SEMESTER COURSE PLAN

GEOPHYSICS GEOTECHNIQUES (P1) COURSES
(23H06131503)

TEACHING TEAM

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STUDI PROGRAM OF GEOPHYSICS - S1
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
HASANUDDIN UNIVERSITY
MAKASSAR

2025

STUDY PROGRAM OF GEOFISIKA - S1
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
HASANUDDIN UNIVERSITY

Vision

Become a program Reliable studies in the field of geophysics to produce superior graduates and mastering science, technology, arts and culture based on BMI in 2030.

Vision Strategy

Misson

Based on the Vision above, the Geophysics Study Program has a mission:

1. Improving the quality of education to produce graduates who are competitive, able to work independently and in groups in implementing and developing science and technology, SBUD BMI;

2. Carrying out research to produce reliable and competitive scientific work oriented towards scientific development solid geophysics, marine geophysics, geoinformatics and hydro-meteorology;

3. Disseminate the results of applied research, action studies and appropriate technology packages in synergistic and accelerated productive activities to improve the quality of life of the community.

Graduate Profiles

Educators in the Field of Geophysics; meteorologist; geomaths; oceanographer; exploration geophysicist; seismologist ; geophysical entrepreneur.

PLO charged to courses

CPL-6 (P3) - Mastering the principles and methods of exploration geophysics in the analysis and interpretation of Geophysical measurement data;

CPL-7 (P4) - Master the principles and current issues of natural disasters and how to mitigate disaster risks

CPL-13 (KK3) - Able to formulate alternative solutions to solve disaster mitigation problems by taking into account public safety, social and environmental factors

Course Learning Outcomes (CLO)

CPMK-1: Able to explain the impacts of geological disasters and the role of geophysical methods in the geotechnical field (CPL7)

CPMK-2: Able to apply geophysical methods to solve various problems in the geotechnical field (CPL6)

CPMK-3: Able to create zoning maps of potential earthquakes and landslides based on the results of geophysical methods (CPL13)

Sub-CLO

Sub CPMK-1: Explain the types of geological disasters and their impact on the geotechnical field (CPMK-1)

Sub CPMK-2: Describes the process by which earthquakes occur and the types of source mechanisms (CPMK-1)

Sub CPMK-3: Explain the factors that influence the amplitude of earthquake waves on the ground surface and their implications in the geotechnical field (CPMK-1)

Sub CPMK-4: Explain the mechanism of occurrence and physical features of landslides (CPMK-1)

Sub CPMK-5: Identify types of geophysical methods in earthquake and landslide disaster mitigation

problems (CPMK-2)

Sub CPMK-6: Demonstrate multichannel analysis of surface wave (MASW) survey data acquisition and processing (CPMK-2)

Sub CPMK-7: Demonstrate single-microtremor survey data acquisition and processing (CPMK-2)

Sub CPMK-8: Able to determine a 1D S wave velocity model profile based on observation data of dispersion curves from MASW and HVSR curves from microtremors (CPMK-2)

Sub CPMK-9: Explain methods for determining soil amplification (CPMK-2)

Sub CPMK-10: Find current issues of geotechnical problems (CPMK-2)

Sub CPMK-11: Demonstrate a distribution map of maximum amplitude and dominant soil period based on soil amplification results (CPMK-3)

Sub CPMK-12: Demonstrating Vs30 distribution maps and depth of bedrock layers based on S-wave 1D velocity model profiles (CPMK-3)

Learning Analytics

Geophysical Geotechnical (P1)

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Demonstrating Vs30 distribution maps and depth of bedrock layers based on S-wave 1D velocity model profiles (CPMK-3)

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Demonstrate a distribution map of maximum amplitude and dominant soil period based on soil amplification results (CPMK-3)

↑

Find current issues of geotechnical problems (CPMK-2)

↑

Explain methods for determining soil amplification (CPMK-2)

