	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
Irrigation and Drainage	2220103152	Compulsory Study Program Subjects	T=3	P=0	ECTS=4.77	4	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Case Studies**

Program Learning Outcomes (PLO)

PLO study program which is charged to the course

Program Objectives (PO)

PO - 1	Able to apply knowledge of the basic principles of water civil engineering in the field of irrigation and drainage.
PO - 2	Able to design secondary irrigation and drainage network systems in urban areas.
PO - 3	Able to plan, complete and evaluate irrigation planning and drainage master plans

PLO-PO Matrix

P.O
PO-1
PO-2
PO-3

PO Matrix at the end of each learning stage (Sub-PO)

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																

Short Course Description

The Irrigation and Drainage course is a civil engineering course in the field of water which is an application of hydraulics in open channels and hydrology. In this course, we teach about irrigation and drainage systems and the water structures in them. Material about irrigation includes: irrigation network systems and patterns, irrigation demand discharge, alternative planting pattern discharge, land and rice field elevation. Meanwhile, materials related to drainage include creating drainage network systems and patterns, drainage facilities, and calculating drainage times. Apart from that, structured assignments will be given in groups regarding secondary network irrigation planning and residential drainage master plans. Duties include discharge calculations, dimensions, and depiction of channel work and buildings. 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 :

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. Direktorat Irigasi dan Rawa. 2013 . Standart Perencanaan Irigasi BI. 01 s/d BI. 03 . Jakarta: Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum.
3. Indiah Kustini. 2014. Perencanaan Petak Tersier . Surabaya: Unesa University Press.
4. Indiah Kustini. 2017. Irigasi Dan Bangunan Air . Surabaya: Unesa University Press.
5. Suhardjono. 1994. Kebutuhan Air Tanaman . ITN: Malang.
6. Suripin. 2004. Sistem Drainase Perkotaan Yang Berkelanjutan . Yogyakarta: Andi.
7. Suryaman, Heri dan Kusnan. 2018. Drainase . Surabaya: Unesa University Press.
8. Syarifudin, A. 2018. Drainase Perkotaan Berwawasan Lingkungan . Yogyakarta: Andi.
9. Wesli. 2008. Drainase Perkotaan . Yogyakarta: Graha Imu.

Supporters:

Supporting lecturer	Ir. Nurhayati Aritonang, M.T. Danayanti Azmi Dewi Nusantara, S.T., M.T. Siti Talitha Rachma, S.T., M.Sc.

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	Global understanding of irrigation	Students understand the Darinase network system	**Criteria:** The assessment has been determined by Unesa **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Drainage Systems **Reader:** *Wesli. 2008. Urban Drainage. Yogyakarta: Graha Imu.*	3%
2	Planning Urban Drainage	1.Students are able to calculate the area of the termination area 2.Students are able to calculate the combined flow coefficient	**Criteria:** The assessment has been determined by Unesa **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Drainage Systems **Literature:** *Suripin. 2004. Sustainable Urban Drainage Systems. Yogyakarta: Andi.*	3%
3	Planning Urban Drainage	1.Students are able to calculate the flow concentration time 2.Students are able to calculate the amount of rain intensity	**Criteria:** The assessment has been determined by Unesa **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Drainage Systems **Literature:** *Suryaman, Heri and Kusnan. 2018. Drainage. Surabaya: Unesa University Press.*	4%
4	Planning Urban Drainage	1.Students are able to calculate the planned flood discharge in the drainage channel 2.Students are able to plan the dimensions of the drainage channels needed	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Drainage Systems **Reader:** *Wesli. 2008. Urban Drainage. Yogyakarta: Graha Imu.*	3%
5	Planning Drainage on Highways	1.Students are able to calculate flood discharge on roads with a longitudinal slope equal to 0 2.Students are able to calculate flood discharge on roads with a longitudinal slope not equal to 0	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Drainage Systems **Literature:** *Syarifudin, A. 2018. Environmentally Friendly Urban Drainage. Yogyakarta: Andi.*	3%

