

SEMESTER LEARNING PLAN

**MACHINE LEARNING COURSES
(23H01130403)**



TEACHING TEAM

Dr. Khaeruddin, M.Sc.
196509141991031003

Edy Saputra Rusdy , S.Si., M.Si.
199104102024061001

A. Muh. Amil Siddik, S.Si.,M.Si.
199110032019031015

STUDI PROGRAM OF MATHEMATICS - S1
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
HASANUDDIN UNIVERSITY
MAKASSAR
2025

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

Vision

The scientific vision is to become a study program with an international reputation in the development of mathematics based on the Indonesian maritime continent by 2030

Vision Strategy

Mission

To fulfill the above vision, the Undergraduate Mathematics Study Program has four missions, namely:

- Organizing innovative and effective mathematics learning to improve the quality and creativity of students in order to compete nationally and internationally.
- Improving a research culture that produces internationally reputable publications.
- Playing an active role in community service activities and collaborating with other academic institutions, government, business, media and society.
- Carry out governance in the Mathematics Study Program that is effective, efficient and transparent based on IT and ISO 9001:2015 standards to achieve the tridharma goals.

Graduate Profiles

Gagal diterjemahkan

PLO charged to courses

CPL-8 (S1) - The students have integrity that highly values the supreme divinity, social responsibility, and professional ethics

CPL-1 (ILO 1) - Students are able to demonstrate an advanced understanding of basic pure and simple applied mathematics.

CPL-2 (P2) - The students are able to identify objects, techniques, and theorems in fundamental mathematics, and making a connection for solving problems

CPL-4 (KU2) - The students are able to use their sufficiently mathematical critical thinking for abstraction and generalization of a mathematical problem

CPL-6 (KK2) - The students are able to apply the mathematical method for solving a mathematical related-problem with or without the aid of computers and software

Course Learning Outcomes (CLO)

CPMK-1: Students are able to apply appropriate basic mathematical concepts in solving problems using Machine Learning. (CPL8 dan CPL1)

CPMK-2: Students are able to recognize simple problems in surrounding phenomena (real-world problems) through data that can be studied and solved mathematically. (CPL2 dan CPL4)

CPMK-3: Students are able to solve machine learning models with the help of computational tools, interpret solutions, and validate solutions using available data. (CPL6)

Sub-CLO

Sub CPMK-1: Ability to explain (C2) and understand (C2) Machine Learning (ML) concepts; how computers can learn, simple data, machine learning taxonomy, and examples of machine learning applications (CPMK-1)

Sub CPMK-2: Ability to understand and explain the basics of mathematics used in Machine Learning.

(CPMK-1, CPMK-2 dan CPMK-3)

Sub CPMK-3: Understand (C2) the concept of probability and use it (C3) for regression. (CPMK-1, CPMK-2 dan CPMK-3)

Sub CPMK-4: Understand (C2) logistic regression concepts and procedures and use them (C3) for the classification process. (CPMK-1, CPMK-2 dan CPMK-3)

Sub CPMK-5: Able to understand (C2) the KNN classification concept and use it (C3) in several cases. (CPMK-1, CPMK-2 dan CPMK-3)