↑

Able to determine a 1D S wave velocity model profile based on observation data of dispersion curves from MASW and HVSR curves from microtremors (CPMK-2)

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Demonstrate single-microtremor survey data acquisition and processing (CPMK-2)

↑

Demonstrate multichannel analysis of surface wave (MASW) survey data acquisition and processing (CPMK-2)

↑

Identify types of geophysical methods in earthquake and landslide disaster mitigation problems (CPMK-2)

↑

Explain the mechanism of occurrence and physical features of landslides (CPMK-1)

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Explain the factors that influence the amplitude of earthquake waves on the ground surface and their implications in the geotechnical field (CPMK-1)

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Describes the process by which earthquakes occur and the types of source mechanisms (CPMK-1)

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Explain the types of geological disasters and their impact on the geotechnical field (CPMK-1)

Have passed the course Soil and Rock Physics (P1)

HASANUDDIN UNIVERSITY
FAKULTY OF MATHEMATICS AND NATURAL SCIENCES
STUDY PROGRAM OF GEOPHYSICS - S1
SEMESTER LEARNING PLAN

Course	Code	Cource Group	Credits	SEMESTER	Compilation Date
Geophysical Geotechnical (P1)	23H06131503	Solid Geophysics	3	5	1 Juli 2025

AUTHORITY	SLP Developer Lecturer	Coordinator	Head of Study Program
	Prof. Dr. Ir. Muh. Altin Massinai, MT., Surv., Drs. Erfan, M.Si., Andi Muhammad Pramatadie, S.T., M.Eng., Ph.D	Prof. Dr. Ir. Muh. Altin Massinai, MT., Surv.	Dr. Muhammad Alimuddin, Eng.

Learning Outcomes Course	**SLOs that are imposed on the course**	
	SLO-6:	Menguasai prinsip dan metode geofisika eksplorasi dalam analisis dan interpretasi data pengukuran Geofisika;
	SLO-7:	Menguasai prinsip dan issue terkini bencana alam dan bagaimana memitigasi resiko bencana
	SLO-13:	Mampu merumuskan alternatif solusi untuk menyelesaikan masalah mitigasi bencana dengan memperhatikan faktor-faktor keselamatan publik, sosial dan lingkungan
	SLO ⇒ Course Learning Outcomes	
	After completing this course, it is expected:	
	SLO-7	**CLO-1:** Able to explain the impacts of geological disasters and the role of geophysical methods in the geotechnical field
	SLO-6	**CLO-2:** Able to apply geophysical methods to solve various problems in the geotechnical field
	SLO-13	**CLO-3:** Able to create zoning maps of potential earthquakes and landslides based on the results of geophysical methods
	CLO ⇒ Sub-CLO	
	CLO-1	**Sub-CLO-1:**Explain the types of geological disasters and their impact on the geotechnical field
		Sub-CLO-2: Describes the process by which earthquakes occur and the types of source mechanisms
		Sub-CLO-3: Explain the factors that influence the amplitude of earthquake waves on the ground surface and their implications in the geotechnical field
		Sub-CLO-4: Explain the mechanism of occurrence and physical features of landslides
		Sub-CLO-5: Identify types of geophysical methods in earthquake and landslide disaster mitigation problems
		Sub-CLO-6: Demonstrate multichannel analysis of surface wave (MASW) survey data acquisition and processing
		Sub-CLO-7: Demonstrate single-microtremor survey data acquisition and processing

	CLO-2	**Sub-CLO-8:**Able to determine a 1D S wave velocity model profile based on observation data of dispersion curves from MASW and HVSR curves from microtremors
		Sub-CLO-9: Explain methods for determining soil amplification
		Sub-CLO-10: Find current issues of geotechnical problems
	CLO-3	**Sub-CLO-11:**Demonstrate a distribution map of maximum amplitude and dominant soil period based on soil amplification results
		Sub-CLO-12: Demonstrating Vs30 distribution maps and depth of bedrock layers based on S-wave 1D velocity model profiles
	Correlation between SLOs/CLOs to Sub-CLOs	

