	Universitas Negeri Surabaya Vocational Faculty, D4 Mechanical Engineering Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Machine Elements	99992140102022	Compulsory Study Program Subjects	T=2	P=0	ECTS=3.18	2	February 1, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**

Program Learning Outcomes (PLO)

PLO study program that is charged to the course

Program Objectives (PO)

PO - 1	Students have good morals, ethics and personality when attending lectures

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	Understanding, mastery, application and analysis of the basic material of machine elements, loads, tension and strain, machine element connections, shafts, springs, clutches, gears and chains, as well as belts and pulleys

References

Main :

1. Sularso, Kiyokatso Suga ; Dasar Perencanaan dan pemilihan elemen mesin, P.T. Pradnya Paramita Jakarta , 1983.
2. Spotts. MF, Design of machine of Element, Prentice hall , USA, 2000.
3. Shigley Mischke, Mechanical Engineering Design, McGraw Hill, USA, 2000.
4. Supadi Hs, Buku ajar Elemen Mesin, Jurusan T.Mesin F.Teknik UNESA, Surabaya 2008.
5. Aaron Deutschment. 1990. Machine Design Theory. Collier Macmillan International Edition, London.
6. Abdi, Ferly Isnomo, dkk. 2023. Elemen Mesin I. Edisi Pertama, Penerbit Nawa Litera Publising, Lamongan.

Supporters:

1. JMK A Collins. 2003. Mechanical Design of Machine Elements and Machines. Jhon Wiley & Son, New York.
2. Beer, Ferdinand P. E., Russell Johnston, Jr. 1985. Mechanics of Materials. Second Edition. McGraw-Hill Book Co., Singapore.
3. Timoshenko, S., D.H. Young. 1996. Mekanika Teknik. Terjemahan, edisi ke-4, Penerbit Erlangga, Jakarta.
4. Khurmi, R.S. 2001. Strength of Materials. S. Chand & Company Ltd., New Delhi.

Supporting lecturer	Dyah Riandadari, S.T., M.T. Ferly Isnomo Abdi, S.T., S.Pd., M.T. Dewi Puspitasari, S.Pd., M.Sc.

Week-	Final abilities of each learning	Evaluation	Help Learning, Learning methods, Student Assignments, [Estimated time]	Learning materials [References	Assessment Weight (%)

	stage (Sub-PO)	Indicator	Criteria & Form	Offline (*offline*)	Online (*online*)	]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Students are able to explain the understanding of force, mass, nominal load and working load as well as moment of effort and power.	1.Explain force and mass 2.Explain nominal load and workload 3.Explain the moment of effort and power	**Criteria:** Activeness and mastery of material **Form of Assessment** : Participatory Activities	Lectures 3 X 50			5%
2	Students are able to explain the understanding of center of gravity, moment of inertia and moment of resistance	1.Explain the center of gravity 2.Explain the moment of inertia and the moment of resistance	**Criteria:** activeness and mastery of material	Lectures, discussions, exercises 3 X 50			0%
3	Students are able to explain their understanding of rivet construction	Explain rivet construction	**Criteria:** activeness and mastery of the material	Lectures, discussions, exercises 3 X 50			0%
4	Students are able to explain their understanding of damage to rivet joints and calculations for rivet construction	1.Explain damage to rivet joints 2.Explain rivet construction calculations	**Criteria:** activeness and mastery of the material	Lectures, discussions, exercises 3 X 50			0%
5	Students are able to explain their understanding of welding construction	Explain welding construction	**Criteria:** activeness and mastery of the material	Lectures, discussions, exercises 3 X 50			0%
6	Students are able to explain their understanding of welding joint calculations	Explain the calculation of welded joints	**Criteria:** activeness and mastery of the material	Lectures, discussions, exercises 3 X 50			0%
7	Students are able to explain their understanding of general threads and the forms of thread damage	1.Explain general things about threads 2.Explain the form of thread damage	**Criteria:** activeness and mastery of material	Lectures, discussions, exercises 3 X 50			0%
8	Sub Summative Exam	Sub Summative Exam	**Criteria:** see rubric **Form of Assessment** : Test	Sub Summative Exam 3 X 50			20%
9	Students are able to explain their understanding of thread size calculations	Explain the calculation of thread sizes	**Criteria:** activeness and mastery of the material	Lectures, discussions, exercises 3 X 50			0%
10	Students are able to explain the understanding of cylindrical screw springs	Explain cylindrical screw springs	**Criteria:** activeness and mastery of the material	Lectures, discussions, exercises 3 X 50			0%
11	Students are able to explain the understanding of torsion springs and leaf springs	1.Explain torsion springs 2.Explain leaf springs	**Criteria:** activeness and mastery of material	Lectures, discussions, exercises 3 X 50			0%
12	Students are able to explain the understanding of V-belts and pulleys	1.Explaining V-belts 2.Explain pulleys	**Criteria:** activeness and mastery of the material	Lectures, discussions, exercises 3 X 50			0%
13	Students are able to explain the understanding of shrinkage and compression connections	1.Explain shrinkage joints 2.Explain compression connections	**Criteria:** activeness and mastery of the material	Lectures, discussions, exercises 3 X 50			0%

14	Students are able to explain the understanding of V-belt transmission	Explains V-belt transmission	**Criteria:** activeness and mastery of the material	Lectures, discussions, exercises 3 X 50			0%
15	Students are able to explain the understanding of rotation belts	1. Explain shift belt transmission 2. Calculate the belt size	**Criteria:** activeness and mastery of material	Lectures, discussions, exercises 3 X 50			0%
16	Students are able to explain their understanding of roller chain transmission		**Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, exercises 3 X 50			30%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	5%
2.	Project Results Assessment / Product Assessment	30%
3.	Test	20%
		55%

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.