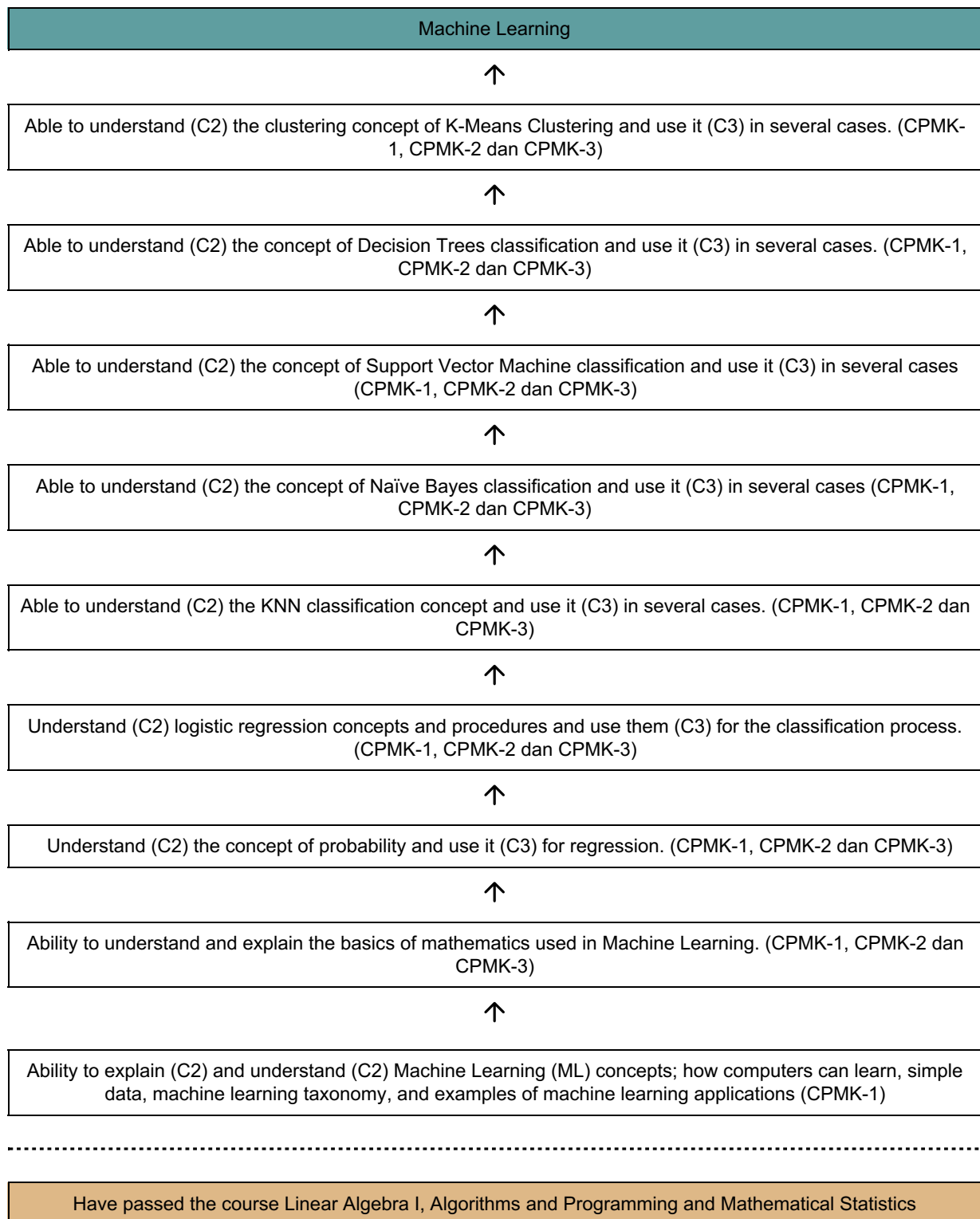
Sub CPMK-6: Able to understand (C2) the concept of Naïve Bayes classification and use it (C3) in several cases (CPMK-1, CPMK-2 dan CPMK-3)

Sub CPMK-7: Able to understand (C2) the concept of Support Vector Machine classification and use it (C3) in several cases (CPMK-1, CPMK-2 dan CPMK-3)

Sub CPMK-8: Able to understand (C2) the concept of Decision Trees classification and use it (C3) in several cases. (CPMK-1, CPMK-2 dan CPMK-3)

Sub CPMK-9: Able to understand (C2) the clustering concept of K-Means Clustering and use it (C3) in several cases. (CPMK-1, CPMK-2 dan CPMK-3)