SLOs that are charged on the Course	CPMK	SUB CPMK	Form of Assessment*				Weight	Value	Student Score
			Formative	Sumative					
				Project/Case Study	Task	Summative Test			
SLO-7	CLO-1	SUB-CLO-1	Participation, Report (PT)	6	0	0	6		
SLO-7	CLO-1	SUB-CLO-2	Participation, Report (PT)	0	6	0	6		
SLO-7	CLO-1	SUB-CLO-3	Participation, Report (PT)	6	0	0	6		
SLO-7	CLO-1	SUB-CLO-4	Participation, Report (PT)	6	0	0	6		
SLO-6	CLO-2	SUB-CLO-5	Participation, Report (PT)	6	0	0	6		
SLO-6	CLO-2	SUB-CLO-6	Participation, Report (PT), Presentation (PT), Quiz	14	0	0	14		
SLO-6	CLO-2	SUB-CLO-7	Participation, Report (PT), Presentation (PT), Quiz	0	0	14	14		
SLO-6	CLO-2	SUB-CLO-8	Participation, Report (PT)	12	0	0	12		
SLO-6	CLO-2	SUB-CLO-9	Participation, Report (PT)	6	0	0	6		
SLO-6	CLO-2	SUB-CLO-10	Participation, Presentation (PT)	0	12	0	12		
SLO-13	CLO-3	SUB-CLO-11	Participation, Report (PT)	0	6	0	6		
SLO-13	CLO-3	SUB-CLO-12	Participation, Report (PT)	0	0	6	6		
				56	24	20	100		

Course Description	This Geotechnical Geophysics course discusses the role of geophysics in geotechnical problems. In particular, the application of geophysical methods in mitigating earthquake and landslide disasters is a concern in the geotechnical field. Course presentation is held in the form of interactive lectures, small group discussions, and field practice, so that course participants can gain insight and experience in field practice. This course can be taken by undergraduate students in the geophysics department in semester 5.

Learning Materials/Subjects	1. Geological disaster 2. Earthquakes and their impacts 3. Landslides 4. Determination of S wave velocity profile 5. Surface wave survey method 6. Microtremor method 7. Soil amplification 8. Earthquake microzonation 9. Depth mapping of bedrock layers
Reference	**Main References**
	1. Kramer, S. L., 1996; Geotechnical Earthquake Engineering; Prentice-Hall. 2. Foti, S., Lai, C.G., Rix, G.J., and Strobbia, C., 2015, Surface Wave Methods for Near-Surface Site Characterization: CRC Press 3. Sharma, P. V., 1997, Environmental and Engineering Geophysics: Cambridge University Press. 4. Parnadi, W.W., 2008, Lecture Diktat in Engineering and Environmental Geophysics 5. Oliveira, Roca, Goula (Eds.), 2008, Assessing and Managing Earthquake Risk; Springer.
	Additional References
	recent papers on geotechnical geophysics in the journals The Leading Edge, Geophysics, Near Surface Geophysics, First Break; Geophysical Prospecting and Journal of Applied Geophysics.
Teaching Team	Prof. Dr. Ir. Muh. Altin Massinai, MT., Surv., Drs. Erfan, M.Si., Andi Muhammad Pramatadie, S.T., M.Eng., Ph.D
Course requirement	Soil and Rock Physics (P1)

Week	**Sub CPMK (End-of-stage learning ability)**	**Penilaian (*Assesment*)**		**Learning Forms and Methods [time estimate]**		**Content**	**Weight of Assessment (%)**
		Indicator	**Techniques & Criteria**	**Offline**	**Online**		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**

