



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

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date																																																																																				
Construction Equipment*	8320502158	Study Program Elective Courses	T=2 P=0 ECTS=3.18	5	July 17, 2024																																																																																				
AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator																																																																																					
	Dr. Gde Agus Yudha Prawira Adistana, S.T., M.T.		Dr. Gde Agus Yudha Prawira Adistana, S.T., M.T.	Dr. Gde Agus Yudha Prawira Adistana, S.T., M.T.																																																																																					
Learning model	Case Studies																																																																																								
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																																																								
	Program Objectives (PO)																																																																																								
	PO - 1	Students have the ability to plan calculations and use them in the Construction Equipment course by utilizing learning resources and ICT																																																																																							
	PO - 2	Students have knowledge of the theory of Construction Equipment courses from planning and calculating the efficiency of using construction equipment.																																																																																							
	PO - 3	Students have the ability to choose the right construction equipment according to the characteristics of the job and have a responsible attitude in developing construction equipment courses in accordance with applicable regulations																																																																																							
	PLO-PO Matrix																																																																																								
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>P.O</td></tr> <tr><td>PO-1</td></tr> <tr><td>PO-2</td></tr> <tr><td>PO-3</td></tr> </table>					P.O	PO-1	PO-2	PO-3																																																																																
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PO Matrix at the end of each learning stage (Sub-PO)																																																																																									
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </tr> </thead> <tbody> <tr><td>PO-1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>					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																
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PO-3																																																																																									
Short Course Description	This course provides an understanding of the function and production of: field cleaning equipment, digging and lifting equipment, loader and transport equipment, compaction equipment, dredging equipment, stone crushing equipment, concreting and asphaltting equipment, Car Crane equipment, Tower Crane equipment, Pile Driving equipment Equipment, Compressors, Water Pumps, Generators, Hand Power Tools, as well as calculations of costs for using Construction Equipment. Learning is carried out by applying lecture, discussion, presentation and assignment methods. Learning is carried out using a combination of direct teaching methods and case study models, with a constructivist paradigm that emphasizes learning at the student center.																																																																																								
References	Main :																																																																																								
	<ol style="list-style-type: none"> 1. Rochmanhadi.1992. Alat-alat berat dan penggunaannya. Jakarta: Yayasan Badan Penerbit Pekerjaan Umum. 2. Susy Fatena Rostiyanti. 2008. Alat Berat untuk Konstruksi. Jakarta: Rineka Cipta. 3. Asianto. 2008. Manajemen Alat Berat untuk konstruksi. Jakarta: Pradnya Paramita. 																																																																																								
	Supporters:																																																																																								
	<ol style="list-style-type: none"> 1. Anonimus. 2008. Caterpillar Performance. Handbook, Perioria Illionis USA: Caterpillar.Inc 																																																																																								
Supporting lecturer	Dr. Gde Agus Yudha Prawira Adistana, 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	Able to explain land transfer strategies	Students can: a. Explain matters related to the basics of land transfer. b. Explain the nature and types of soil. c. Calculating tool efficiency. d. Calculating tool productivity.	Criteria: 1.Explain matters related to the basics of land transfer. b. Explain the nature and types of soil. c. Calculating tool efficiency. d. Calculating tool productivity. answer correctly and precisely 2.basic earthmoving Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: basics of earth moving Reference: <i>Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</i> Material: basics of land transfer Reference: <i>Susy Fatena Rostiyanti. 2008. Heavy Equipment for Construction. Jakarta: Rineka Cipta.</i>	2%
2	Able to explain the purpose, types and classification of heavy equipment	a. Explain the purpose of using heavy equipment on construction projects. b. Explain the classification of heavy equipment. c. Explain the factors that influence the selection of heavy equipment. d. Explain heavy equipment in various construction projects	Criteria: Explain the purpose of using heavy equipment on construction projects. b. Explain the classification of heavy equipment. c. Explain the factors that influence the selection of heavy equipment. d. Explain heavy equipment in various construction projects correctly and precisely	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: types and classification of heavy equipment Reference: <i>Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</i> Material: types and classification of heavy equipment Library: <i>Asianto. 2008. Heavy Equipment Management for construction. Jakarta: Pradnya Paramita.</i> Material: types and classification of heavy equipment Reader: <i>Susy Fatena Rostiyanti. 2008. Heavy Equipment for Construction. Jakarta: Rineka Cipta.</i>	2%

