

SEMESTER COURSE PLAN

**BASIC PHYSICS COURSES
(18H02110852)**



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 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-4 (P1) - Mastering theoretical concepts of land, sea and geophysicsatmosphere, principles of exploration, and designexploration required for identification and mappingnatural 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.

Course Learning Outcomes (CLO)

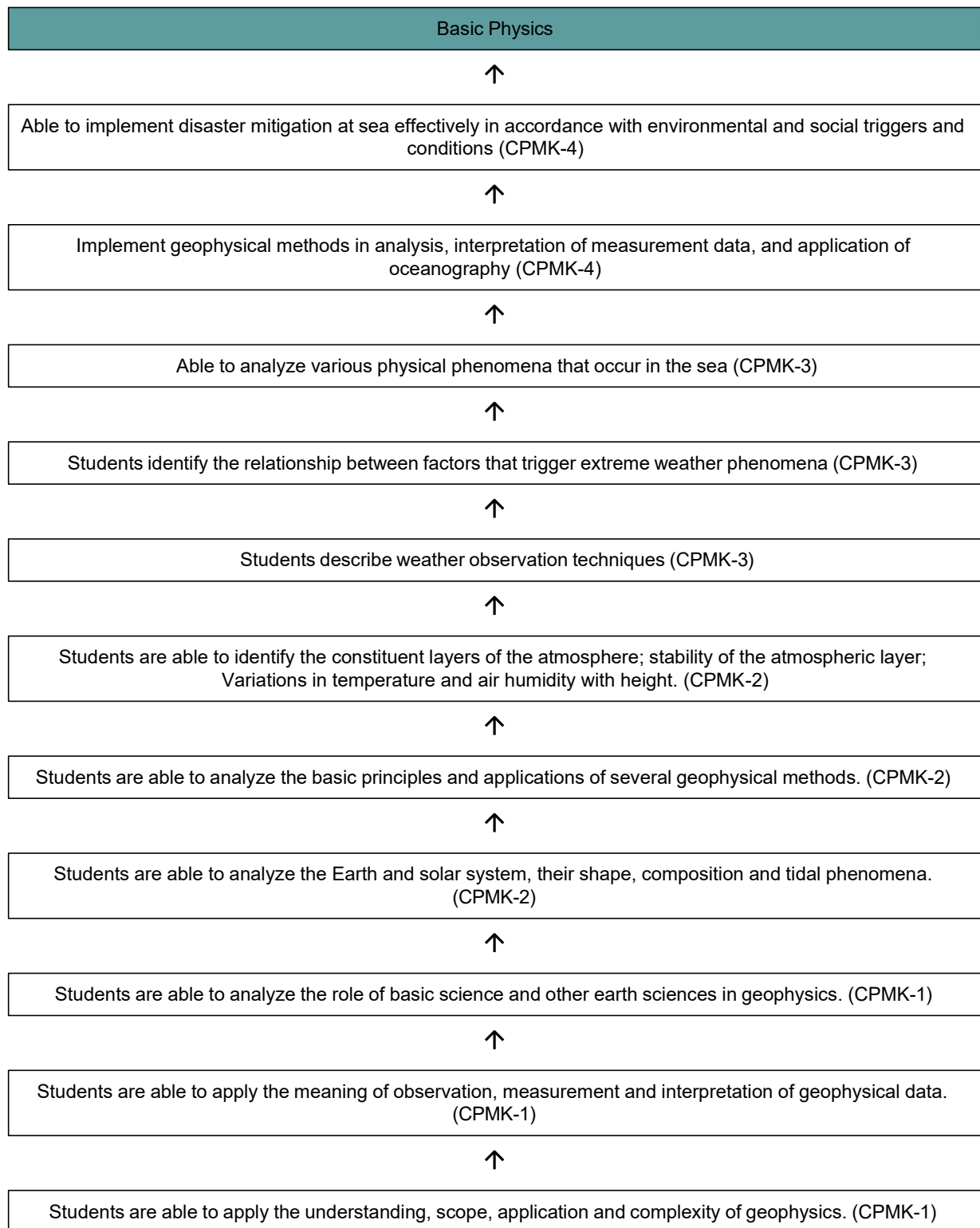
- CPMK-1: Students are able to apply and apply geophysics as well as the basic principles of geophysical and BMI-based methods; (CPL4 dan CPL8)
- CPMK-2: Able to apply the basic principles of various natural disaster exploration and mitigation methods (CPL4 dan CPL8)
- CPMK-3: Analyze structured studies on the dynamics and role of oceans as a physical system in human life and living creatures. (CPL4 dan CPL8)
- CPMK-4: Analyzing the potential threat of hydro-meteorological disasters related to the hydrological cycle of sea water which is triggered by local, regional and global climate conditions. (CPL4 dan CPL8)

