



**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																																																																			
River Engineering *	2220102129	Study Program Elective Courses	T=2 P=0 ECTS=3.18	5	July 18, 2024																																																																			
AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator																																																																				
	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 that is charged to the course																																																																							
	Program Objectives (PO)																																																																							
	PO - 1	Able to identify, formulate, analyze and resolve sediment transport problems in river flows.																																																																						
	PO - 2	Able to identify and evaluate river control based on existing problems.																																																																						
	PLO-PO Matrix																																																																							
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PO Matrix at the end of each learning stage (Sub-PO)																																																																								
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Short Course Description	This course discusses rivers from upstream to downstream. First, we will explain river morphology, river characteristics and river areas. Next, we explain sediment transport in rivers including bed load, suspended load and total load transport. Finally, we will explain river control techniques including controlling flow, discharge (floods) and sediment (debris). Lectures are held face-to-face, either directly or online. Assessments are carried out to determine the achievement of course learning outcomes through structured assignments, quizzes, mid-semester exams and final semester exams.																																																																							
References	Main :																																																																							
	<ol style="list-style-type: none"> 1. Asdak, Chay. 1995. Hidrologi Pengelolaan Daerah Aliran Sungai. Yogyakarta : Gama. 2. Suyono. 1978. Teknik Perbaikan dan Pengerasan Sungai. Jakarta: CV. Pradnya Paramita 3. Salmani.2011. Teknologi Pengaman Sungai . Bandung 4. Tri Mulat Sunarji. 1994. Pengelolaan Sumber Daya Air. PJT Malang 5. Mulyanto, H.R.2007. Sungai, Fungsi dan Sifat-sifatnya . Edisi pertama. Yokyakarta. Graha Ilmu 6. Chandrawidjaja, Robertus. 2013. Sedimen Transport: Dasar Teori-Soal-Penyelesaian. Banjarmasin: Lambung Mangkurat University Press. 7. Paimin. 2012. Sistem Perencanaan Pengelolaan Daerah Aliran Sungai. Jakarta: Balai Penelitian dan Pengembangan Teknologi Pengelolaan Daerah Aliran Sungai. 8. Tjakrawarsa, dkk. 2015. Teknik Pengukuran Hasil Sedimen. Jakarta: Balai Penelitian dan Pengembangan Teknologi Pengelolaan Daerah Aliran Sungai. 																																																																							
	Supporters:																																																																							
Supporting lecturer	Ir. Nurhayati Aritonang, M.T. Drs. Djoni Irianto, M.T. Danayanti Azmi Dewi Nusantara, 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	Get to know the morphology and shape of rivers	1. Explain the morphology of the river correctly. 2. Explain the shape of the river correctly	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises		Material: morphology and shape of rivers References: <i>Asdak, Chay. 1995. Hydrology of Watershed Management. Yogyakarta : Gama.</i>	4%
2	Understand the function of river parts and watershed management	1. Explain the function of rivers 2. Explain the parts of rivers 3. Explain watershed management	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises		Material: function of river parts and watershed management References: <i>Asdak, Chay. 1995. Hydrology of Watershed Management. Yogyakarta : Gama.</i>	4%
3	Understanding river monitoring	1. Explain river monitoring based on flow 2. Explain river monitoring based on sediment transport	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises		Material: River monitoring Reference: <i>Salmani. 2011. River Safety Technology. Bandung</i>	3%
4	Understand the basic principles of River Engineering	1. Explain the basic principles of engineering regarding the regulation of basic balance and river flow 2. Explain the basic principles of engineering regarding the regulation of river discharge 3. Explain the basic engineering principles of regulating river water levels	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises		Material: Basic principles of River Engineering Reference: <i>Mulyanto, HR2007. Rivers, their functions and properties. First edition. Yokyakarta. Science House</i>	3%
5	Understand the causes of river bank damage	1. Explain the causes of the factors that influence river bank damage 2. Explain the mechanism of river bank failure	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises		Material: damage to river cliffs Reference: <i>Paimin. 2012. Watershed Management Planning System. Jakarta: Research and Development Center for Watershed Management Technology.</i>	4%
6	Understanding river hydrometry	Explain the concept of river hydrometry	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises		Material: river hydrometry References: <i>Asdak, Chay. 1995. Hydrology of Watershed Management. Yogyakarta : Gama.</i>	4%