3	Able to explain the types and purposes of field cleaning equipment, as well as calculate the productivity of the equipment.	a. Explain the various types of field cleaning equipment. b. Explain the parts and functions of field cleaning equipment. c. Calculate the productivity of field cleaning equipment.	<p>Criteria: Able to explain various types of field cleaning equipment correctly and precisely</p> <p>Form of Assessment : Practice / Performance</p>	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	<p>Material: Explains various types of field cleaning equipment. Reference: Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</p> <hr/> <p>Material: Explaining various types of field cleaning equipment Reference: Susy Fatena Rostiyanti. 2008. Heavy Equipment for Construction. Jakarta: Rineka Cipta.</p> <hr/> <p>Material: Explain the various types of field cleaning equipment Reader: Asianto. 2008. Heavy Equipment Management for construction. Jakarta: Pradnya Paramita.</p>	0%
4	Able to explain the types and purposes of land clearing equipment, and able to calculate the productivity of this equipment.	a. Explain the definition of land clearing work. b. Explain the factors that influence land clearing activities and productivity. c. Calculating land clearing productivity.	<p>Criteria: Able to explain the definition of land clearing work correctly and precisely</p> <p>Form of Assessment : Practice / Performance</p>	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	<p>Material: land clearing work Reference: Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</p> <hr/> <p>Material: land clearing work Reference: Susy Fatena Rostiyanti. 2008. Heavy Equipment for Construction. Jakarta: Rineka Cipta.</p>	2%
5	Able to explain the types, functions and how digging and lifting equipment works, as well as being able to calculate the productivity of this equipment.	a. Explain the various types of digging and lifting equipment. b. Explain the function of digging and lifting equipment. c. Explain how digging and lifting equipment works. d. Calculate the productivity of digging and lifting equipment.	<p>Criteria: 1.Can answer correctly 2.Able to explain various types of digging and lifting equipment properly and correctly</p>	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	<p>Material: digging and lifting equipment Reference: Asianto. 2008. Heavy Equipment Management for construction. Jakarta: Pradnya Paramita.</p> <hr/> <p>Material: digging and lifting equipment Reference: Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</p>	2%

6	Able to explain the types, functions and workings of loading and transport equipment, as well as being able to calculate the productivity of this equipment.	a. Explain the various types of loading and transport equipment. a. Explain the function of loading and transport equipment. b. Explain how loader and transport equipment works. c. Calculate the productivity of loader and transport equipment.	Criteria: Able to explain various types of loading and transport equipment correctly and precisely Form of Assessment : Practice / Performance	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: loader and transport equipment Library: <i>Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</i> Material: loader and transport equipment Reference: <i>Asianto. 2008. Heavy Equipment Management for construction. Jakarta: Pradnya Paramita.</i>	2%
7	Able to explain the types, functions, parts and workings of surface forming and compaction equipment, and able to calculate the productivity of this equipment.	a. Explain the types of surface forming and compaction equipment. b. Explain the parts and functions of surface forming and compaction equipment. c. Explain how surface forming and compaction equipment works. d. Calculate the productivity of surface forming and compaction equipment	Criteria: Able to explain the types of surface forming and compaction equipment correctly and precisely Form of Assessment : Practice / Performance	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: surface forming and compaction equipment Reference: <i>Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</i> Material: surface forming and compaction equipment Reference: <i>Asianto. 2008. Heavy Equipment Management for construction. Jakarta: Pradnya Paramita.</i>	2%
8	-	-	Criteria: -	Sub-Summative Exam 2 X 50			32%
9	Able to explain the purpose, types and how dredging equipment works, as well as being able to calculate the productivity of the equipment.	a. Explain the purpose of dredging work. b. Explain the various types of dredging equipment. c. Calculating the productivity of dredging equipment.	Criteria: Able to explain the purpose of dredging work correctly and precisely	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: dredging equipment Reference: <i>Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</i> Material: dredging equipment Reference: <i>Susy Fatena Rostiyanti. 2008. Heavy Equipment for Construction. Jakarta: Rineka Cipta.</i> Material: dredging equipment Reference: <i>Asianto. 2008. Heavy Equipment Management for construction. Jakarta: Pradnya Paramita.</i>	2%

