



**Universitas Negeri Surabaya
Faculty of Engineering
Civil Engineering Undergraduate Study Program**

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date																																																																												
Project Investment Analysis *	2220102001	Study Program Elective Courses	T=2	P=0	ECTS=3.18	5	April 29, 2023																																																																												
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator																																																																													
	Ir. Mas Suryanto HS., S.T., M.T.				Yogie Risdianto, 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 are able to have knowledge about project investment analysis to be used in carrying out civil engineering work.																																																																																	
	PO - 2	Students are able to carry out project investment analysis by considering all the risks that occur.																																																																																	
	PLO-PO Matrix																																																																																		
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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;"> <tr> <td rowspan="2" style="text-align: center;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="text-align: center;">1</td><td style="text-align: center;">2</td><td style="text-align: center;">3</td><td style="text-align: center;">4</td><td style="text-align: center;">5</td><td style="text-align: center;">6</td><td style="text-align: center;">7</td><td style="text-align: center;">8</td><td style="text-align: center;">9</td><td style="text-align: center;">10</td><td style="text-align: center;">11</td><td style="text-align: center;">12</td><td style="text-align: center;">13</td><td style="text-align: center;">14</td><td style="text-align: center;">15</td><td style="text-align: center;">16</td> </tr> <tr> <td style="text-align: center;">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 style="text-align: center;">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> </table>																P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PO-1																	PO-2																
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Short Course Description	This course contains basic concepts of technical economics and their application in analyzing the feasibility of economic aspects of project investment, which consists of basic concepts of technical economics, interest and interest formulas, time value of money, selection of economic alternatives, net present value (NPV), internal rate of return (IRR), profitability index (PI), payback period (PP), break even point (BEP), benefit cost ratio (B/C), sensitivity and risk analysis.																																																																																		
References	Main :																																																																																		
	<ol style="list-style-type: none"> 1. Pujawan I Nyoman. 2009. Ekonomi Teknik . Surabaya: Guna Widya. 2. Giatman M. 2011. Ekonomi Teknik . Jakarta: Rajagrafindo Persada. 3. Soeharto Iman. 2001. Manajemen Proyek dari Konseptual Sampai Operasional Jilid 2 . Jakarta: Erlangga. 4. Raharjo Ferianto. 2007. Ekonomi Teknik (Analisis Pengambilan Keputusan). Yogyakarta: Andi. 5. Kuswandi. 2007. Analisis Keekonomian Proyek . Yogyakarta: Andi. 																																																																																		
	Supporters:																																																																																		
	<ol style="list-style-type: none"> 1. Puerbo Hartono. 1993. Tekno Ekonomi Bangunan Bertingkat Banyak . Jakarta: Djambatan. 2. Journal of Management in Engineering (ASCE) 																																																																																		
Supporting lecturer	Ir. Mas Suryanto H.S., S.T., M.T. Alwan Gangsar Brilian Putra, S.Tr.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 basic concepts of technical economics in project investment analysis.	Can mention and explain decision-making steps in project investment analysis.	<p>Criteria: Perfect score if answered correctly.</p> <p>Form of Assessment : Participatory Activities</p>	Lectures, discussions and questions and answers. 2 X 50	Lectures and questions and answers. 2 X 50	<p>Material: Engineering Economic Decision Making Reader: <i>Pujawan I Nyoman. 2009. Engineering Economics. Surabaya: Guna Widya.</i></p>	3%
2	Understand the components of production costs and cash flow.	<p>1.Can mention the components of production costs.</p> <p>2.Can draw a cash flow diagram.</p>	<p>Criteria: Perfect score if answered correctly.</p> <p>Form of Assessment : Participatory Activities</p>	Lectures, discussions and questions and answers. 2 X 50	Lectures and questions and answers. 2 X 50	<p>Material: Components of Production Costs Reference: <i>Giتمان M. 2011. Engineering Economics. Jakarta: Rajagrafindo Persada.</i></p> <p>Material: Depiction of Cash Flow Reader: <i>Raharjo Ferianto. 2007. Engineering Economics (Decision Making Analysis). Yogyakarta: Andi.</i></p>	4%
3	Understand the meaning and calculation of interest.	Can calculate simple interest, compound interest, nominal interest and effective interest.	<p>Criteria: Perfect score if all practice questions can be done correctly.</p> <p>Form of Assessment : Participatory Activities</p>	Lectures, questions and answers, practice questions. 2 X 50	Lectures, practice questions. 2 X 50	<p>Material: Flowers and Flower Formulas Library: <i>Pujawan I Nyoman. 2009. Engineering Economics. Surabaya: Guna Widya.</i></p> <p>Material: Flowers and Flower Formulas Library: <i>Raharjo Ferianto. 2007. Engineering Economics (Decision Making Analysis). Yogyakarta: Andi.</i></p>	4%