1	Explain the types of geological disasters and their impact on the geotechnical field (CPMK-1)	**Formative:** Accuracy in explaining the occurrence of types of geological disasters and their impacts **Sumative:** -	**Formative Criteria:** Participation, Report (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Project/Case Study (6) dinilai dengan rubrik 1 **Assessment Technique:** Non Test	**Studying:** Group discussion (Small Group Discussion) TM [1 x 3 x 50"] **Studying:** Group discussion (Small Group Discussion) Worked in groups, each looking for 1 case of earthquake, landslide, liquefaction, tsunami in Indonesia. State the causes of these disasters and the impacts they cause. PT [1 x 3 x 60”] **Studying:** Group discussion (Small Group Discussion) Read Chapter 1 of main library book no. 1 BM [1 x 3 x 60”]		-RPS Courses -Lecture contracts -Introduction to geological disasters: Earthquakes, Landslides, Liquefaction, Tsunamis	6

2	Describes the process by which earthquakes occur and the types of source mechanisms (CPMK-1)	**Formative:** -Accuracy in explaining the occurrence of earthquakes Accuracy in explaining the types of earthquake source mechanisms earth **Sumative:** -	**Formative Criteria:** Participation, Report (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Task (6) dinilai dengan rubrik 1 **Assessment Technique:** Non Test	**Studying:** Group discussion (Small Group Discussion) TM [1 x 3 x 50"] **Studying:** Group discussion (Small Group Discussion) Identify the earthquake magnitude characteristics of various source mechanisms and their causes. PT [1 x 3 x 60"]		-Elastic Rebound Theory -Earthquake source mechanism	6

3	Explain the factors that influence the amplitude of earthquake waves on the ground surface and their implications in the geotechnical field (CPMK-1)	**Formative:** - Accuracy in explaining the factors that influence the amplitude of earthquake waves on the ground surface - Accuracy in explaining the implications of these factors in the geotechnical field **Sumative:** -	**Formative Criteria:** Participation, Report (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Project/Case Study (6) dinilai dengan rubrik 1 **Assessment Technique:** Non Test	**Studying:** Group discussion (Small Group Discussion) TM [1 x 3 x 50”] **Studying:** Group discussion (Small Group Discussion) Determine examples of earthquake recording cases that are dominated by: -source effect -path effect -site effect PT [1 x 3 x 60”] **Studying:** Group discussion (Small Group Discussion) Reading Chapter 6 of main library book no 1 BM [1 x 3 x 60”]		Factors that influence the amplitude of earthquake waves at the ground surface: -Source effect -Path effect -Soil/Site effect -Gel.S velocity profile	6

4	Explain the mechanism of occurrence and physical features of landslides (CPMK-1)	**Formative:** -Accuracy in explaining landslide events. -Accuracy in explaining the physical features of landslides **Sumative:** -	**Formative Criteria:** Participation, Report (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Project/Case Study (6) dinilai dengan rubrik 1 **Assessment Technique:** Non Test	**Studying:** Group discussion (Small Group Discussion) TM [1 x 3 x 50"] **Studying:** Group discussion (Small Group Discussion) Name 4 features of landslide settings that need to be identified in landslide investigations using geophysical methods. PT [1 x 3 x 60"] **Studying:** Group discussion (Small Group Discussion) -Reading Chapter 10 of main library book no 1 -Reading papers related to this subcpmk topic BM [1 x 3 x 60"]		-Landslide phenomena -Process of landslides -Physical features of landslides	6

