

## Fall 2010: GEO371C - Construction and Interpretations of 3D Stratigraphy

(Unique # 26940)

Monday/Friday 2-4 PM Room JGB2.108

Instructor: Dr. David Mohrig - mohrig@mail.utexas.edu

Office: EPS3.162 Phone: 512-471-2282

Office hours: T 2:30-3:30, W 11-12 & by appointment

From Earth surface to subsurface, this course uses three-dimensional volumes of basin-filling stratigraphy to explore how depositional landscapes are preserved in the sedimentary record and how sedimentary deposits can be analyzed to produce quantitative reconstructions of past environmental states. Data will include both laboratory and industry-grade volumes of stratigraphy. Methods for subdividing sedimentary deposits into genetically related units will be developed. Stratigraphic signatures of change in water and sediment discharge, base level, and tectonics will be looked at and weighed against apparent stratigraphic trends generated by the naturally occurring variability within sediment-transporting systems.

The course is intended for earth scientists requiring a quantitative understanding of how the structure of depositional landscapes is translated into subsurface stratigraphy. Topics covered in this class will include: 1) generation of sequence boundaries and flooding surfaces; 2) controls on development of parasequences and channel & valley-filling deposits; 3) natural variability in sedimentation patterns; and, most importantly 4) stratigraphic signatures of base-level, tectonic and climate change.

Friday, August 27	Introduction to Class, Data Sets, and Interpretation Software
Monday, August 30	Baselevel Control on Development of Stratigraphy: <b>Part 1: Isolated baselevel cycles – fast versus slow</b>
Friday, September 3	Baselevel Control on Development of Stratigraphy: <b>Part 1: Isolated baselevel cycles – fast versus slow</b>
Monday, September 6	<b>Labor Day Holiday</b>
Friday, September 10	Baselevel Control on Development of Stratigraphy: <b>Part 1: Isolated baselevel cycles – fast versus slow</b>
Monday, September 13	Baselevel Control on Development of Stratigraphy: <b>Part 2: Superimposed baselevel cycles</b>
Friday, September 17	<b>[PROJECT 1 IS DUE]</b> Baselevel Control on Development of Stratigraphy: <b>Part 2: Superimposed baselevel cycles</b>
Monday, September 20	Baselevel Control on Development of Stratigraphy: <b>Part 2: Superimposed baselevel cycles</b>
Friday, September 24	Baselevel Control on Development of Stratigraphy: <b>Part 2: Superimposed baselevel cycles</b>
Monday, September 27	Structural Control on Development of Stratigraphy: <b>Part 1A: Steering of channels and stratigraphic packages via spatially varying subsidence patterns</b>
Friday, October 1	<b>[PROJECT 2 IS DUE]</b> Structural Control on Development of Stratigraphy: <b>Part 1A: Steering of channels and stratigraphic packages via spatially varying subsidence patterns</b>

Monday, October 4	Structural Control on Development of Stratigraphy: <b>Part 1A:</b> <i>Steering of channels and stratigraphic packages via spatially varying subsidence patterns</i>
Friday, October 8	Structural Control on Development of Stratigraphy: <b>Part 1A:</b> <i>Steering of channels and stratigraphic packages via spatially varying subsidence patterns</i>
Monday, October 11	<b>[PROJECT 3 IS DUE]</b> Structural Control on Development of Stratigraphy: <b>Part 1B:</b> <i>Steering of channels and stratigraphic packages via spatially varying subsidence patterns – Gulf of Mexico seismic volume</i>
Friday, October 15	Structural Control on Development of Stratigraphy: <b>Part 1B:</b> <i>Steering of channels and stratigraphic packages via spatially varying subsidence patterns – Gulf of Mexico seismic volume</i>
Monday, October 18	Structural Control on Development of Stratigraphy: <b>Part 1B:</b> <i>Steering of channels and stratigraphic packages via spatially varying subsidence patterns – Gulf of Mexico seismic volume</i>
Friday, October 22	Structural Control on Development of Stratigraphy: <b>Part 1B:</b> <i>Steering of channels and stratigraphic packages via spatially varying subsidence patterns – Gulf of Mexico seismic volume</i>
Monday, October 25	<b>[PROJECT 4 IS DUE]</b> Structural Control on Development of Stratigraphy: <b>Part 2A:</b> <i>Connection between growth faulting and sedimentation</i>
Friday, October 29	Structural Control on Development of Stratigraphy: <b>Part 2A:</b> <i>Connection between growth faulting and sedimentation</i>
Monday, November 1	Structural Control on Development of Stratigraphy: <b>Part 2A:</b> <i>Connection between growth faulting and sedimentation</i>
Friday, November 5	Structural Control on Development of Stratigraphy: <b>Part 2A:</b> <i>Connection between growth faulting and sedimentation</i>
Monday, November 8	<b>[PROJECT 5 IS DUE]</b> Structural Control on Development of Stratigraphy: <b>Part 2B:</b> <i>Connection between growth faulting and sedimentation – Mississippi Delta seismic vol.</i>
Friday, November 12	Structural Control on Development of Stratigraphy: <b>Part 2B:</b> <i>Connection between growth faulting and sedimentation – Mississippi Delta seismic vol.</i>
Monday, November 15	Structural Control on Development of Stratigraphy: <b>Part 2B:</b> <i>Connection between growth faulting and sedimentation – Mississippi Delta seismic vol.</i>
Friday, November 19	Structural Control on Development of Stratigraphy: <b>Part 2B:</b> <i>Connection between growth faulting and sedimentation – Mississippi Delta seismic vol.</i>
Monday, November 22	<b>[PROJECT 6 IS DUE]</b> Climate Control on Development of Stratigraphy: <i>Temporal variations in water and sediment discharge and sedimentation patterns</i>
Friday, November 26	<b>Thanksgiving Holiday</b>
Monday, November 29	Climate Control on Development of Stratigraphy: <i>Temporal variations in water and sediment discharge and sedimentation patterns</i>
Friday, December 3	Climate Control on Development of Stratigraphy: <i>Temporal variations in water and sediment discharge and sedimentation patterns</i>
Wed., December 8	<b>[PROJECT 7 IS DUE]</b>

