

SEMESTER COURSE PLAN

**SEDIMENTOLOGY AND STRATIGRAPHY (P1) COURSES
(23H06121802)**



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

Mission

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 BMI science and technology;
2. Carrying out research to produce reliable and competitive scientific work oriented towards the scientific development of 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-4 (P1) - Mastering theoretical concepts of land, sea and geophysics atmosphere, principles of exploration, and design exploration necessary for identification and mapping natural resources and natural disaster mitigation;
- CPL-8 (KU1) - Able to apply logical, critical, systematic and innovative thinking in developing or applying geophysical science by considering human values, and able to analyze and communicate case studies and research results using geophysical tools through scientific reports, international presentations and article publications, as well as uploading them on the university website.
- CPL-9 (KU2) - Able to demonstrate independent, quality and measurable performance in maintaining professional collaboration with supervisors and colleagues at national and international levels, as well as completing tasks responsibly using relevant modern geophysical tools
- CPL-14 (KK4) - Able to investigate potential natural resources and utilize appropriate information and computing technology-based instruments to carry out natural resource exploration and natural disaster mitigation activities

Course Learning Outcomes (CLO)

- CPMK-1: Students are able to apply the concept of layering and its changes to sedimentary rocks (CPL4)
- CPMK-2: Students are able to implement the concept of rock strata in sedimentary rocks with implementation in the field (due to tectonic factors, depositional environment) according to certain geological conditions and time (CPL8)
- CPMK-3: Able to explain stratigraphic concepts and apply them to other related fields (CPL9)
- CPMK-4: Able to use geophysical principles to communicate with the wider community in conveying natural phenomena related to stratigraphy (CPL14)

Sub-CLO

Sub CPMK-1: Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment (CPMK-1)

Sub CPMK-2: Students are able to analyze the processes and depositional environments of sediments as well as the relationships between strata of sediments in certain geological conditions (CPMK-1)

Sub CPMK-3: Students are able to determine regression and transgression zones (CPMK-2)

Sub CPMK-4: Students are able to determine facies types (CPMK-2)

Sub CPMK-5: Students are able to determine the type of misalignment (CPMK-3)