Sub-CLO

- Sub CPMK-1: Students are able to apply the understanding, scope, application and complexity of geophysics. (CPMK-1)
- Sub CPMK-2: Students are able to apply the meaning of observation, measurement and interpretation of geophysical data. (CPMK-1)

- Sub CPMK-3: Students are able to analyze the role of basic science and other earth sciences in geophysics. (CPMK-1)
- Sub CPMK-4: Students are able to analyze the Earth and solar system, their shape, composition and tidal phenomena. (CPMK-2)
- Sub CPMK-5: Students are able to analyze the basic principles and applications of several geophysical methods. (CPMK-2)
- Sub CPMK-6: Students are able to identify the constituent layers of the atmosphere; stability of the atmospheric layer; Variations in temperature and air humidity with height. (CPMK-2)
- Sub CPMK-7: Students describe weather observation techniques (CPMK-3)
- Sub CPMK-8: Students identify the relationship between factors that trigger extreme weather phenomena (CPMK-3)
- Sub CPMK-9: Able to analyze various physical phenomena that occur in the sea (CPMK-3)
- Sub CPMK-10: Implement geophysical methods in analysis, interpretation of measurement data, and application of oceanography (CPMK-4)
- Sub CPMK-11: Able to implement disaster mitigation at sea effectively in accordance with environmental and social triggers and conditions (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
Basic Physics		18H02110852		3	1	1 Juli 2025
AUTHORITY		SLP Developer Lecturer	Coordinator		Head of Study Program	
		Prof. Dr. Halmar Halide, M.Sc., Dr. Samsu Arif, M.Si., Dr. Muhammad Alimuddin, Eng., Syamsuddin, S.Si.,MT.	Dr. Muhammad Alimuddin, Eng.		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 ⇒ Course Learning Outcomes					
	After completing this course, it is expected:					
	SLO-8	CLO-1: Students are able to apply and apply geophysics as well as the basic principles of geophysical and BMI-based methods;				
		CLO-2: Able to apply the basic principles of various natural disaster exploration and mitigation methods				
		CLO-3: Analyze structured studies on the dynamics and role of oceans as a physical system in human life and living creatures.				
		CLO-4: Analyzing the potential threat of hydro-meteorological disasters related to the hydrological cycle of sea water which is triggered by local, regional and global climate conditions.				
	SLO-4	CLO-1: Students are able to apply and apply geophysics as well as the basic principles of geophysical and BMI-based methods;				
		CLO-2: Able to apply the basic principles of various natural disaster exploration and mitigation methods				
		CLO-3: Analyze structured studies on the dynamics and role of oceans as a physical system in human life and living creatures.				
		CLO-4: Analyzing the potential threat of hydro-meteorological disasters related to the hydrological cycle of sea water which is triggered by local, regional and global climate conditions.				
	CLO ⇒ Sub-CLO					
		Sub-CLO-1:Students are able to apply the understanding, scope, application and complexity of geophysics.				

