

SEMESTER COURSE PLAN

**TROPICAL METEOROLOGY COURSES
(23H06121203)**



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

CPL-10 (KU3) - Able to make the right decisions in solving problems, verifying information, and analyzing data in the field of applied geophysics—especially in land use studies and environmental studies—by using modern geophysical analysis and computing tools based on the results of information and data analysis, to carry out the process of evaluating, documenting, and rediscovering data to ensure validity and prevent plagiarism

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 apply tropical weather and climate instruments and access data from world climate sites (CPL7)

CPMK-2: Able to link triggers and disasters in tropical areas due to weather and climate (CPL10)

CPMK-3: Able to carry out effective tropical disaster mitigation according to the triggers and conditions of the maritime community (CPL13)

Sub-CLO

Sub CPMK-1: Able to analyze the thermodynamic properties of the tropical atmosphere (CPMK-1)

Sub CPMK-2: Able to analyze atmospheric circulation and convection in tropical areas (CPMK-1)

Sub CPMK-3: Able to analyze tropical cyclones (CPMK-2)

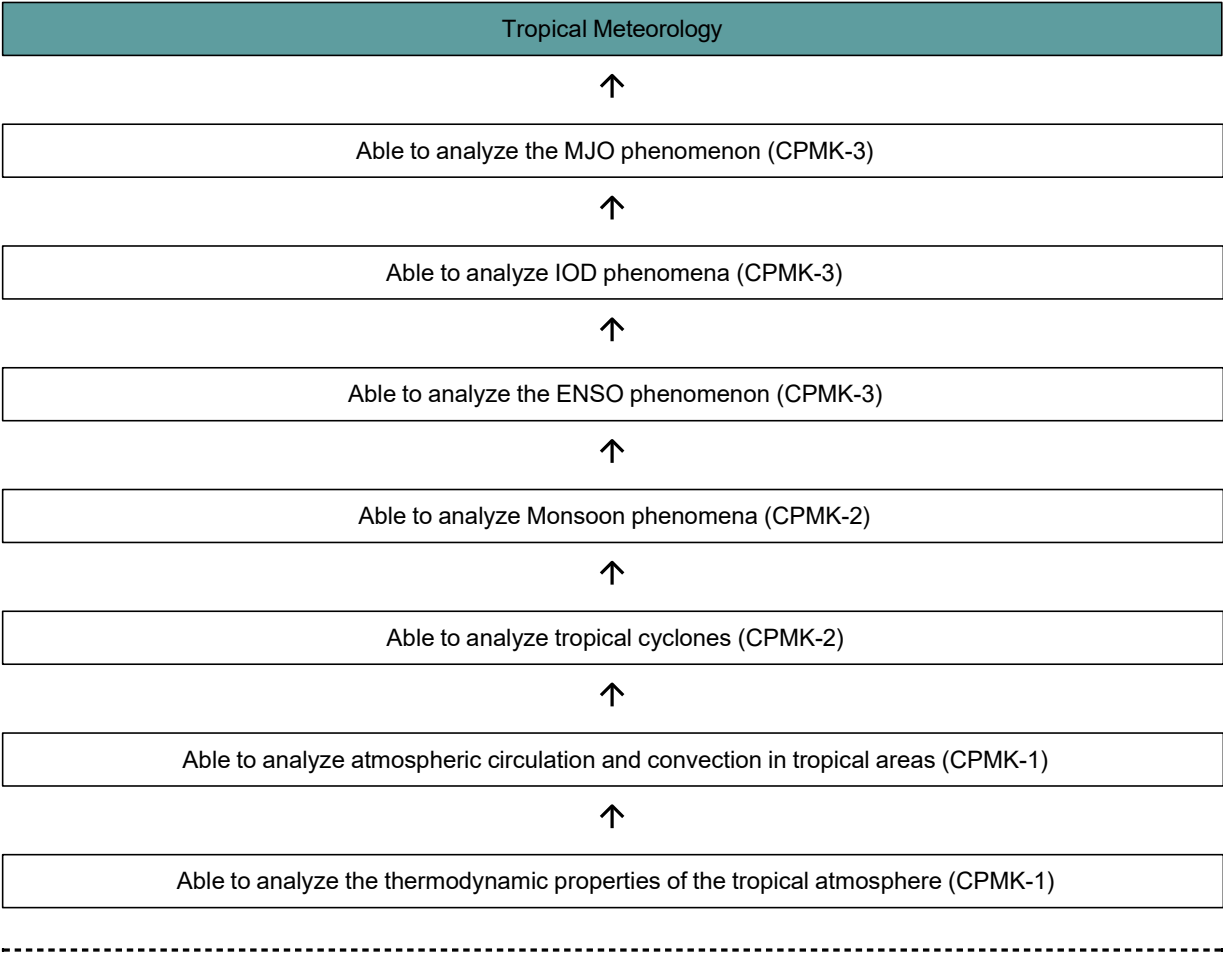
Sub CPMK-4: Able to analyze Monsoon phenomena (CPMK-2)

