AGP 411 - SEISMIC METHODS OF PROSPECTING

COURSE PARTICULARS

Course Code: AGP 411  
Course Title: Seismic Methods Of Prospecting  
No. of Units: 3  
Course Duration: Three hours of theory and three hours of practical per week for 15 weeks  
Status: Compulsory  
Course Email Address: agp411@gmail.com  
Course Webpage: http://www.fwt.futa.edu.ng/courseschedule.php?coursecode=AGP%20411  
Prerequisite: AGP 202

COURSE INSTRUCTORS

Prof. (Mrs) M. T. Olowokere  
Room 7, Applied Geophysics Wing, 1st Floor, SEMS Building,  
Dept. of Applied Geophysics,  
Federal University of Technology, Akure, Nigeria.  
Phone: +2348035415090  
Email: mtolowokere@futa.edu.ng

and

Prof. B. D. Ako  
Room 3, Applied Geophysics Wing, 1st Floor, SEMS Building,  
Dept. of Applied Geophysics,  
Federal University of Technology, Akure, Nigeria.  
Phone: +2345037117058  
Email: bdako@futa.edu.ng

Dr Mike Ayuk  
Applied Geophysics Wing, 1st Floor, SEMS Building,  
Dept. of Applied Geophysics,  
Federal University of Technology, Akure, Nigeria.  
Phone: +2348035223352  
Email: maayuk@futa.edu.ng

Mr S. J. Abe  
Chevron Laboratory, PG Laboratory Building,  
Dept. of Applied Geophysics,  
Federal University of Technology, Akure, Nigeria.  
Phone: +2348035652409  
Email: sjabe@futa.edu.ng
COURSE DESCRIPTION


The objectives of this course are to:

- have full understanding of the following:
  - Analytical treatment of elementary seismic reflection problems.
  - Concept of 3-D depth imaging in seismic exploration and development.
  - Prediction of reservoir parameters from seismic data.
  - Delineate reservoirs and discover reserves from both structural and stratigraphic traps in order to determine where wells can be located.
  - Reservoir Management using Seismic Data

COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will be able to:

(Knowledge based)
- understand type of seismic velocities and determination methods and their applications;
- Determine the thickness of rock layers.
- Predict reservoir parameters using seismic data
- Delineate reservoir locations,

(Skills)
GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

- Class Attendance: 10%
- Assignments: 10%
- Test(s): 20%
- Final Examination: 60%

TOTAL: 100%

GENERAL INSTRUCTIONS

Attendance: It is expected that every student will be in class for lectures and also participate in all practical exercises. Attendance records will be kept and used to determine each person’s qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with any of the instructors, indicating the reason for the absence.

Academic Integrity: Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person’s work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students’ misconduct as spelt out in the Students’ Handbook.

Assignments and Group Work: Students are expected to submit assignments as scheduled. Failure to submit an assignment as at when due will earn you zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

Code of Conduct in Lecture Rooms and Laboratories: Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, etc.) during lectures. Food and drinks are not permitted in the laboratories.

READING LIST

The following books cover important topics in reflection seismology. Most require some knowledge of mathematics, geology, and/or physics at the university level or above.


Further research in reflection seismology may be found particularly in books and journals of the Society of Exploration Geophysicists, the American Geophysical Union, and the European Association of Geoscientists and Engineer.

*Legend*

1- Available on the Internet via the professional bodies' website.

2- Available as Personal Collection

3- Available in local bookshops.
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<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>1</td>
<td>• Elasticity. Huygen’s principle and ray path. Snell’s law. Propagation of seismic waves in a homogeneous medium.</td>
<td>During this first class, the expectation of the students from the course will also be documented.</td>
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<tr>
<td>2 &amp; 3</td>
<td>• Factors affecting seismic velocities. • Types of seismic waves. Seismic refraction fundamentals. • Horizontal and Multilayer refraction. • Single dipping interface refraction profile.</td>
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<tr>
<td>4 &amp; 5</td>
<td>• Fermat’s principle (Least time). Statics. • The Single refractor case. • Field techniques. Processing and interpretation of seismic refraction data. • Applications of the Seismic Refraction Method. Time-Depth charts. • Reflections from a dipping interface.</td>
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<td>6</td>
<td>• Elementary concepts of the reflection seismology. • Analytical treatment of elementary seismic reflection problems.</td>
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<tr>
<td>7 &amp; 8</td>
<td>• Determination of velocity and depth to interface. • Characteristics of seismic events. Types of seismic noise. Attenuation of noise.</td>
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<tr>
<td>9 &amp; 10</td>
<td>• Field methods and equipment for land survey. Marine equipment and methods. • Processing and interpretation of seismic reflection data: • Interpretation Procedures • Structural Interpretation</td>
<td>Students will be divided into groups and given practical case studies.</td>
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<tr>
<td>11 &amp; 12</td>
<td>• Direct Contouring and the Importance of the Strike Perspective • Fault Recognition and Mapping • Composite Displays • Students will be divided into groups and given practical case studies.</td>
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<tr>
<td>13 &amp; 14</td>
<td>• Advantages and Disadvantages of Different Displays • Subtle Structural Features • Visualization and Autotracking.</td>
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<td>15</td>
<td>REVISION This is the week preceding the final examination. At this time, evaluation will be done to assess how far the students’ expectations for the course have been met.</td>
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