	CLO-1	
		Sub-CLO-2:Students are able to apply the meaning of observation, measurement and interpretation of geophysical data.
		Sub-CLO-3:Students are able to analyze the role of basic science and other earth sciences in geophysics.
	CLO-2	Sub-CLO-4:Students are able to analyze the Earth and solar system, their shape, composition and tidal phenomena.
		Sub-CLO-5:Students are able to analyze the basic principles and applications of several geophysical methods.
		Sub-CLO-6:Students are able to identify the constituent layers of the atmosphere; stability of the atmospheric layer; Variations in temperature and air humidity with height.
	CLO-3	Sub-CLO-7:Students describe weather observation techniques
		Sub-CLO-8:Students identify the relationship between factors that trigger extreme weather phenomena
		Sub-CLO-9:Able to analyze various physical phenomena that occur in the sea
	CLO-4	Sub-CLO-10:Implement geophysical methods in analysis, interpretation of measurement data, and application of oceanography
		Sub-CLO-11:Able to implement disaster mitigation at sea effectively in accordance with environmental and social triggers and conditions
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-8	CLO-1	SUB-CLO-1	Participation.	5	0	5		
SLO-8	CLO-1	SUB-CLO-2	Participation	10	0	10		
SLO-8	CLO-1	SUB-CLO-3	Participation	10	0	10		
SLO-8	CLO-2	SUB-CLO-4	Participation	5	0	5		
SLO-8	CLO-2	SUB-CLO-5	Participation	10	0	10		
SLO-8	CLO-2	SUB-CLO-6	Participation	0	15	15		
SLO-8	CLO-3	SUB-CLO-7	Participation	5	0	5		
SLO-8	CLO-3	SUB-CLO-8	Participation	10	0	10		
SLO-8	CLO-3	SUB-CLO-9	Participation	5	0	5		
SLO-8	CLO-4	SUB-CLO-10	Participation	10	0	10		
SLO-8	CLO-4	SUB-CLO-11	Participation	0	15	15		

SLOs that are charged on the Course	CPMK	SUB CPMK	Form of Assessment*		Weight	Value	Student Score	
			Formative	Sumative				
				Project/Case Study				Summative Test
			70	30	100			
Course Description	This course is an introductory course that introduces the scope of geophysical studies in the world of natural disaster exploration and mitigation. The introductory geophysics course provides introductory material regarding the scope of geophysics in the study of subsurface geophysics, meteorology and oceanography. This course is offered in the first year for Geophysics Study Program students.							
Learning Materials/Subjects	1. Basic principles, scope, applications and complexity of geophysics. 2. Observation, measurement, processing and interpretation of geophysical data phenomena. 3. The role of basic science and other earth sciences as well as teamwork in geophysical trends for the next 5-10 years. 4. Earth and solar system, shape and composition of Earth, gravitational field, geoid, and tidal phenomena. 5. Subsurface survey using geophysical methods 6. Coastal and marine dynamics 7. Atmospheric dynamics							
Reference	Main References							
	1. Introduction to Geophysical Exploration, Philips, Keary. 2. Introduction to Theoretical Geophysics, Charles, B. Officer. 3. Ackerman, S. A., and J. A. Knox. (2011). Meteorology – Understanding the atmosphere. Jones & Bartlett Learning. 4. Ahrens, C. D. (2012). Essentials of Meteorology – An invitation to the atmosphere. Belmont: Brookes/Cole. 5. Moran, J. M. (2012). Weather Studies (5th ed). American Meteorological Society, USA 6. Bearman, G., 1993, Ocean Circulation , Open University, UK . 7. Bearman, G., 1994, Waves, Tides and Shallow Water Processes , Open University, UK 8. Bearman, G., 1995, Seawater: Its composition, properties and behavior , Open University, UK							
	Additional References							

1. Introduction to Geophysical Engineering, Joko Santoso. 2. Geophysics in Engineering Investigations, MC, Dowell. 3. Behringer, W. (2010). A Cultural History of Climate. Cambridge: Polity Press. 4. Horikawa K. 1988. Nearshore dynamics and coastal processes . Japan: Tokyo University Press. 5. OSR Ongkosongo, Suyarso. 1989. Tides. Jakarta: Indonesian Institute of Sciences (LIPI), Center for Oceanology Development. 6. Other sources on the internet.							
Teaching Team		Prof. Dr. Halmar Halide, M.Sc., Dr. Samsu Arif, M.Si., Dr. Muhammad Alimuddin, Eng., Syamsuddin, S.Si.,MT.					
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 apply the understanding, scope, application and complexity of geophysics. (CPMK-1)	Formative: Accuracy in analyzing, explaining and making conclusions Sumative: -	Formative Criteria: Participation. dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100 Minutes		Basic principles, scope, applications, and geophysical complexity.	5

2	Students are able to apply the meaning of observation, measurement and interpretation of geophysical data. (CPMK-1)	Formative: Accuracy in analyzing, explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (10) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100		Basic principles, scope, applications, and geophysical complexity.	10
3	Students are able to analyze the role of basic science and other earth sciences in geophysics. (CPMK-1)	Formative: Accuracy in analyzing, explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (10) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100		-	10
4	Students are able to analyze the Earth and solar system, their shape, composition and tidal phenomena. (CPMK-2)	Formative: Accuracy in analyzing and explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100 Minutes		-	5

