



**Universitas Negeri Surabaya
Vocational Faculty,
D4 Transportation Study Program**

**Document
Code**

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Drainage	99993940102032	Drainage	T=1	P=1	ECTS=3.18	3	July 16, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
	R. Endro Wibisono, S.Pd., M.T.		R. Endro Wibisono, S.Pd., M.T.			Dr. Anita Susanti, S.Pd., M.T.	

Learning model	Case Studies																																																	
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																	
	PLO-7 Able to carry out work and entrepreneurship in the field of land transportation engineering technology professionally.																																																	
	PLO-11 Able to internalize ethics, norms and laws in carrying out work.																																																	
	Program Objectives (PO)																																																	
	PO - 1 Able to carry out work and entrepreneurship in the field of land transportation engineering technology professionally. Able to apply logical, critical, innovative, quality and measurable thinking in identifying, implementing and evaluating independently and coordinating groups to solve technical and non-technical problems and able to communicate verbally and in writing. Able to apply the principles of mechanics, mathematics and engineering concepts to the technical design process, drawing measurement results, and design in the field of land transportation engineering technology. Able to carry out design work, implementation, supervision, documentation of work in the field of land transportation engineering technology according to applicable standards by prioritizing principles occupational and environmental security and safety systems (SMK3L). Able to internalize ethics, norms and laws in carrying out Drainage work																																																	
	PLO-PO Matrix																																																	
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PO Matrix at the end of each learning stage (Sub-PO)																																																		
<table border="1"> <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> </table>	P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PO-1																
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Short Course Description This course provides an understanding of the history of drainage development in a particular area, especially in Indonesia. Definition, aims and objectives of drainage, network patterns and determining channel dimensions, hydrological analysis, regional rainfall (rainfall), Rain Intensity Curve, Practical ways to process rainfall intensity in forecasting flood discharge, watersheds, runoff, estimating peak flow rates and use of rational methods, use of the hydrograph method (HSS), flood forecast hydrographs, condition of the city of Surabaya, geographical position, topography, hydrology and land use, drainage system patterns, gravity flow, pump stations and average rainfall, special drainage, drainage, planning steps and use of planning criteria, technical flow aspects, basic hydraulic planning, basic concepts, conversion laws, flow, specific energy, depth of stable channel planning patterns, in-buildings in drainage and pump systems. This course discusses special drainage planning systems for roads, railways, ports and airports. The material to be studied is drainage networks, drainage facilities, and surface and subsurface drainage systems. Apart from that, drainage planning applications will be taught including hydrological and hydraulic analysis to determine the drainage capacity to be planned.

References	Main :
	<ol style="list-style-type: none"> 1. Anonim. 2015. Kumpulan Materi Kuliah Drainase Teknik Sipil FT-Unesa 2015 . Surabaya: Unipres. 2. Jurnal Kajian Pendidikan Teknik Bangunan FT-Unesa. 3. Kusnan. 2015. Pengembangan Model Penanggulangan Banjir Kampus Unesa Ketintang . Surabaya: Unipres. 4. _____ . 2012. Drainase Perkotaan . Surabaya: Unipres. 5. Suripin. Sistem Drainase Perkotaan yang Berkelanjutan . Semarang: Andi. 6. Varshney, R.M.1978. Engineering Hydrologi Irrigation Research Institute . 7. New Delhi: Central Water & Power Comission . 8. Imade Kamiana, Perhitungan Debit Rencana Bangunan Air.
	Supporters:

Supporting lecturer		R. Endro Wibisono, S.Pd., 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	Know the history of drainage development in a particular area, especially in Indonesia	Explain the background and development of drainage	Criteria: Full marks are obtained if you do the questions correctly and precisely Form of Assessment : Participatory Activities, Tests	Question and answer presentation and reflection 2 X 50			20%
2	Understand the definition of the purpose and objectives of drainage	Explain the definition of the aims and objectives of Drainage	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50			0%
3	Understand the types/kinds of network patterns and determine channel dimensions. Hydrological analysis and consistency test of hydrological data	1.Explains the types/kinds of network patterns and determines channel dimensions. 2.Hydrological analysis and consistency test of hydrological data	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50			0%
4	Understand regional rainfall (rainfall) rain intensity curves practical ways to process and rain intensity forecast flood discharge watershed influence of watershed characteristics forest plants reservoirs absorption wells on flooding	1.Explains regional rainfall (rainfall) rain intensity curves, practical ways to process rain intensity 2.Estimating watershed area flood discharge due to watershed characteristics	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50			0%
5	Understand the factors that influence runoff, estimate peak flow rates and rational methods	1.Explain the runoff factors that influence runoff 2.Estimating peak flow rate and rational methods	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50			0%
6	Understand the Hydrograph Method (HSS) Hydrograph Unit Hydrograph and flood forecasting	Explains the Hydrograph Method (HSS) Hydrograph Unit Hydrograph. Estimating flood forecasts	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50			0%

7	Understand flood forecasting, unit hydrograph components that make up river hydrographs, depletion curves, synthetic hydrographs and reservoir pond routing.	1.Explains the flood unit hydrograph components that form a river hydrograph, synthetic hydrograph depletion curve and tendon pool routing 2.Estimating floods using component hydrograph units that form river hydrographs synthetic hydrograph depletion curves and reservoir pond routing	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50			0%
8	UTS	UTS	Criteria: UTS	UTS 2 X 50			0%
9	Understand the condition of Surabaya City, Geography, Topography, Hydrology and land use	1.Explains the condition of the City of Surabaya, Geography, Topography, Hydrology and land use 2.Compare topographic elevation and land use	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50			0%
10	Understand the flood conditions in the city of Surabaya, flooding from the local flood upstream of Surabaya and the development of the city, the condition of existing drainage channels and flooding, including puddles	1.Explaining the flood situation in the city of Surabaya, flooding from upstream of local Surabaya floods and the development of the city, the condition of existing drainage channels and flooding including puddles 2.Estimating floods in the city of Surabaya, flooding from upstream local floods in Surabaya and city development	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 5 X 50			0%
11	Understand the drainage system pattern. Gravity flow, rain station, pump house and average rainfall.	Explains the drainage system pattern. Gravity flow at the pump house rain station and average rainfall.	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50			0%
12	Understand special drainage for airfield drainage, planning and design criteria for airfield drainage, sports fields, roads and environmental sanitation	Explains special drainage for airfield drainage, planning and design criteria for airfield drainage, sports fields, roads and environmental sanitation	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50			0%

13	Understand the planning steps, planning criteria, technical flow aspects, examples of drainage master plan proposal frameworks	Explains the planning steps for planning criteria for technical flow aspects, for example a drainage master plan proposal framework	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50		0%
14	Understanding of hydraulic planning basic concepts of permanent flow conversion laws aspects of permanent uniform (steady uniform flow) economical channel shapes	Explaining hydraulic planning basic concepts of permanent flow conversion laws aspects of permanent uniform (steady uniform flow) economical channel shapes	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50		0%
15	Understanding specific energy, critical depth, gradually varying flow, planning stable channels for buildings in drainage and pump systems	Explaining the specific energy of the critical depth of gradually varying flow (gradually varied flow) planning of stable channels for buildings in drainage and pump systems	Criteria: Full marks are obtained if you do the questions correctly and precisely	Question and answer presentation and reflection 2 X 50		0%
16	UAS	UAS	Criteria: UAS	UAS 2 X 50		0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	10%
2.	Test	10%
		20%

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.