Learning Analytics





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

Course		Code	Course Group	Credits	SEMESTER	Compilation Date
Machine Learning		23H01130403	Algorithms and Programming	3	5	10 Agustus 2024
AUTHORITY		SLP Developer Lecturer	Coordinator		Head of Study Program	
		Dr. Khaeruddin, M.Sc., Edy Saputra Rusdy , S.Si., M.Si., A. Muh. Amil Siddik, S.Si.,M.Si.	Dr. Khaeruddin, M.Sc.		Dr. Firman, S.Si.,M.Si.	
	SLOs that are imposed on the course					
	SLO-8:	Mahasiswa memiliki integritas yang sangat menghargai keilahian tertinggi, tanggung jawab sosial, dan etika profesional				
	SLO-1:	Mahasiwa memiliki pemahaman yang relatif mendalam dalam matematika murni dan matematika terapan sederhana.				
	SLO-2:	Mahasiswa mampu mengidentifikasi objek, teknik, dan sifat dalam matematika dasar, dan membuat koneksi untuk menyelesaikan masalah				
	SLO-4:	Mahasiswa dapat menggunakan pemikiran kritis matematis mereka yang cukup untuk abstraksi dan generalisasi masalah matematika berdasarkan hasil analisis informasi dan data				
	SLO-6:	Mahasiswa dapat menerapkan metode matematika untuk memecahkan masalah terkait matematika dengan atau tanpa bantuan komputer dan perangkat lunak				
	SLO ⇒ Course Learning Outcomes					
	After completing this course, it is expected:					
	SLO-1	CLO-1: Students are able to apply appropriate basic mathematical concepts in solving problems using Machine Learning.				
	SLO-8	CLO-1: Students are able to apply appropriate basic mathematical concepts in solving problems using Machine Learning.				
	SLO-2	CLO-2: Students are able to recognize simple problems in surrounding phenomena (real-world problems) through data that can be studied and solved mathematically.				
	SLO-4	CLO-2: Students are able to recognize simple problems in surrounding phenomena (real-world problems) through data that can be studied and solved mathematically.				
	SLO-6	CLO-3: Students are able to solve machine learning models with the help of computational tools, interpret solutions, and validate solutions using available data.				
	CLO ⇒ Sub-CLO					

Learning Outcomes Course	CLO-1	Sub-CLO-1: Ability to explain (C2) and understand (C2) Machine Learning (ML) concepts; how computers can learn, simple data, machine learning taxonomy, and examples of machine learning applications
		Sub-CLO-2: Ability to understand and explain the basics of mathematics used in Machine Learning.
		Sub-CLO-3: Understand (C2) the concept of probability and use it (C3) for regression.
		Sub-CLO-4: Understand (C2) logistic regression concepts and procedures and use them (C3) for the classification process.
		Sub-CLO-5: Able to understand (C2) the KNN classification concept and use it (C3) in several cases.
		Sub-CLO-6: Able to understand (C2) the concept of Naïve Bayes classification and use it (C3) in several cases
		Sub-CLO-7: Able to understand (C2) the concept of Support Vector Machine classification and use it (C3) in several cases
		Sub-CLO-8: Able to understand (C2) the concept of Decision Trees classification and use it (C3) in several cases.
		Sub-CLO-9: Able to understand (C2) the clustering concept of K-Means Clustering and use it (C3) in several cases.
	CLO-2	Sub-CLO-2: Ability to understand and explain the basics of mathematics used in Machine Learning.
		Sub-CLO-3: Understand (C2) the concept of probability and use it (C3) for regression.
		Sub-CLO-4: Understand (C2) logistic regression concepts and procedures and use them (C3) for the classification process.
		Sub-CLO-5: Able to understand (C2) the KNN classification concept and use it (C3) in several cases.
		Sub-CLO-6: Able to understand (C2) the concept of Naïve Bayes classification and use it (C3) in several cases
		Sub-CLO-7: Able to understand (C2) the concept of Support Vector Machine classification and use it (C3) in several cases
		Sub-CLO-8: Able to understand (C2) the concept of Decision Trees classification and use it (C3) in several cases.
		Sub-CLO-9: Able to understand (C2) the clustering concept of K-Means Clustering and use it (C3) in several cases.
	CLO-3	Sub-CLO-2: Ability to understand and explain the basics of mathematics used in Machine Learning.
		Sub-CLO-3: Understand (C2) the concept of probability and use it (C3) for regression.
		Sub-CLO-4: Understand (C2) logistic regression concepts and procedures and use them (C3) for the classification process.
		Sub-CLO-5: Able to understand (C2) the KNN classification concept and use it (C3) in several cases.
		Sub-CLO-6: Able to understand (C2) the concept of Naïve Bayes classification and use it (C3) in several cases
		Sub-CLO-7: Able to understand (C2) the concept of Support Vector Machine classification and use it (C3) in several cases
		Sub-CLO-8: Able to understand (C2) the concept of Decision Trees classification and use it (C3) in several cases.
		Sub-CLO-9: Able to understand (C2) the clustering concept of K-Means Clustering and use it (C3) in several cases.
	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							
				Independent Assignment	Quiz	Short Q&A	Group task	Case Studies			
SLO-1	CLO-1	SUB-CLO-1		5	0	0	0	0	5		
SLO-6	CLO-3	SUB-CLO-2		5	0	0	0	0	5		
SLO-6	CLO-3	SUB-CLO-3		5	0	0	0	0	5		
SLO-6	CLO-3	SUB-CLO-5		5	0	0	0	55	60		
SLO-6	CLO-3	SUB-CLO-6		0	10	0	0	0	10		
SLO-6	CLO-3	SUB-CLO-8		0	0	5	0	0	5		
SLO-6	CLO-3	SUB-CLO-9		0	0	0	10	0	10		
				20	10	5	10	55	100		
Course Description	The Machine Learning course trains students to understand basic ideas, intuition, concepts, algorithms and techniques to make computers better. intelligently through the process of learning from data. The material presented includes supervised learning, unsupervised learning, reinforcement learning, and ensemble methods.										
Learning Materials/Subjects	1. Motivation and components of machine learning, as well as a taxonomy of learning in machine learning. 2. Supervised learning: a. Regression b. Support Vector Machine c. Artificial Neural Networks: Multi-Layer Perceptron and Probabilistic Neural Networks d. Naive Bayes 3. Unsupervised learning: a. Partitional-based clustering b. Hierarchical clustering 4. Reinforcement learning 5. Ensemble methods										
Reference	Main References										
	1. https://scikit-learn.org/stable/user_guide.html 2. https://alex.smola.org/drafts/thebook.pdf										
	Additional References										
	Gagal diterjemahkan										
Teaching Team	Dr. Khaeruddin, M.Sc., Edy Saputra Rusdy , S.Si., M.Si., A. Muh. Amil Siddik, S.Si.,M.Si.										
Course requirement	Linear Algebra I, Algorithms and Programming, Mathematical Statistics										