7	Understanding river maintenance	<p>1. Explain efforts and types of river maintenance.</p> <p>2. Explain the choice of river protection methods</p>	<p>Criteria:</p> <p>1.1. Explain river maintenance efforts</p> <p>2.2. Explain the types of river maintenance</p> <p>3.3. Explain the selection of river protection methods</p> <p>4.4. Explain the definition, purpose, use, advantages, disadvantages, materials and installation and maintenance of stone riprap protective structures, gabions.</p> <p>5.5. Explain the definition, purpose, use, advantages, disadvantages, materials and installation and maintenance of used tire protection structures and</p> <p>6.6. Explain the definition, purpose, use, advantages, disadvantages, materials and installation and maintenance of soil cement mixture protective structures</p> <p>7.7. Explain the definition of pocket protection buildings and wooden retaining walls</p> <p>8.8. Explain the definition, purpose, use, advantages, disadvantages, materials and installation and maintenance of protective buildings for concrete and sheet pile retaining walls (bulkhead)</p> <p>9.9. Explain the definition, purpose, use, advantages, disadvantages, materials and installation and maintenance of rock toe dike protection structures.</p> <p>10.10. Explain the definition, purpose, use, advantages, disadvantages, materials and installation and maintenance of protective structures for a-</p>	Lectures, discussions, questions and answers, and 2 X 50 exercises	<p>Material: river maintenance</p> <p>Reference:</p> <p><i>Paimin. 2012. Watershed Management Planning System. Jakarta: Research and Development Center for Watershed Management Technology.</i></p>	470
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			<p>jacks and klibs (spurs)</p> <p>11.11. Explain the definition, purpose, use, advantages, disadvantages, materials and installation and maintenance of guide bank and a-jack & tetrahedron structures</p> <p>12.12. Explain the definition, purpose, use, advantages, disadvantages, materials and installation and maintenance of check dam protective structures (drop structures) and geo textiles</p> <p>Form of Assessment :</p>			
8	Master River Engineering material from meetings 1 - 7 by taking the mid-semester exam (UTS)		<p>Participatory Activities</p> <p>Form of Assessment :</p> <p>Test</p>	2 X 50		20%
9	Understanding how to mitigate river damage	Explain the mechanisms for dealing with river damage	<p>Criteria:</p> <p>Full marks are obtained if you do all the questions correctly</p> <p>Form of Assessment :</p> <p>Participatory Activities</p>	Lectures, discussions, questions and answers, and 2 X 50 exercises	<p>Material:</p> <p>mitigation of river damage</p> <p>Reader:</p> <p>Suyono. 1978. <i>River Improvement and Hardening Techniques</i>. Jakarta: CV. Pradnya Paramita</p>	3%
10	Understanding damage from span effects (Reach Based) and local effects (side based)	<p>1. Explain the mechanism of collapse due to stretching influences (reach based)</p> <p>2. Explain collapse due to local influences (side based)</p>	<p>Criteria:</p> <p>Full marks are obtained if you do all the questions correctly</p> <p>Form of Assessment :</p> <p>Participatory Activities</p>	Lectures, discussions, questions and answers, and 2 X 50 exercises	<p>Material:</p> <p>damage from span effects (Reach Based) and local effects (side based)</p> <p>References:</p> <p>Chandrawidjaja, Robertus. 2013. <i>Sediment Transport: Basic Theory-Problem-Solution</i>. Banjarmasin: Lambung Mangkurat University Press.</p>	4%
11	Understand the forms of coping with river bank collapse	<p>1. Explain the forms of dealing with river bank collapse directly</p> <p>2. Explain the forms of dealing with river bank collapse indirectly</p>	<p>Criteria:</p> <p>Full marks are obtained if you do all the questions correctly</p> <p>Form of Assessment :</p> <p>Participatory Activities</p>	Lectures, discussions, questions and answers, and 2 X 50 exercises	<p>Material:</p> <p>forms of coping with river bank collapses</p> <p>Reader:</p> <p>Suyono. 1978. <i>River Improvement and Hardening Techniques</i>. Jakarta: CV. Pradnya Paramita</p>	3%

12	Understanding river protection structures	1. Explain the protective structures for stone riprap, gabions. 2. Explain the protective structures for used tires and 3. Explain the protective structures for soil cement mixtures. 4. Explain the protective structures for bags and wooden retaining walls. 5. Explain the protective structures for concrete and sheet pile retaining walls (bulkhead) 6. Explain the rock toe dike protection structure 7. Explain the a-jack and spurs protection structure 8. Explain the guide bank and a-jack & tetrahedron protection structure 9. Explain the check protection structure dam (drop structure) and geo textile	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises		Material: river protection buildings Reference: <i>Suyono. 1978. River Improvement and Hardening Techniques. Jakarta: CV. Pradnya Paramita</i>	4%
13	Understand the use of the HECRAS application	1. Explain the definition of the Hecras2 application. Explains the function of the Hecras3 application. Explaining the use of the Hecras Application	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises			3%
14	1. Understanding river data collection using Google Maps 2. Understand the identification and selection of river data forms.	1. Explain collecting river data using Google Map2. Explain the identification and selection of river data forms3. Explains the process of collecting river data using Google Maps	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises		Material: identification and selection of river data forms. Reference: <i>Asdak, Chay. 1995. Hydrology of Watershed Management. Yogyakarta : Gama.</i>	3%
15	Operates using the Hecras application	1. Execute the mechanism for using the Hecras2 application. Execute the Hecras application analysis results method	Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises			4%

16	Able to identify and evaluate river control based on existing problems by working on UAS		Criteria: Full marks are obtained if you do all the questions correctly Form of Assessment : Test	2 X 50			30%
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Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	50%
2.	Test	50%
		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.