	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
Energy Conversion Machine	8320302079		T=2	P=0	ECTS=3.18	4	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Ir. Wahyu Dwi Kurniawan, S.Pd., M.Pd.

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	This course provides insight into energy and its sources, conversion technology and its impact on the environment
References	**Main :**
	1. Indra Herlamba Siregar, Mesin Konversi Energi, UniPress UNESA Surabaya 20072. D Yogi Goswani Frank Kreith, Energy Conversion, CRC Press Boca Ranton 2008
	Supporters:
Supporting lecturer	Indra Herlamba Siregar, S.T., M.T. Dany Iman Santoso, S.T., 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	Understand the definition, classification and sources of energy	Students name energy sources	**Criteria:** Answer correctly	100 Minutes Live Learning			0%

2	Able to understand the sources and impacts of using fossil energy and able to obtain energy from biomass	1. Students can explain the origin of fossil energy, 2. Students can make energy from biomass	**Criteria:** Answer correctly	100 Minutes Live Learning			0%
3	Able to calculate ideal and real air requirements for fossil fuels and biomass	Students are able to calculate ideal and real air requirements for fossil fuels and biomass	**Criteria:** Answer correctly	4 X 50 Hands-On Learning			0%
4							0%
5	Able to explain the working principles of gasoline engines and the Otto cycle	Students can describe the working principles of gasoline engines and the Otto cycle	**Criteria:** Answer correctly	100 Minutes Live Learning			0%
6	Able to explain the working principles of Diesel Engines and the Diesel cycle	Students can describe the working principles of Diesel Engines and the Diesel cycle	**Criteria:** Answer correctly	100 Minutes Live Learning			0%
7	Able to calculate Otto and Diesel cycle performance	Students can calculate the performance of the Otto and Diesel cycles	**Criteria:** Answer correctly	100 Minutes Live Learning			0%
8							0%
9	Able to calculate pump performance	Students can calculate pump performance	**Criteria:** Answer correctly	100 Minutes Live Learning			0%
10	Able to calculate Rankine cycle performance	Students can calculate Rankine cycle performance	**Criteria:** Answer correctly	200 Minutes Live Learning			0%
11							0%
12	Able to calculate the performance of the absorption cooling cycle	Students understand the working principles of the absorption refrigeration cycle and can calculate the performance of the absorption refrigeration cycle	**Criteria:** Answer correctly	200 Minutes Live Learning			0%
13							0%
14	Describe the wind power generation system	Students understand the working principles of wind power generation systems and are able to calculate the dimensions of wind turbines	**Criteria:** Answer correctly	100 Minutes Live Learning			0%

15	Describe the hydroelectric power generation system	Students understand the working principles of hydroelectric power generation systems and calculate the power generated by water turbines	**Criteria:** Answer correctly	100 Minutes Live Learning			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.