



Bachelor Program in Geophysics

Faculty of Mathematics and Natural Sciences
HASANUDDIN UNIVERSITY

12. Seismic Refraction

Module Name	:	Seismic Refraction
Module Level	:	Bachelor
Code, if applicable	:	23H06120303
Subtitle, if applicable	:	-
Courses, if applicable	:	Seismic Refraction
Semester(s) in which the module is taught	:	III (Third Semester)
Module coordinator(s)	:	Ir. Bambang Hari Mei Soeprapto, M.Si
Lecturer(s)	:	Ir. Bambang Hari Mei Soeprapto, M.Si., Drs. Erfan, M.Si., Sabrianto Aswad, S.Si., MT.
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Compulsory courses in the second year for Bachelor Degree in Geophysics
Type of teaching, contact hours	:	This course is delivered through Lectures (i.e., Project/Case-based learning), complemented by structured assignments (paper review, project/case evaluation) and independent study. Contact hours consist of 150 minutes lectures per week, plus 180 minutes per week for each of the following: structured assignments and independent study
Workload	:	Total workload is 135 hours per semester, consisting of 38 hours for lectures, and 48.5 hours each for structured assignments and independent study
Credit points	:	3 SKS (4.8 ECTS)
Requirements according to the examination regulations	:	Students are eligible to attend the examination if their absences are less than 20% of the lectures
Recommended prerequisites	:	-
Module objectives/intended learning outcomes	:	After completion of this module, students will be able to: CLO 1. Students are able to explain refracted seismic waves and their relationship to aspects of earth science and exploration; CLO 2. Students are able to explain the potential of regional geology in Indonesia and the process of hydrocarbon and geotechnical exploration. The following is the mapping of the ILO and the CLO of this course:



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				ILO 4	ILO 6	ILO 8	ILO 12
		CLO 1	✓	✓			
		CLO 2				✓	✓

Content	:	1. Theory of Seismic Wave Propagation in Elastic-Isotropic Media; 2. Concept of anisotropy-isotropy; 3. Snapshot and Synthetic Seismogram 4. Eikonal Equation: 5. Basic Theory of Seismic Refraction 6. Seismic Refraction Data Acquisition and Data Processing for 2-Layer Cases; 7. Interpretation Methods; 8. Seismic Transmission; 9. Wide-angle Seismic																														
Study and examination requirements		Participants are marked based on their performance in theory: Case Study/Project (100%). Students are marked based on their percentage of points obtained and based on the following grade scale: <table><tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr><tr><td>85 – 100</td><td>A</td><td>4.00</td></tr><tr><td>80 - <85</td><td>A-</td><td>3.75</td></tr><tr><td>75 - < 80</td><td>B+</td><td>3.5</td></tr><tr><td>70 - < 75</td><td>B</td><td>3.0</td></tr><tr><td>65 - < 70</td><td>B-</td><td>2.75</td></tr><tr><td>60 - < 65</td><td>C+</td><td>2.5</td></tr><tr><td>50 - < 60</td><td>C</td><td>2.00</td></tr><tr><td>40 - < 50</td><td>D</td><td>1.00</td></tr><tr><td>< 40</td><td>E</td><td>0.00</td></tr></table>	Percentage of Achievement	Grade	Conversion Value	85 – 100	A	4.00	80 - <85	A-	3.75	75 - < 80	B+	3.5	70 - < 75	B	3.0	65 - < 70	B-	2.75	60 - < 65	C+	2.5	50 - < 60	C	2.00	40 - < 50	D	1.00	< 40	E	0.00
Percentage of Achievement	Grade	Conversion Value																														
85 – 100	A	4.00																														
80 - <85	A-	3.75																														
75 - < 80	B+	3.5																														
70 - < 75	B	3.0																														
65 - < 70	B-	2.75																														
60 - < 65	C+	2.5																														
50 - < 60	C	2.00																														
40 - < 50	D	1.00																														
< 40	E	0.00																														



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Exams and assessment formats	Assessment in this course is entirely case/project-study based. Students are provided with real or simulated cases, which they analyze in depth by processing and interpreting data, preparing a written report, and presenting their findings. The case studies are evaluated by the lecturer, with feedback given for revisions. Final assessment is determined by the quality of the analysis, accuracy of problem-solving, and the completeness of the revised report.
Reading list	Main References: 1. Telford et al.; Applied Geophysics, Cambridge University Press, 1976. 2. Musgrave, A.; Seismic refraction prospecting, Society of Exploration Geophysics, Tulsa, 1986. 3. Cerveny, Ray Theory, Cambridge Univ, Press., 2004. 4. N. Matsuda; Seismic refraction analysis for engineering study, Oyo Technical Notes, 1981. 5. Kenneth, H.W.; Refraction Seismologi. John Wiley and Sons, 1988. Additional References: 1. Taib, M.I.T.; Interpretasi Seismic Refraksi dan Seismologi Teknik, Laboratorium Geoteknik, Pusat Antar Universitas Ilmu Rekayasa-ITB, 1987. 2. Abdullah M. Al-Amri "Princip of Geophysics" Dept. of Geology & Geophysics King Saud University, Riyadh 3. Peter M. Shearer 2009 "Introduction to Seismology second edition" Cambridge University Press Bina, S.M., Jalilinasrabad, S., Fujii, H. & Relevant reputable international journals published in the last 5 years.
Last revision date	July 1 st , 2025