SYLLABUS

Hydrogeology GEOL-4444
Department of Physical and Environmental Sciences
Spring 2018

A. COURSE INFORMATION

Course number/section: GEOL-4444
Class meeting time: T/R 9:30-10:45 am
Class location: TBA
Lab meeting time: M 10-11:50 pm
Lab location: OCNR-240
Course Website: https://bb9.tamucc.edu/webapps/login/

B. INSTRUCTOR INFORMATION

Instructor: Dr. Dorina Murgulet
Office location: NRC 3103
Office hours: T/R 12:00 -2:30 pm
Telephone: 361-825-2309
e-mail: dorina.murgulet@tamucc.edu
Appointments: call or email

C. COURSE DESCRIPTION

An introductory hydrogeology course that investigates surface water flow, groundwater flow, hydrologic cycle, water resources, groundwater contamination, and environmental topics of interest related to water resources.

D. PREREQUISITES AND COREQUISITES

Prerequisites
Prerequisite course required are:
GEOL1403, MATH2413, and PHYS1401 or PHYS2425.

Co-Requisite of SMTE 009X

An understanding of algebra, the basic principles of chemistry and physics are highly recommended.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

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).

F. STUDENT LEARNING, OUTCOMES AND ASSESSMENT
Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course students will be equipped 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.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

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.**

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).

H. MAJOR COURSE REQUIREMENTS AND GRADING

Student learning outcomes described in Section F will be measured as follows:

**Course Grading**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Midterm Exams</td>
<td>20% (each)</td>
</tr>
<tr>
<td>Assignments (homework &amp; laboratories)</td>
<td>30%</td>
</tr>
<tr>
<td>Project</td>
<td>25%</td>
</tr>
</tbody>
</table>

Page 2  Murgulet GEOL-4444.001 Syllabus: Spring 2018
**Final Exam** 25%

**Grading Scale**
A: 90-100%; B: 80-89.9%; C: 70-79.9%; D: 60-69.9%; F: 0-59.9%

**Online Course Management**
Blackboard (http://bb9.tamucc.edu) is your online course management system for GEOL 4444. It will include course notes, syllabus, and other information. Contact Blackboard helpdesk at 361-825-2825 for login issues.

I. **COURSE CONTENT/SCHEDULE** *(Tentative Class Schedule)*

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

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>LABS</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 16</td>
<td>Introduction, Units, Dimensions, and Math Review</td>
<td>TBA</td>
<td>No Lab</td>
</tr>
<tr>
<td>18</td>
<td>Introduction, Units, Dimensions, and Math Review</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>… Math Review (cont.), Hydrologic Cycle</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>25</td>
<td>Hydrologic Cycle (cont.), Hydrologic Budget/Surface Water</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Rivers: Rainfall versus runoff, Rating Curves</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>February 1</td>
<td>Properties of Aquifers, Definitions: Fluid Mechanics.</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Properties of Aquifers, Groundwater Occurrence</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>8</td>
<td>Principles of Groundwater Flow</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Properties of Aquifers, Definitions: Fluid Mechanics.</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>15</td>
<td>Darcy’s Law and its Applications</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td><strong>Test 1</strong></td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>22</td>
<td>Darcy’s Law and its Applications cont.</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Flow Nets/ Groundwater Flow to Wells</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>March 1</td>
<td>Groundwater Flow to Wells</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Groundwater Flow to Wells; Radial Flow</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>8</td>
<td>Analyses of Aquifer Testing, Pumping Tests, Slug Tests</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td><strong>Spring Break/No class</strong></td>
<td>TBA</td>
<td>No Lab</td>
</tr>
<tr>
<td>15</td>
<td><strong>Spring Break/No class</strong></td>
<td>TBA</td>
<td>No Lab</td>
</tr>
<tr>
<td>20</td>
<td>Analyses of Aquifer Testing, Pumping Tests, Slug Tests</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td></td>
<td>Topic</td>
<td>Date</td>
<td>Notes</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------------------------------</td>
<td>------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>22</td>
<td>Aquifer recharge; MAR and ASR</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Regional Groundwater Flow Systems, Boundaries, Methods of Images</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>29</td>
<td>Test 2</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>April 3</td>
<td>Groundwater Development, Water Level Fluctuations, Exploration Techniques</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>5</td>
<td>Groundwater Modeling</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Flow in Unsaturated Zones</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>12</td>
<td>Chemical Properties of Groundwater, Water Quality</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Principles of Hydrogeochemistry/ <strong>Independent Project is due</strong></td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>19</td>
<td>Chem. Prop. of Groundwater</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Groundwater Contamination, Hydrocarbons/ <strong>Independent project presentations/ Project is due</strong></td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>26</td>
<td><strong>Independent project presentations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 1</td>
<td>Recap/ <strong>Independent project presentations</strong></td>
<td></td>
<td>No Lab</td>
</tr>
<tr>
<td>May 10</td>
<td>Final examination</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LABS:** will meet every Wednesday from 12:00-1:50 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.
J. COURSE POLICIES

Attendance/Tardiness
All students are expected to attend class. Poor attendance will result in missed lecture material and may reflect in less than desired class performance. It is the students’ responsibility to acquire class notes from peers if class is missed.

Late Work and Make-up Exams
See Section G

Extra Credit
N/A

Cell Phone/Laptop Use
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.

Food in Class
N/A

Missed Exam
See above

Participation
Students are expected to participate in classroom exercises and equally in the class projects.

Others
N/A

K. COLLEGE AND UNIVERSITY POLICIES

- Academic Integrity (University)
  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.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- 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.

- **Statement of Civility**
  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.

- **Deadline for Dropping a Course with a Grade of W (University)**
  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 your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.** 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.** Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  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 at
[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.

- **Disability Services**
  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 (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

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.

http://disabilityservices.tamucc.edu/

- **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.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering 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. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.