SYLLABUS
Stratigraphy and Sedimentation GEOL 4402
Fall, 2015
MWF 10:00-10:50AM VIN 158
Labs T or W 2-4:50 PM

Professor: Dr. Fawn M. Last **Office:** 130 VIN **Phone:** 325-486-6987

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Office hours: Monday, Wednesday, Friday 8AM - 10AM, Tuesday, Thursday 9AM – 11AM or by appointment.

Required Texts: Prothero, D. R. and Schwab, F., 2014. Sedimentary Geology: An Introduction to Sedimentary Rocks and Stratigraphy, 3rd Edition: W.H. Freedman and Co., 593 p.

Tucker, M.E., 2011. Sedimentary Rocks In the Field: A Practical Guide, 4th Edition: John Wiley and Sons, 277p

Not required: but will be sources of many handouts / lecture illustrations:

AAPG Memoir 31 Sandstone Depositional Environments

AAPG Memoir 33 Carbonate Depositional Environments

Stow, D.A.V., 2005, Sedimentary Rocks in the Field: A Color Guide

James, N.P. and Dalrymple, R.W. (Eds.), 2010. Facies Models 4. Geological Association of Canada, 586 p.

COURSE CONTENT:

This course is intended to provide an overview of the major depositional environments of sediments and sedimentary rocks. In addition we will have the chance to review related background information and topics such as sedimentary textures and structures, sedimentary rock classification, weathering and erosion, lithification and diagenesis, and stratigraphic nomenclature and analyses. Our emphasis this term will be on understanding *process sedimentology* and *depositional environments*. Our objective will be to summarize, from a process controlled genetic unit approach, each of the major terrigenous and marine depositional systems and associated environments.

COURSE FORMAT and ATTENDANCE POLICY:

Meeting time: Monday, Wednesday, Friday at 10:00-10:50AM; VIN 158.
The format of the course during this academic session will be mainly lectures. There will be some movie/video presentations. *All* audiovisual program presentations should be considered an integral part of the course and the material covered by these AV programs is, unless otherwise indicated, testable. A course web page for GEOL4402 will be maintained in Blackboard. You are expected to attend every class meeting and are responsible for all material presented/discussed. If you must miss a class, please contact me if you need help in obtaining assignments or notes.

LABORATORY:

Tuesday or Wednesday at 2:30-4:50, VIN 158.
The weekly labs will cover many aspects of applied and practical sedimentology including rock identification and interpretation (siliciclastics and carbonates), facies analysis, grain size analysis, well logging, and subsurface interpretation.

FIELD TRIP:

A potential weekend field trip is being planned for sometime in October or early November. Details will be discussed in class when arrangements are finalized. In addition there may be short field trips to local outcrops.

LEARNING OUTCOMES:

(1) To have a good working knowledge of modern sedimentary processes and depositional environments.

(2) To be able to describe sedimentary facies and interpret sedimentary sequences.

(3) To have a basic understanding of the "classic examples" of modern and ancient depositional settings.

Exams, a lab test, a written term project and graded lab projects will assess these outcomes.

EVALUATION AND GRADING:

Grades for this course will be determined on the basis of the following components:

- *2 Term Tests (each 15%):* exact dates will be announced well in advance but are tentatively late September/early October and early November
- *1 Final Exam (20%)* Dec 7 10:30 AM-12: 30 PM
- *1 Lab Practical Exam (5%)* In lab period during week of November 30
- *1 Term Project Paper* (15%) Format requirements and due date will be discussed in class and posted on Blackboard
- *Lab reports and assignments including one field trip report (total 30%)*

Tests/exams will cover material from lectures, laboratory assignments and exercises,

assigned readings, and AV programs. The tests are generally of a 'closed-book, short-answer' format and may include calculations.

LECTURE/ LAB SCHEDULE:

Tentative Lecture/Lab Schedule and Topics list. Please note: this schedule may be adjusted depending upon availability of audio-visual material, instructor schedule, possible guest speakers or other factors. Specific due dates for labs will be announced.

Week:

1: (**Week of August 24):** *no lab;* Course business (grades, requirements, readings, labs, etc.); Introduction to sedimentology and stratigraphy; Historical development; Overview/review of important stratigraphic, sedimentological and petrographic concepts

2 (Week of August 31): Overview/review (continued); Stratigraphic concepts and analysis; Facies and sequences; lab: Grain size vs. environment

3 (Week of September 7): No classes September 7; Sedimentological and stratigraphic principles (continued); Introduction to alluvial systems; lab: Sequence stratigraphy in Western interior Cretaceous basin / Western Canada sedimentary basin

4 (Week of September 14): Alluvial systems (continued); lab: Markov chain analysis/ Facies relationship diagrams; Fluvial environments

5 (Week of September 21): Aeolian systems; Terrigenous coastal systems (delta, interdeltaic, barrier island complexes); lab: Seismic stratigraphy

6 (Week of September 28): Terrigenous coastal systems (continued); Term test I (tentative); lab: Anastomosed stream model / Mississippi delta

7 (Week of October 5): Terrigenous shelf and shallow sea systems; lab: Barrier island complex/ shelf systems

8 (Week of October 12): Deep marine systems**;** lab: Deep water sands

9 (Week of October 19): Deep marine systems (continued); Lacustrine systems; lab: Facies Map

10 (Week of October 26): Chemical and biogeochemical sedimentology fundamentals; Marine evaporitic systems; Fundamental concepts/principles of carbonate sedimentology; lab: Modern carbonates

11 (Week of November 2): The carbonate factory; Carbonate peritidal and subtidal systems; Term test II (tentative); November 2: last day to drop course; lab: Arid

carbonate coastlines

12 (Week of November 9): Reefs and buildups; Other chemical and biogenic sedimentary environments; lab: Guadalupe sequence/ Smackover

13 (Week of November 16): Large-scale stratigraphic variations; Basin analysis and sequence stratigraphy: lab: North Sea

14 (Week of November 23): Basin analysis and sequence stratigraphy (continued); No classes November 25-27

15 (Week of November 30): Sequence stratigraphy (continued); Review/summary

COURSE WEBPAGE

http://blackboard.angelo.edu contains assigned readings, supplementary images and power point presentations, assignments, and grades.

Join GEO, AAPG, SEPM and IAS!

One of your most rewarding responsibilities as a Geoscience major or minor is the chance to participate in activities of GEO, our organization of geology students at ASU, and the major international 'sedimenotlogical' geoscientific organizations: **AAPG** (American Association of Petroleum Geologists) and **SEPM** (Society for Sedimentology), and IAS (International Association of Sedimentologists). GEO is the ASU Student Chapter of AAPG and has regular supper meetings Wednesdays at 7:00 in VIN 139. The last Wednesday of each month we meet together with the San Angelo Geological Society and host a significant geology talk by an outside speaker. GEO dues are $15.00/semester. AAPG student membership is free! To join AAPG fill out membership application at www.aapg.org (AAPG membership is strongly encouraged). Student memberships for SEPM and IAS are $15/yr and €10/yr, respectively.

Know the ASU Honor Code

Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. Students are responsible for understanding the Academic Honor Code, which is contained in both print and web versions of the Student Handbook.

Our Honor Code reminds us that copying work of others or allowing others to copy your work is plagiarism. You will receive a zero for any assignment containing copied work. However, you can and should work with others.

Persons with disabilities which may warrant academic accommodations must contact the Student Life Office, Room 112 University Center, in order to request such accommodations prior to any accommodations being implemented. You are encouraged to make this request early in the semester so that appropriate

arrangements can be made.

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.