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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Engineering Mathematics II	2120103040		T=3	P=0	ECTS=4.77	4	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Ir. Priyo Heru Adiwibowo, S.T., M.T.

Learning model	**Case Studies**
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	Students are able to conceptually understand ordinary differential equations, multi-variable functions (partial derivatives, gradient vectors, extreme values), double integrals, Laplace transforms and Fourier series and Fourier transforms.
References	**Main :**
	1. 1. Mursita, Danang. 2011. *Matematika untuk Perguruan Tinggi . . Bandung: Rekayasa Sains.* 2. K.A. Stroud. 2015. Matematika untuk Teknik. Bandung: Erlangga
	Supporters:
Supporting lecturer	Indra Herlamba Siregar, S.T., M.T. Tri Hartutuk Ningsih, S.T., M.T. Ferly Isnomo Abdi, S.T., S.Pd., 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							0%
2							0%
3							0%

4	Students can understand the concept of PD: 1. PD Homoden second order2. Non-homogeneous PD of order 2	Can solve questions related to PD1. second order homogeneous2. non-homogeneous second order	**Criteria:** maximum score 100	Scientific direct learning dankoo[erative group work and individual and group activity 1 X 1			0%
5	MULTI VARIABLE FUNCTION	Students have understood the concept of 1. There are many domains and ranges for variable functions. Draw a quadratic plane in space or dimension 33. Determine partial derivatives of multi-variable functions (TP-1 and TP-2)	**Criteria:** Score per question 35 30 and 35	Cooperative group approach and 3 X 50 discussion			0%
6	Students can solve extreme value problems	Can solve maximum and minimum problems. Can solve extreme value problems using the Lagrange method.	**Criteria:** Maximum score 50 and 50	Group work and cooperative learning 6 X 50			0%
7							0%
8	Students can solve problems related to double and triple integrals	Can solve questions related to the concept of double and 3 integrals	**Criteria:** Maximum scores 40 and 60	cooperative group work and 3 X 50 assignments			0%
9	Differential Equations of Multiple Integral Multivariable Functions	Can solve questions in meetings 1 to 8	**Criteria:** The score for each question is 25 from 4 questions	Closed Written test essay 1 X 1			0%
10	Students can or are able to complete the concept: Line integral vector field (Green's Theorem)	Students can and are able to solve problems related to line integral vector fields (Green's Theorem)	**Criteria:** activeness and togetherness and cohesiveness of group work	Cooperative model group work Group discussion 6 X 50			0%
11	1. Can solve Differential Equations questions in the engineering field2. Can apply PD theory to complete engineering applications	1. Have been able to solve questions related to WW2. Able to complete or form a PD and name the PD	**Criteria:** Essay assessment	Scientific Discussion and questions and answers Direct and cooperative learning model Important points in understanding mathematics concepts 2 3 X 50			0%
12	Students can understand the concepts: Gradient divergence and curl of a vector field function	Can solve problems related to gradient divergence and rotation of a vector field and a scalar field	**Criteria:** maximum score 100	Cooperative group work and discussion of 1 X 1 group presentations			0%
13							0%
14	Understand the Laplace Transform and its applications	Students understand the concept of the Laplace transformation to solve problems in engineering	**Criteria:** individual	Group work discussion and presentation 6 X 50			0%

15	1. Applying the Laplace Transformation in engineering, Mathematics and Natural Sciences and other fields, especially electrical engineering2.	1. Solving problems in the engineering field, especially related to the application of the Laplace Transform2.	**Criteria:** 1.1. Maximum scoring of 100 for each formative test or PTS and PAS 2.2. Follow the UNESA scoring format: participation (2), Assignments (3), PTS (2) and PS (3) 3.3. Minimum attendance requirement is 75%	Approach: Scientific Method: Question and answer, discussion and assignment Model: Direct learning model Strategy: assignment and presentation in turns. 3 X 50			0%
16							0%

Evaluation Percentage Recap: Case Study

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.