6	Planning subsurface drainage	1. Students are able to understand the drainage system below the surface 2. Students are able to plan sub surface drainage for a simple sports field	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50			3%
7	Understand the need for drainage facilities	Students are able to determine the need for drainage facilities	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Drainage Systems **Literature:** *Suryaman, Heri and Kusnan. 2018. Drainage. Surabaya: Unesa University Press.*	3%
8	Master the Drainage System material by taking the Mid-Semester Exam (UTS)	Students master the Drainage System material by taking the Mid-Semester Exam (UTS)	**Criteria:** UTS **Form of Assessment** : Participatory Activities, Tests	UTS 2 X 50		**Material:** Drainage Systems **Reader:** *Wesli. 2008. Urban Drainage. Yogyakarta: Graha Imu.* **Material:** Drainage Systems **Literature:** *Syarifudin, A. 2018. Environmentally Friendly Urban Drainage. Yogyakarta: Andi.* **Material:** Drainage Systems **Literature:** *Suryaman, Heri and Kusnan. 2018. Drainage. Surabaya: Unesa University Press.* **Material:** Drainage Systems **Literature:** *Suripin. 2004. Sustainable Urban Drainage Systems. Yogyakarta: Andi.*	20%
9	Understand the condition of Surabaya City, Geography, Topography, Hydrology and land use	1. Students can explain the purpose of irrigation 2. Students can explain irrigation patterns and systems 3. Students can explain water sources and how to provide water	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities	Participation activities, questions and answers and reflection 3 X 50		**Material:** Irrigation Systems **Literature:** *Directorate of Irrigation and Swamps. 2013. KP Irrigation Planning Standards. 01 to KP. 09 . Jakarta: Directorate General of Water Resources, Ministry of Public Works*	4%

10	Calculating the water needs of rice plants in NFR rice fields	1. Students can explain the application of irrigation network systems 2. Students can apply the water needs of rice plants in rice fields	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Irrigation Systems **Literature:** *Directorate of Irrigation and Swamps. 2013. KP Irrigation Planning Standards. 01 to KP. 09 . Jakarta: Directorate General of Water Resources, Ministry of Public Works*	4%
11	Calculate the discharge in each irrigation channel	Students are able to calculate the water demand in the irrigation network	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities, Practice/Performance	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Irrigation Systems **Literature:** *Directorate of Irrigation and Swamps. 2013 . BI Irrigation Planning Standards. 01 to BI. 03 . Jakarta: Directorate General of Water Resources, Ministry of Public Works.*	4%
12	Planning Irrigation Buildings	1. Students are able to understand the components of auxiliary buildings in irrigation 2. Students are able to understand the planning of siphon crossings, gutters and culverts	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Irrigation Systems **Library:** *Indiah Kustini. 2017. Irrigation and Water Structures. Surabaya: Unesa University Press.*	4%
13	Planning Irrigation Buildings	1. Students are able to understand the main building components of the weir and intake intake 2. Students are able to understand the planning of the main building	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities, Practice/Performance	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Irrigation Systems **Library:** *Indiah Kustini. 2014. Tertiary Plot Planning. Surabaya: Unesa University Press.*	4%
14	Planning Tertiary Plots	1. Students are able to plan tertiary plot nomenclature 2. Students are able to plan a water distribution system in tertiary plots	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Irrigation Systems **Library:** *Indiah Kustini. 2014. Tertiary Plot Planning. Surabaya: Unesa University Press.*	4%

15	Understanding specific energy, critical depth, gradually varying flow, planning stable channels for buildings in drainage and pump systems	Students are able to plan water channels and structures in tertiary plots	**Criteria:** Full marks are obtained if you do the questions correctly and precisely **Form of Assessment** : Participatory Activities	Participatory activities, questions and answers and reflection 3 X 50		**Material:** Irrigation Systems **Literature:** *Directorate of Irrigation and Swamps. 2013 . BI Irrigation Planning Standards. 01 to BI. 03 . Jakarta: Directorate General of Water Resources, Ministry of Public Works.*	4%
16	Master the Irrigation System material by taking the Final Semester Examination (UAS)	Students master the Irrigation Systems material by taking the Final Semester Examination (UAS)	**Criteria:** UAS **Form of Assessment** : Participatory Activities, Tests	UAS 3 X 50		**Material:** Irrigation Systems **Literature:** *Directorate of Irrigation and Swamps. 2013. KP Irrigation Planning Standards. 01 to KP. 09 . Jakarta: Directorate General of Water Resources, Ministry of Public Works* **Material:** Irrigation Systems **Literature:** *Directorate of Irrigation and Swamps. 2013 . BI Irrigation Planning Standards. 01 to BI. 03 . Jakarta: Directorate General of Water Resources, Ministry of Public Works.* **Material:** Irrigation Systems **Library:** *Indiah Kustini. 2014. Tertiary Plot Planning. Surabaya: Unesa University Press.* **Material:** Irrigation Systems **Library:** *Indiah Kustini. 2017. Irrigation and Water Structures. Surabaya: Unesa University Press.*	30%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	69.5%
2.	Project Results Assessment / Product Assessment	1.5%
3.	Practice / Performance	4%
4.	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.