	Universitas Negeri Surabaya Faculty of Engineering, Undergraduate Study Program in Informatics Engineering	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Data Mining	5520203014		T=3	P=0	ECTS=4.77	6	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Aditya Prapanca, S.T., M.Kom.

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

	P.O

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	This course examines the design and implementation of various data mining techniques and gets to know various cases and techniques in real life. Understanding real world problems and solving them using various data mining algorithms such as classification, clustering and association rules. Apart from that, an introduction to the various tools available in the data mining process.
References	**Main :**

1. Tan, Pang-Ning; Steinbach, Michael; Kumar, Vipin. 2018. Introduction to Data Mining, 2nd Edition. Pearson Education, Inc.
2. Han, Jiawei; Kamber, Micheline, and Jian Pei, Morgan Kaufmann. 2011. Data Mining Concepts and Techniques 3rd Edition . Morgan Kaufmann, Inc.
3. Maimon,Oded; Rocach, Lior. 2010. Data Mining and Knowledge Discovery, Handbook Second Edition . Springer.

	Supporters:
Supporting lecturer	Dr. Yuni Yamasari, S.Kom., M.Kom. Naim Rochmawati, S.Kom., M.T.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (*offline*)	Online (*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Students are able to understand the concept of data mining and the general stages of its use.	1.Explain the definition of data mining; 2.Explain the general stages of the data mining process.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%

2	Students are able to apply data preprocessing techniques.	1. Explain the definition of data; 2. Identify types of data; 3. Explains the quality of the data; 4. Implement data preprocessing processes; 5. Implement data measurement processes.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
3	Students are able to apply data representation techniques.	1. Apply statistics to data; 2. Apply visualization to data; 3. Applying multidimensional data analysis and OLAP.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
4	Students are able to apply the basics of data mining processes.	1. Explain data mining primitives; 2. Applying query language in data mining.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
5	Students are able to apply characterization and comparisons in concept descriptions.	1. Implement data generalization processes; 2. Apply characterization analytically; 3. Implementing mining class comparison.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
6	Students are able to apply classification techniques in data mining.	1. Explain the basic concepts of classification; 2. Applying decision tree methods and overfitting models to data; 3. Implement a classifier performance evaluation process; 4. Apply the classification comparison method; 5. Applying the nearest neighbor algorithm; 6. Applying Bayessian algorithm; 7. Applying a combination of several methods (ensemble methods) in data mining; 8. Explain the concept of class imbalance problem and its solution.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%

7	Students are able to apply classification techniques in data mining.	1. Explain the basic concepts of classification; 2. Applying decision tree methods and overfitting models to data; 3. Implement a classifier performance evaluation process; 4. Apply the classification comparison method; 5. Applying the nearest neighbor algorithm; 6. Applying Bayessian algorithm; 7. Applying a combination of several methods (ensemble methods) in data mining; 8. Explain the concept of class imbalance problem and its solution.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
8	Sub-Summative Exam / Midterm Exam	Sub-Summative Exam / Midterm Exam		Written and/or Practical Exam 3 X 50			0%
9	Students are able to apply association analysis techniques/methods in data mining.	1. Implementing the FP-Growth algorithm; 2. Applying techniques for evaluating association patterns; 3. Implement frequent itemset generation; 4. Implement rule generation; 5. Implement compact representation of frequent itemset; 6. Applying the handling of categorical attributes and continuous attributes in association analysis; 7. Applying sequential, subgraph and infrequent patterns in data mining.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
10	Students are able to apply association analysis techniques/methods in data mining.	1. Implementing the FP-Growth algorithm; 2. Applying techniques for evaluating association patterns; 3. Implement frequent itemset generation; 4. Implement rule generation; 5. Implement compact representation of frequent itemset; 6. Applying the handling of categorical attributes and continuous attributes in association analysis; 7. Applying sequential, subgraph and infrequent patterns in data mining.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%

11	Students are able to apply clustering techniques in data mining.	1. Explain the definition and basic concepts of clustering; 2. Explain the characteristics of data, clusters and clustering algorithms; 3. Applying the K-Means algorithm; 4. Applying the Hierarchical Clustering algorithm; 5. Implement DBSCAN algorithm; 6. Implement a clustering evaluation process; 7. Applying prototype-based clustering techniques; 8. Applying density-based clustering; 9. Applying graph-based clustering techniques; 10. Apply clustering scalability techniques.		Definition and basic concepts of clustering, data characteristics, clusters and clustering algorithms, K-Means, Hierarchical Clustering, DBSCAN, clustering evaluation, prototype-based and density-based clustering, graph-based clustering, and clustering scalability. Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
12	Students are able to apply clustering techniques in data mining.	1. Explain the definition and basic concepts of clustering; 2. Explain the characteristics of data, clusters and clustering algorithms; 3. Applying the K-Means algorithm; 4. Applying the Hierarchical Clustering algorithm; 5. Implement DBSCAN algorithm; 6. Implement a clustering evaluation process; 7. Applying prototype-based clustering techniques; 8. Applying density-based clustering; 9. Applying graph-based clustering techniques; 10. Apply clustering scalability techniques.		Definition and basic concepts of clustering, data characteristics, clusters and clustering algorithms, K-Means, Hierarchical Clustering, DBSCAN, clustering evaluation, prototype-based and density-based clustering, graph-based clustering, and clustering scalability. Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
13	Students are able to apply ways to handle data anomalies and detect data anomalies.	1. Explain the definition of data anomalies and statistical approaches to overcome data anomalies; 2. Implementing a data anomaly detection process with proximity-based outliers; 3. Implementing a data anomaly detection process with density-based outliers; 4. Implementing a data anomaly detection process using a clustering-based technique.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%

14	Students are able to apply data mining processes to complex data.	1. Applying data mining processes for time-based multimedia spatial databases; 2. Applying data mining processes for text-based multimedia spatial databases; 3. Applying data mining processes for World Wide Web-based multimedia spatial databases.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
15	Students are able to create data mining development applications according to existing trends.	1. Explains the data mining process in case examples in the fields of finance, retail industry, telecommunications, and biology. 2. Implement the creation of scientific applications and products, systems and research prototypes using data mining.		Approach: Scientific Model: Cooperative Method: Discussion, Presentation 3 X 50			0%
16	Summative Exam / Final Semester Exam	Summative Exam / Final Semester Exam		Written and/or Practical Exam 3 X 50			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
		0%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.