



**Universitas Negeri Surabaya
Faculty of Engineering,
Mechanical Engineering Education Undergraduate Study
Program**

Document
Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Engineering Mechanics	8320303220	Compulsory Study Program Subjects	T=2	P=0	ECTS=3.18	3	May 12, 2023
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
	Dr. Djoko Suwito, M.Pd.		Wahyu Dwi Kurniawan, S.Pd., M.Pd.			Ir. Wahyu Dwi Kurniawan, S.Pd., M.Pd.	

Learning model	Case Studies
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Program Learning Outcomes (PLO)	PLO study program which is charged to the course				
	PLO-5	Have social competence and personality competence in mechanical engineering education			
	PLO-7	Have an understanding of technopreneurship in the field of automotive/production technology			
	PLO-10	Have an understanding of mathematics and basic mechanical engineering			
	Program Objectives (PO)				
	PO - 1	Understand the resultant of 2 unidirectional forces at one capture point			
	PO - 2	Understand the resultant of 2 forces in opposite directions at one capture point			
	PO - 3	Understand the resultant of 2 forces that form an angle of 90° at one capture point			
	PO - 4	Understand the resultant of 2 forces that form an arbitrary angle at one capture point			
	PO - 5	Understand the resultant for more than 2 forces at one capture point			
	PO - 6	Understanding Varignon's Moment theorem			
	PO - 7	Understand the graphical requirements for balance of a plane style arrangement			
	PO - 8	Understand the decomposition and calculation of forces in space			
	PO - 9	Understand normal stress, tension and compression			
	PO - 10	Understanding Shear Stress			
	PLO-PO Matrix				
		P.O	PLO-5	PLO-7	PLO-10
		PO-1			
		PO-2			
	PO-3				
	PO-4				
	PO-5				
	PO-6				
	PO-7				
	PO-8				
	PO-9				
	PO-10				
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															
		PO-3															
		PO-4															
		PO-5															
		PO-6															
		PO-7															
		PO-8															
		PO-9															
		PO-10															
Short Course Description	Understand the resultant of 2 unidirectional forces at one capture point. Understand the resultant of 2 forces in opposite directions at one capture point. Understand the resultant of 2 forces that form an angle of 90° at one capture point. Understand the resultant of 2 forces that form an arbitrary angle at one capture point. Understand the resultant for more than 2 forces at one capture point. Understanding Varignon's Moment theorem. Understand the graphical requirements for balance of a plane style arrangement. Understand the requirements of balance techniques. Understand how to determine the center of gravity of flat images. Understanding Cremona diagrams for flat frames. Understand the Culman and Ritter intersection methods																
References	Main :																
		1. S. Timosenko, DH Young. 1990. Mekanika Teknik, Jakarta, Penerbit Erlangga 2. Ferdinand P. Bear dan E.Russell Johnston, Jr. 1987. Statika. (Mekanika untuk Insinyur), Erlangga Jakarta															
	Supporters:																
Supporting lecturer	Dr. Djoko Suwito, M.Pd.																
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	Know what is meant by forces on a flat plane	Able to determine the resultant of two or more forces using vectors. Able to calculate the resultant of two or more forces using vectors	Criteria: Active discussion, questions and answers and attendance in class Form of Assessment : Participatory Activities	Lectures, discussions and questions and answers 2 X 50	Lectures, discussions and questions and answers 2 X 50	Material: Able to determine the resultant of two or more forces using vectors. References: S. Timosenko, DH Young. 1990. Engineering Mechanics, Jakarta, Erlangga Publishers	3%										
2	Know what is meant by forces on a flat plane	1.Able to graphically calculate the magnitude of the resultant of more than 2 forces. Analyze the magnitude of the resultant and two forces 2.Describes the resultant of more than 2 forces	Criteria: Active discussions, questions and answers, class attendance and practice questions Form of Assessment : Participatory Activities	Lectures, discussions and questions and answers 2 X 50	Lectures, discussions and questions and answers 2 X 50	Material: Calculating the magnitude of vectors of more than two forces graphically. References: S. Timosenko, DH Young. 1990. Engineering Mechanics, Jakarta, Erlangga Publishers	3%										

