



**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																																																																		
Water Structure Engineering	2220103164	Study Program Elective Courses	T=3	P=0	ECTS=4.77	5	July 17, 2024																																																																		
AUTHORIZATION		SP Developer	Course Cluster Coordinator			Study Program Coordinator																																																																			
		Danayanti Azmi Dewi Nusantara, S.T., M.T.	Danayanti Azmi Dewi Nusantara, S.T., M.T.			Yogie Risdianto, S.T., M.T.																																																																			
Learning model	Case Studies																																																																								
Program Learning Outcomes (PLO)	PLO study program which is charged to the course																																																																								
	Program Objectives (PO)																																																																								
	PO - 1	Able to identify, formulate, analyze and resolve water resource problems by planning appropriate water structures.																																																																							
	PO - 2	Able to plan and evaluate various types of water structures based on their function.																																																																							
	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">P.O</td> <td colspan="16">Week</td> </tr> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td> </tr> <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> </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 discusses various types of water structures based on their function. The functions of water structures include water catchment, flood control, river protection, and hydroelectric power generation. Apart from that, there is also material regarding various crossing structures in a channel, namely gutters, culverts and siphons. Lectures are held face-to-face, either directly or online. Assessments are carried out to determine the achievement of course learning outcomes through assignments, quizzes, mid-semester exams and final semester exams.																																																																								
References	Main :																																																																								
	<ol style="list-style-type: none"> 1. Direktorat Irigasi dan Rawa. 2013. Standart Perencanaan Irigasi KP. 01 s/d KP. 09. Jakarta: Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum. 2. Mawardi Erman. 2007. Desain Bangunan Air . Alfabeta: Bandung. 3. Direktorat Irigasi dan Rawa. 2013. Standart Perencanaan Irigasi BI. 01 s/d BI. 03. Jakarta: Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum. 4. Kumala, F. Yiniarti Eka. 2019. Bangunan Air. Bandung: Itenas. 5. Indiah Kustini dan Bambang Sabariman. 2020. Merencana Bangunan Bendung. Surabaya: Unesa University Press. 6. Indiah Kustini. 2017. Irigasi Dan Bangunan Air. Surabaya: Unesa University Press. 7. Kamiana, I Made. 2019. Teknik Perhitungan Debit Rencana Bangunan Air. Sleman: Graha Ilmu. 																																																																								
	Supporters:																																																																								
Supporting lecturer	Ir. Nurhayati Aritonang, M.T. Danayanti Azmi Dewi Nusantara, S.T., M.T.																																																																								
Week-	Final abilities of each learning stage	Evaluation			Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials																																																																		

	(Sub-PO)	Indicator	Criteria & Form	Offline (<i>offline</i>)	Online (<i>online</i>)	[References]	Assessment Weight (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Able to identify water resource problems.	Students are able to identify water resource problems.	Criteria: Decree from Unesa Form of Assessment : Participatory Activities, Project Results Assessment / Product Assessment	3 X 50		Material: Identification of water resource problems Reference: <i>Directorate of Irrigation and Swamps. 2013. BI Irrigation Planning Standards. 01 to BI. 03. Jakarta: Directorate General of Water Resources, Ministry of Public Works.</i>	4%
2	Able to identify water building needs for natural resource utilization.	Students are able to identify the need for water structures for natural resource utilization.	Criteria: Decree from Unesa Form of Assessment : Participatory Activities	3 X 50		Material: Identification of water building needs for natural resource utilization. Reference: <i>Kumala, F. Yiniarti Eka. 2019. Water Buildings. Bandung: Itenas.</i>	4%
3	Able to plan water structures for natural resource utilization. (Main Irrigation Building: Weir)	Students are able to plan water structures for natural resource utilization. (Main Irrigation Building: Weir)	Criteria: Decree from Unesa Form of Assessment : Participatory Activities	3 X 50		Material: Water buildings for the use of natural resources Reference: <i>Kumala, F. Yiniarti Eka. 2019. Water Buildings. Bandung: Itenas.</i>	4%
4	Able to identify water building needs to control natural resource damage.	Students are able to identify the need for water structures to control natural resource damage.	Criteria: Decree from Unesa Form of Assessment : Participatory Activities	3 X 50		Material: The need for water structures to control natural resource damage. Reference: <i>Mawardi Erman. 2007. Water Building Design. Alphabet: Bandung.</i>	4%
5	Able to plan water building needs to control natural resource damage. (Motion Dam: Water Gate)	Students are able to plan water building needs to control natural resource damage. (Motion Dam: Water Gate)	Criteria: Unesa provisions Form of Assessment : Participatory Activities	3 X 50		Material: The need for water structures to control natural resource damage. Reference: <i>Mawardi Erman. 2007. Water Building Design. Alphabet: Bandung.</i>	3%