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	Ability to explain (C2) and understand (C2) Machine Learning (ML) concepts; how computers can learn, simple data, machine learning taxonomy, and examples of machine learning applications (CPMK-1)	Formative: Accuracy of Answers Sumative: Activity in discussion	Formative Criteria: Sumative Criteria: Independent Assignment (5) dinilai dengan rubrik 04 Assessment Technique: Non Test			-Lecture Contract, -Scope of course college, -Introduction machine learning, -Benefits and urgency machine learning, -Setup Jupyter or colab	5
2	Ability to understand and explain the basics of mathematics used in Machine Learning. (CPMK-1, CPMK-2, CPMK-3)	Formative: Precision method Sumative: Ability to apply methods using specific cases and utilizing data schooner that data and generate prediction output	Formative Criteria: Sumative Criteria: Independent Assignment (5) dinilai dengan rubrik 04 Assessment Technique: Test and Non-Test			Data -Types of data -Quality of data -Preprocessing -Similarity and dissimilarity Regression -Linear: Univariate and Multivariate -Non-linear: Univariate and Multivariate	5
3	Understand (C2) the concept of probability and use it (C3) for regression. (CPMK-1, CPMK-2, CPMK-3)	Formative: Precision method Sumative: Ability to apply methods using specific cases and utilizing secondary data that data and produce classification output	Formative Criteria: Sumative Criteria: Independent Assignment (5) dinilai dengan rubrik 01 Assessment Technique: Gagal diterjemahkan			Classification problems, decision boundaries, nearest neighbor methods, Decision tree , impurity, information gain, gini ratio.	5

