INTRODUCTION TO PETROLEUM GEOLOGY GEOL 4436
Department of Physical and Environmental Sciences
Fall 2020

A. COURSE INFORMATION
Course number/section: GEOL 4436.001
Class meeting time: Lecture: TR 09:30-10:45AM; Lab: M 12:00-01:50PM
Class location: Lecture: BH-202; Lab: CS-226
Course Website: http://Bb9.tamucc.edu

B. INSTRUCTOR INFORMATION
Instructor: Dr. Mohamed Ahmed
Office location: NRC 3102
Office hours: TR 01:00-03:30PM
Telephone: 361-825-3278
e-mail: Mohamed.ahmed@tamucc.edu
Appointments: Appointments only by email.

C. COURSE DESCRIPTION
Catalog Course Description
Basic concepts of petroleum geology and techniques used in the exploration and production of hydrocarbon systems. Lectures and lab exercises will cover principles of stratigraphy, sedimentology, hydrocarbon generation, hydrocarbon-trapping mechanisms, reservoir characterization, seismic interpretation, well-log interpretation, and geologic risk analysis.

Extended Course Description
Petroleum geology is the application of geology to the exploration for and production of oil and gas. This course introduces the principles of petroleum geology and methods used for discovery of oil and gas in the subsurface environment. The elements of petroleum geology consist of the deposition and maturation of a source rock, followed by the migration of petroleum from the source into a porous permeable reservoir rock trapped beneath an impermeable seal. This course also describes the science and technology of petroleum exploration and production, the technological advances particularly in horizontal drilling and hydraulic fracturing, the production of gas and oil from shale. This is an essential class for students planning to go for oil and gas industry after graduation.

D. PREREQUISITES AND COREQUISITES
Prerequisites
GEOL 4411 - Sedimentation and Stratigraphy
GEOL 4322 – Geophysics
GEOL 4421 - Structural Geology
Corequisites
None.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)

Optional Textbook(s) or Other References

Supplies
Scientific Calculator; USB-thumb-flash drive; Pencil, eraser, colored pencils, and ruler.

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 should be able to:

1. Explain major components of petroleum systems,
2. Discuss geological processes that lead to the accumulation of petroleum,
3. Identify basic and advanced techniques used for petroleum exploration and development,
4. Discuss mechanisms for petroleum migration, formation of traps and seals, and formation of sedimentary basins.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Petroleum Geology is a very visual and hands-on discipline. In addition to Power Point slides that include many photos depicting geologic concepts and features from around the world, most chapters also contain animations. Be sure to add your own written comments besides the information you are provided. During the laboratory exercises, you will be given the opportunity to deepen your understanding of the course material with hands-on activities.

- **Homework:**
  Homework is due one week after being assigned. Late homework (up to one week after being assigned) will be graded at 50% value. No assignment will be accepted after one week. Care should be taken to assure that a neat, organized, understandable, and concise product is the result of your work.
• Labs:
  Hands-on experiences on a complete G&G project will be provided. Professional conduct and a professional write-up are crucial and will be treated as such in grading.

• Quizzes and Mid-term Exam:
  Two quizzes and a mid-term exam will be given.

• Paper & Presentation:
  Paper and presentation related to the use of advanced geophysical techniques in petroleum exploration. A 5-pages, excluding figures, research paper should include an abstract, background, research rational, objectives, methods and approaches, results, discussion and conclusions, and references. More details will be provided in class.

• Final Exam:
  A comprehensive final exam will be given. This exam may include problems worked in homework and on mid-term exams. Additional vocabulary and essay questions (not identical to homework and exams) are likely.

Each student is expected to take all exams at the designated time and place unless prior arrangements have been made with the instructor. The use of a calculator is allowed. Students who miss an exam will receive a grade of zero. Make-up exams will be given contingent providing approved medical excuse, or by pre-excused permission of the instructor. No other exceptions will be made. The format of make-up exams may differ from that of the regular exam. All exams are closed book. 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.

H. MAJOR COURSE REQUIREMENTS AND GRADING

The student learning outcomes described in Section F will be measured through the assignments listed below:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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</thead>
<tbody>
<tr>
<td>Quizzes 1 &amp; 2 and Mid-term Exam</td>
<td>30</td>
</tr>
<tr>
<td>Lab Assignments</td>
<td>25</td>
</tr>
<tr>
<td>Homework</td>
<td>10</td>
</tr>
<tr>
<td>Research paper</td>
<td>10</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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</tbody>
</table>
## I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1. Introduction; 1.1. Historical Review of Petroleum Exploration; 1.2. The Context of Petroleum Geology</td>
<td>1</td>
<td>Petroleum system</td>
</tr>
<tr>
<td>2</td>
<td>2. The Physical and Chemical Properties of Petroleum; 2.1. Natural Gases; 2.2. Gas Hydrates; 2.3. Crude Oil</td>
<td>2</td>
<td>Geophysical imaging - 1</td>
</tr>
</tbody>
</table>


Reservoir Characterization 1&2

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

COVID-19
Face Coverings—Face coverings (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Extra masks will be made available if needed.

Attendance/Tardiness
Lecture attendance is strongly recommended. 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.

Late Work and Make-up Exams
Late homework (up to one week after being assigned) will be graded at 50% value. No assignments will be accepted after one week. Each student is expected to take all exams at the designated time and place unless prior arrangements have been made with the instructor. Students who miss an exam will receive a grade of zero. Make-up exams will be given contingent providing presentation of approved medical excuse, or by pre-excused permission of the instructor.

Extra Credit
None.

Cell Phone Use
Cell phone use is not allowed in the class.

Laptop Use
Not allowed.

Food in Class
No food or drinks are allowed in the class.

Missed Exam
Students who could not avoid missing an exam should contact the instructor in advance to arrange a makeup exam. If the absence is unplanned, you should contact the instructor as soon as possible to discuss the situation.

Participation
Participation is highly encouraged and recommend during the class.

Others
Reading of the textbook is mandatory.

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.C0.03, 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 required 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.C0.03, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://academicaffairs.tamucc.edu/rules_procedures/assets/13.02.99.c0.03_student_grade_appeals.pdf](http://academicaffairs.tamucc.edu/rules_procedures/assets/13.02.99.c0.03_student_grade_appeals.pdf). 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.
Civil Rights Complaints
Texas A&M University-Corpus Christi is committed to fostering a culture of caring and respect that is free from discrimination, relationship violence and sexual misconduct, and ensuring that all affected students have access to services. For information on reporting Civil Rights complaints, options and support resources (including pregnancy support accommodations) or university policies and procedures, please contact the University Title IX Coordinator, Sam Ramirez (Samuel.ramirez@tamucc.edu) or Deputy Title IX Coordinator, Rosie Ruiz (Rosie.Ruiz@tamucc.edu) x5826, or visit website at Title IX/Sexual Assault/Pregnancy.

Limits to Confidentiality. Essays, journals, and other materials submitted for this class are generally considered confidential pursuant to the University’s student record policies. However, students should be aware that University employees, including instructors, are not able to maintain confidentiality when it conflicts with their responsibility to report alleged or suspected civil rights discrimination that is observed by or made known to an employee in the course and scope of their employment. As the instructor, I must report allegations of civil rights discrimination, including sexual assault, relationship violence, stalking, or sexual harassment to the Title IX Coordinator if you share it with me.

These reports will trigger contact with you from the Civil Rights/Title IX Compliance office who will inform you of your options and resources regarding the incident that you have shared. If you would like to talk about these incidents in a confidential setting, you are encouraged to make an appointment with counselors in the University Counseling Center.

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.