

**Course Syllabus: Seismic Interpretation**  
**McCoy College of Science, Mathematics, and Engineering**  
GEOS 6853  
Fall 2019

**Contact Information**

Instructor: Dr. Andrew Katumwehe

Office: Bolin 307H

Lecture: TR 8:00-9:20 AM RM 105

Lab: R 11:00-11:50 AM RM 105

Office hours: Mon-Wed and Friday; 1:00 – 4:00PM and by appointment

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**Course Description**

This course aims to provide students with basic seismic interpretation. This course is focused on methods and approaches that are appropriate for the shallow targets. Lectures will cover only the most essential aspects of the 26 topics that comprise this course. The course introduces each geophysical method by presenting the basic theory as well as its practical applications in exploring a given target. We will cover the various fundamental principles of experimental designs to support the theory and brief discussions on how data is processed and interpreted.

We will examine the different elements involved such seismic data acquisition and processing principles for both refraction and reflection seismics. We will cover Seismic well tie based on modeling a synthetic seismogram from sonic and density logs to match them with seismic reflection data to produce a relationship between the logs (measured in depth) and the seismic (measured in travel time). However, we will go into more detail for the reflection seismic data acquisition and interpretation. Many sedimentary layers behave differently to due to the difference in acoustic impedance. Most times this, difference is utilized in inferring the geology of the subsurface from processed seismic record directed towards the creation of structural maps of the subsurface from the observed three dimensional configuration of arrival times. Other important topics covered will be seismic amplitude and attribute analysis that are important in fault interpretation and horizon correlation. Attributes such as coherency and amplitude will be discussed on how they aid in identifying structural and depositional phenomena. The theory of wave propagation, velocity models and the importance of seismic migration will be discussed. In addition to the PowerPoint-based lectures, you are expected to read the appropriate chapters in the required course textbook. This course outline/syllabus contains a detailed schedule including a list of specific topics. You are expected to attend lectures and come prepared. The Lab portion of the course has an industry standard hands-on project that is designed for individual projects participation and a final project presentation.

Active participation in all required lab sessions is expected. Completion of all lab assignments on time is expected. If you are going to miss a lab you must let Dr.

Andrew know in advance. You must make up any missed lab by making suitable arrangement with Dr. Andrew. Note that some labs will consist of take home problem sets only whereas other labs will require use of software available on computers in Bolin 105 or Bolin 308. We may use part of the lab to finalize lecture materials before we embark on a the individual project

### **Required Textbook & Instructional Materials**

1- Introduction to Applied Geophysics by Burger, Sheehan, and Jones Norton 2006

### **Student Handbook**

Refer to: [Student Handbook 2017-18](#)

### **Academic Misconduct Policy & Procedures**

Academic Dishonesty: Cheating, collusion, submitting similar projects and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted norm of crediting, or the submission for credit of work not the individual's to whom credit is given). Additional guidelines on procedures in these matters may be found in the Office of Student Conduct.

### **Grading**

Assignments=10% of final grade. Lab assignments =30%, while individual final project contributes 60% of the total grade. If you miss any of the classes make up is possible only if (1) you have a written excuse as to why you missed the exam and (2) you notified Dr. Andrew Katumwehe in advance that you would miss the exam. A missed exam must be made up within one week or you may receive a grade of zero. Note that oversleeping is not an acceptable reason! The final project will be an individual effort. Lab attendance and participation, lab exercise completion and homework assignments will determine your overall Lab Completion grade. All lab assignments must be turned in within one week of original due date. The final project submitted more than two weeks late may be given a grade of zero. The final project must be orally presented (the grading rubric will be uploaded on D2L), submitted in both printed and electronic form. The electronic form will follow the following criteria; 1-Geology summary (use two lithological units) and faulting. 2-Interpretation workflow. 3-Horizon interpretation (inline and crossline). 4-Results map figure showing synthetic tie, figure with well tie showing horizon. 5-Discussion (figure showing the faults, contours, structure, isochrones and amplitudes. 6-Conclusion. The latter should be submitted via Dr. Andrew Katumwehe's University email at [andrew.katumwehe@msutexas.edu](mailto:andrew.katumwehe@msutexas.edu) with the words "GEOS 6853 Paper Fall 2019" along with your paper title on the email subject line. The project grade is determined based on format compliance. All components of your final grade must be submitted/completed by December 6. The homework assignments will be posted on D2L. The homework assignments will include questions to answer that focus on lecture and lab content. Homework due dates are listed in the syllabus. The Table below (next page) summarizes the grading policy for this course.

**Table 1: Points allocated to graded item or group of items discussed in the Grading Section above.**

<b>Graded Items</b>	<b>Contribution to Final Course Grade</b>
Lecture Assignments	10%
Lab Assignments	30%
Final Projects	60%

**Table 2: Final grade determination** (grades are rounded up to the nearest integer before assigning the final course letter grade. This means, for example, that a final calculated course grade of 89.8% will be rounded up to a final course grade of 90.)