4	Understand and be able to calculate the Time Value of Single Payment Money.	Can calculate the monetary value of time for a single payment.	<p>Criteria: Perfect score if all practice questions can be done correctly.</p> <p>Form of Assessment : Participatory Activities, Project Results Assessment / Product Assessment</p>	Lectures, questions and answers, practice questions. 2 X 50	Lectures, practice questions. 2 X 50	<p>Material: Equivalence of the Value of Money Against Time Reader: <i>Pujawan I Nyoman. 2009. Engineering Economics. Surabaya: Guna Widya.</i></p> <p>Material: Equivalence of the Value of Money Reference: <i>Giatman M. 2011. Engineering Economics. Jakarta: Rajagrafindo Persada.</i></p>	4%
5	Understand and be able to calculate the Time Value of Uniform Series of Money.	Can calculate the monetary value of time for a uniform series.	<p>Criteria: Perfect score if all practice questions can be done correctly.</p> <p>Form of Assessment : Participatory Activities</p>	Lectures, questions and answers, practice questions. 2 X 50	Lectures, practice questions. 2 X 50	<p>Material: Equivalence of the Value of Money Against Time Reader: <i>Pujawan I Nyoman. 2009. Engineering Economics. Surabaya: Guna Widya.</i></p> <p>Material: Equivalence of the Value of Money Reference: <i>Giatman M. 2011. Engineering Economics. Jakarta: Rajagrafindo Persada.</i></p>	4%
6	Understand and be able to calculate the Time Value of Money Gradient Series Payments and Irregular Cash Flows.	<p>1.Can calculate the monetary value of time for Gradient Series Payments.</p> <p>2.Can calculate the money value of time for Irregular Cash Flows.</p>	<p>Criteria: Perfect score if all practice questions can be done correctly.</p> <p>Form of Assessment : Participatory Activities</p>	Lectures, questions and answers, practice questions. 2 X 50	Lectures, practice questions. 2 X 50	<p>Material: Equivalence of the Value of Money Against Time Reader: <i>Pujawan I Nyoman. 2009. Engineering Economics. Surabaya: Guna Widya.</i></p> <p>Material: Equivalence of the Value of Money Reference: <i>Giatman M. 2011. Engineering Economics. Jakarta: Rajagrafindo Persada.</i></p>	3%

7	Understanding Depreciation & Taxes.	<ol style="list-style-type: none"> 1.Can calculate asset depreciation using various methods. 2.Can calculate tax value based on depreciation. 3.Can tabulate investment cash flows. 	<p>Criteria: Perfect score if all practice questions can be done correctly.</p> <p>Form of Assessment : Participatory Activities</p>	Lectures, questions and answers, practice questions. 2 X 50	Lectures, practice questions. 2 X 50	<p>Material: Depreciation and Taxes Literature: <i>Pujawan I Nyoman. 2009. Engineering Economics. Surabaya: Guna Widya.</i></p> <hr/> <p>Material: Depreciation and Taxes Literature: <i>Raharjo Ferianto. 2007. Engineering Economics (Decision Making Analysis). Yogyakarta: Andi.</i></p>	4%
8	Midterm Exam (UTS)		<p>Form of Assessment : Participatory Activities, Tests</p>				20%
9	Understand and be able to calculate Investment Analysis without considering the Time Value of Money (PP, ROI).	<ol style="list-style-type: none"> 1.Can explain the assessment of project proposals. 2.Can calculate the Pay-back Period (PP) of an investment project. 3.Can calculate the Return on Investment (ROI) of an investment project. 	<p>Criteria: Perfect score if all practice questions can be done correctly.</p> <p>Form of Assessment : Participatory Activities</p>	Lectures, questions and answers, practice questions. 2 X 50	Lectures, practice questions. 2 X 50	<p>Material: Investment Analysis Literature: <i>Soeharto Iman. 2001. Project Management from Conceptual to Operational Volume 2. Jakarta: Erlangga.</i></p> <hr/> <p>Material: Project Investment Analysis Library: <i>Kuswandi. 2007. Project Economic Analysis. Yogyakarta: Andi.</i></p>	3%

