

Sedimentology GEOL 3425

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Office Hours M-W 10:30-11:30
Th 2:30-3:30

Text Prothero and Schwab *Sedimentary Geology*. 3rd Edition

Goals: On completion of the class you should be able to:

- 1: identify and describe sedimentary rocks in field and hand specimen,
- 2: describe a stratigraphic section, correlate stratigraphy both in outcrop and the subsurface,
- 3: Interpret depositional processes and depositional environments.
- 4: You should have a thorough understanding of the physics of sediment transport and how this is reflected in sedimentary rocks.
- 5: You should be able to interpret depositional environments from rocks.

I want you to be able to look at a rock and interpret the processes active based on the sedimentary structures, then interpret the environment based on the processes you infer.

Methods: There are three parts to this class. (1) Learning about sedimentology and stratigraphy in the lecture part of the class. (2) Learning practical field and laboratory skills. You must demonstrate a complete knowledge of sedimentary rocks and how to describe them. Much of this will be graded as pass-fail, either you do it or you don't. (3) Application of class material and practical skills to solve field problems. The last lab sections are devoted to a major field problem which you will write up as a paper.

Grading: Four Exams 60%; Labs and field Projects 25% Final Project 15%

Notes: **Read each chapter before attending the lecture on it.** Take notes and ask yourself questions while reading. Attendance is not mandatory; however there are no make-ups for labs, field problems, or exams unless prior permission is obtained. Some laboratories may incorporate lectures.

Graduate Student Requirements – Graduate students are required to complete all of the assignments required of undergraduates and in addition must – 1) write 3 reports on field laboratory studies written in the style of professional journals and that include references from recent articles on the type of deposit studied. They are required to demonstrate a greater degree of understanding on the midterm and final exams and will be expected to score 5 points higher than the undergraduates for a comparable grade on each exam.

| | Date | Topic / Laboratory | Assigned Reading |
|--|------|--|---------------------------|
| Sediments and sedimentary rocks | | | |
| Week 1 | | Intro to Class, What is sedimentology? Sedimentary particles and textures, Lab 1 – Sediment Textures <i>Description of Sed Rocks, Describing a Strat Section</i> Field Trip 1 Friday | Chapter 1, Chapter 5 |
| Week 2 | | Sedimentary Structures Siliciclastic Sediments Field Trip 2 -- Sedimentary Structures | Chpt. 4, Chpt. 6, Chpt 7, |
| Week 3 | | Stokes Law, Bernoulli's eqn. The Physics of flow and particle movement, bed load and suspended load transport Lab 2 Sedimentary Structures | Chpt 3 |
| Week 4 | | Current flow and sed structures ripples, dunes, antidunes Lab 3 Clastic Sediments Test on Sedimentary Fabrics and Structures and Clastic Sedimentary Rocks | Chpt 2 cont. |
| Section 2 Physics of Sedimentation | | | |
| Week 5 | | Clastic Depositional environments. Environmental Analysis-- Walther's Law, Facies Models FT - 3 Breaking out and Describing Facies | Chapters 8, 9, 10 |
| Week 6 | | Carbonate Rocks and Environments | Chpt 11, 12 |
| Week 7 | | Other Sedimentary Rocks | Chpt. 13, 14 |
| Section 3 Depositional Environments | | | |

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| Week 8 | FT-4 Facies Analysis Bedforms in channels Field Trip, Second Exam Physics of Flow GSA, Vancouver 19-22 | |
| Week 9 | Coastal Deposition Marine Environments Fluvial and Eolian Deposition | Chpt 9, to p. 306 Chpt. 10, 11 to p. 398 |
| Week 10 | Deep sea and Carbonate deposition Field Trip-OCT 31,NOV 1,2 San Juan Basin and Northern NM | Chpt 11 p. 398 to end, Chpt 12 Readings on final project |
| Section 4 Stratigraphy | | |
| Week 11 | Lithostratigraphy/ | Chpt 13 |
| Week 12 | Exam 3 on depositional Environments Seismic Stratigraphy | Chpt 14 |
| Week 13 | Field Day. Intro To Final Project Seismic Stratigraphy LAB 5 Seismic Stratigraphy Lab/ Second field Trip Trip to Indio and Guadalupe mountains Nov 21,22,23 | Chpt 17-18 |
| Week 14 | Seismic Stratigraphy Cont., Basin Analysis | Chapt. 19 |
| Week 15 | Last Exam Final Project Due Dead Day Friday Dec 5 | |
| | <i>optional</i> Final Exam Monday Dec 8th 10:00-12:45 | |

Supplies Needed

- Colored Pencils
- Calculator
- 2 protractors
- 2 rulers with a metric scale
- Field notebook
- Marking Pen
- Sharp mechanical pencil
- Graph paper with a 1 cm grid
- Water bottles
- Hammer