GEOL440: Stratigraphy and Sedimentation

"Beautiful is what we see,
More beautiful is what we know,
Most beautiful by far is what we do not."
— Nicolas Steno

Fall 2017
MWF: 10:00-10:50 in LDB 318
W: 2:00-3:50 in LDB 318

Instructor: **Professor Andy Fraass**
fraass@shsu.edu
Office: 313 LBD
(936) 294-1593 (office)

Office Hours: **MF 11:00-12:00, T 12:30-1:30** + by appointment

Suggested Textbook: *Sedimentary Geology*, Prothero & Schwab (ISBN-10: 1-4292-3155-6)
Alternate Textbook: *Principles of Sedimentology and Stratigraphy*, Fourth Edition, Sam Boggs, Jr. ***

I. Rationale:

"Those who cannot remember the past are condemned to repeat it."
– George Santayana

Humans only have a memory of their lifetime. The human species has only a memory of our recorded, either verbally or written, history. Through archeology and anthropology we can access the history of Hominidae.

This course is how we read rest of our book. That is, it's how we understand the other more than 99% of our history.

II. Course Aims and Outcomes:

Aims

Modern science is collaborative. I do, however, have to give you grades. Therefore, work is going to be a mix of a big collaborative project, individual exams, and lab exercises. I want to make you think as scientists do. You'll be collecting and analyzing raw data and observations, we'll do a large experiment that you will come up with.

Specific Learning Outcomes:
By the end of this course, I hope to help you understand:

- Soft rock identification and description
- Depositional processes
- Paleoenvironmental information
- Various forms of stratigraphy (e.g., time v. rock units)
- Sequence Stratigraphy
- Cool new science (Macrostratigraphy!)

III. Format and Procedures:

This course is a mix of lecture and lab. We will sometimes do in-class exercises during the lecture portion.

Website: I will be using Blackboard to post lecture powerpoint files and other materials.

SHSU Email: Your SHSU email account is the official form of university communication. I will use it as a primary means of communication with you. Please make sure that you maintain a valid password and regularly check your SHSU email account for important announcements.

IV. Expectations:

*Attendance:*I will not be taking **lecture** attendance. You are adults. Make your own decisions.
I do, however, expect that you will turn in assignments on time and **attend labs**. Assignments that are not turned in on time will lose 10% each day. After a week, it will not be accepted. There *is* a weekend fieldtrip for this course. There can be a makeup assignment for unavoidable conflicts, but I'm going to make it *really obnoxious* if I have to come up with it.

If you have an issue (sickness, death in the family, accident, work-related issue) please come see or inform me as quickly as possible and we will work out a solution. **If this issue causes a conflict with an exam, you must contact the Dean of Students instead of me. They will verify that you have a valid reason for missing the exam.**

Email Policy:
I will respond to student emails within 2 business days. You can write casual emails, but they must be in complete sentences and words (If I see a 'u' instead of 'you' I'm not going to respond.) The subject line should include the course number (GEOL440). If I have not responded in two days, go ahead and resend the email.

Phones and laptops:

I realize that everybody has lives, and sometimes you are are waiting for a very important phone call. Please, be respectful of your time, my time, and the attention of those around you.

Similarly, laptops can be used for taking notes. Facebook and Twitter are not note-taking services.

V. Grading Breakdown:

- Labs (32% total)
- Rock ID Practical (10%)
- Austin Fieldtrip (6%)
- Exams 1-3 (13% each)
- Sam Science Foundation – Program for Sedimentary Flume Research / Industrial Flume Access Application (13%)

  There will be a large collaborative project (NSF-PSFR/IFAA). I will be passing out more information around September 20th. It will be multipart, but equivalent in total to one exam. Exams will not be cumulative.

If you would like to challenge a grade, please **provide that challenge in writing** with sufficient detail to explain the error. Support your claim. I will not change anything or discuss on the spot.

Tentative Grading Scale
A = 90-100%
B = 80-89.99%
C = 70-79.99%
D = 60-69.99%
F = <59.99%

VI. Academic Integrity

> *"The University expects all students to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action."*
>
> — Sam Houston State University Academic Dishonesty Procedure

I **will** peruse consequences for cheating in accordance with the Sam Houston State University Academic Dishonesty Procedure. See Section 5.3 Academic Honesty.

Anything ***I*** consider cheating (copying work, plagiarism, etc.) will receive a penalty, with possibly a zero on the assignment. Cheating on an exam earns a 0 on that exam.

VII. Diversity and Discussion Statement

We are all individuals with our own experiences, backgrounds, and perspectives. We will do our best to be respectful of that diversity. Please let me know if there are additional efforts that can be taken to support learning about our shared Earth.

This is a course where we will discuss a variety of subjects, and not everyone in the room will agree. You **must** be respectful of disagreement, hear, and acknowledge other's experiences and perspectives.

That said, this is a course in science. You are entitled to your own opinions, you are not entitled to your own facts. I welcome a vigorous discussion. I welcome challenging accepted facts. Challenges, however, have to be backed up with data. This is *not* a class on rhetoric.