10	Understand and be able to calculate Investment Analysis Taking into account the Time Value of Money (NPV, IRR, IP, BCR, ACC).	<ol style="list-style-type: none"> 1.Can calculate the Net Present Value (NPV) of an investment project. 2.Can calculate the Internal Rate of Return (IRR) of an investment project. 3.Can calculate the Profitability Index (IP) of an investment project. 4.Can calculate the Benefit Cost Ratio (BCR) of an investment project. 5.Can calculate the Annual Capital Charge (ACC) of an investment project. 	<p>Criteria: Perfect score if all practice questions can be done correctly.</p> <p>Form of Assessment : Participatory Activities</p>	Lectures, questions and answers, practice questions. 2 X 50	Lectures, practice questions. 2 X 50	<p>Material: Investment Analysis Literature: <i>Soeharto Iman. 2001. Project Management from Conceptual to Operational Volume 2. Jakarta: Erlangga.</i></p> <hr/> <p>Material: Project Investment Analysis Library: <i>Kuswandi. 2007. Project Economic Analysis. Yogyakarta: Andi.</i></p>	4%
11	Understand sensitivity analysis of investment projects.	Can calculate the sensitivity of changes in investment parameters.	<p>Criteria: Perfect score if all practice questions can be done correctly.</p> <p>Form of Assessment : Project Results Assessment / Product Assessment</p>	Lectures, questions and answers, practice questions. 2 X 50	Lectures, practice questions. 2 X 50	<p>Material: Sensitivity Analysis Literature: <i>Pujawan I Nyoman. 2009. Engineering Economics. Surabaya: Guna Widya.</i></p> <hr/> <p>Material: Sensitivity Analysis Literature: <i>Raharjo Ferianto. 2007. Engineering Economics (Decision Making Analysis). Yogyakarta: Andi.</i></p>	3%

12	Can carry out analysis of the break even point (BEP) of investment projects.	<ol style="list-style-type: none"> 1.Can calculate break even point analysis (break event point)/BEP for production problems. 2.Can calculate break even point analysis (break event point)/BEP for selecting investment alternatives. 3.Can calculate breakeven point analysis (break event point)/BEP for buying. 	<p>Criteria: Perfect score if all practice questions can be done correctly.</p> <p>Form of Assessment : Participatory Activities</p>	Lectures, questions and answers, practice questions. 2 X 50	Lectures, practice questions. 2 X 50	<p>Material: Break Even Point Analysis Literature: <i>Pujawan I Nyoman. 2009. Engineering Economics. Surabaya: Guna Widya.</i></p> <hr/> <p>Material: Break-Even Point Analysis References: <i>Giatman M. 2011. Engineering Economics. Jakarta: Rajagrafindo Persada.</i></p>	3%
13	Can carry out investment analysis of building projects.	<ol style="list-style-type: none"> 1.Can analyze the results of investment in building projects. 2.Can explain the results of investment in building projects. 3.Can create investment results reports on building projects. 	<p>Criteria: Good marks if the presentation and questions can be answered well and correctly.</p> <p>Form of Assessment : Project Results Assessment / Product Assessment</p>	Presentations and group discussions. 2 X 50	Presentations and group discussions. 2 X 50	<p>Material: Investment Analysis Literature: <i>Soeharto Iman. 2001. Project Management from Conceptual to Operational Volume 2. Jakarta: Erlangga.</i></p> <hr/> <p>Material: Project Economic Feasibility Study Library: <i>Kuswandi. 2007. Project Economic Analysis. Yogyakarta: Andi.</i></p>	3%
14	Can carry out investment analysis of road and bridge projects.	<ol style="list-style-type: none"> 1.Can analyze investment results on road and bridge projects. 2.Can explain the results of investment in road and bridge projects. 3.Can make reports on investment results for road and bridge projects. 	<p>Criteria: Good marks if the presentation and questions can be answered well and correctly.</p> <p>Form of Assessment : Project Results Assessment / Product Assessment</p>	Presentations and group discussions. 2 X 50	Presentations and group discussions. 2 X 50	<p>Material: Investment Analysis Literature: <i>Soeharto Iman. 2001. Project Management from Conceptual to Operational Volume 2. Jakarta: Erlangga.</i></p> <hr/> <p>Material: Project Economic Feasibility Study Library: <i>Kuswandi. 2007. Project Economic Analysis. Yogyakarta: Andi.</i></p>	4%

15	Can carry out investment analysis of water building projects.	<p>1.Can analyze the investment results of water building projects.</p> <p>2.Can explain the results of investment in water building projects.</p> <p>3.Can make reports on investment results for water building projects.</p>	<p>Criteria: Good marks if the presentation and questions can be answered well and correctly.</p> <p>Form of Assessment : Project Results Assessment / Product Assessment</p>	Presentations and group discussions. 2 X 50	Presentations and group discussions. 2 X 50	<p>Material: Investment Analysis Literature: <i>Soeharto Iman. 2001. Project Management from Conceptual to Operational Volume 2. Jakarta: Erlangga.</i></p> <p>Material: Project Economic Feasibility Study Library: <i>Kuswandi. 2007. Project Economic Analysis. Yogyakarta: Andi.</i></p>	4%
16	Final Semester Examination (UAS)		<p>Form of Assessment : Participatory Activities, Tests</p>				30%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	59%
2.	Project Results Assessment / Product Assessment	16%
3.	Test	25%
		100%

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.

