



**GEOL 4433 - GEOPHYSICS  
TENTATIVE SYLLABUS - Fall Semester 2009**

| [Inclement Weather](#) | [Religious Observances](#) | [Grading](#) |

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**TEXTBOOK:**

Lillie, R.J., Whole Earth Geophysics: An Introductory Textbook for Geologists & Geophysicists: Upper Saddle River, NJ, Prentice-Hall, 361pp.

**OFFICE:**

Wednesdays, 2:00 - 5:00 p.m. in Ozark Hall room 202.  
Phone: 479-575-7134 or 479-575-6603

**EXPECTED LEARNING OUTCOMES:** Students who successfully complete this course should:

- 1 Understand basic principles of physics and their application to understanding of global-scale processes manifest as major geologic features of Earth;
- 2 Display basic understanding of elastic properties of rock;
- 3 Understand basic principles of seismic refraction;
- 4 Understand basic principles of seismic reflection;
- 5 Have basic understanding of the interior structure of Earth deduced from seismic methods;
- 6 Understand fundamentals governing variation of gravity across Earth;
- 7 Display basic understanding of the role of paleomagnetic studies in understanding Earth history
- 8 Display basic understanding of heat flow in the Earth

The student will demonstrate basic understanding of these topics through successful completion of laboratory exercises and examinations.

**WEEK 1**

08/24/09 M LAB 01 INTRODUCTION TO EARTH PROPERTIES  
08/26/09 W Policies & Procedures in GEOL 4433  
Read: Preface, Ch. 1  
08/28/09 F Overview of Geophysics: Methods  
Read: Ch. 1

**WEEK 2**

09/01/09 M LAB 02: GEOPHYSICAL RESOURCES: Digital Data Bases in Geophysics  
09/02/09 W Overview of Geophysics: Data and Interpretations  
Read Ch. 1  
09/04/09 F Overview of Geophysics: Importance to Modern Geology  
Read Ch. 2  
**LAB 02: GEOPHYSICAL RESOURCES: Due Today**

**WEEK 3**

09/07/09 M **NO CLASS TODAY; LABOR DAY HOLIDAY**



09/09/09 W ROCK PHYSICS: Elastic Properties of Rocks  
Read: Ch. 3, 45-50.

09/11/09 F ROCK PHYSICS: Seismic Wave Propagation  
Read: Ch. 3, 50-71.

#### WEEK 4

09/14/09 M LAB 03: BASIC PRINCIPLES OF SEISMIC METHODS

09/16/09 W SEISMIC REFRACTION: Snell's Law

Read: Ch. 3, 52-70

09/18/09 F SEISMIC REFRACTION: Refraction Surveying

Read: Ch. 3, 52-70

#### WEEK 5

9/21/09 M **EXAM I: Ch. 1-3**

9/23/09 W SEISMIC REFRACTION: Refraction Surveying

Read: Ch. 3, p.52-70

9/25/09 F SEISMIC REFRACTION: Interpreting Seismic Refraction Data

Read: Ch. 4, 73-85

#### WEEK 6

9/28/09 M LAB 04: UA LIBRARY RESOURCES: Ms. Jan Dixon, GEOS Reference Librarian

9/30/09 W INTRODUCTION TO SEISMOLOGY: Basic Concepts and Phases

Read: Ch. 7

10/02/09 F INTRODUCTION TO SEISMOLOGY: Time-Distance Curves in Seismology

Read: Ch. 7, 206-218.

#### WEEK 7

10/05/09 M LAB 05: FINDING THE MOHOROVICIC DISCONTINUITY

10/07/09 W SEISMIC REFLECTION: Basic Principles

Read: Ch. 5, 100-106

10/09/09 F SEISMIC REFLECTION: Interpreting Seismic Reflection Data

Read: Ch. 6

#### WEEK 8

10/12/09 M LAB 06: SEISMIC REFRACTION MODELING

10/14/09 W SEISMIC REFLECTION: Sequence Stratigraphy

Read: Supplemental Reading Assigned

10/16/09 F SEISMIC REFLECTION: Sequence Stratigraphy and Plate Tectonics

Read: Ch. 6, 163-168

#### WEEK 9

10/19/09 M NO CLASS – GEOLOGICAL SOCIETY OF AMERICA MEETING

10/21/09 W NO CLASS – GEOLOGICAL SOCIETY OF AMERICA MEETING

10/23/09 F Review of major discoveries in Geosciences from the GSA Meeting

#### WEEK 10

10/26/09 M LAB 07: SEISMIC REFLECTION PROFILES AND INTERPRETATION

10/28/09 W INTRODUCTION TO GRAVITY

Read: Ch. 8, 223-237

10/30/09 F GRAVITY AND ISOSTASY

Read: Ch. 8, 237-243

#### WEEK 11

11/02/09 M **EXAM II, Ch. 3-7**

11/04/09 W GRAVITY, ISOSTASY, AND TECTONICS



11/06/09 F Read: Ch. 8, 260-276  
GRAVITY, ISOSTASY, AND TECTONICS  
Read: Ch. 8, 260-276

## WEEK 12

11/09/09 M LAB 08: GRAVITY MODELLING  
11/11/09 W EARTH MAGNETISM  
Read: Ch. 9, 284-297  
11/13/09 F PALEOMAGNETISM  
Read: Ch. 9, 297-308

## WEEK 13

11/16/09 M LAB 09: INTERPRETING MAGNETIC ANOMALIES  
11/18/09 W INTRODUCTION TO HEAT FLOW  
Read: Ch. 10, 311-320  
11/20/09 F INTERPRETING HEAT FLOW  
Read: Ch. 10, 320-328.

## WEEK 14

11/23/09 M **EXAM III, Ch. 8-9**  
11/25/09 W NO CLASS: THANKSGIVING BREAK  
11/27/09 F NO CLASS: THANKSGIVING BREAK

## WEEK 15

11/30/09 M LAB 10: HEAT FLOW  
12/02/09 W REVIEW FOR FINAL EXAM  
12/04/09 F REVIEW FOR FINAL EXAM

## WEEK 16

12/07/09 M COURSE EVALUATIONS & FINAL EXAM REVIEW  
12/09/09 W NO CLASS: DEAD DAY

**12/12/08 S FINAL EXAM, 3:00 – 5:00 P.M.**

## NOTES ON GRADING POLICIES FOR THIS COURSE:

Your grade for this course will be determined by your performance on the laboratory assignments and the examinations. Your overall grade for the course will be apportioned as follows:

Laboratory Assignments 25%

Examinations 75% - The final examination will be comprehensive. Exam I = 15% of your final grade, Exams II, III, and Final Exam= 20% each of your final grade.

Please note that late assignments and exams will neither be accepted nor graded by me. Grading laboratory assignments and exams for this course is a very time-consuming endeavor for which I must carefully budget my time. I will not tolerate assignments trickling in after posted deadlines.

There will be no exceptions, so PLEASE don't ask!

Additionally, you may expect grades to be determined according to the following guidelines:

A 90% or better; B 89% - 80%; C 79% - 70%; D 69% - 60%; F 59% or below



NOTES ON RELIGIOUS OBSERVANCES:

The University of Arkansas does not observe religious holidays. However, the Campus Council has passed a resolution concerning individual observance of religious holidays as it pertains to class attendance. In accordance with the wishes of the Campus Council, the following policy regarding religious observances will be adhered to in this course:

*When members of any religion seek to be excused from class for religious reasons, they are expected to provide their instructors with a schedule of religious holidays that they intend to observe, in writing, before the completion of the first week of classes.*