5	Identify types of geophysical methods in earthquake and landslide disaster mitigation problems (CPMK-2)	**Formative:** - Accuracy in identifying geophysical methods in earthquake disasters. - Accuracy in identifying geophysical methods in landslide disasters **Sumative:** -	**Formative Criteria:** Participation, Report (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Project/Case Study (6) dinilai dengan rubrik 1 **Assessment Technique:** Non Test	**Studying:** Group discussion (Small Group Discussion) TM [1 x 3 x 50"] **Studying:** Group discussion (Small Group Discussion) Lecture participants describe: -methods for determining 1D gel velocity profiles. PT [1 x 3 x 60"] **Studying:** Case Study (Case Study) -Reading Chapter 1 of main library book no 2 -Reading papers related to this subcpmk topic BM [1 x 3 x 60"]		-Surface wave methods for S-wave velocity profile estimation -Multichannel analysis of surface waves -Microtremor measurement -Geoelectric method	6
6-7	Demonstrate multichannel analysis of surface wave (MASW) survey data acquisition and processing (CPMK-2)	**Formative:** - Accuracy in carrying out multichannel analysis of surface wave (MASW) survey data acquisition - Accuracy in carrying out multichannel analysis of surface wave (MASW) survey data processing	**Formative Criteria:** Participation, Report (PT), Presentation (PT), Quiz dinilai dengan rubrik 1 **Sumative Criteria:** Project/Case Study (14) dinilai dengan rubrik 4 **Assessment Technique:**	**Practicum, Studio Practice, Workshop Practice, Field Practice:** Cooperative learning (Cooperative learning) TM [1 x 3 x 50"] **Practicum, Studio Practice, Workshop Practice, Field Practice:**		-Acquisition of surface wave data and its parameters -Acquisition equipment -Analysis of recorded data in the time and distance domains - Transformation of the time and distance domains into phase velocities and frequencies -Dispersion curve analysis	14

		Sumative: -	Non Test	Cooperative learning (Cooperative learning) Mention the MASW survey acquisition design parameters and their functions Mention the MASW survey acquisition design parameters and their functions **Practicum, Studio Practice, Workshop Practice, Field Practice:** Cooperative learning (Cooperative learning) -Reading Chapter 3 of main library book no 2 -Reading papers related to this subcpmk topic BM [1 x 3 x 60”] **Studying:** Collaborative learning (Collaborative Learning) TM [1 x 3 x 50”] **Studying:** Cooperative learning (Cooperative learning), Collaborative Learning (Collaborative Learning) Lecture participants were divided into 3 groups presenting surface wave methods (surveys and data processing techniques): MASW, SASW, and CSW. PT [1 x 3 x 60”]			

				Studying: Collaborative learning (Collaborative Learning) -Reading Chapter 4 of main library book no 2 -Reading papers related to this sub-cpmk topic -Quiz: MASW data processing steps BM [1 x 3 x 60"]			
8-9	Demonstrate single-microtremor survey data acquisition and processing (CPMK-2)	**Formative:** - Accuracy in performing single-microtremor data acquisition - Accuracy in processing single-microtremor survey data **Sumative:** -	**Formative Criteria:** Participation, Report (PT), Presentation (PT), Quiz dinilai dengan rubrik 1 **Sumative Criteria:** Summative Test (14) dinilai dengan rubrik 1 **Assessment Technique:** Test and Non-Test	**Practicum, Studio Practice, Workshop Practice, Field Practice:** Cooperative learning (Cooperative learning) TM [1 x 3 x 50"] **Practicum, Studio Practice, Workshop Practice, Field Practice:** Cooperative learning (Cooperative learning) Mention the steps for data acquisition using microtremors PT [1 x 3 x 60"] **Practicum, Studio Practice, Workshop Practice, Field Practice:** Cooperative learning (Cooperative learning) -Reading Chapters 8.4 and 8.5 of main library book no 2		Acquisition of microtremor measurements -Acquisition equipment -Analysis of data records in the time domain -Data spectrum analysis -Hvsr curve analysis	14

				-Reading papers related to this subcpmk topic BM [1 x 3 x 60”] **Studying:** Collaborative learning (Collaborative Learning) TM [1 x 3 x 50”] **Studying:** Collaborative learning (Collaborative Learning) Lecture participants were divided into 3 groups presenting microtremor processing methods: SPAC, HVSR, and Interferometry Lecture participants were divided into 3 groups presenting microtremor processing methods: SPAC, HVSR, and Interferometry PT [1 x 3 x 60”] **Studying:** Collaborative learning (Collaborative Learning) -Reading Chapters 8.4 and 8.5 of main library book no 2 -Reading papers related to this subcpmk topic -Summative Test BM [1 x 3 x 60”]			