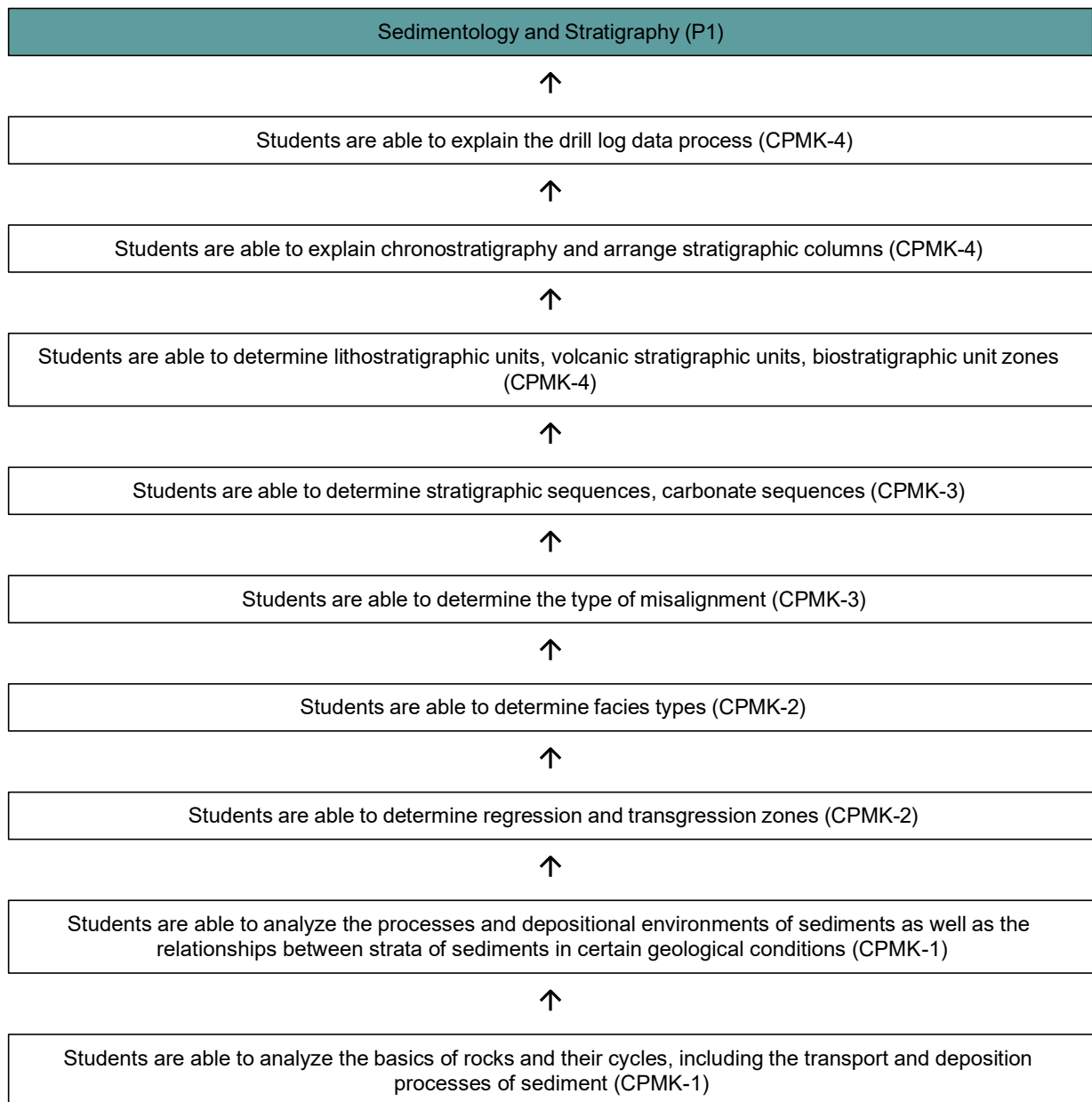
Sub CPMK-6: Students are able to determine stratigraphic sequences, carbonate sequences (CPMK-3)

Sub CPMK-7: Students are able to determine lithostratigraphic units, volcanic stratigraphic units, biostratigraphic unit zones (CPMK-4)

Sub CPMK-8: Students are able to explain chronostratigraphy and arrange stratigraphic columns (CPMK-4)

Sub CPMK-9: Students are able to explain the drill log data process (CPMK-4)