6	Able to plan water building needs to control natural resource damage. (Fixed Dam)	Students are able to plan water building needs to control natural resource damage. (Fixed Dam)	Criteria: Unisa provisions Form of Assessment : Participatory Activities	3 X 50		Material: The need for water structures to control natural resource damage. Reference: <i>Directorate of Irrigation and Swamps. 2013. BI Irrigation Planning Standards. 01 to BI. 03. Jakarta: Directorate General of Water Resources, Ministry of Public Works.</i>	4%
7	Able to identify Flow Meter Buildings in SDA Infrastructure.	Students are able to identify Flow Measuring Buildings in SDA Infrastructure.	Criteria: Unisa's existing provisions Form of Assessment : Participatory Activities	3 X 50		Material: Flow Meter Buildings in Natural Resources Infrastructure Reference: <i>Indiah Kustini. 2017. Irrigation and Water Buildings. Surabaya: Unesa University Press.</i>	3%
8	Master the Air Building Engineering material from meetings 1 - 7 by taking the mid-semester exam (UTS)	Students master the Air Building Engineering material from meetings 1 - 7 by taking the mid-semester exam (UTS)	Form of Assessment : Participatory Activities, Tests	3 X 50			20%
9	Able to explain various types of Water Buildings/Infrastructure apart from: Buildings for Irrigation, Buildings on Rivers, and Weir and Dam Buildings.	Students are able to explain various types of Water Buildings/Infrastructure apart from: Buildings for Irrigation, Buildings on Rivers, and Weir and Dam Buildings.	Criteria: According to the provisions at Unesa Form of Assessment : Participatory Activities	3 X 50		Material: Various Buildings/Water Infrastructure Library: <i>Kumala, F. Yiniarti Eka. 2019. Water Buildings. Bandung: Itenas.</i>	3%
10	Able to explain information regarding the introduction of hydropower water building infrastructure.	Students are able to explain information regarding the introduction of hydropower water building infrastructure.	Criteria: Using the provisions at Unesa Form of Assessment : Participatory Activities	3 X 50		Material: Introduction to hydroelectric power plant infrastructure Reference: <i>Directorate of Irrigation and Swamps. 2013. KP Irrigation Planning Standards. 01 to KP. 09. Jakarta: Directorate General of Water Resources, Ministry of Public Works.</i>	3%
11	Able to understand an example of a case study on a PLTMH.	Students are able to understand an example of a case study on a PLTMH.	Criteria: Using the provisions of Unesa Form of Assessment : Participatory Activities	3 X 50			3%

12	Able to plan simple hydropower building infrastructure.	Students are able to plan simple hydropower building infrastructure.	Criteria: Assessment provisions that apply at Unesa Form of Assessment : Participatory Activities	3 X 50		Material: Simple hydropower building infrastructure Reference: <i>Kamiana, I Made. 2019. Water Building Plan Discharge Calculation Technique. Sleman: Graha Ilmu.</i>	4%
13	Able to plan crossing buildings: Siphon, Gutters, Culverts.	Students are able to plan crossing buildings: Siphons, Gutters, Culverts.	Criteria: Existing provisions Form of Assessment : Participatory Activities	3 X 50		Material: Siphons, Gutters, Culverts Library: <i>Directorate of Irrigation and Swamps. 2013. KP Irrigation Planning Standards. 01 to KP. 09. Jakarta: Directorate General of Water Resources, Ministry of Public Works.</i>	3%
14	Able to plan waterfall buildings.	Students are able to plan waterfall buildings.	Criteria: Using the provisions of Unesa Form of Assessment : Participatory Activities	3 X 50		Material: Waterfall Building Library: <i>Indiah Kustini. 2017. Irrigation and Water Buildings. Surabaya: Unesa University Press.</i>	4%
15	Able to plan and evaluate various types of water structures based on their function. (review of material)	Students are able to plan and evaluate various types of water structures based on their function.	Criteria: using the provisions of the Unesa criteria Form of Assessment : Participatory Activities	3 X 50		Material: Types of water structures based on their function. Reference: <i>Directorate of Irrigation and Swamps. 2013. KP Irrigation Planning Standards. 01 to KP. 09. Jakarta: Directorate General of Water Resources, Ministry of Public Works.</i>	4%
16	Able to identify, formulate, analyze and resolve water resource problems by planning appropriate water structures by working on UAS.	Students are able to identify, formulate, analyze and solve water resource problems by planning appropriate water structures by working on the UAS.	Form of Assessment : Participatory Activities, Tests	3 x 50			30%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	73%
2.	Project Results Assessment / Product Assessment	2%
3.	Test	25%
		100%

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.