These challenges cannot be disruptive to the learning of others in the class. I reserve the right to stop a discussion if it is monopolizing class time and move it to my office hours (if no other students require office hours).

VIII. University Policies:

Students with Disabilities: It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see:
http://www.shsu.edu/dept/academic-affairs/documents/aps/students/811006.pdf

Religious Holy Days: If a student desires to be excused from class, assignment, or a test to participate in activities associated with a religious holy day, then the student must notify the instructor ahead of time of each scheduled class that he/she will miss for religious reasons. In such cases, the student will be required to take the test or submit the assignment early—unless there are good reasons for not being able to do so and the instructor has agreed to those reasons.

Visitors in the Classroom: Unannounced visitors to the classroom must present a current, official SHSU identification card to be permitted in the classroom. They must not present a disruption to the class by their attendance. If the visitor is not a registered student, it is at the instructor's discretion whether or not the visitor will be allowed to remain in the classroom. This policy is not intended to discourage occasional visiting of classes by responsible persons.

IX. Counseling

College can be tough. College students self-reported stress level is at the highest since 1966 (CIRP, 2010). My door is open.

SHSU offers counseling from 8-5 MThF, 8-7 TuW. (369) 294-1720 or stop by to make an appointment.

X. Tentative Course Schedule: (*Subject to change*)

Week	Date	Subject
Week 1	Aug. 23	Introduction, Quiz
	Aug. 25	Rock cycle, weathering, erosion and soil formation
Week 2	Aug. 28	Sediment transport: Fluid dynamics
	Aug. 30	Sediment transport: Fluvial, eolian, wave transport, etc.
	Sept. 1	Sedimentary textures
Week 3	**Sept. 4**	**Labor Day**
	Sept. 6	Sedimentary structures
	Sept. 28	Siliciclastic sedimentary rocks & classification
Week 4	Sept. 11	Siliciclastic diagenesis
	Sept. 13	Carbonate sedimentary rocks & classification
	Sept. 15	Carbonate diagenesis
Week 5	Sept. 18	Biochemical and evaporitic rocks
	Sept. 20	Coal and oil source rocks
	Sept. 22	**MIDTERM EXAM (Rocks)**

Week 6	Sept. 25	Fluvial depositional environments
	Sept. 27	Eolian and lacustrine environments
	Sept. 29	Guest Speaker (Kendra? Emily?) (Oil and Gas Formation + Retreval?)
Week 7	Oct. 2	Glacial environments
	Oct. 4	Deltaic and beach barrier island environments
	Oct. 6	Estuarine, lagoonal, and tidal environments
Week 8	Oct. 9	Siliciclastic marine environments
	Oct. 11	Carbonate marine environments
	Oct. 13	Principles of stratigraphy, lithostratigraphy
Week 9	Oct. 16	Stratigraphic Code
	Oct. 18	Seismic Stratigraphy Basics
	Oct. 20	
Week 10	Oct. 23-GSA	**MIDTERM EXAM (Environments)**
	Oct. 25-GSA	
	Oct. 27	Chronostratigraphy
Week 11	Oct. 30	Chronostratigraphy 2
	Nov. 1	Geologic time
	Nov. 3	Basin analysis
Week 12	Nov. 6	plate tectonics
	Nov. 8	Guest Speaker (Khalifa?) (Industry Biostrat/Wells?)
	Nov. 10	Sequence Stratigraphy
Week 13	Nov. 13	Sequence Stratigraphy
	Nov. 15	Sequence Stratigraphy
	Nov. 17	
Week 14	Nov. 20	Well Logs
	Nov. 22	**Thanksgiving Break**
	Nov. 24	**Thanksgiving Break**
Week 15	Nov. 27	Seismic Interpretation (Chris? Guest Lecture)
	Nov. 29	Macrostratigraphy and Sloss Sequences
	Dec. 1	
Final		**Final Exam (Stratigraphy)**

Lab Schedule (*Subject to change*)

Week	**Date**	**Activity**

Week 1	Aug. 23	No Lab
Week 2	**Aug. 30**	**Local Fieldtrip (River Bed Mechanics)**
Week 3	Sept. 6	Siliciclastics
Week 4	Sept. 13	Carbonates
Week 5	Sept. 20	*Introduce SSF-PSFR/IFAA*, Other Soft Rocks
Week 6	**Sept. 27**	**Local Fieldtrip (Sedimentary Structures I)**
Week 7	Oct. 4	Sedimentary Structures II (in Lab)
Week 8	Oct. 11	Depositional Environments
	Oct. 14	**Austin Cretaceous Reef Complex Fieldtrip**
Week 9	Oct. 18	Core Description
Week 10	Oct. 25	*Work on SSF-PSFR/IFAA*
Week 11	Nov. 1	Chronostratigraphy and Correlation
Week 12	Nov. 8	*NSF-PSFR/IFAA Experiments* (Meet at Core Lab)
Week 13	Nov. 15	Well Logs and Sequence Stratigraphy
Week 14	Nov. 22	THANKSGIVING BREAK
Week 15	Nov. 29	*SSF-PSFR/IFAA* Conference

***Lab/Lecture content subject to change**