Sub CPMK-5: Able to analyze the ENSO phenomenon (CPMK-3)

Sub CPMK-6: Able to analyze IOD phenomena (CPMK-3)

Sub CPMK-7: Able to analyze the MJO phenomenon (CPMK-3)

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
Tropical Meteorology		23H06121203		3	4	16 Juni 2023
AUTHORITY		SLP Developer Lecturer	Coordinator		Head of Study Program	
		Prof. Dr. Halmar Halide, M.Sc.	Prof. Dr. Halmar Halide, M.Sc.		Dr. Muhammad Alimuddin, Eng.	
Learning Outcomes Course	SLOs that are imposed on the course					
	SLO-7:	Menguasai prinsip dan issue terkini bencana alam dan bagaimana memitigasi resiko bencana				
	SLO-10:	Mampu mengambil keputusan yang tepat dalam memecahkan masalah, memverifikasi informasi, dan menganalisis data pada bidang geofisika terapan—khususnya dalam kajian tata guna lahan dan studi lingkungan—dengan menggunakan perangkat analisis dan komputasi geofisika modern berdasarkan hasil analisis informasi dan data, untuk melaksanakan proses evaluasi, pendokumentasian, serta penemuan kembali data guna menjamin validitas dan mencegah plagiasi				
	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 apply tropical weather and climate instruments and access data from world climate sites				
	SLO-10	CLO-2: Able to link triggers and disasters in tropical areas due to weather and climate				
	SLO-13	CLO-3: Able to carry out effective tropical disaster mitigation according to the triggers and conditions of the maritime community				
	CLO ⇒ Sub-CLO					
	CLO-1	Sub-CLO-1:Able to analyze the thermodynamic properties of the tropical atmosphere				
		Sub-CLO-2:Able to analyze atmospheric circulation and convection in tropical areas				
	CLO-2	Sub-CLO-3:Able to analyze tropical cyclones				
		Sub-CLO-4:Able to analyze Monsoon phenomena				
	CLO-3	Sub-CLO-5:Able to analyze the ENSO phenomenon				
		Sub-CLO-6:Able to analyze IOD phenomena				

Sub-CLO-7:Able to analyze the MJO phenomenon

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	Practicum	Summative Test			
SLO-7	CLO-1	SUB-CLO-1	Participation	10	0	0	10		
SLO-7	CLO-1	SUB-CLO-2	Participation	10	0	0	10		
SLO-10	CLO-2	SUB-CLO-3	Participation	10	0	0	10		
SLO-10	CLO-2	SUB-CLO-4	Participation	10	0	15	25		
SLO-13	CLO-3	SUB-CLO-5	Participation	5	5	0	10		
SLO-13	CLO-3	SUB-CLO-6	Participation	10	0	0	10		
SLO-13	CLO-3	SUB-CLO-7	Participation	10	0	15	25		
				65	5	30	100		

Course Description	This lecture contains a discussion of the dynamics and thermodynamics of a number of meteorological phenomena that trigger hydrometeorological disasters in tropical countries. These phenomena are: Hadley and Walker circulation, Monsoon, ENSO (El Niño Southern Oscillation), IOD (Indian Ocean Dipole), MJO (Madden Julian Oscillation), Equatorial Atmospheric Waves and Tropical Cyclones. This lecture is also accompanied by Mid exam and Final exam.
Learning Materials/Subjects	1. Access tropical weather and climate data on the world climate website 2. The relationship between weather and climate phenomena and a number of events (disasters) in tropical areas 3. Mitigation of events (disasters) in tropical areas caused by weather and climate
Reference	Main References
	McGregor, G. R., and S. Nieuwolt. (1998). Tropical Climatology: An Introduction to the Climates of the Low Latitudes 2 nd ed. New York: John Wiley & Sons. Krishnamurti, T. N., L. Stefanova, and V. Misra. (2013) Tropical Meteorology: an Introduction. New York: Springer.
	Additional References
	Emanuel, K. 2005. DIVINE WIND: The History and Science of Hurricanes, New York: Oxford University Press

