	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
Kinematics and Dynamics	2120103033		T=3	P=0	ECTS=4.77	3	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	Understanding and mastery of kinematics, basics of vectors, kinematics of particles, types of plane motion, Newton's working principle, principle of momentum in particles, principle of momentum in rigid objects, degrees of freedom of mechanisms, determining speed and acceleration in kinematic mechanisms
References	**Main :**

1. Martin, George H. 1982. Kinematics dan Dynamics of Mechanics , 2nd Edition. McGraw Hill.
2. Russel C, Hibbeler. 1995. EngineeringMechanics : Dynamics. Prentice Hall.
3. Hirchorn J. 1962. Kinematics and Dynamics of Plane Mechanism . McGraw Hill Book Company.
4. Ferdinand P Beer, E Russel Johnston Jr. 1998. V ector Mechanism for Engineers, Dynamics, 3rd Edition . McGraw Hill.
5. Priyo Heru Adiwibowo. 2013. Kinematika dan Dinamika, Bagian 1 Kinematika . Unesa University Press.

	Supporters:
Supporting lecturer	Ir. Priyo Heru Adiwibowo, S.T., M.T. Diah Wulandari, 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	Students are able to explain their understanding of the problem that will be designed to design the mechanism	Know the problem to be designed	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
2	Students are able to explain their understanding of the stages in designing a mechanism	Know the stages of design	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
3	Students are able to use physical quantities, symbols and units	Use physical quantities, symbols and units	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
4	Students are able to use the basics of vectors	Identifying scalar and vector quantities Drawing vectors Skilled in using addition, subtraction and resultant vectors Skilled in using vector decomposition	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
5	Students are able to use the basics of vectors	Skilled in using vectors in the Cartesian axis system Skilled in using multiplication of vectors with scalars Skilled in using multiplication of vectors with vectors	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
6	Students are able to use particle motion on a flat plane	Distinguish between absolute and relative vectors Skilled in using Cartesian coordinates Skilled in using polar coordinates Skilled in using motion reference axis systems Skilled in using absolute and relative particle motion	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
7	Students are able to use particle motion on a flat plane	Distinguishing between absolute and relative vectors Skilled in using Cartesian coordinates Skilled in using polar coordinates Skilled in using motion reference axis systems Skilled in using absolute and relative particle motion	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
8	Midterm Exam (UTS)			3 X 50			0%

9	Students are able to explain relative speed and relative acceleration	1. Skilled at explaining relative speed 2. Skilled in explaining relative acceleration 3. Skilled in explaining the speed relationship between two points on a rigid link 4. Skilled in explaining the acceleration of a point on a link rotating about a fixed center with a constant radius 5. Skilled in explaining the relative acceleration of two points on a rigid link	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
10	Students are able to explain relative speed and relative acceleration	1. Skilled at explaining relative speed 2. Skilled in explaining relative acceleration 3. Skilled in explaining the speed relationship between two points on a rigid link 4. Skilled in explaining the acceleration of a point on a link rotating about a fixed center with a constant radius 5. Skilled in explaining the relative acceleration of two points on a rigid link	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%

11	Students are able to calculate and apply relative speed and relative acceleration	1. Skilled at calculating relative speed 2. Skilled in calculating relative acceleration 3. Skilled in calculating the speed relationship between two points on a rigid link 4. Skilled in calculating the acceleration of a point on a link rotating about a fixed center with a constant radius 5. Skilled in calculating the relative acceleration of two points on a rigid link	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
12	Students are able to calculate and apply relative speed and relative acceleration	1. Skilled at calculating relative speed 2. Skilled in calculating relative acceleration 3. Skilled in calculating the speed relationship between two points on a rigid link 4. Skilled in calculating the acceleration of a point on a link rotating about a fixed center with a constant radius 5. Skilled in calculating the relative acceleration of two points on a rigid link	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
13	Students are able to explain and calculate relative speed and relative acceleration in the application of various mechanisms	1. Skilled in calculating relative speed applications 2. Skilled in calculating relative acceleration applications	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%

14	Students are able to explain and calculate relative speed and relative acceleration in the application of various mechanisms	1. Skilled in calculating relative speed applications 2. Skilled in calculating relative acceleration applications	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
15	Students are able to explain and calculate relative speed and relative acceleration in the application of various mechanisms	1. Skilled in calculating relative speed applications 2. Skilled in calculating relative acceleration applications	**Criteria:** Compliance with the answer key	Lectures, discussions, questions and answers, exercises and assignments 3 X 50			0%
16	Final Semester Examination (UAS)			3 X 50			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.