

	Universitas Negeri Surabaya Faculty of Engineering, Building Engineering Education Undergraduate Study Program						Document Code																																
SEMESTER LEARNING PLAN																																							
Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date																																
Railway Engineering	8320502196		T=2	P=0	ECTS=3.18	5	July 18, 2024																																
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator																																	
			Dr. Gde Agus Yudha Prawira Adistana, S.T., M.T.																																	
Learning model	Case Studies																																						
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																						
	Program Objectives (PO)																																						
	PLO-PO Matrix																																						
		<div style="border: 1px solid black; padding: 5px; display: inline-block;">P.O</div>																																					
	PO Matrix at the end of each learning stage (Sub-PO)																																						
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td rowspan="2" style="padding: 5px;">P.O</td> <td colspan="16" style="padding: 5px;">Week</td> </tr> <tr> <td style="padding: 5px;">1</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;">3</td> <td style="padding: 5px;">4</td> <td style="padding: 5px;">5</td> <td style="padding: 5px;">6</td> <td style="padding: 5px;">7</td> <td style="padding: 5px;">8</td> <td style="padding: 5px;">9</td> <td style="padding: 5px;">10</td> <td style="padding: 5px;">11</td> <td style="padding: 5px;">12</td> <td style="padding: 5px;">13</td> <td style="padding: 5px;">14</td> <td style="padding: 5px;">15</td> <td style="padding: 5px;">16</td> </tr> </table>						P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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Short Course Description	This course provides an overview to students: History of the development of railroads in Indonesia and pavement construction, definition of track, function of railroads, how to know the classification of roads based on travel speed, passing tones and axle loads, types rails, dimensions of railroad bodies, cross-sections of railroad tracks, introducing students to railroad planning, including: Distribution of loads on railroad tracks, subsoil layers, sand caps, ballast, types of rails, forces at work on railroads (centrifugal force, train overturning force), railroad track geometry (horizontal and vertical alignment), bottom and top construction planning, emplacement, crossings and types of wedges.																																						
References	Main :																																						
	1. [1]. Dadang. 2004. <i>Buku Ajar Jalan Raya & KA</i> . Surabaya: FT. Sipil Unesa. [2]. Banks, J.H. 2002. <i>Introduction to Transportation Engineering</i> . MacGraw Hill. 2nd Edition. Boston. 502p [3]. Oglesby. 1982. <i>Highway Engineering</i> . Singapore. [4]. Utomo, S.H.T. 2009. <i>Jalan Rel</i> . Beta Offset. Edisi Kedua. Yogyakarta. [5]. Surakim, <i>Konstruksi Jalan Rel</i> , Penerbit Nuansa Cendekia Bandung (2014) [6]. PJK 1986 <i>Perencanaan Konstruksi jalan Rel (Peraturan Dinas 10 A,B,C)</i> [7]. Imam Subarkah 1981 <i>Jalan Kereta Api Bandung : Idea Dharma</i>																																						
	Supporters:																																						
Supporting lecturer	Dr. Ir. H. Dadang Supriyatno, M.T. Yogie Risdianto, S.T., M.T. Purwo Mahardi, 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	Students understand the definition of a railroad, as well as the scope of trains for the user community	Students can understand transportation, transportation systems and transportation systems engineering		2 X 50			0%
2	Students understand the classification of trains in fulfilling people's lives	Students can understand the development of land transportation and the role of transportation in people's lives		2 X 50			0%
3	Students understand the Geometric Characteristics of JKA Environmental Conditions Economic considerations and the surrounding community	Students understand the components in geometric design of railway roads		2 X 50			0%
4	Students are able to understand the types of train traffic surveys, planning train traffic surveys, inventory surveys, calculating train operational capacity	Students can understand and differentiate the definitions of each sub-material.		2 X 50			0%
5	Students are able to prepare a geometric pre-plan for a railway road with the elements: Sight Distance, Horizontal Alignment, Vertical Alignment	Students can understand various variables in planning good road geometry for safe roads		2 X 50			0%
6	Students are able to understand the needs/road materials in: Stability analysis, soil bearing capacity analysis, material quality	Students are able to calculate the kung force of the soil		2 X 50			0%
7	Students are able to understand the needs/road materials in: Stability analysis, soil bearing capacity analysis, material quality	Students are able to calculate the kung force of the soil		2 X 50			0%
8	UTS	UTS	Criteria: UTS	UTS 2 X 50			0%
9	Students are able to understand the planning of lower & upper construction of railway roads: planning methods, lower and upper construction	Students are able to analyze road pavement layers according to the conditions of the surrounding environment		2 X 50			0%

10	Students understand and understand railway drainage and complementary buildings: surface drainage, sub-surface drainage, road drainage buildings, other complementary buildings	Students are able to tell about the development of road transportation infrastructure in various regions.		2 X 50			0%
11	Students understand & understand the development of Railway Transportation: Development of railroads in Indonesia,	Students are able to understand the definition and role of free space for safe train travel		2 X 50			0%
12	Rail road elements: Carriage load conveying, Rails, Rail connections, Rail Fastening, Bearings, Ballast,	Students are able to understand the stages of load delivery from top construction to bottom construction of the railway		2 X 50			0%
13	Students are able to recognize and understand the various types of railway bodies in straight lines and curves	Students are able to understand the shapes of railroad bodies		2 X 50			0%
14	Students are able to recognize and understand curved steel roads: curved loads and widening of curved rails	Students are able to understand the planning stages of a railroad in curves		2 X 50			0%
15	Students are able to recognize and understand Elements and Stations: Several train functions, Several types of stations, Several types of installations, Buildings and complementary facilities	Students are able to understand the function of emplacements and stations for train travel and train users		2 X 50			0%
16	Students are able to recognize and understand Elements and Stations: Several train functions, Several types of stations, Several types of installations, Buildings and complementary facilities	Students are able to understand the function of emplacements and stations for train travel and train users		2 X 50			0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
		0%

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.