10-11	Able to determine a 1D S wave velocity model profile based on observation data of dispersion curves from MASW and HVSR curves from microtremors (CPMK-2)	**Formative:** Accuracy in demonstrating the process of determining the S-wave 1D velocity model profile based on observation data of dispersion curves and HVSR curves **Sumative:** -	**Formative Criteria:** Participation, Report (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Project/Case Study (12) dinilai dengan rubrik 1 **Assessment Technique:** Non Test	**Studying:** Cooperative learning (Cooperative learning) TM [2 x 2 x 50"] **Studying:** Cooperative learning (Cooperative learning) Lecture participants described the flow of the stages of the process of determining the 1D S wave velocity model profile based on dispersion curve observation data PT [1 x 3 x 60”] **Studying:** Cooperative learning (Cooperative learning) Lecture participants described the flow of the stages of the process of updating the 1D S-wave velocity model profile based on HVSR curve observation data BM [2 x 2 x 60"]		Evaluation of transfer functions -Uniform undamped soil on rigid rock -Uniform damped soil on rigid rock -Uniform damped soil on elastic rock -Layered damped soil on elastic rock	12

12	Explain methods for determining soil amplification (CPMK-2)	**Formative:** Accuracy in demonstrating the process of determining the S-wave 1D velocity model profile based on observation data of dispersion curves and HVSR curves **Sumative:** -	**Formative Criteria:** Participation, Report (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Project/Case Study (6) dinilai dengan rubrik 1 **Assessment Technique:** Non Test	**Studying:** Cooperative learning (Cooperative learning) TM [1 x 3 x 50"] **Studying:** Cooperative learning (Cooperative learning) Lecture participants derive the soil amplification equation PT [1 x 3 x 60"] **Studying:** Cooperative learning (Cooperative learning) -Reading Chapter 7 of main library book no 1 -Reading papers related to this subcpmk topic BM [1 x 3 x 60"]		-Evaluation of transfer functions -Uniform undamped soil on rigid rock -Uniform damped soil on rigid rock -Uniform damped soil on elastic rock -Layered damped soil on elastic rock	6

13-14	Find current issues of geotechnical problems (CPMK-2)	**Formative:** - Suitability of selecting the current issue topic - Suitability of explaining geophysical methods on the selected current issue topic **Sumative:** -	**Formative Criteria:** Participation, Presentation (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Task (12) dinilai dengan rubrik 1 **Assessment Technique:** Non Test	**Studying:** Collaborative learning (Collaborative Learning) TM [2 x 2 x 50"] **Studying:** Collaborative learning (Collaborative Learning) Lecture participants were divided into 4 groups looking for publications related to current issues of: -Earthquake mitigation efforts -Landslide mitigation efforts In 1 meeting, 2 groups made presentations. PT [2 x 2 x 60"] **Studying:** Collaborative learning (Collaborative Learning) Reading Supporting Literature BM [2 x 2 x 60"]		Current issues of: -Earthquake mitigation efforts -Landslide mitigation efforts	12

15	Demonstrate a distribution map of maximum amplitude and dominant soil period based on soil amplification results (CPMK-3)	**Formative:** Accuracy in making maximum amplitude distribution maps and soil dominant periods based on soil amplification results **Sumative:** -	**Formative Criteria:** Participation, Report (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Task (6) dinilai dengan rubrik 1 **Assessment Technique:** Non Test	**Studying:** Cooperative learning (Cooperative learning) TM [1 x 3 x 50"] **Studying:** Cooperative learning (Cooperative learning) Lecture participants made maps of the maximum amplitude distribution and dominant periods of the land provided. Then do a presentation of the results. PT [1 x 3 x 60"] **Studying:** Cooperative learning (Cooperative learning) Reading papers related to this subcpmk topic BM [1 x 3 x 60"] **Studying:** Cooperative learning (Cooperative learning) Reading papers related to this subcpmk topic BM [1 x 3 x 60"]		-	6