4	Understand (C2) logistic regression concepts and procedures and use them (C3) for the classification process. (CPMK-1, CPMK-2, CPMK-3)	Formative: Precision method Sumative: Ability to apply methods using specific cases and utilizing secondary data that data and produce classification output	Formative Criteria: Sumative Criteria: Assessment Technique: Gagal diterjemahkan			Naive Bayes Classifier: Discrete and Continuous Attributes	0
5-6	Able to understand (C2) the KNN classification concept and use it (C3) in several cases. (CPMK-1, CPMK-2, CPMK-3)	Formative: Precision method Sumative: Activity in discussionsAbility to apply methods using specific cases and utilizing secondary data which data and produce classification output	Formative Criteria: Sumative Criteria: Independent Assignment (5) dinilai dengan rubrik 01 Assessment Technique: Gagal diterjemahkan			1. Multi-Layer Perceptron with Backpropagation learning 2. Probabilistic Neural Networks	5
7	Able to understand (C2) the concept of Naïve Bayes classification and use it (C3) in several cases (CPMK-1, CPMK-2, CPMK-3)	Formative: Precision method Sumative: Ability to apply methods using specific cases and utilizing secondary data that data and produce classification output	Formative Criteria: Sumative Criteria: Quiz (10) dinilai dengan rubrik 01 Assessment Technique: Gagal diterjemahkan			-Binary Class SVM: Linearly separable data and non-linearly separable data - Multi Class SVM: Linearly separable data and Nonlinearly separable data	10

9-10	Able to understand (C2) the concept of Support Vector Machine classification and use it (C3) in several cases (CPMK-1, CPMK-2, CPMK-3)	Formative: Precision method Sumative: Ability to apply methods using specific cases and utilizing secondary data that data and produce clustering output	Formative Criteria: Sumative Criteria: Assessment Technique: Gagal diterjemahkan			Week 9: Concept clustering Proximity measure between cluster: Single-link, Complete-link, Group average, Centroid-based Week 10: Partitional-based clustering (K-means):pseudocode, objective function, influence initialization centroid. Hierarchical clustering: dendrogram representation, nested clusters representation, divisive and agglomerative approach	0
11-12	Able to understand (C2) the concept of Decision Trees classification and use it (C3) in several cases. (CPMK-1, CPMK-2, CPMK-3)	Formative: Precision method Sumative: Ability to apply methods using specific cases and utilizing secondary data that data and produce decisions	Formative Criteria: Sumative Criteria: Short Q&A (5) dinilai dengan rubrik 04 Assessment Technique: Gagal diterjemahkan			Week 11: Markov Decision Processes Bellman Equations Week 12: Value Iteration and Policy Iteration Q-Learning	5
13-15	Able to understand (C2) the clustering concept of K-Means Clustering and use it (C3) in several cases. (CPMK-1, CPMK-2, CPMK-3)	Formative: Precision method Sumative: Ability to apply methods using specific cases and utilizing secondary data that data and produce decisions	Formative Criteria: Sumative Criteria: Group task (10) dinilai dengan rubrik 04 Assessment Technique: Gagal diterjemahkan			-Bagging (voting for classification, averaging for regression). -Gradient Boosting -Random Forest	10

15-16	Able to understand (C2) the KNN classification concept and use it (C3) in several cases. (CPMK-1, CPMK-2, CPMK-3)	Formative: Gagal diterjemahkan Sumative: Gagal diterjemahkan	Formative Criteria: Sumative Criteria: Case Studies (55) dinilai dengan rubrik 03 Assessment Technique: Non Test			Delivery of projects based on data. Comprehensively, students must be able to: - prepare data - choose methods - produce output	55
							100

Matrix of SLO, CLO, and Assessment Method

SLO / CLO	CLO-1	CLO-2	CLO-3
CPL-1 (ILO 1)	Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Case Studies (Weight 55%) Quiz (Weight 10%) Short Q&A (Weight 5%) Group task (Weight 10%)		
CPL-2 (P2)		Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Case Studies (Weight 55%) Quiz (Weight 10%) Short Q&A (Weight 5%) Group task (Weight 10%)	

SLO / CLO	CLO-1	CLO-2	CLO-3
CPL-4 (KU2)		Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Case Studies (Weight 55%) Quiz (Weight 10%) Short Q&A (Weight 5%) Group task (Weight 10%)	
CPL-6 (KK2)			Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Case Studies (Weight 55%) Quiz (Weight 10%) Short Q&A (Weight 5%) Group task (Weight 10%)

SLO / CLO	CLO-1	CLO-2	CLO-3
CPL-8 (S1)	Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Independent Assignment (Weight 5%) Case Studies (Weight 55%) Quiz (Weight 10%) Short Q&A (Weight 5%) Group task (Weight 10%)		

