

SEMESTER COURSE PLAN

**FORECASTING METHODS (P2) COURSES
(23H06132102)**



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

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-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 produce geophysical disaster predictive models that are tested, reliable and economically valuable (CPL7, CPL9 dan CPL13)

Sub-CLO

Sub CPMK-1: Able to create, test the accuracy and calculate the economic value of predictive models for long-term drought disasters (CPMK-1)

Sub CPMK-2: Able to create, test the accuracy and calculate the economic value of predictive models for flood disasters (CPMK-1)

Sub CPMK-3: Able to create, test the accuracy and calculate the economic value of flash flood predictive models (CPMK-1)

Sub CPMK-4: Able to create, test the accuracy and calculate the economic value of a landslide disaster predictive model (CPMK-1)

Sub CPMK-5: Able to create, test the accuracy and calculate the economic value of predictive models for tornado disasters (CPMK-1)

- Sub CPMK-6: Able to create, test the accuracy and calculate the economic value of predictive models for strong wind disaster models (CPMK-1)
- Sub CPMK-7: Able to create, test the accuracy and calculate the economic value of predictive models for tropical cyclone disasters (CPMK-1)
- Sub CPMK-8: Able to create, test accuracy and calculate the economic value of CB (Cumulo-nimbus) cloudiness predictive models (CPMK-1)
- Sub CPMK-9: Able to create, test the accuracy and calculate the economic value of the TS (Thunder-Storm) cloud prediction model (CPMK-1)
- Sub CPMK-10: Able to create, test accuracy and calculate the economic value of fish catch predictive models (CPMK-1)
- Sub CPMK-11: Able to create, test the accuracy and calculate the economic value of predictive models for red-tides disasters (CPMK-1)
- Sub CPMK-12: Able to create, test the accuracy and calculate the economic value of predictive models for coral-bleaching disasters (CPMK-1)
- Sub CPMK-13: Project: Hydrometeorological disaster and mitigation (CPMK-1)
- Sub CPMK-14: Project: Ecological disaster and mitigation (CPMK-1)

Learning Analytics



Able to create, test the accuracy and calculate the economic value of predictive models for flood disasters (CPMK-1)



Able to create, test the accuracy and calculate the economic value of predictive models for long-term drought disasters (CPMK-1)



HASANUDDIN UNIVERSITY

FAKULTY OF MATHEMATICS AND NATURAL SCIENCES

STUDY PROGRAM OF GEOPHYSICS - S1

SEMESTER LEARNING PLAN

Course		Code	Course Group	Credits	SEMESTER	Compilation Date
Forecasting Method (P2)		23H06132102		2	5	1 Juli 2025
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-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-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 produce geophysical disaster predictive models that are tested, reliable and economically valuable				
	SLO-9	CLO-1: Able to produce geophysical disaster predictive models that are tested, reliable and economically valuable				
	SLO-13	CLO-1: Able to produce geophysical disaster predictive models that are tested, reliable and economically valuable				
	CLO ⇒ Sub-CLO					
	CLO-1	Sub-CLO-1:Able to create, test the accuracy and calculate the economic value of predictive models for long-term drought disasters				
		Sub-CLO-2:Able to create, test the accuracy and calculate the economic value of predictive models for flood disasters				
		Sub-CLO-3:Able to create, test the accuracy and calculate the economic value of flash flood predictive models				
		Sub-CLO-4:Able to create, test the accuracy and calculate the economic value of a landslide disaster predictive model				
		Sub-CLO-5:Able to create, test the accuracy and calculate the economic value of predictive models for tornado disasters				
		Sub-CLO-6:Able to create, test the accuracy and calculate the economic value of predictive models for strong wind disaster models				
		Sub-CLO-7:Able to create, test the accuracy and calculate the economic value of predictive models for tropical cyclone disasters				

Sub-CLO-8: Able to create, test accuracy and calculate the economic value of CB (Cumulo-nimbus) cloudiness predictive models
Sub-CLO-9: Able to create, test the accuracy and calculate the economic value of the TS (Thunder-Storm) cloud prediction model
Sub-CLO-10: Able to create, test accuracy and calculate the economic value of fish catch predictive models
Sub-CLO-11: Able to create, test the accuracy and calculate the economic value of predictive models for red-tides disasters
Sub-CLO-12: Able to create, test the accuracy and calculate the economic value of predictive models for coral-bleaching disasters
Sub-CLO-13: Project: Hydrometeorological disaster and mitigation
Sub-CLO-14: Project: Ecological disaster and mitigation

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			
SLO-13	CLO-1	SUB-CLO-1	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-2	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-3	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-4	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-5	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-6	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-7	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-8	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-9	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-10	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-11	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-12	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-13	Participation	20	20		
SLO-13	CLO-1	SUB-CLO-14	Participation	20	20		
				100	100		

