GEOS 4534-101 Sedimentology and Stratigraphy Lecture Syllabus

Instructor: Dr. Jesse Carlucci (jesse.carlucci@mwsu.edu), (940) 397-4448

Class: MWF, 9am -9:50am, BO 125

Office hours: Bolin Hall 131, MWF, 11am – 2pm, Tuesday, 11am - 1pm.

You can arrange to meet with me at any time, by appointment.

Textbook: Principles of Sedimentology and Stratigraphy by Sam Boggs Jr., 5th edition. I will occasionally post articles and other readings on D2L. I will also upload Power Point presentations to D2L before each class, if possible.

Course Objectives: This course will discuss the two primary subdisciplines of sedimentary geology: sedimentology & stratigraphy. GEOS 4535 provides the student with an understanding of how sedimentary processes: (1) transport and deposit sediment in both the modern world and in the past (2) how sediment is deposited and forms strata (3) the types of environments that sedimentary rocks record and (4) practical knowledge about stratigraphy that can be used in industry or research applications (e.g., basin analysis). By the end of the course, the student will be able to characterize sedimentary deposits, interpret their depositional environments, and understand the spatial and temporal patterns of sediment in the geologic record.

LECTURE SCHEDULE

Jan 14-18: Introduction; history of sed/strat and geologic time; physical and chemical weathering
Boggs (pg. 1-17)

No class on January 21, Martin Luther King Day.

Jan 23-25: Sediments: erosion, transport and deposition
Boggs (pg. 19-39)

Jan 28-Feb 1: Sedimentary rocks: texture, structures, bedforms.
Boggs (pg. 43-97)

Feb 4-8: Siliciclastic sedimentary rocks: classification, composition, diagenesis
Boggs (pg. 99-129)

Feb 11-15: Carbonate sedimentary rocks: classification, composition, texture Quiz 1 (Feb 11; 5%).
Boggs (pg. 135-164)

Feb 18-22: Carbonate rocks continued; chemical sedimentary rocks
Boggs (pg. 168-194)
Feb 25-March 1: Carbonate and marine depositional environments; history of reef systems through time. 
    Boggs (pg. 308-329)

March 4-8: Evaporative and marginal depositional environments Mid-term exam (March 4; 15%). 
    Boggs (pg. 328-329, 246-273)

No Class Spring Break March 11-16

March 18-22: Terrestrial (fluvial, eolian, lacustrine, glacial) depositional environments. 
    Boggs (pg. 211-242)

March 25-27: Lithostratigraphy: stratigraphic principles and units, correlation Quiz 2 (March 27; 5%). 
    Boggs (pg. 335-337)

No class Easter Break March 29

April 1-5: Biostratigraphy, chronostratigraphy, geologic time 
    Boggs (pg. 406-461)

April 8-12: Sequence stratigraphy 
    Boggs (pg. 380-388)

April 15-19: Sequence stratigraphy continued; well-log analysis 
    Boggs (pg. 380-388)

April 22-26: Seismic stratigraphy, chemostratigraphy, magnetic stratigraphy 
    Boggs (pg. 449-461, 365-396)

April 29-May 3: Basins and basin analysis, sedimentation, poster presentations, Poster due (May 3, 15%). 
    Boggs (pg. 463-487)

Final (Wed, May 8, 10:30am; 20%)

Grading scheme
Quizzes 10%
Lecture mid-term 15%
Lecture final 20%
Field trip material 10%
Poster project 15%
Labs 30%
The quizzes will be held in the first 25 minutes of class, and I will let everyone know the subject the class period before.

Review sheets for the lecture midterm and final will be passed out the class period before the exam. Each will include a combination of multiple choice, short answer, and essay-style questions.

Grading Standards: In this class, the following numerical equivalents for grades are used: A = 100-90% | B = 89-80% | C = 79-70% | D = 69-60% | F = 59-0%.

Attendance: Attendance is required for both lecture and lab. Absences can only be excused by contacting me in advance, prior to lecture or laboratory assignments. Absences presented after the class is over will not be accommodated except in rare circumstances. I reserve the right to drop any student from the class who has more than 3 unexcused absences. Attendance will be used to make decisions on the final grade score of students who are on the border between two letter grades.

Late assignment policy. For all assignments, the late penalty is 5% per working day (25% per week). No assignments will be accepted after Wednesday of finals week.

Poster Project Format (DUE May 3)
The poster should have introduction and conclusions sections. All sources of information must be cited in the body of the text and listed in a reference list somewhere on the poster. Citation consists of the author's name plus the publication date. e.g. Jones (2001) or (Jones, 2001). You should use several references in writing the essay (at least half-a-dozen) and most of these must be from scientific journals.

Web sites are not usually appropriate sources for college level projects. Do not use web sites as sources of information (only for images) for your poster. However, you are encouraged to use the Midwestern Library on-line resources to research your poster. A poster that makes extensive use of web sites as primary sources is not acceptable.

The following journals are good sources and many of them can be accessed on-line:

Semipopular journals: Scientific American; American Scientist.

Research journals: Journal of Sedimentary Research; Stratigraphy, Lethaia; Science; Nature; Palaeoecology, Palaeogeography, Palaeoclimatology; Palaios, Geology, Sedimentology, AAPG Bulletin.

Illustrations should be included where appropriate and may be photocopied or scanned directly from a scientific journal or text book. However, the source of the information should be indicated in the figure caption (e.g. from Jones, 2001). You may also use images from the web, but include the site information.
**Format.** The poster can be in any format that you wish, but it will need to be constructed in Power Point (available in Bolin) or with illustration software (Adobe Illustrator, Corel Draw etc.). Grading is based on: content (10 pts), style and organization (8 pts) and references/citation (7 pts).

**Poster topics.** The poster can be on *any* topic under the umbrella of sedimentology or stratigraphy. In order to assist you in choosing a subject, a list of potential topics is included below. However, you are free to come up with your own topic if none of these are appealing. It is a good idea to clear your poster topic with me prior to writing.

1.) Contribution of one scientist to the field of sed/strat (Steno, Hutton, Werner etc.).

2.) Geologic history of a particular sedimentary basin.

3.) Geologic history of a particular petroleum producing formation.

4.) Stratigraphy of a particular geologic formation, local or otherwise.

5.) Sedimentology of different depositional environments (delta’s, alluvial fans, lacustrine, eolian etc.).

6.) Well-log analysis.

7.) Geologic history of reefs.

8.) Some aspect of sequence stratigraphy or sea-level change.

9.) Sed/Strat of a particular interval of time (e.g., Permian of North Texas etc.).

10.) Biostratigraphy and the fossil groups that are used in it.