Learning Analytics





HASANUDDIN UNIVERSITY

FAKULTY OF MATHEMATICS AND NATURAL SCIENCES

STUDY PROGRAM OF GEOPHYSICS - S1

SEMESTER LEARNING PLAN

Course		Code	Course Group	Credits	SEMESTER	Compilation Date
Sedimentology and Stratigraphy (P1)		23H06121802		2	4	1 Juli 2025
AUTHORITY		SLP Developer Lecturer	Coordinator		Head of Study Program	
		Prof. Dr. Ir. Muh. Altin Massinai, MT., Surv., Makhrani, S.Si. M.Si	Prof. Dr. Ir. Muh. Altin Massinai, MT., Surv.		Dr. Muhammad Alimuddin, Eng.	
Learning Outcomes Course	SLOs that are imposed on the course					
	SLO-4:	Menguasai konsep teoritis Geofisika darat, laut dan atmosfer, prinsip-prinsip eksplorasi, dan perancangan eksplorasi yang diperlukan untuk identifikasi dan pemetaan SDA serta mitigasi bencana alam;				
	SLO-8:	Mampu menerapkan pemikiran logis, kritis, sistematis, dan inovatif dalam mengembangkan atau menerapkan ilmu geofisika dengan mempertimbangkan nilai-nilai kemanusiaan, serta mampu menganalisis dan mengkomunikasikan studi kasus dan hasil penelitian menggunakan perangkat geofisika melalui laporan ilmiah, presentasi internasional, dan publikasi artikel, serta mengunggahnya pada laman universitas.				
	SLO-9:	Mampu menunjukkan kinerja yang mandiri, berkualitas, dan terukur dalam menjaga kolaborasi profesional dengan pembimbing dan rekan kerja di tingkat nasional maupun internasional, serta menyelesaikan tugas secara bertanggung jawab dengan menggunakan perangkat geofisika modern yang relevan				
	SLO-14:	Mampu menyelidiki potensial sumberdaya alam dan memanfaatkan instrumen yang berbasis teknologi informasi dan komputasi yang sesuai untuk melakukan aktivitas eksplorasi SDA dan Mitigasi Bencana Alam				
	SLO ⇒ Course Learning Outcomes					
	After completing this course, it is expected:					
	SLO-4	CLO-1: Students are able to apply the concept of layering and its changes to sedimentary rocks				
	SLO-8	CLO-2: Students are able to implement the concept of rock strata in sedimentary rocks with implementation in the field (due to tectonic factors, depositional environment) according to certain geological conditions and time				
	SLO-9	CLO-3: Able to explain stratigraphic concepts and apply them to other related fields				
	SLO-14	CLO-4: Able to use geophysical principles to communicate with the wider community in conveying natural phenomena related to stratigraphy				
	CLO ⇒ Sub-CLO					
	CLO-1	Sub-CLO-1:Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment				
		Sub-CLO-2:Students are able to analyze the processes and depositional environments of sediments as well as the relationships between strata of sediments in certain geological conditions				

	CLO-2	Sub-CLO-3: Students are able to determine regression and transgression zones
		Sub-CLO-4: Students are able to determine facies types
	CLO-3	Sub-CLO-5: Students are able to determine the type of misalignment
		Sub-CLO-6: Students are able to determine stratigraphic sequences, carbonate sequences
	CLO-4	Sub-CLO-7: Students are able to determine lithostratigraphic units, volcanic stratigraphic units, biostratigraphic unit zones
		Sub-CLO-8: Students are able to explain chronostratigraphy and arrange stratigraphic columns
		Sub-CLO-9: Students are able to explain the drill log data process
	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	Summative Test			
SLO-4	CLO-1	SUB-CLO-1	participation, participation, participation, participation, participation, participation, participation, participation and participation	35	10	45		
SLO-4	CLO-1	SUB-CLO-2	participation	10	0	10		
SLO-8	CLO-2	SUB-CLO-3	participation	5	0	5		
SLO-8	CLO-2	SUB-CLO-4	participation	5	0	5		
SLO-9	CLO-3	SUB-CLO-5	participation	5	0	5		
SLO-14	CLO-4	SUB-CLO-8	participation and participation	20	0	20		
SLO-14	CLO-4	SUB-CLO-9	participation	0	10	10		
				80	20	100		

