SYLLABUS

GEOL/ESCI 4490/5490  Advanced Soil and Groundwater Restoration    Spring 2013

INSTRUCTOR
Dr. Dorina Murgulet
Natural Resources Center, Office # 3102
Phone: 825-2309
Email: dorina.murgulet@tamucc.edu

LECTURES (3 credit hours)
TR: 2:00-3:15; IH-267

OFFICE HOURS
TR: 10-12; or by appointment

PREREQUISITES
GEOL 1403, CHEM 1311/1111, CHEM 1312/1112, GEOL 3443 or equivalents, and/or with instructor’s permission.

COURSE DESCRIPTION
Advanced study of methods for restoring contaminated soil and groundwater by examining the factors and processes influencing the efficacy of remediation systems. An emphasis will be placed on the scientific principles upon which soil and groundwater remediation is based.

STUDENT LEARNING OUTCOMES
This course will give students the skills to evaluate which technologies and techniques used to remediate soil and groundwater are best suited for different environments, remediation objectives, and particular types of contaminants. Students will exit this course with the ability to demonstrate: 1) knowledge of remediation options and design criteria; 2) implement the design of and present a feasibility study for a remedial investigation; 3) understand the factors limiting and controlling cleanup of hazardous pollutants in soil and groundwater; 4) conduct analyses of to determine transport characteristics of chemical in groundwater; and 5) provide skills necessary to choose appropriate techniques for effective contaminant control, remediation, and restoration.

RECOMMENDED TEXT BOOKS
COURSE GRADING
3 Exams \{Exam 1 = 15\%, Exam 2 = 15\%, Final = 15\%\} + HW \{15\%\} 
+ Class Project \{20\%\} + Independent Project \{20\%\}.

GRADING POLICY
A: 90-100\%; B: 80-89.9\%; C: 70-79.9\%; D: 60-69.9\%; F: 0-59.9\%

ATTENDANCE POLICY
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.

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! One and only one make-up exam will be given after each regularly scheduled exam. Time and place for the make-up exam will be arranged at the next regularly scheduled class following each exam. 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. 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.

Class Project
Students will be required to submit a project report (oral and written) utilizing the principles learned in class to construct an RI/FS study for a contamination site.

Independent Project
Students will be required to submit a synthesis and report (oral and written) related to a specific class of contaminants and discuss appropriate remediation technologies that apply.

NOTICE TO STUDENTS WITH DISABILITIES AND VETERANS
Texas A&M University-Corpus Christi complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. If you suspect that you may have a disability (physical impairment, learning disability, psychiatric disability, etc.), please contact the Services for Students with Disabilities Office, located in Driftwood 101, at 825-5816. If you need disability accommodations in this class, please see me as soon as possible.

ACADEMIC ADVISING
The College of Science and 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. The College's Academic Advising Center is located in the Center for Instruction, room 350, and can be reached at 825-6094.

**ACADEMIC INTEGRITY**
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. 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.

*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.*

**COURSE OUTLINE**:  

**January**
- 24 [R] Introduction to Course; Superfund, Planning, & Evaluation (RI/FS)  
- 29 [T] Contaminant Transport and Distribution  
- 31 [R] Site Characterization

**February**
- 5 [T] Containment/Control: Barriers, Immobilization Drains, Wells  
- 7 [R] Pump and Treat: Fundamentals  
- 12 [T] Pump and Treat: Performance  
- 14 [R] Pump and Treat: Performance/ Pump and Treat: Case Study  
- 19 [T] Pump and Treat: Case Study  
- 21 [R] Pump and Treat: Estimating Contaminant Removal Time  
- 26 [T] Enhanced Flushing Techniques; Discussion of Term Project  
- **28 [R] EXAM 1**

**March**
- 5 [T] Enhanced Flushing Techniques  
- 7 [R] Enhanced Flushing Techniques  
- 12 [T] *Spring Break (No Class)*  
- 14 [R] *Spring Break (No Class)*  
- 19 [T] Air Sparging,  
- 21 [R] Soil Venting  
- 26 [T] UVB Systems Enhanced Soil Venting, Steam  
- 28 [R] In-situ Treatment – Physical/Chemical
April
2 [T] In-situ Treatment – Physical/Chemical
4 [R] In-situ Treatment – Physical/Chemical
9 [T] In-situ Treatment – Biological
11 [R] EXAM 2
16 [T] In-situ Treatment – Biological
18 [R] In-situ Treatment - Biological
23 [T] Case Study: NAPL Remediation/ Independent Project Due
25 [R] Class Project Presentations
30 [T] Class Project Presentations

May
2 [R] Class Project Presentations
7 [T] Pollution Prevention/Course Wrap Up

FINAL EXAM  TBA (2.5 hour exam).

READING: Reading material will be assigned at the end of each lecture session.
*NOTE: The syllabus is subject to change at the instructor’s discretion.