

TEXAS A&M UNIVERSITY – CORPUS CHRISTI
COLLEGE OF SCIENCE AND TECHNOLOGY

GEOLOGY 5311 – Clastic Biostratigraphy and Sequence Stratigraphy
Spring 2009

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Course Description

This graduate-level course is for coastal and marine systems science and environmental science majors and professional geologists who would like a better understanding of the latest sequence stratigraphic techniques, principles, and clastic facies models available to geoscientists. The course will consist of an examination of the latest topics, techniques, and models in chronostratigraphy and sequence stratigraphy. There will be hands-on examination and analysis of data sets.

Prerequisites: Graduate standing, Sedimentation and Stratigraphy (or equivalent) and Invertebrate Paleontology, or permission of the instructor (with appropriated professional work experience).

Course Goals and Objectives

Upon completion of this course, the participant should be able to:

- (1) utilize the concepts of clastic depositional sequence stratigraphy in paleoenvironmental reconstructions
- (2) utilize the principles of biostratigraphy in the chronostratigraphy
- (3) apply clastic facies models in the interpretation of the rock record
- (4) identify clastic depositional facies patterns in 3-D seismic data volumes, well logs, cores, and outcrops
- (5) utilize facies models in developing sequence stratigraphic models
- (6) utilize trace fossils in making paleoecological interpretations within a sequence stratigraphic framework
- (7) construct realistic paleogeographic maps
- (8) construct realistic cross-sections

Evaluation and Grade Assignment

Grades will be based on:

- A) Classroom quizzes and problem sets (10%).
- B) Research paper describing how biostratigraphy and sequence stratigraphy could increase efficiency in the analysis of paleoenvironmental and paleoecologic problems (20%).
- C) Research project or a geological data interpretation project (20%). A paper describing the project, project data, interpretations, and conclusions will be submitted two weeks before the conclusion of the course. Topic must be approved by the instructor.
- D) Mid-term examination (25%)
- E) Final examination (25%)

Class Policies

Attendance of all lectures is mandatory. While group discussion and collaboration is encouraged during the course, unless work is explicitly specified to be a team project, the work you hand in is expected to be yours.

Textbooks

Sandstone Depositional Environments

Author: Scholle and Spearing (eds.)

Publisher: AAPG Memoir 31

ISBN: 0-89181-307-1

Siliciclastic Sequence Stratigraphy in Well Logs, Cores, and Outcrops

Author: Van Wagoner, Mitchum, Campion, and Rahmanian

Publisher: AAPG Methods in Exploration Series, No. 7

ISBN: 0-89181-657-7

Sandstone Facies Models Response to Sea Level Change (Required)

Author: Walker and James (eds.)

Publisher: Geological Association of Canada

ISBN: 0-919216-49-8

Additional research and technical papers will be provided as needed

Supplies

Notebook, pencils, colored pencils, scientific calculator, hand lens, and ruler

Lecture Topics

History of Stratigraphic Thought

Clastic Facies Models I – Fluvial Systems

Clastic Facies Models II – Delta Systems

Clastic Facies Models III – Shoreline Systems

Clastic Facies Models IV – Deep Water Systems

Principles of Biostratigraphy

Principles of Ichnology

Depositional Sequence Stratigraphy I

Depositional Sequence Stratigraphy II

Depositional Sequence Stratigraphy III

Seismic Sequence Stratigraphy

Principles of Paleoenvironmental Interpretation

Principles of Paleogeographic Reconstructions

Principles of Paleocological Reconstructions

Developing Realistic Cross-sections