

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

GEOLOGY 5322 – Advanced Geophysical Techniques Seminar
Fall 2008

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Course Description

This graduate-level course is for coastal and marine systems science and environmental science majors and professional petroleum geologists who would like a better understanding of the latest advanced geophysical techniques and principles available to geoscientist working subsurface problems. The course will examine the latest topics, techniques, and software. The class will consist of many hands-on introductions to the latest software. New techniques and topics will be presented by geology staff and visiting experts working in those fields.

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

Course Goals and Objectives

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

- (1) apply the latest principles and limitations of advanced 3-D seismic interpretation using state of the art software (including SMT, Geographix, etc.)
- (2) apply the principles of sequence stratigraphy and its use in the interpretation of seismic reservoir systems
- (3) apply the latest advanced concepts and models of seismic data processing
- (4) identify basic depositional facies patterns in 3-D seismic data volumes
- (5) utilize Ground-penetrating Radar data in delineating reservoir heterogeneity
- (6) apply the latest advanced techniques in geophysical well-log analysis
- (7) integrate gravity and magnetic survey data in the interpretation of seismic data
- (8) utilize the principles of down hole micro-resistivity imaging logs and dipmeter logs
- (9) utilize the principles hydrofracturing technology and subsurface stress fields
- (10) utilize the principles and use of magnetotelluric techniques
- (11) integrate biostratigraphy with the interpretation of 3-D seismic data volumes

Evaluation and Grade Assignment

Grades will be based on:

- A) Classroom exams, quizzes, and problem sets (40%)
- B) Research paper describing the latest advances in one of the presented geophysical technologies including examples of how this technology could increase efficiency in the analysis of subsurface geology problems (30%)

- C) Research project involving the solving of a practical geological problem or geological interpretation using a geophysical data set, including the presentation of the results of the project (30%)

Fees

A lab fee of \$50.00 will be collected to cover costs of computer facility maintenance and printer and plotter supplies.

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.

Textbook

No textbook required

Research papers, technical manuals and practical exercise handouts will be provided as needed

Supplies

Notebook, pencils, colored pencils, scientific calculator

Lecture Topics

Depositional sequence stratigraphy

Seismic data analysis using Geographix software

Seismic data analysis using SMT software I

Seismic data analysis using SMT software II

Seismic data analysis using SMT software III

Advanced seismic data analysis techniques

Seismic data processing

Advanced well log analysis

Great successes and failures using subsurface geophysical data

Ground-penetrating radar techniques

Magnetotelluric techniques

Applications of gravity and magnetic surveying to subsurface interpretations

Applications of micropaleontology to seismic stratigraphy

An introduction to hydrofracturing technology and subsurface stress fields

Down hole micro-resistivity imaging logs and dipmeter logs