	Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Data Science Undergraduate Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Algorithm Design and Analysis	4920203012		T=3	P=0	ECTS=4.77	3	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	Atik Wintarti	Yuliani Puji Astuti, S.Si., M.Si.

Learning model	**Case Studies**

Program Learning Outcomes (PLO)

PLO study program that is charged to the course

Program Objectives (PO)

PO - 1	Able to apply appropriate computing techniques in providing computer-based solutions according to needs and evaluating the solutions provided. 2. Able to evaluate the chosen algorithm design, both through analytical evaluation and testing 3. Able to solve computational problems independently

PLO-PO Matrix

P.O
PO-1

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
PO-1																

Short Course Description	This lecture teaches how to design and analyze an algorithm to solve problems that require programming. The two main issues emphasized in designing and analyzing these algorithms are the aspects of correctness and complexity. Various techniques and approaches will be discussed, including dynamic programming, greedy algorithms, backtracking, graph algorithms, approximation algorithms, and others.

References

Main :

1. Cormen, T.H., Leiserson, C.E., Rivest, R.L. and Stein, C., Introduction to Algorithms (2nd edition), MIT Press, 2001.

Supporters:

Supporting lecturer	Dr. Atik Wintarti, M.Kom. Hasanuddin Al-Habib, M.Si. Riskyana Dewi Intan Puspitasari, M.Kom.

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		1.1. Explain the concept of dynamic programming 2.2. Use the correct matrix-chain multiplication method to solve matrix computing problems	**Form of Assessment** : Participatory Activities	Collaborative Learning (Lectures, discussions and questions and answers) 3 X 50	Collaborative Learning (Lectures, discussions and questions and answers) 3 x 50		5%
2		1.1. Using the optimal binary search trees method 2.2. Explain the concept of greedy algorithms	**Form of Assessment** : Participatory Activities, Practice/Performance	Collaborative Learning (Lectures, discussions and questions and answers) 3 X 50	Collaborative Learning (Lectures, discussions and questions and answers) 3 x 50		5%
3		1. Explain the concept of adding data structures	**Form of Assessment** : Participatory Activities	Collaborative approach (discussion and expository) Discussion 3 X 50	Collaborative approach (discussion and expository) Discussion 3 x 50		0%
4	Understand data structures that support dynamic system operations	1. Explain the concept of adding data structures	**Form of Assessment** : Participatory Activities, Practice/Performance	Collaborative approach (discussion and expository) Discussion 3 X 50	Collaborative approach (discussion and expository) Discussion 3 x 50		0%
5							0%
6							0%
7							0%
8							20%
9							0%
10							0%
11							0%
12							0%
13							0%
14							0%
15							0%
16							0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	7.5%
2.	Practice / Performance	2.5%
		10%

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.