Course Description	The Sedimentology course is an elective course that studies the processes of formation, transportation and deposition of material that accumulates as sediment in the environment continental and marine to form rocks sediment. The formation of sediment bodies includes the transport of particles to the place of deposition either by gravity, water, air, ice, mass flow or chemical or biological material growth processes in place that. Transport and deposition processes can be determined by looking at each sediment layer. The size, shape, and distribution of particles provide an indication of how material was transported and deposited. So studying this can provide more extensive information regarding the characteristics of the depositional environment. Apart from that, we also studied the meaning and stratigraphic concepts, Depositional Environments, Regression and Transgression, Facies, Unconformities, Drill Log Data, Sequences Stratigraphy, Carbonate Sequences, Lithostratigraphic Units, Volcanic Stratigraphic Units, Biostratigraphic Units, Units Chronostratigraphy, Rock Units and Stratigraphic Columns, (held field trip to study analysis bedding patterns in field and stratigraphic analysis).
Learning Materials/Subjects	1. classification and characteristics of sediments, 2. sediment texture and structure, 3. granulometric analysis, 4. flow systems and deposition mechanisms and 5. depositional environment analysis 6. Stratigraphic concepts and depositional environments 7. Regression and Transgression 8. Facies and unconformities 9. Drill Log Data 10. Sequence Stratigraphy and tracts systems 11. Carbonate sequences, lithostratigraphy, volcanic stratigraphy, biostratigraphy and chronostratigraphy 12. Rock Units and Stratigraphic Columns
	Main References 1. Pettijohn, F. J. , 1957, Sedimentary rocks, Classification and nomenclature. New York. 2. Katili, J. A. 1959, Introduction to General Geology, Bandung. 3. Friedman, G. M., and Sanders, J. E., 1978, Principles of sedimentology, John Willey, New York. 4. Boggs, Sam, Jr., 1995, Principles of Sedimentology and Stratigraphy. Edition 2. Prentice-Hall, New Jersey. 5. Massinai, Muhammad Altin. 2015. Tectonic Geomorphology. Yogyakarta. Science Publishing Library. 6. Dumbor and Roger., 1957, Principles of Stratigraphy, John Wiley and Sons Inc, New York, 356p 7. Martodjojo, S and Djuhaeni., 1996, Indonesian Stratigraphy Code, Association of Indonesian Geologists (IAGI)

Reference		Additional References					
		8. Nichols, G., 1999. Sedimentology and Stratigraphy. Blackwell Science Ltd., Oxford. 9. Selley R.C., 1980, Ancient Sedimentary Environments. Chapman & Hall, London. 10. Selley R. C., 1988, Applied Sedimentology, Academic Press, New York 11. Sarg, Rick. 2011. Sequence Stratigraphy of Carbonates. Subsurface Consultants & Associates Publications. Texas. 12. Van Wagoner, J.C, Michum, R.M, Campion, K.M & Rahmanian, V.D., 1990, Silicystic Sequence Stratigraphy in Well Logs, Cores and Outcrops: Concepts for high-resolution Correlation of Time and Facies, Am.Ass. Petrol. Geol. Methods in Exploration Series No. 7, U.S.A 55p. 13. Relevant reputable international journals published in the last 5 years.					
Teaching Team		Prof. Dr. Ir. Muh. Altin Massinai, MT., Surv., Makhrani, S.Si. M.Si					
Course requirement							
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	Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment (CPMK-1)	Formative: Precision in analyze sedimentology,classification sedimentary rock properties Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Case Study (Case Study) (2 x 50')		Definition of sedimentology Sediment classification Properties and description of sedimentary rocks References: 1 and 2	5

2	Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment (CPMK-1)	Formative: Accuracy in analyzing material given as a group assignment Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Group discussion (Small Group Discussion), Case Study (Case Study) (2 x 50')		Sediment texture Grain properties Granulometry Library: 2 and 4	5
3	Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment (CPMK-1)	Formative: Precision in analyze given as assignment group Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Group discussion (Small Group Discussion), Case Study (Case Study) (2 x 50')		Mechanics of sedimentation Mechanics of transport and deposition References: 2 and 4	5

4	Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment (CPMK-1)	Formative: Precision in analyze given as assignment group Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Group discussion (Small Group Discussion), Case Study (Case Study) (2 x 50')		Sedimentary structure: Attraction current systems, turbidites and concentrated currents References: 2, 4 and 8	5
5	Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment (CPMK-1)	Formative: Precision nature identify as assignment group Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Group discussion (Small Group Discussion), Case Study (Case Study) (2 x 50')		Understanding and classifying depositional environments Elements of depositional environments Sediment structures in bedding areas Deposition of fine and colloidal fractions Clay minerals and their depositional environments References: 2, 4 and 8	5

6	Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment (CPMK-1)	Formative: Precision in analyze given as assignment group Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Group discussion (Small Group Discussion), Case Study (Case Study) (2 x 50')		Description of sedimentary structures, description of criss-cross layers Sedimentary structures in the bedding areas Library: 2, 4 and 8	5
7	Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment (CPMK-1)	Formative: Accuracy in analyzing material given as a group assignment Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Case Study (Case Study) (2 x 50')		Definition of carbonates, mineral composition, mineral composition and texture of carbonate rocks Main limestone classification, porosity and carbonate diagenesis References: 1, 2, 4 and 8	5