16	Demonstrating Vs30 distribution maps and depth of bedrock layers based on S-wave 1D velocity model profiles (CPMK-3)	**Formative:** Accuracy in creating Vs30 distribution maps and depth of bedrock layers based on 1D S wave velocity model profiles **Sumative:** -	**Formative Criteria:** Participation, Report (PT) dinilai dengan rubrik 1 **Sumative Criteria:** Summative Test (6) dinilai dengan rubrik 1 **Assessment Technique:** Test and Non-Test	**Studying:** Cooperative learning (Cooperative learning) TM [1 x 3 x 50”] **Studying:** Cooperative learning (Cooperative learning) Lecture participants made maps of the distribution of Vs30 and the depth of the bedrock layers provided. Then do a presentation of the results. PT [1 x 3 x 60”]		soil type classification based on Vs30 value -Vs30 calculation -Determination of bedrock layer	6
							100

Matrix of SLO, CLO, and Assessment Method

SLO / CLO	CLO-1	CLO-2	CLO-3
CPL-6 (P3)		Project/Case Study (Weight 6%) Project/Case Study (Weight 14%) Summative Test (Weight 14%) Project/Case Study (Weight 12%) Project/Case Study (Weight 6%) Task (Weight 12%)	
CPL-7 (P4)	Project/Case Study (Weight 6%) Task (Weight 6%) Project/Case Study (Weight 6%) Project/Case Study (Weight 6%)		
CPL-13 (KK3)			Task (Weight 6%) Summative Test (Weight 6%)

Evaluation Type and Assessment Weight

Type	Assessment Weight
Project/Case Study	56
Task	24
Summative Test	20
Total	100

Assessment and Evaluation of Student Achievement of CLOs

SLOs that are charged on the Course	CLO	SUB CLO	Form of Assessment*				Weight	Value	Student Score
			Formative	Sumative					
				Project/Case Study	Task	Summative Test			
SLO-7	CLO-1	SUB-CLO-1	Participation, Report (PT)	6	0	0	6		
SLO-7	CLO-1	SUB-CLO-2	Participation, Report (PT)	0	6	0	6		
SLO-7	CLO-1	SUB-CLO-3	Participation, Report (PT)	6	0	0	6		
SLO-7	CLO-1	SUB-CLO-4	Participation, Report (PT)	6	0	0	6		
SLO-6	CLO-2	SUB-CLO-5	Participation, Report (PT)	6	0	0	6		
SLO-6	CLO-2	SUB-CLO-6	Participation, Report (PT), Presentation (PT), Quiz	14	0	0	14		
SLO-6	CLO-2	SUB-CLO-7	Participation, Report (PT), Presentation (PT), Quiz	0	0	14	14		
SLO-6	CLO-2	SUB-CLO-8	Participation, Report (PT)	12	0	0	12		
SLO-6	CLO-2	SUB-CLO-9	Participation, Report (PT)	6	0	0	6		
SLO-6	CLO-2	SUB-CLO-10	Participation, Presentation (PT)	0	12	0	12		
SLO-13	CLO-3	SUB-CLO-11	Participation, Report (PT)	0	6	0	6		
SLO-13	CLO-3	SUB-CLO-12	Participation, Report (PT)	0	0	6	6		
				56	24	20	100		

SLOs that are charged on the Course	CLO	SUB CLO	Form of Assessment*				Weight	Value	Student Score
			Formative	Sumative					
				Project/Case Study	Task	Summative Test			

