

GEOLOGY 5326, CARBONATE PETROLOGY, Fall, 2017

Instructor: Dave Rohr, Science 315, x8167. drohr@sulross.edu

Office Hours: MWF 9:30 – 11:30; 11:00-12:00 Tu, Th, or by appointment.

Description and Objectives: Carbonate petrology deals with the origin, description, classification, and interpretation of limestones and dolomite. The emphasis will be on carbonate stratigraphy and interpretation of microfacies. Local and regional examples will be examined.

Course Outline:

- Week 1: Introduction and review of carbonate sedimentation.
- Week 2: Classification of carbonate rocks.
- Week 3: Techniques of carbonate petrography
- Week 4: Microfacies
- Week 5: Diagenesis.
- Week 6: Stratigraphy of carbonates
- Week 7 :Carbonate platforms (Read, 1985)
- Week 8: Reefs
- Week 9: Permian Reef Complex
- Week 10: Bahamas
- Week 11: Persian Gulf (Bathurst, Ch. 4)
- Week 12: Dolomite
- Week 13: Ancient examples of carbonates.
- Week 14: Student Presentations

Methods of Instruction; The course consists of three hours of lecture per week and several optional one-day field trips. While the emphasis of the course is on carbonate depositional environments, some petrographic exercises will be required including an independent project which will require preparation of samples. Outside readings and discussions of the articles are also a part of the course.

Field trips: Two optional one-day field trips will be taken to examine local carbonates.

Class attendance policy: Attendance is expected in lectures. Assignments can not be made up at a later time unless prior arrangements are made with the instructor. If you are going to miss a lecture exam for a legitimate reason, let the instructor know AHEAD of time.

Methods of Assessment: The semester grade is based on three exams, homework, and an independent project. Exams will be given about every 5 weeks and count 25% each. The project will count 15%. Homework will count 10%. Incomplete (I) grades are given where passing work has been done and only a minor part of the requirements are incomplete.

Incomplete (I) will not be given for late term projects. 25 %

First Exam: after approximately 5 weeks into course. 25 %

Second Exam: Approximately 10 weeks into course. 25 %

Final Exam: May. 25 %

Text: Carbonate Sedimentology. Tucker and Wright. Wiley-Blackwell; 1 ed. (January 16, 1991), • **ISBN-10:** 0632014725 • **ISBN-13:** 978-0632014729

Expected Learning Outcomes – Upon completion of this course, students will apply critical reasoning and problem solving skills to be able to:

- identify carbonates in hand sample and thin section
- describe and implement carbonate rock classification schemes
- explain the sedimentary processes that produce various types of carbonate rocks
- identify and explain the products and processes of diagenesis

METHODS OF ASSESSMENT/EVALUATION – Learning outcome assessment will be made on the basis of two (2) Exams, one (1) Final Exam and a semester project with an oral presentation. The exams will assess the application of critical reasoning and problem solving skills through short answer questions and multiple choice questions (with some diagrams), and specimens (hand sample and thin section). The graded exams will be reviewed, by discussing the logic of the answers to and content of the questions missed by a majority of the class. Homework assignments will assess student problem solving skills in applying, describing, and explaining principles and processes of stratigraphy and sedimentology. A project and presentation will demonstrate original thinking.

Exemplary Core Curriculum Objectives –

Program Learning Outcome (PLO). The student will identify, compare/contrast, synthesize and apply bodies of information of Geology in the area of advanced sedimentary geology.

- to understand and apply methods and appropriate technology to the study of the rocks
- to recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses, and interpretation both orally and in writing
- to identify and recognize the differences among competing scientific theories
- to demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies
- to demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture.

Student Learning Outcome (SLO)

The student will identify, compare/contrast, synthesize and apply bodies of information of Geology in the area of advanced sedimentary geology.

Assessment Method/Tool

Target/Criteria for Success 1a. Comprehensive final exams or projects that cover elements of advanced sedimentary geology are administered in all relevant courses, such as GEOL 5320 Advanced Paleontology, GEOL5326 Carbonate Petrology, GEOL 5328 Advanced Sedimentation, and/or GEOL 5304 Special Topics (as applicable).

DISABILITY: "It is Sul Ross State University policy to provide reasonable accommodation to students with disabilities. If you would like to request such accommodations because of a physical, mental, or learning disability, please contact the Disabilities Services Coordinator in Counseling and Disabilities Center in Ferguson Hall, Rm. 112, 837-8203. Please inform me ASAP if accommodation is needed

Carbonate Petrology Term Project Specimens, Abstract and Oral Presentation

Part of your grade will be based on a term project which will involve the preparation of carbonate samples and their description and interpretation. Each person will have samples from a different carbonate unit of your choice, but not your thesis research. Two or more people can have the same formation, but not the same outcrop. Try to pick a unit that has some variety in it and will be interesting to you. We will visit several possible collecting sites on field trips, or I have some hand samples available from outside Texas.

The project will require you to turn in at least 5 hand specimens (slabs). You may want to attempt thin sections and acetate peels, but this is optional. Based on these specimens you will prepare a short (1 page, single-spaced), printed ABSTRACT that will include the following:

1. A brief introduction describing where the carbonates are from and the general nature of the formation (age, areal extent, general lithology, etc.). This information may be obtained from one of the USGS Lexicon (http://ngmdb.usgs.gov/Geolex/geolex_home.html) and should not be more than 2 pages.
2. A description of the specimens.
3. Interpretation of the carbonates. To what microfacies do they belong. What was the environment of deposition? Diagenetic effects? What is your evidence?

4. Short bibliography of any references cited.

5. Oral presentations with PowerPoint of the results of each project, about 15 minutes long, will be presented during the last few class meetings.

Term projects are due the last weeks of class. A sign-up sheet for the schedule will be provided. You cannot all go last. The abstract is due when you give your presentation. Ten points will be deducted for each day late after that date. No incomplete grades (I) will be give for missing projects.