8	Students are able to analyze the basics of rocks and their cycles, including the transport and deposition processes of sediment (CPMK-1)	Formative: Precision in give Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Summative Test (10) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Other methods (2 x 50')		Meeting materials 2 to 7	10
9	Students are able to analyze the processes and depositional environments of sediments as well as the relationships between strata of sediments in certain geological conditions (CPMK-1)	Formative: Activity and accuracy in define transgression. Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (10) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Cooperative learning (Cooperative learning) [1 x 2 x 50`]		Regression and Transgression Library: 5 – 7	10

10	Students are able to determine regression and transgression zones (CPMK-2)	Formative: Activity and accuracy in determine type facies. Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Cooperative learning (Cooperative learning) [1 x 2 x 50']		Facies Library: 5 – 7	5
11	Students are able to determine facies types (CPMK-2)	Formative: Activity and accuracy in define misalignment Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Cooperative learning (Cooperative learning) [1 x 2 x 50']		Misalignment Libraries: 5 – 7	5

12	Students are able to determine the type of misalignment (CPMK-3)	Formative: Activity and accuracy in understanding drill log data. Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Cooperative learning (Cooperative learning) [1 x 2 x 50']		Drill log data Libraries: 5 – 7	5
13-14	Students are able to explain chronostratigraphy and arrange stratigraphic columns (CPMK-4)	Formative: Activity and accuracy in define stratigraphy, carbonate sequence and system tracts, lithostratigraphy, stratigraphic units unit biostratigraphy, and chronostratigraphy. Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (10) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Group discussion (Small Group Discussion) [8 x 2 x 50']		1. Sequence Stratigraphy and tract systems 2. Carbonate Sequence 3. Lithostratigraphic Units 4. Volcano Stratigraphic Unit 5. Biostratigraphic Units 6. Chronostratigraphic Unit 7. Unit Rocks and ColumnsStratigraphy Bibliography: 11 – 13	10

15	Students are able to explain chronostratigraphy and arrange stratigraphic columns (CPMK-4)	Formative: Mastery and understanding create column Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (10) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Project-Based Learning (Project-based Learning) [2 x 2 x 50']		Material: Stratigraphic Column Library: 5 – 7 and 11 – 13	10
16	Students are able to explain the drill log data process (CPMK-4)	Formative: Precision in give Sumative: -	Formative Criteria: participation dinilai dengan rubrik 1 Sumative Criteria: Summative Test (10) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Other methods (2 x 50')		Meeting materials 9 to 15	10
							100

Matrix of SLO, CLO, and Assessment Method

SLO / CLO	CLO-1	CLO-2	CLO-3	CLO-4
CPL-4 (P1)	Project/Case Study (Weight 35%) Summative Test (Weight 10%) Project/Case Study (Weight 10%)			
CPL-8 (KU1)		Project/Case Study (Weight 5%) Project/Case Study (Weight 5%)		
CPL-9 (KU2)			Project/Case Study (Weight 5%)	
CPL-14 (KK4)				Project/Case Study (Weight 20%) Summative Test (Weight 10%)

Evaluation Type and Assessment Weight

Type	Assessment Weight
Project/Case Study	80
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	Summative Test				
SLO-4	CLO-1	SUB-CLO-1	participation, participation, participation, participation, participation, participation, participation and participation	35	10	45			
SLO-4	CLO-1	SUB-CLO-2	participation	10	0	10			
SLO-8	CLO-2	SUB-CLO-3	participation	5	0	5			
SLO-8	CLO-2	SUB-CLO-4	participation	5	0	5			
SLO-9	CLO-3	SUB-CLO-5	participation	5	0	5			
SLO-14	CLO-4	SUB-CLO-8	participation and participation	20	0	20			
SLO-14	CLO-4	SUB-CLO-9	participation	0	10	10			
				80	20	100			

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