Lampiran Rubrik 1 | Rubrik Holistik

Tabel 6. 1 Rubrik Holistik

Grade Capaian	Skor	Uraian
Sangat Baik	≥ 85	Memperlihatkan pemahaman yang lengkap tentang permasalahan. Semua metode dan persyaratan tentang tugas terdapat dalam jawaban
Baik	71 - 84	Memperlihatkan cukup pemahaman tentang permasalahan. Semua persyaratan tentang tugas terdapat dalam jawaban
Cukup Baik	61 - 70	Memperlihatkan hanya sebagian pemahaman tentang permasalahan. Kebanyakan persyaratan tentang tugas terdapat dalam jawaban
Kurang	51 - 60	Memperlihatkan sedikit pemahaman tentang permasalahan. Banyak persyaratan tugas yang tidak ada
Sangat kurang	< 51	Memperlihatkan tidak ada pemahaman tentang permasalahan

Lampiran Rubrik 4 | Rubrik Praktikum

Tabel 6. 4 Rubrik Praktikum

Kegiatan	:	Mahasiswa mampu melaksanakan kegiatan Praktikum sesuai Modul Percobaan yang diberikan.	
Kriteria Penilaian	:	1. Penyediaan alat dan bahan	10 %
		2. Merangkai alat dan bahandengan benar, rapi dan memperhatikan keselamatan kerja	10 %
		3. Pengamatan/Pengambilan Data percobaan	20 %
		4. Pengolahan data hasil percobaan 5. Menyimpulkan hasil percobaan	20 % 10 %
		6. Penyusunan laporan hasi lpercobaan dalam bentuk tulisan yang rapi	30 %

Kriteria/ Dimensi	**Penilaian mahasiswa**				
	Sangat Baik	**Baik**	**Cukup**	**Kurang**	**Sangat kurang**
	Skor≥ 85	**Skor 71 - 84**	**Skor 61 - 70**	**Skor 51 – 60**	**Skor 41 - 50**
Penyediaan alat dan bahan	Menyiapkan alat dan bahan dengan rapi dan lengkap serta mengembalikannya dalam keadaan lengkap dan baik	Menyiapkan alat danbahan dengan rapi dan lengkap serta mengembalikannya dengan lengkap namun keadaannya kurang rapi	Menyiapkan alat dan bahan dengan lengkap dan rapi, namun tidak mengembalikannya dalam keadaan lengkap dan baik	Menyiapkan alat dan bahan dengan lengkap namun tidak rapi serta mengembalikannya dalam keadaan tidak lengakap dan dalam keadaaan kurang baik	Tidak menyiapkan alat dan bahan praktikum
Merangkai alat dan bahan dengan benar, rapi dan memperhatikan keselamatan kerja	Rangkaian alat benar, rapi, dan memperhatikan keselamatan	Rangkaian alat benar, rapi, dan memperhatikan keselamatan kerja	Rangkaian alat benar, rapi namun tidak memperhatikan keselamatan kerja	Rangkaian alat benar, tetapi tidak rapi	Rangkaian alat tidak benar
Pengamatan/Pengambilan Data	cermat, tepat dan bebas interpretasi	cermat, tidak mengandung tidak tepat	cermat, tepat tetapi mengandung interpretasi	tidak cermat, kurang tepat	tidak cermat, tidak tepat (salah)
Pengolahan data hasil percobaan					
Menyimpulkan hasil percobaan	Kesimpulan sesuai tujuan, singkat, dan logis	Kesimpulan sesuai tujuan, singkat, ada kesimpulan yangtidak sesuai tujuan	Kesimpulan sesuai tujuan, sebagian kesimpulan tidak sesuaitujuan, terlalu panjang	Tidak benar atau tidak sesuai tujuan	Tidak menyimpulkan hasil percobaan
Penyusunan laporan hasil percobaan dalam bentuk tulisan yang rapi	Laporan disajikan/tersusun sistimatis, jelas, dan lengkap serta rapi	Laporan disajikan/tersusun sistimatis, jelas, dan lengkap namun tidak rapi	Laporan disajikan/tersusun kurang sistimatis, kurrang jelas namun lengkap	Laporan disajikan/tersusun tidak sistimatis, tidak jelas, dan tidak lengkap	Tidak membuat laporan