Evaluation Type and Assessment Weight

Type	Assessment Weight
Independent Assignment	20
Quiz	10
Short Q&A	5
Group task	10
Case Studies	55
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							
				Independent Assignment	Quiz	Short Q&A	Group task	Case Studies			
SLO-1	CLO-1	SUB-CLO-1		5	0	0	0	0	5		
SLO-6	CLO-3	SUB-CLO-2		5	0	0	0	0	5		
SLO-6	CLO-3	SUB-CLO-3		5	0	0	0	0	5		
SLO-6	CLO-3	SUB-CLO-5		5	0	0	0	55	60		
SLO-6	CLO-3	SUB-CLO-6		0	10	0	0	0	10		
SLO-6	CLO-3	SUB-CLO-8		0	0	5	0	0	5		
SLO-6	CLO-3	SUB-CLO-9		0	0	0	10	0	10		
				20	10	5	10	55	100		

Lampiran Rubrik 01 | ASSESMENT TERTULIS

Kriteria Penilaian	Bobot/Skor Penilaian				
	5	4	3	2	1/0
Konsep/ metode yang digunakan	Penjelasan konsep /metode (*) sangat lengkap dan akurat	Penjelasan konsep/metode (*) cukup jelas tetapi beberapa informasi tidak dituliskan secara lengkap.	Penjelasan konsep/metode (*) kurang jelas dan banyak informasi yang tidak dituliskan	Penjelasan yang dituliskan hampir tidak berkaitan dengan konsep/ metode (*)	Tidak memberikan konsep yang dibutuhkan
Sistematika penulisan/ pembuktian	Sistematika penulisan/ pembuktian sangat jelas dan terstruktur	Sistematika penulisan/ pembuktian cukup jelas namun ada langkah yang hilang	Sistematika penulisan/ pembuktian kurang jelas	Sistematika penulisan/ pembuktian tidak jelas	Jawaban tidak benar/ tidak ada
Interpretasi geometri/ kualitatif/ kuantitatif.	Interpretasi geometri/ kualitatif/ kuantitatif (*) tepat dan lengkap	Interpretasi geometri/ kualitatif/ kuantitatif (*) cukup lengkap/ tepat	Interpretasi geometri/ kualitatif/ kuantitatif (*) kurang lengkap/ tepat	Interpretasi geometri/ kualitatif/ kuantitatif(*) tidak lengkap/ tepat	Interpretasi geometri/ kualitatif/kuantitatif(*) tidak benar
Perhitungan/kesimpulan	Perhitungan/ kesimpulan sangat akurat/tepat dan disertai alasan yang mendasarinya	Perhitungan/ kesimpulan cukup akurat/tepat dan disertai alasan yang mendasarinya	Kesimpulan cukup tepat, namun tidak disertai alasan yang jelas	Perhitungan/ kesimpulan kurang akurat/tepat dan tidak disertai alasan yang mendasarinya	Perhitungan/kesimpulan salah

