

Sedimentology and Stratigraphy: GEOS 315 SYLLABUS – FALL 2011

Description and Objectives

This course will introduce students to the basic principles used in the study of sedimentology and stratigraphy. This will include a focus on the processes that influence the formation of sediments and sedimentary rocks, as well as focusing on the physical, chemical, and biological aspects of sediments and sedimentary rocks. Special emphasis will also be placed on the features of sedimentary rocks that are used to make environmental and climatic interpretations, and on the techniques used to put strata in context of time and space. Lab exercises will be incorporated into the lectures and will be used to reinforce major topics. There will also be a required field trip, and a fee will be assessed for travel expenses. This is a Writing Intensive course for the Geoscience Major. Special emphasis will be placed on how to read articles from the geosciences and how to effectively write several styles of reports – including: lab reports, reaction papers, short reports based on library and internet sources, and reports of original research. Effective written and oral communication skills are essential for becoming a professional in the geosciences.

Course Information

Instructor: Dr. Karl W. Leonard

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url: <http://www.mnstate.edu/leonard>

office hours: M, W 10:30- 11:30 & 1:30 – 2:30, T, Th 9:30 – 11:30, F 1:30 – 3:30, or whenever I'm in my office

Textbooks: Boggs, S., Jr. (2006). Principles of Sedimentology and Stratigraphy. Prentice Hall Inc.

Additional readings will come from articles provided by the instructor.

Class web page can be found on: <http://www.mnstate.edu/leonard>

Evaluation/Grading

Exam and quiz grades will be done on a 100-point scale where 90-100=A, 80-89=B, 70-79=C, 60-69=D etc. Making up missed labs will not be possible, and making up missed exams will only be allowed in extreme cases....

Lecture: EXAMS (3)	- 45%
Reading Quizzes and 5-minute essays	- 05%
Reaction Papers (2) – 3 pgs each	- 05%
Laboratory: EXERCISES (8) & reports (4) 2 pgs each	- 30%
Library Research Paper (2 drafts with peer reviews) – 5 pgs.	- 05%
Class Project and Report – 5 pgs	- 10%
_____ TOTAL =	100%

"Lecture" Format:

This course will combine a lecture and discussion format. Material covered in the course is often very conceptual and controversial -- lots of room for differing opinions and debate. We will also be reading, on occasion, conflicting research papers specifically for discussion and for the laboratory exercises.

Field Trip, Class Project, and Summary Paper:

The best way to gain an appreciation of how sedimentology and stratigraphy is conducted is to actually experience it for yourself. To do this I would like each student to be responsible for one aspect of a class-wide research project. The project will be done using core samples of rocks from the subsurface of the Williston Basin of western North Dakota housed at the William Laird Core Library in Grand Forks. Collection of the necessary field data will require 1 day of field work; in addition, a few hours in the laboratory after the data collections are made may be required. Students will conduct field work, laboratory preparation, and data manipulation in groups, but each student will be responsible for their own written paper (a 5-7 page scientific research paper plus figures).

Laboratory Exercises:

Lab exercises will be incorporated into the lecture at least once a week. Most exercises can be completed in class, though some additional "in lab" time may be required. Other labs will utilize computer simulations to stress important concepts or methods, or utilize various pieces of research equipment in order to experience sedimentary and stratigraphic modeling. Towards the end of the semester additional lab time will be devoted to working on material collected for the class projects.

Writing Intensive Competencies (Students Completing This Course – should be able to):

- Use a coherent writing process including invention, organization, drafting, revising, and editing to form an effective final written product.
- Consult effectively and appropriately with others to produce quality written products.
- Read, analyze, evaluate, synthesize, and integrate appropriately and ethically both information and ideas from diverse sources or points of view in their writing.
- Locate, use, and cite appropriately primary and secondary source materials from both print and electronic resources.
- Use correct grammar and mechanics in writing.

Policies

Attendance: Students are expected to attend all class meetings.

Special Accommodations: Students who believe that they may need accommodations in this course (note takers, etc.) should contact Greg Toutges, Coordinator of Disability Services at 477-5859, CMU 222, as soon as possible to ensure accommodations can be implemented in a timely fashion.

Lecture Schedule (Tentative)

Week	Topic	Reading
1 Aug. 23	T - Introduction – What is Sedimentology and Stratigraphy Th - Origin of Sediments – Weathering	Boggs, Introduction Boggs, Ch. 1
2 Aug. 30	T – Soils and Paleoclimates Th - Lab 1: Soils and Paleosols – Formal Lab Report due the following week	Boggs, Ch. 1
3 Sept. 6	T- Library Session & Transport and Deposition of Sediments Th - Physical Properties of Sediments	Boggs, Ch. 2 Boggs, Ch. 3
4 Sept. 13	T- Sedimentary Structures Th - Lab 2: Texture and Sedimentary Structures– Formal Lab Report due the following week	Boggs, Ch. 4
5 Sept. 20	T - Siliciclastics – Classification and Diagenesis Th - Lab 3: Siliciclastics – Classification	Boggs, Ch. 5
6 Sept. 27	T - Carbonates – Classification and Diagenesis Th - Lab 4: Carbonates – Classification	Boggs, Ch. 6
7 Oct. 4	T - Depositional Environments – Interpretations and Classification Reaction Paper #1 Where does chert/flint form? Th –EXAM # 1	Boggs, Ch. 8
8 Oct. 11	T – No Class - inservice Th -- Depositional Environments – Interpretations and Classification Term Paper – First Draft due	Boggs, Ch. 8
9 Oct. 18	T - Continental Environments – Stream Systems Th - Lab 5: Streams – Formal Lab Report due the following week	Boggs, Ch. 8
10 Oct. 25	T - Continental Environments – Lacustrine, Eolian, and Glacial Systems Th – Lab 6: Environmental interpretation– Formal Lab Report due the following week Term Paper Peer Reviews due	Boggs, Ch. 8
11 Nov. 1	T – Marine Environments – Siliciclastics Th – Marine Environments – Carbonates Reaction Paper #2 – the Dolomite Problem	Boggs, Ch. 10 Boggs, Ch. 11

12 Nov. 8	T- Principles of Stratigraphy – Lithostratigraphy Th - Lab 7: Correlation Final Draft of Term Paper Due	Boggs, Ch. 12
13 Nov. 15	T – Sequence Stratigraphy Th – Lab 8: Correlation II Grand Forks Field Trip	Boggs, Ch. 13
14 Nov. 22	T – EXAM #2	
15 Nov. 29	T - Sequence Stratigraphy Th – Sequence Stratigraphy	
16 Dec. 6	T – Other Types of Stratigraphy Final Project Due	Boggs, Ch. 14 & 15

Final Exam (EXAM # 3) – Dec. 12 – 3:00 pm