<b>Grade</b>	<b>Points</b>
A	90 and above
B	80-89
C	70-79
D	60-69
F	Less than 60

### **Homework**

See Grading Section for details – All Homework to be submitted to my office in your regular lab section

### **Lab Assignments**

See Grading Section for details – All Lab Assignments to be submitted to me during your regular lab section meeting.

### **Lab Attendance Policy – Important!**

Students who miss three or more lab section meetings may be dropped from the course by the instructor. Students must notify Dr. Andrew Katumwehe by email in advance of missing a lab section. Students who leave lab sections early may be marked absent.

### **Exams**

This course has no exams but the final project will be an individual effort.

### **Final Project**

See Grading Section for details about content and format. The power point presentation and PDF format must be submitted to [andrew.katumwehe@msutexas.edu](mailto:andrew.katumwehe@msutexas.edu) and paper copy to my physical mailbox in Bolin 307H.

## **Late Work**

Late work will be accepted with the following penalties: 10% for one day past due; 20% for two days past due; 30% for one weeks past due; after one week a grade of zero may be recorded. No course assignments will be accepted after 12/06/2019.

## **Important Dates**

The last Day to drop this course is found on the University 2019 Fall calendar under [Drops, Withdrawals & Void](#)

## **Desire-to-Learn (D2L)**

The MSU D2L program is a part of this course. Lectures, review materials, and course information are available through D2L. You can log into [D2L](#) through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

## **Change of Schedule**

A student dropping a course (but not withdrawing from the University) within the first 12 class days of a regular semester or the first four class days of a summer semester is eligible for a 100% refund of applicable tuition and fees. Dates are published in the Schedule of Classes each semester.

## **Refund and Repayment Policy**

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs. As described below, two formulas (federal and state) exists in determining the amount of the refund. (Examples of each refund calculation will be made available upon request).

## **Services for Students with Disabilities**

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through Disability Support Services, located in the Clark Student Center, Room 168, (940) 397-4140. Current documentation of a disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to [Disability Support Services](#).

## **College Policies**

Campus Carry Rules/Policies are given here: [Campus Carry Rules and Policies](#)

### **Smoking/Tobacco Policy**

College policy strictly prohibits the use of tobacco products in any building owned or operated by WATC. Adult students may smoke only in the outside designated-smoking areas at each location.

### **Alcohol and Drug Policy**

To comply with the Drug Free Schools and Communities Act of 1989 and subsequent amendments, students and employees of Midwestern State are informed that strictly enforced policies are in place, which prohibits the unlawful possession, use or distribution of any illicit drugs, including alcohol, on university property or as part of any university-sponsored activity. Students and employees are also subject to all applicable legal sanctions under local, state and federal law for any offenses involving illicit drugs on University property or at University-sponsored activities.

### **Grade Appeal Process**

Students who wish to appeal a grade should consult the Midwestern State University [Undergraduate Catalog](#)

### **Notice**

Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructor. These changes will be communicated to all students through [D2L](#). Please check the course news on a regular basis for schedule updates.

The course schedule detail is given below the first table lists lecture topics, textbook readings, and the three lecture exams. The second table lists the dates for the lab topics, three lab quizzes, research paper due date, homework assignment due dates, and self-assessment assignments.

## Tentative Course Schedule – Laboratory and Lecture Topics

Date	Topic and Topic Number	
27-Aug	Course overview, Schedule	
29-Aug	Fundamentals of seismic methods	
02-Sep	Labor Day - No Classes	None
3-Sep	Refraction seismic method	
05-Sep	Reflection seismic methods	
10-Sep	Seismic reflection acquisition	
12-Sep	Seismic synthetics	
17-Sep	Coherence and amplitude	
19-Sep	Seismic attribute-curvature	
24-Sep	Seismic lab project-Kingdom suite	
26-Sep	Seismic attribute-curvature	
01-Oct	Seismic correlation	
03-Oct	Seismic amplitude gradients	
08-Oct	Volumetric analysis	
10-Oct	Project introduction	
15-Oct	Sequence stratigraphy	
17-Oct	Structure styles in oil and gas	
22-Oct	Fracture analysis	
24-Oct	Individual Project	
29-Oct	Individual Project	
31-Oct	Individual Project	
05-Nov	Individual Project	
07-Nov	Individual Project	
12-Nov	Individual Project	
14-Nov	Individual Project	
19-Nov	<b>Project Presentation</b>	
21-Nov	<b>Project Presentation</b>	
26-Nov	<b>Project Presentation</b>	
28-Nov	<b>Thanksgiving Break - No Class</b>	
03-Dec	<b>Final I Presentation</b>	