Teaching Team		Prof. Dr. Halmar Halide, M.Sc., Andika, 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
1-2	Able to analyze the thermodynamic properties of the tropical atmosphere (CPMK-1)	Formative: Accuracy in analyzing the thermodynamic properties of the tropical atmosphere 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) 150 Response and Tutorial: Simulation (Role-Play & Simulation) 150		Balance radiative and convective	10
3	Able to analyze atmospheric circulation and convection in tropical areas (CPMK-1)	Formative: Accuracy in analyzing atmospheric circulation and convection in tropical areas 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) 75 Response and Tutorial: Simulation (Role-Play & Simulation) 75		Hadley, Walker circulation and tropical convection	10

4-5	Able to analyze tropical cyclones (CPMK-2)	Formative: Precision in analyze 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) 150 Response and Tutorial: Simulation (Role-Play & Simulation) 150		Tropical Cyclone	10
6-7	Able to analyze Monsoon phenomena (CPMK-2)	Formative: Accuracy in analyzing the Monsoon phenomenon 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) 150 Response and Tutorial: Case Study (Case Study) 150		Global Monsoon Dynamics	10
8	Able to analyze Monsoon phenomena (CPMK-2)	Formative: - Sumative: Able to analyze Monsoon phenomena	Formative Criteria: Sumative Criteria: Summative Test (15) dinilai dengan rubrik 1 Assessment Technique: Test			-	15

9-11	Able to analyze the ENSO phenomenon (CPMK-3)	Formative: Precision in analyze ENSO Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Practicum (5) dinilai dengan rubrik 4 Assessment Technique: Test and Non-Test	Studying: Case Study (Case Study) 150 Response and Tutorial: Case Study (Case Study) 150 Response and Tutorial: Simulation (Role-Play & Simulation) 150		ENSO dynamics	10
12-13	Able to analyze IOD phenomena (CPMK-3)	Formative: Precision in analyze 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) 150 Response and Tutorial: Case Study (Case Study) 150		IOD Dynamics	10

14-15	Able to analyze the MJO phenomenon (CPMK-3)	Formative: Precision in analyze MJO Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (10) dinilai dengan rubrik 1 Assessment Technique: Test	Studying: Case Study (Case Study) 150 Response and Tutorial: Simulation (Role-Play & Simulation) 150	-	10
16	Able to analyze the MJO phenomenon (CPMK-3)	Formative: - Sumative: Able to analyze the MJO phenomenon	Formative Criteria: Sumative Criteria: Summative Test (15) dinilai dengan rubrik 1 Assessment Technique: Test		-	15
						100

Matrix of SLO, CLO, and Assessment Method

SLO / CLO	CLO-1	CLO-2	CLO-3
CPL-7 (P4)	Project/Case Study (Weight 10%) Project/Case Study (Weight 10%)		
CPL-10 (KU3)		Project/Case Study (Weight 10%) Project/Case Study (Weight 10%) Summative Test (Weight 15%)	
CPL-13 (KK3)			Project/Case Study (Weight 5%) Practicum (Weight 5%) Project/Case Study (Weight 10%) Project/Case Study (Weight 10%) Summative Test (Weight 15%)

Evaluation Type and Assessment Weight

Type	Assessment Weight
Project/Case Study	65
Practicum	5
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	Practicum	Summative Test			
SLO-7	CLO-1	SUB-CLO-1	Participation	10	0	0	10		
SLO-7	CLO-1	SUB-CLO-2	Participation	10	0	0	10		
SLO-10	CLO-2	SUB-CLO-3	Participation	10	0	0	10		
SLO-10	CLO-2	SUB-CLO-4	Participation	10	0	15	25		
SLO-13	CLO-3	SUB-CLO-5	Participation	5	5	0	10		
SLO-13	CLO-3	SUB-CLO-6	Participation	10	0	0	10		
SLO-13	CLO-3	SUB-CLO-7	Participation	10	0	15	25		
				65	5	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