Course Description		This course discusses the design of statistical models (deterministic and probabilistic), their testing and verification as well as the economic value of various predictive models for hydrometeorological and ecological disasters.					
Learning Materials/Subjects		1. Modeling, accuracy and economics of Multiple Regression and Stepwise Regression models 2. Modeling, accuracy and economics of PCA (Principal Component Analysis) models 3. Modeling, accuracy and economics of Discriminant Analysis (Linear and Quadratic) models 4. Modeling, accuracy and economics of Machine Learning (Decision Tree) models 5. Project: Hydrometeorological, Ecological and Health disaster and mitigation					
Reference		Main References					
		Daniel Wilks, 2011. Statistical Methods in the Atmospheric Sciences, Volume 100, 3 rd Edition, Academic Press.					
		Halmar Halide, 2021. Design of Extreme Weather Early Warning Based on Cyclone Movement Kinematics, Publisher: FMIPA Unhas.					
		Ian T. Jolliffe and David B. Stephenson (Editors), 2012. Forecast Verification: A Practitioner's Guide in Atmospheric Science, 2 nd Edition, John Wiley & Sons					
		Additional References					
		S. G. Makridakis, S. C. Wheelwright, and Rob J Hyndman, 1998. Forecasting: Methods and Applications,3 rd Edition, John Wiley & Sons					
Teaching Team		Prof. Dr. Halmar Halide, M.Sc., Andika, S.Si., M.Si.					
Course requirement							
Week	Sub CPMK (End-of-stage learning ability)	Penilaian (<i>Assesment</i>)		Learning Forms and Methods [time estimate]		Content	Weight of Assessment (%)
		Indicator	Techniques & Criteria	Offline	Online		
1	2	3	4	5	6	7	8

1	Able to create, test the accuracy and calculate the economic value of predictive models for long-term drought disasters (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100		Multiple Regression, PCA, DA, Decision Tree	5
2	Able to create, test the accuracy and calculate the economic value of predictive models for flood disasters (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100		Multiple Regression, PCA, DA, Decision Tree	5
3	Able to create, test the accuracy and calculate the economic value of flash flood predictive models (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100		Multiple Regression, PCA, DA, Decision Tree	5

4	Able to create, test the accuracy and calculate the economic value of a landslide disaster predictive model (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100	Multiple Regression, PCA, DA, Decision Tree	5
5	Able to create, test the accuracy and calculate the economic value of predictive models for tornado disasters (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100	Multiple Regression, PCA, DA, Decision Tree	5
6	Able to create, test the accuracy and calculate the economic value of predictive models for strong wind disaster models (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100	Multiple Regression, PCA, DA, Decision Tree	5

7	Able to create, test the accuracy and calculate the economic value of predictive models for tropical cyclone disasters (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100		Multiple Regression, PCA, DA, Decision Tree	5
8	Able to create, test accuracy and calculate the economic value of CB (Cumulo-nimbus) cloudiness predictive models (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100		Multiple Regression, PCA, DA, Decision Tree	5
9	Able to create, test the accuracy and calculate the economic value of the TS (Thunder-Storm) cloud prediction model (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100		Multiple Regression, PCA, DA, Decision Tree	5

10	Able to create, test accuracy and calculate the economic value of fish catch predictive models (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100	Multiple Regression, PCA, DA, Decision Tree	5
11	Able to create, test the accuracy and calculate the economic value of predictive models for red-tides disasters (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100	Multiple Regression, PCA, DA, Decision Tree	5
12	Able to create, test the accuracy and calculate the economic value of predictive models for coral-bleaching disasters (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (5) dinilai dengan rubrik 1 Assessment Technique: Non Test	Response and Tutorial: Group discussion (Small Group Discussion), Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 100	Multiple Regression, PCA, DA, Decision Tree	5

13-14	Project: Hydrometeorological disaster and mitigation (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (20) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 200		Multiple Regression, PCA, DA, Decision Tree	20
15-16	Project: Ecological disaster and mitigation (CPMK-1)	Formative: Accuracy in making accuracy test analyzes Sumative: -	Formative Criteria: Participation dinilai dengan rubrik 1 Sumative Criteria: Project/Case Study (20) dinilai dengan rubrik 1 Assessment Technique: Non Test	Studying: Simulation (Role-Play & Simulation), Discovery Learning, Self-Directed Learning, Case Study (Case Study) 200		Multiple Regression, PCA, DA, Decision Tree	20
							100

Matrix of SLO, CLO, and Assessment Method

SLO / CLO	CLO-1
CPL-7 (P4)	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 5%)
	Project/Case Study (Weight 20%)
	Project/Case Study (Weight 20%)

SLO / CLO	CLO-1
CPL-9 (KU2)	Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 20%) Project/Case Study (Weight 20%)

SLO / CLO	CLO-1
CPL-13 (KK3)	Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 5%) Project/Case Study (Weight 20%) Project/Case Study (Weight 20%)

Evaluation Type and Assessment Weight

Type	Assessment Weight
Project/Case Study	100
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			
SLO-13	CLO-1	SUB-CLO-1	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-2	Participation	5	5		
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SLO-13	CLO-1	SUB-CLO-11	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-12	Participation	5	5		
SLO-13	CLO-1	SUB-CLO-13	Participation	20	20		
SLO-13	CLO-1	SUB-CLO-14	Participation	20	20		
				100	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