	Universitas Negeri Surabaya Faculty of Engineering, Bachelor of Information Systems Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Operational Research	5720102078		T=2	P=0	ECTS=3.18	3	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	I Kadek Dwi Nuryana, S.T., M.Kom.

Learning model	**Project Based Learning**

Program Learning Outcomes (PLO)

PLO study program that is charged to the course

PLO-24	Mastering concepts and skills in computer programming languages;

Program Objectives (PO)

PO - 1	Students have knowledge of the meaning, history and development of operational research.
PO - 2	Students have the ability to analyze, formulate linear programming problems

PLO-PO Matrix

P.O	PLO-24
PO-1	
PO-2	

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																
PO-2																

Short Course Description	This course introduces the benefits and objectives of Operations Research. Theoretically, students are provided with mathematical models and problem solving techniques through Linear Programming (LP), LP elimination method, simplex method, Big-M method. Assignment and Queue Applications are given by adding case studies discussed in class.

References

Main :

1. Taha, Hamdy. 2007. Operations Research: An Introduction eight edition. Pearson. Prentice Hall. New Jersey
2. Aminudin. 2005. Prinsip 13 Prinsip Riset Operasi. Erlangga

Supporters:

Supporting lecturer	Aries Dwi Indriyanti, S.Kom., M.Kom. Paramitha Nerisafitra, S.ST., 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	Students are able to understand the history, meaning, benefits and objectives of RO operational research	1. Explains the history of RO 2. Students understand and are able to explain the concept of probability 3. Explain the benefits of RO	**Criteria:** 1. Participation = 20% 2. Tasks = 30% 3. UTS = 20% 4. UAS = 30% **Form of Assessment** : Participatory Activities	Model: Direct Learning 3x50			3%
2	Students are able to read and formulate problems rationally	Explain the problem formulation rationally	**Criteria:** 1. Participation = 20% 2. Tasks = 30% 3. UTS = 20% 4. UAS = 30% **Form of Assessment** : Participatory Activities	Model: Problem Based Learning 3x50			4%
3	Students are able to understand the meaning, benefits and objectives of Linear Programming (LP)	1. Explain the meaning of LP 2. Explain the benefits of LP 3. Explain the purpose of LP	**Criteria:** 1. Participation = 20% 2. Tasks = 30% 3. UTS = 20% 4. UAS = 30% **Form of Assessment** : Participatory Activities	Model: Problem Based Learning 3x50			3%
4	Students are able to write problem formulations according to Linear Programming (LP) rules	Explain the problem formulation according to LP rules	**Criteria:** 1. Participation = 20% 2. Tasks = 30% 3. UTS = 20%	Explain the problem formulation according to the LP 3x50 rule			0%
5	Students are able to solve LP problems using the Elimination method	Explain solving LP problems using the Elimination method		3x50			0%
6	Students are able to solve LP problems using the Simplex method	Explain solving LP problems using the Simplex method		3x50			0%
7	Students are able to solve LP problems using the Big M method	Explain solving LP problems using the Big M method		3x50			0%
8	Students are able to formulate transportation problems according to LP rules	Explain the formulation of transportation problems according to LP regulations	**Form of Assessment** : Project Results Assessment / Product Assessment	3x50			25%
9	Students are able to understand the benefits of assignments and methods in assignments	1. Explain the benefits of the Assignment 2. Explains the 13 methods in the Assignment		3x50			0%
10	Students are able to solve LP problems using the Hungarian method	Explaining the LP problem using the Hungarian method		3x50			0%

11	Students are able to understand and know the background of queues and queuing systems	1. Explain the background of the queue 2. Explain the queuing system		3x50			0%
12	Students are able to formulate single server single queuing system problems	Explain the problem formulation of a single server single queue system		3x50			0%
13	Students are able to formulate multiple single server queuing system problems	Explain the formulation of the problem of queuing for many single servers		3x50			0%
14	Students are able to understand the background, benefits and objectives of simulation systems	1. Explain the background of the simulation system 2. Explain the purpose of the simulation system		3x50			0%
15	Students are able to solve problems using simulation models	Explain problem solving using a simulation model		3x50			0%
16	UAS			1x1			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	10%
2.	Project Results Assessment / Product Assessment	25%
		35%

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.