Lampiran Rubrik 03 | ASSESMENT MAKALAH

Kriteria Penilaian	Bobot/Skor Penilaian				
	5	4	3	2	1
Sistematika dan kelengkapan penulisan	Mahasiswa menyusun laporan dengan sistematika yang sangat sesuai dengan format yang diberikan dan sangat lengkap	Mahasiswa menyusun laporan dengan sistematika yang sesuai dengan format yang diberikan dan lengkap	Mahasiswa menyusun laporan dengan sistematika yang cukup sesuai dengan format yang diberikan dan cukup lengkap	Mahasiswa menyusun laporan dengan sistematika yang kurang sesuai dengan format yang diberikan dan kurang lengkap	Mahasiswa menyusun laporan dengan sistematika yang tidak sesuai dengan format yang diberikan dan tidak lengkap
Kebenaran konsep ide yang dipaparkan	Mahasiswa menyusun makalah dengan konsep/ide yang dipaparkan dengan sangat tepat (sesuai dengan teori)	Mahasiswa menyusun makalah dengan konsep/ide yang dipaparkan dengan tepat	Mahasiswa menyusun makalah dengan konsep/ide yang dipaparkan dengan cukup tepat	Mahasiswa menyusun makalah dengan konsep/ide yang dipaparkan dengan kurang tepat	Mahasiswa menyusun makalah dengan konsep/ide yang dipaparkan dengan tidak tepat
Interpretasi metode dengan permasalahan yang dikaji	Mahasiswa sangat mampu mengidentifikasi relevansi metode dengan permasalahan yang dikaji	Mahasiswa mampu mengidentifikasi relevansi metode dengan permasalahan yang dikaji	Mahasiswa cukup mampu mengidentifikasi relevansi metode dengan permasalahan yang dikaji	Mahasiswa kurang mampu mengidentifikasi relevansi metode dengan permasalahan yang dikaji	Mahasiswa tidak mampu mengidentifikasi relevansi metode dengan permasalahan yang dikaji
Validitas Referensi – VR	Mahasiswa menggunakan referensi yang sangat <i>up to date</i> dan sangat relevan	Mahasiswa menggunakan referensi yang <i>up to date</i> dan relevan	Mahasiswa menggunakan referensi yang cukup <i>up to date</i> dan cukup relevan	Mahasiswa menggunakan referensi yang kurang <i>up to date</i> dan kurang relevan	Mahasiswa menggunakan referensi yang tidak <i>up to date</i> dan tidak relevan
Ketepatan waktu	Mahasiswa mengumpulkan makalah tepat waktu atau sebelum batas waktu yang ditentukan.	Mahasiswa mengumpulkan makalah lewat 1 hari dari batas waktu yang ditentukan.	Mahasiswa mengumpulkan makalah lewat 2 hari dari batas waktu yang ditentukan.	Mahasiswa mengumpulkan makalah lewat 3 hari dari batas waktu yang ditentukan.	Mahasiswa mengumpulkan makalah lewat 4 hari atau lebih dari batas waktu yang ditentukan.

Lampiran Rubrik 04 | ASSESMENT DISKUSI

Kriteria Penilaian	Bobot/Skor Penilaian				
	5	4	3	2	1
Kelugasan argumen	Mahasiswa menyampaikan pendapat menggunakan bahasa yang sangat baik, sangat mudah dimengerti, intonasi suara yang sangat jelas	Mahasiswa menyampaikan pendapat menggunakan bahasa yang baik, mudah dimengerti, intonasi suara yang jelas	Mahasiswa menyampaikan pendapat menggunakan bahasa yang cukup baik, cukup mudah dimengerti, intonasi suara yang cukup jelas	Mahasiswa menyampaikan pendapat menggunakan bahasa yang kurang baik, kurang mudah dimengerti, intonasi suara yang kurang jelas	Mahasiswa menyampaikan pendapat menggunakan bahasa yang tidak baik, tidak mudah dimengerti, intonasi suara yang tidak jelas
Parsipitasi aktif	Mahasiswa sangat aktif menyampaikan pendapat/masukannya, sangat aktif memberi jawaban, dan sangat berinisiatif mencari solusi	Mahasiswa aktif menyampaikan pendapat/masukannya, aktif memberi jawaban, dan berinisiatif mencari solusi	Mahasiswa cukup aktif menyampaikan pendapat/masukannya, cukup aktif memberi jawaban, dan cukup berinisiatif mencari solusi	Mahasiswa kurang aktif menyampaikan pendapat/masukannya, kurang aktif memberi jawaban, dan kurang berinisiatif mencari solusi	Mahasiswa tidak aktif menyampaikan pendapat/masukannya, tidak aktif memberi jawaban, dan tidak berinisiatif mencari solusi

Etika dan sikap tata nilai	Mahasiswa sangat mengindahkan etika diskusi akademik secara umum	Mahasiswa mengindahkan etika diskusi akademik secara umum	Mahasiswa cukup mengindahkan etika diskusi akademik secara umum	Mahasiswa kurang mengindahkan etika diskusi akademik secara umum	Mahasiswa tidak mengindahkan etika diskusi akademik secara umum
Kepemimpinan (diskusi kelompok)	Mahasiswa sangat mampu menginisiasi, menggerakkan, mengarahkan, mengorganisir jalannya diskusi	Mahasiswa mampu menginisiasi, menggerakkan, mengarahkan, mengorganisir jalannya diskusi	Mahasiswa cukup mampu menginisiasi, menggerakkan, mengarahkan, mengorganisir jalannya diskusi	Mahasiswa kurang mampu menginisiasi, menggerakkan, mengarahkan, mengorganisir jalannya diskusi	Mahasiswa tidak mampu menginisiasi, menggerakkan, mengarahkan, mengorganisir jalannya diskusi