10	Able to explain the function, capacity and how stone crushing equipment works	a. Explain the function of stone crushing equipment, b. Explain the capacity of stone crushing equipment, c. Calculating the productivity of stone crushing equipment,	Criteria: Able to explain the function of stone crushing equipment correctly and precisely Form of Assessment : Practice / Performance	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: stone crushing equipment Reference: <i>Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</i> Material: stone crushing equipment Reader: <i>Susy Fatena Rostiyanti. 2008. Heavy Equipment for Construction. Jakarta: Rineka Cipta.</i> Material: stone crushing equipment Reference: <i>Anonymous. 2008. Caterpillar Performance. Handbook, Perioria Illinois USA: Caterpillar.Inc</i>	2%
11	Able to explain the functions, types and workings of concrete and paving equipment, and able to calculate the productivity of this equipment.	a. Explain the function of concrete and paving equipment. b. Explain the various types of paving and paving equipment. c. Calculate the productivity of concrete and paving equipment	Criteria: Able to explain the function of concrete and paving equipment correctly and precisely Form of Assessment : Practice / Performance	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: paving and paving equipment Reference: <i>Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</i> Material: paving and paving equipment Reader: <i>Susy Fatena Rostiyanti. 2008. Heavy Equipment for Construction. Jakarta: Rineka Cipta.</i>	2%
12	Able to explain the functions, parts and workings of mobile cranes, tower cranes, pile driving equipment, and be able to calculate the productivity of this equipment.	a. Explain the function of mobile cranes, tower cranes, pile driving equipment. b. Explain the parts of a mobile crane, tower crane, pile driving equipment. c. Explain how mobile cranes, tower cranes, pile driving equipment work. d. Calculating the productivity of mobile cranes, tower cranes, pile driving equipment.	Criteria: Able to explain the function of mobile cranes, tower cranes, pile driving equipment correctly and precisely Form of Assessment : Practice / Performance	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: crane, tower crane, pile driving equipment Reference: <i>Anonymous. 2008. Caterpillar Performance. Handbook, Perioria Illinois USA: Caterpillar.Inc</i> Material: crane, tower crane, pile driving equipment Library: <i>Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</i>	2%
13	Able to explain the function and workings of compressors, water pumps and generators, as well as being able to calculate the productivity of this equipment.	a. Explain the function of compressors, water pumps and generators. b. Explain how compressors, water pumps and generators work. c. Calculate the productivity of compressors, water pumps and generators.	Criteria: able to explain the function of compressors, water pumps and generators correctly and precisely	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: compressor, water pump and generator Library: <i>Asianto. 2008. Heavy Equipment Management for construction. Jakarta: Pradnya Paramita.</i>	2%

14	Able to explain the types, functions and how hand power tools work, as well as being able to calculate the productivity of the equipment.	a. Explain the various types of hand power tools. b. Explain the function of hand power tools. c. Explain how hand power tools work. d. Calculating the productivity of hand power tools.	Criteria: Can explain Explain the various types of hand power tools correctly and precisely Form of Assessment : Practice / Performance	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: hand power tools Reference: <i>Anonymous. 2008. Caterpillar Performance Handbook, Perioria Illinois USA: Caterpillar.Inc</i>	2%
15	Able to calculate the cost of construction equipment	a. Explain the various sources of procurement of construction equipment b. Explain the cost structure of construction equipment c. Explain the classification of construction equipment financing d. Explain the various unit prices for work/construction equipment rental. Calculate the unit price of work/construction equipment rental	Criteria: Able to explain various sources of procurement of construction equipment correctly and precisely	Lectures, discussions, questions and answers, and presentations 2 X 50	Lectures, discussions, questions and answers, and presentations 2 X 50	Material: construction equipment costs Reference: <i>Rochmanhadi.1992. Heavy equipment and their use. Jakarta: Public Works Publishing Agency Foundation.</i> Material: construction equipment costs Reader: <i>Anonymous. 2008. Caterpillar Performance Handbook, Perioria Illinois USA: Caterpillar.Inc</i>	2%
16				Summative Exam 100			40%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	2%
2.	Practice / Performance	14%
		16%

Notes

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Forms of assessment:** test and non-test.
- 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.
- 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.
- Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 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%.
- TM=Face to face, PT=Structured assignments, BM=Independent study.