highest standards of academic honesty. *Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism.* (Plagiarism is the presentation of the work of another as one’s own work.) This instructor will follow these guidelines if such infraction such as plagiarism or other dishonest conduct occurred as part of this class. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. The use of cell phones, pagers, CD players, headphones and similar electronic devices is not allowed in class. Keep these devices in your bags, not on the tables. You may be asked to refrain from using a laptop in class. *Cheating will not be tolerated!* Please be advised that the penalty for cheating is a failing grade and possible further disciplinary action by the university.

Any student who has been penalized for academic dishonesty has the right to appeal the judgment or the penalty assessed. The Appeals Procedure will be the same as that specified for grade appeals. The grade appeals procedure may be found in the University Rules manual at [http://www.tamucc.edu/provost/university_rules/](http://www.tamucc.edu/provost/university_rules/).

*The university policy of scholastic dishonesty will be followed in the event of academic misconduct. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student.*

**Dropping a Class:** I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation **WILL NOT** automatically result in your being dropped from the class. November 7 is the last day to drop a class with an automatic grade of “W” this term.

**Classroom/professional behavior:** Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality
educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

**Grade Appeals:** As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage ([http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html)). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

**Students with Disabilities**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Corpus Christi Hall 116. If you need disability accommodations in this class, please see me as soon as possible.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

**Academic Advising**

The College of Science and Technology requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. The College's Academic Advising Center is located in Faculty Center 178, and can be reached at 825-6094.

**Statement of Academic Continuity**

In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus.
However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

*COURSE OUTLINE (Tentative Class Schedule)*

**August**
28 Introduction, Units, Dimensions, and Math Review  
LAB: no Lab

**September**
2 Introduction, Units, Dimensions, and Math Review  
LAB: no Lab
4 Math Review (cont.), Hydrologic Cycle
9 Hydrologic Cycle (cont.), Hydrologic Budget/Surface Water  
LAB: TBA
11 Rivers: Rainfall versus runoff, Rating Curves
LAB: TBA
16 Properties of Aquifers, Groundwater Occurrence
18 Principles of Groundwater Flow  
LAB: TBA
25 Darcy’s Law and its Applications  
LAB: TBA
30 Darcy’s Law and its Applications cont.

**October**
2 Flow Nets/ Groundwater Flow to Wells  
LAB: TBA
7 Groundwater Flow to Wells
9 Groundwater Flow to Wells; Radial Flow  
LAB: TBA
14 TEST 1
16 Analyses of Aquifer Testing, Pumping Tests, Slug Tests  
LAB: TBA
21 Analyses of Aquifer Testing, Pumping Tests, Slug Tests
23 Aquifer recharge; MAR and ASR  
LAB: TBA
28 Regional Groundwater Flow Systems, Boundaries, Methods of Images
30 Groundwater Development, Water Level Fluctuations, Exploration Techniques  
LAB: TBA

**November**
4 Groundwater Modeling
6 Flow in Unsaturated Zones  
LAB: TBA
11 Flow in Unsaturated Zones
13 Chemical Properties of Groundwater, Water Quality  
LAB: TBA
18 Principles of Hydrogeochemistry
20 Chem. Prop. of Groundwater  
LAB: Review
25 TEST 2

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Thanksgiving Holiday/No class
LAB: No LAB

December
2 [T]  Principles of Hydrogeochemistry/ Groundwater Contamination, Hydrocarbons/ Project is due

TBA  FINAL EXAM
*NOTE: The tentative class schedule is subject to change as considered appropriate by instructor

LABS: will meet every Thursday from 7:00-8:50 PM except when noted (see tentative class schedule).

- Labs are designed to support material presented in lecture. The lab will synthesize your basic knowledge of the principles of hydrogeology with what you learn in the lecture portion of the class in order to develop field techniques and problems solving skills, so that you can address a number of groundwater problems.

- Lab topics will be announced at least a week in advance. Materials covered during the lab sections will be part of tests and final exam.

- The laboratory section is a required part of GEOL-4444.001. Attendance at all laboratory meetings and submission of all laboratory work is required for successful completion of the class. Please arrive on time to all laboratory sessions. It is your responsibility to make sure that you read the laboratory and become familiar with the laboratory procedures and assignments before the laboratory sessions.

READING: Reading material will be assigned at the end of each lecture session.