5-6	Students are able to analyze the basic principles and applications of several geophysical methods. (CPMK-2)	Formative: Accuracy in analyzing and explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (10) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100 Minutes	-	10
7-8	Students are able to identify the constituent layers of the atmosphere; stability of the atmospheric layer; Variations in temperature and air humidity with height. (CPMK-2)	Formative: Accuracy in analyzing and explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Summative Test (15) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100 Minutes	-	15
9	Students describe weather observation techniques (CPMK-3)	Formative: Accuracy in analyzing, explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 4 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100 Minutes	-	5

10-11	Students identify the relationship between factors that trigger extreme weather phenomena (CPMK-3)	Formative: Accuracy in analyzing and explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (10) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100 Minutes	-	10
12	Able to analyze various physical phenomena that occur in the sea (CPMK-3)	Formative: Accuracy in analyzing, explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100 Minutes	-	5
13-14	Implement geophysical methods in analysis, interpretation of measurement data, and application of oceanography (CPMK-4)	Formative: Accuracy in analyzing, explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (10) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Group discussion (Small Group Discussion) 100 Minutes	-	10

15-16	Able to implement disaster mitigation at sea effectively in accordance with environmental and social triggers and conditions (CPMK-4)	Formative: Accuracy in analyzing and explaining and making conclusions Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Summative Test (15) dinilai dengan rubrik 1 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 100 Minutes		-	15
							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 5%) Project/Case Study (Weight 10%) Project/Case Study (Weight 10%)	Project/Case Study (Weight 5%) Project/Case Study (Weight 10%) Summative Test (Weight 15%)	Project/Case Study (Weight 5%) Project/Case Study (Weight 10%) Project/Case Study (Weight 5%)	Project/Case Study (Weight 10%) Summative Test (Weight 15%)
CPL-8 (KU1)	Project/Case Study (Weight 5%) Project/Case Study (Weight 10%) Project/Case Study (Weight 10%)	Project/Case Study (Weight 5%) Project/Case Study (Weight 10%) Summative Test (Weight 15%)	Project/Case Study (Weight 5%) Project/Case Study (Weight 10%) Project/Case Study (Weight 5%)	Project/Case Study (Weight 10%) Summative Test (Weight 15%)

Evaluation Type and Assessment Weight

Type	Assessment Weight
Project/Case Study	70
Summative Test	30
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-8	CLO-1	SUB-CLO-1	Participation.	5	0	5		
SLO-8	CLO-1	SUB-CLO-2	Participation	10	0	10		
SLO-8	CLO-1	SUB-CLO-3	Participation	10	0	10		
SLO-8	CLO-2	SUB-CLO-4	Participation	5	0	5		
SLO-8	CLO-2	SUB-CLO-5	Participation	10	0	10		
SLO-8	CLO-2	SUB-CLO-6	Participation	0	15	15		
SLO-8	CLO-3	SUB-CLO-7	Participation	5	0	5		
SLO-8	CLO-3	SUB-CLO-8	Participation	10	0	10		
SLO-8	CLO-3	SUB-CLO-9	Participation	5	0	5		
SLO-8	CLO-4	SUB-CLO-10	Participation	10	0	10		
SLO-8	CLO-4	SUB-CLO-11	Participation	0	15	15		
				70	30	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

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	20 %
	:	5. Menyimpulkan hasil percobaan	10 %
	:	6. Penyusunan laporan hasil percobaan 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 dan bahan 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 lengkap dan dalam keadaan 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 yang tidak sesuai tujuan	Kesimpulan sesuai tujuan, sebagian kesimpulan tidak sesuai tujuan, terlalu panjang	Tidak benar atau tidak sesuai tujuan	Tidak menyimpulkan hasil percobaan
Penyusunan laporan hasil percobaan dalam bentuk tulisan yang rapi	Laporan disajikan/tersusun sistematis, jelas, dan lengkap serta rapi	Laporan disajikan/tersusun sistematis, jelas, dan lengkap namun tidak rapi	Laporan disajikan/tersusun kurang sistematis, kurang jelas namun lengkap	Laporan disajikan/tersusun tidak sistematis, tidak jelas, dan tidak lengkap	Tidak membuat laporan