3	Continue meeting 2	Decomposing forces in components. Determining the perpendicular components of a force, Adding forces by adding	Criteria: null Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: How to graphically depict the resultant of more than 2 unidirectional forces at one capture point. References: <i>S. Timosenko, DH Young. 1990. Engineering Mechanics, Jakarta, Erlangga Publishers</i>	3%
4	Know about the resultant forces in space	1.Understand the concept of style in the field of space 2.Describes the components of force in the field of space	Criteria: null Form of Assessment : Test		Lectures, discussions and questions and answers 2 X 50	Material: Explaining the concept of force in the field of space. References: <i>S. Timosenko, DH Young. 1990. Engineering Mechanics, Jakarta, Erlangga Publishers</i>	7%
5	Continuing the 4th Meeting	1.Understand the concept of style in the field of space 2.Describes the components of force in the field of space	Criteria: null Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Describe the components of force x, y, and z References: <i>S. Timosenko, DH Young. 1990. Engineering Mechanics, Jakarta, Erlangga Publishers</i>	3%
6	Continuing the 5th Meeting	1.Understand the concept of style in the field of space 2.Describes the components of force in the field of space	Criteria: null Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Calculating the magnitude of congruent forces in space References: <i>S. Timosenko, DH Young. 1990. Engineering Mechanics, Jakarta, Erlangga Publishers</i>	3%
7	MKnowing the center of gravity of plates and composites	1.Understand the concept of center of gravity of planes and lines 2.Understand the concept of center of gravity of planes and lines 3.Understand the center of gravity of plates and composites	Criteria: null Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Calculating the center of gravity of plates and composites References: <i>S. Timosenko, DH Young. 1990. Engineering Mechanics, Jakarta, Erlangga Publishers</i>	3%

8	Know the center of gravity of plates and composites	<ol style="list-style-type: none"> 1. Understand the concept of center of gravity of planes and lines 2. Understand the concept of center of gravity of planes and lines 3. Understand the center of gravity of plates and composites 	Criteria: null Form of Assessment : Participatory Activities, Tests		Lectures, discussions and questions and answers 2 X 50	Material: Knowing the center of gravity of plates and composites References: <i>S. Timosenko, DH Young, 1990. Engineering Mechanics, Jakarta, Erlangga Publishers</i>	15%
9	Understand normal, tensile and compressive stress	Understand normal, tensile and compressive stress	Criteria: presentation and discussion Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Understanding normal, tensile and compressive stress References: <i>S. Timosenko, DH Young, 1990. Engineering Mechanics, Jakarta, Erlangga Publishers</i>	3%
10	Understand normal, tensile and compressive stress	Understand normal, tensile and compressive stress	Criteria: presentation and discussion Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Understanding normal, tensile and compressive stress References: <i>S. Timosenko, DH Young, 1990. Engineering Mechanics, Jakarta, Erlangga Publishers</i>	3%
11	Understanding shear stress	Understanding shear stress	Criteria: presentation and discussion Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Understanding shear stress References: <i>Ferdinand P. Bear and E. Russell Johnston, Jr. 1987. Statics. (Mechanics for Engineers), Erlangga Jakarta</i>	4%
12	Understanding shear stress	Understanding shear stress	Criteria: presentation and discussion Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Understanding shear stress References: <i>Ferdinand P. Bear and E. Russell Johnston, Jr. 1987. Statics. (Mechanics for Engineers), Erlangga Jakarta</i>	3%

13	Understanding shear stress	Understand stresses in inclined sections	Criteria: presentation and discussion Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Understanding stress in inclined sections References: <i>Ferdinand P. Bear and E. Russell Johnston, Jr. 1987. Statics. (Mechanics for Engineers), Erlangga Jakarta</i>	4%
14	Understanding Deflection or diflection	presentation and discussion	Criteria: presentation and discussion Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Understanding deflection or diflection References: <i>Ferdinand P. Bear and E. Russell Johnston, Jr. 1987. Statics. (Mechanics for Engineers), Erlangga Jakarta</i>	4%
15	Understanding Deflection or diflection	presentation and discussion	Criteria: presentation and discussion Form of Assessment : Participatory Activities		Lectures, discussions and questions and answers 2 X 50	Material: Understanding deflection or diflection References: <i>Ferdinand P. Bear and E. Russell Johnston, Jr. 1987. Statics. (Mechanics for Engineers), Erlangga Jakarta</i>	4%
16	Understanding Deflection or diflection	Understanding Deflection or diflection	Criteria: presentation and discussion Form of Assessment : Test		Lectures, discussions and questions and answers 2 X 50	Material: Understanding deflection or diflection References: <i>Ferdinand P. Bear and E. Russell Johnston, Jr. 1987. Statics. (Mechanics for Engineers), Erlangga Jakarta</i>	35%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	50.5%
2.	Test	49.5%
		100%

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** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities 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.