## COURSE MATERIALS

Each student will be provided with an external hard-drive to store the stratigraphic volumes on during the class.

**IMPORTANT:** These hard drives must be returned to the instructor before a grade will be issued for the class.

**Assigned Class Readings** will be announced at the beginning of each week. Some materials will be placed on the Reserved Shelf in Walter Library.

**Lecture notes:** Lecture notes and readings from other texts can be found on Blackboard (<http://courses.utexas.edu/>)

**GRADING:** Your grade for this course will be based on 7 reports; each report will be worth 14.3% of your grade. A project outline will be distributed at the beginning of each of the 7 modules. The expectations for each report will be included in each one of these project outlines.

Each report will be due on the date listed above unless otherwise agreed upon by student and instructor prior to the original due date.

Late assignments will be deducted by half a grade for each day past the due date.

- There are no extra credit assignments in this class.
- +/- letter grades are assigned at the end of the semester based on your 7 project scores.

**Class Attendance Policy:** There is a very strong correlation between the best project reports and class attendance. More than 3 unexcused absences and your final grade will drop one-half letter grade; an additional half-letter grade will be deducted for each additional 2 absences. Field trips, field work, illness, and family crisis can all qualify as excused absences. Please tell the instructor as soon as you know that you will miss a class.

## COURSE EXPECTATIONS

- **Laptop Use Policy** – Classroom Laptop use for taking notes related to this course only. Laptop activities unrelated to this course will lead to dismissal from class. **Repeat offenses will result in a filing of a report of academic problems.**
- **Other Electronic Devices (Cell phone, Blackberry, I-Phone, etc.) Use Policy** – **All devices must be turned off during class.** Any use of these devices, including texting, web-surfing, etc. will lead to dismissal from class. **Repeat offenses will result in a filing of a report of academic problems.**

## IMPORTANT INFORMATION ON UNIVERSITY POLICIES

### The University of Texas Honor Code

The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

**Religious Holidays** – Religious holy days sometimes conflict with class and examination schedules. If you miss an examination, work assignment, or other project due to the observance of a religious holy day you will be given an opportunity to complete the work missed within a reasonable time **after** the absence. It is the policy of The University of Texas at Austin that **you must notify each of your instructors at least fourteen days prior to the classes scheduled on dates you will be absent** to observe a religious holy day.

**Documented Disability Statement** - Any student with a documented disability who requires academic accommodations should contact Services for Students with Disabilities at 471-6259 (voice) or 1-866-329-3986 (Video Phone) as soon as possible to request an official letter outlining authorized accommodations. See Website below for more information: <http://deanofstudents.utexas.edu/ssd/providing.php>

### **Use of Blackboard**

This course uses Blackboard, a Web-based course management system in which a password-protected site is created for each course. Blackboard can be used to distribute course materials, to communicate and collaborate online, to post grades, to submit assignments, and to take online quizzes and surveys.

You will be responsible for checking the Blackboard course site regularly for class work and announcements. As with all computer systems, there are occasional scheduled downtimes as well as unanticipated disruptions. Notifications of these disruptions will be posted on the Blackboard login page. Scheduled downtimes are **not** an excuse for late work. However, if there is an unscheduled downtime for a significant period of time, we will make an adjustment if it occurs close to the due date.

Blackboard is available at <http://courses.utexas.edu>. Support is provided by the ITS Help Desk at 475-9400 Monday through Friday 8 a.m. to 6 p.m., so plan accordingly.

### **University Electronic Mail Notification Policy (Use of E-mail for Official Correspondence to Students)**

All students should become familiar with the University's official e-mail student notification policy. It is the student's responsibility to keep the University informed as to changes in his or her e-mail address. Students are expected to check e-mail on a frequent and regular basis in order to stay current with University-related communications, recognizing that certain communications may be time-critical. It is recommended that e-mail be checked daily, but at a minimum, twice per week. The complete text of this policy and instructions for updating your e-mail address are available at <http://www.utexas.edu/its/policies/emailnotify.html>.

In this course e-mail will be used as a means of communication with students. You will be responsible for checking your e-mail regularly for class work and announcements. Note: if you are an employee of the University, your e-mail address in Blackboard is your employee address.