

Note: All classes will be conducted online using Zoom beginning March 31, 2020.

Syllabus – Summer 2020
Depositional Systems: Processes, Deposits and Applications
aka “Sedimentary Rocks”
By: Jon R. Rotzien

Course Number: GEO 316P

Class Days and Times: T/Th 9:30-11:00 (Unique #03040), CBA 4.330

Instructor Information: Office: TBD
Hours: By appointment
E-mail: jon.rotzien@mcombs.utexas.edu

Required Text: *Sedimentary Geology*, 3rd Edition, by D. R. Prothero & F. Schwab

Course Description: This is a newly redesigned course here at University of Texas at Austin, addressing a topic that is important, timely and fun. It will encourage you to apply your economics knowledge to sedimentary basin analysis by i) reviewing industry literature and textbook information and ii) by assessing energy industry case studies to create exploration and development scenarios. We will focus on the first principles of sedimentation, stratigraphy and basin formation as the drivers of economic accumulations of petroleum in many different types of environments of deposition and basins globally. We will not be limited to events of the *Shale Revolution*, discussing both conventional and unconventional petroleum resources from the mid-19th century to the present.

Course Objectives: After taking this course, participants will be able to:

- Identify and characterize key depositional environments on Earth that are critical to the energy industry,
- Recognize how the variety of sedimentary basins are formed and fill due to the complex interaction of tectonic, climatic, eustatic and sedimentary drivers,
- Apply scientific reasoning and geologic risk analysis to the exploration and production of resources – focusing on oil and gas – in sedimentary basins,
- Use subsurface and outcrop data to map and interpret the stratigraphy along passive and active continental margins, and
- Understand the broad challenges pertaining to sedimentary basin analysis and associated economic recovery of resources, and be able to discuss frameworks for scientifically sound, financially viable and societally acceptable solutions.

Class Attendance and Participation: It is the responsibility of the student to attend class regularly and to be prepared for class lecture and discussion. Attendance is not a part of the grade calculation; however, in-class participation can have a positive impact on the final grade of the student. In-class participation is the crux of the course, as we will structure our meetings around a critical discussion of the readings. In-class participation includes asking questions,

contributing meaningful dialogue to the discussion topics, and analyzing case studies. Each student will be responsible for stimulating their colleagues with leading questions on their case study. In advance of your “leadership day” on your case study, you must submit no less than five potential questions to the instructor via email. Analyzing a case study means being able to describe the key facets of the case – which can be a journal article, excerpt from a textbook chapter, or any number of real-life exercises based on industry or academic data – and identify i) what the case is about, ii) what the objectives are, iii) what is the geologic risk and uncertainty, iv) what is the scientific outcome, as well as v) being able to elaborate on the business significance of the study. Case studies are assigned in advance, and students are expected to provide a high-quality discussion of their assigned case study to the class. While this class provides a classical scientific understanding of sedimentary rocks, the applied themes of oil and gas exploration and production, natural resource management and factors controlling source-to-sink relationships and modern environments are emphasized.

Laptop and Cell Phone Policy: Laptops are permitted during lectures as long as they do not cause a disruption or distraction for other class participants. Cell phones are to be turned off during class.

Grading:

- Exam 1 – 20%
- Exam 2 – 30%
- PowerPoint – 20%
- Homework Assignments – 20%
- Participation & Case Study – 10%

Examinations: Exams consist of multiple choice and short essay questions. Make-up exams will consist of short answer and essay questions.

Note: If an exam is missed, the student will require the written approval of the instructor to arrange a make-up exam. Make-up exams will be allowed for legitimate and documented excuses.

Examination Dates:

- Exam 1 – Tuesday, June 23, 2020**
- Exam 2 – Wednesday, July 8, 2020**

Homework: There will be four homework assignments that will be posted on Canvas during the course. Each assignment should be submitted on or before the due date on Canvas.

Presentation: Each student will be responsible for a PowerPoint presentation on the final week of class, to share your findings on your chosen sedimentary basin with the class (and perhaps other outside experts). There are four assignments associated with the PowerPoint that will be due during the course. Key information regarding the PowerPoint will be provided in the first week of the course.

Final PowerPoint Due: **Wednesday, July 8, 2020**

Reading:

Assigned reading will be posted on Canvas. The reading will consist of textbook pages and articles that will be used in classroom discussion.

Schedule of Reading (subject to change as needed):

- Chapter 1 – Introduction to sedimentary geology
- Chapter 2 – Weathering and soils
- Chapter 3 – Clastic transport and fluid flow
- Chapter 4 – Sedimentary structures
- Chapter 5 – Sandstone and conglomerate depositional systems
- Chapter 6 – Mudrock depositional systems
- Chapter 7 – Siliciclastic diagenesis
- Chapter 8 – Terrestrial sedimentary environments
- Chapter 9 – Coastal environments
- Chapter 10 – Clastic marine and pelagic environments
- Chapter 11 – Carbonate rocks
- Chapter 12 – Carbonate environments
- Chapter 13 – Other biogenic sedimentary rocks
- Chapter 14 – Chemical and nonclastic sedimentary rocks
- Chapter 15 – Lithostratigraphy
- Chapter 16 – Biostratigraphy
- Chapter 17 – Geophysical and chemostratigraphic correlation
- Chapter 18 – Geochronology and chronostratigraphy
- Chapter 19 – Sedimentary rocks in space and time

Final Grades¹:

A	93-100%
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%
C+	77-79%
C	73-76%
C-	70-72%
D+	67-69%
D	63-66%
D-	60-62%
F	Below 60%

¹ Simple rules of rounding will apply to final grades.

Scholastic Dishonesty: The McCombs School of Business has no tolerance for acts of scholastic dishonesty. The responsibilities of both students and faculty with regard to scholastic dishonesty are described in detail in the BBA Program's Statement on Scholastic Dishonesty at <http://my.mcombs.utexas.edu/BBA/Code-of-Ethics>. By teaching this course, I have agreed to observe all faculty responsibilities described there. By enrolling in this class, you have agreed to observe all student responsibilities described there. If the application of the Statement on Scholastic Dishonesty to this class or its assignments is unclear in any way, it is your responsibility to ask me for clarification. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since dishonesty harms the individual, all students, the integrity of the University, and the value of our academic brand, policies on scholastic dishonesty will be strictly enforced. You should refer to the Student Conduct and Academic Integrity website at <http://deanofstudents.utexas.edu/conduct/> to access the official University policies and procedures on scholastic dishonesty as well as further elaboration on what constitutes scholastic dishonesty.

Students with Disabilities: Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, <http://diversity.utexas.edu/disability/>.

Religious Holy Days: By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Note: The course syllabus is subject to change at the sole discretion of the instructor. Students will be given reasonable notice of any changes.