	Universitas Negeri Surabaya Vocational Faculty, D4 Transportation Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Highway Pavement Structure and Practical	3930103037	Highway	T=2	P=1	ECTS=4.77	3	July 16, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	Project Based Learning	
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-9	Able to apply the principles of mechanics, mathematics and engineering concepts to the technical design process, drawing measurement results, and designing in the field of land transportation engineering technology
	PLO-11	Able to internalize ethics, norms and laws in carrying out work.
	Program Objectives (PO)	
	PO - 1	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 work. Master the principles, applications, technical references, procedures and work standards (SOP) in the Road laboratory
	PLO-PO Matrix	

P.O	PLO-7	PLO-9	PLO-11
PO-1			

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																

Short Course Description	This course is an introduction to the definition of highways, the history of development and role of highways, highway classification, highway cross-sections. Highway pavement layer materials: asphalt, aggregate, filler. Types of asphalt and technology, asphalt properties, asphalt production process, asphalt classification, asphalt inspection, asphalt specifications, asphalt selection and mixing, implementation of the mixture in the field and spreading. Aggregate as a hard layer material: types of aggregate, aggregate inspection, aggregate specifications, analytical/graphical mixing of aggregates. Types of road pavement. Factors influencing road pavement planning. Stresses in flexible and rigid pavement layers. Subgrade bearing capacity: CBR, subgrade reaction modulus (k), subgrade stiffness modulus (E), design CBR, correlation between CBR, k and E, DDT. Carrying capacity of each hard layer. Relative strength coefficient. Planned traffic load. Regional factors. Flexible pavement planning using the Bina Marga method (Component Analysis Method), Overlay planning and gradual layer construction, rigid pavement planning using the Bina Marga Method, Road damage and road maintenance. Learning is carried out by applying a constructivist approach. The learning activity ends with an exercise in planning the thickness of highway pavement.
References	Main :

1. AASHTO. 1986. Guide for Design of Pavement Structures . Washington DC: American Association of State Highway and Transportation Officials.
2. DepartemenPekerjaan Umum. 1987. Petunjuk Perencanaan Tebal Perkerasan Lentur Jalan Raya dengan Metode Analisa Komponen. Jakarta: Penerbit Yayasan Badan Penerbit PU.
3. Departemen Pekerjaan Umum. Direktorat Jenderal Bina Marga. Pedoman Perencanaan Perkerasan Kaku (Beton Semen).
4. Hartom.1988. Beton Semen sebagai Salah Satu Alternatif Perkerasan Jalan. Seminar Perencanaan dan Pelaksanaan Rigid Pavement, Surabaya: ITS.
5. Hendarsin, Shirley L. 2000. Penuntun Praktis Perencanaan Teknik Jalan Raya. Bandung: Politeknik Negeri Bandung, Jurusan Teknik Sipil.
6. Huang,Yang H. 1993. Pavement Analysis and Design . New Jersey: Prentice Hall.
7. Roestaman. Dasar-dasar Pelaksanaan Perkerasan Kaku (Rigid Pavement). Makalah Seminar.
8. Sukirman, Silvia. 1995. Perkerasan Lentur Jalan Raya. Bandung: Penerbit Nova.
9. Undang-Undang RI No 38. 2004. Jalan.
10. Widayanti, Ari. 2004. Perencanaan Perkerasan Jalan Raya. Surabaya: JTS FT Unesa.
11. Widayanti, Ari. 2013. Rekayasa Jalan Raya. Surabaya: JTS FT Unesa.
12. Construction and Building Materials Journal, homepage: www.elsevier.com/locate/conbuildmat .

Supporters:	

Supporting lecturer	Dr. Ari Widayanti, S.T., 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	Understand the definition of highway, history of development and role of highway, classification of highways, highway cross-section.	State the definition of highway, history of development and role of highway, classification of highways, cross-section of highways.	**Criteria:** Full marks are obtained if you do all the questions correctly. **Form of Assessment** : Participatory Activities	Discussion presentation and question and answer. 3 X 50		**Material:** Definition of highways, history of development and role of highways, classification of highways, cross-section of highways. **Bibliography:** *Sukirman, Silvia. 1995. Highway Flexible Pavements. Bandung: Nova Publishers.* **Material:** Definition of highways, history of development and role of highways, classification of highways, cross-section of highways. **References:** *Republic of Indonesia Law No. 38. 2004. Jalan.*	10%
2	Get to know road pavement materials: asphalt aggregate filler.	Mention road pavement materials: asphalt aggregate filler.	**Criteria:** Full marks are obtained if you do all the questions correctly. **Form of Assessment** : Participatory Activities	Discussion presentation and question and answer. 3 X 50		**Material:** Highway pavement layer materials: asphalt, aggregate, filler. **Bibliography:** *Sukirman, Silvia. 1995. Highway Flexible Pavements. Bandung: Nova Publishers.*	10%
3	Get to know the types of asphalt and their technology, the properties of asphalt, the process of making asphalt, the asphalt classification, the asphalt specifications.	Able to mention types of asphalt and technology, properties of asphalt, process of making asphalt, asphalt classification, asphalt specifications.	**Criteria:** Full marks are obtained if you do all the questions correctly. **Form of Assessment** : Participatory Activities	Discussion presentation and question and answer. 3 X 50		**Material:** Types of asphalt and technology, properties of asphalt, process of making asphalt, asphalt classification, asphalt specifications. **Bibliography:** *Sukirman, Silvia. 1995. Highway Flexible Pavements. Bandung: Nova Publishers.*	10%

4	Carry out asphalt inspection.	Able to carry out asphalt inspections.	**Criteria:** Full marks are obtained if you do all the questions correctly.	Discussion presentations and exercises. 3 X 50		**Material:** Asphalt inspection. **Reference:** *AASHTO. 1986. Guide for Design of Pavement Structures. Washington DC: American Association of State Highway and Transportation Officials.*	20%
5	Selecting and mixing asphalt, implementing the mixture in the field and spreading it.	Able to select and mix asphalt. Be able to mention the implementation of mixtures in the field and spreading.	**Criteria:** Full marks are obtained if you do all the questions correctly.	Discussion presentations and exercises. 3 X 50		**Material:** Selection and mixing of asphalt, implementation of the mixture in the field and spreading. **Reference:** *AASHTO. 1986. Guide for Design of Pavement Structures. Washington DC: American Association of State Highway and Transportation Officials.*	10%
6	Getting to know aggregate as a hard layer material: types of aggregates checking aggregates aggregate specifications analytical/graphical mixing of aggregates.	Be able to state aggregate as a hard layer material: types of aggregate, aggregate inspection, aggregate specifications, aggregate mixing analytically/graphically.	**Criteria:** Full marks are obtained if you do all the questions correctly. **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion presentation and question and answer. 3 X 50		**Material:** Aggregate as a hard layer material: types of aggregates, aggregate inspection, aggregate specifications, analytical/graphical mixing of aggregates. **Bibliography:** *Sukirman, Silvia. 1995. Highway Flexible Pavements. Bandung: Nova Publishers.*	15%
7	Get to know the types of highway pavement.	Be able to name the types of road pavement. Able to identify types of highway pavement. Able to differentiate between types of road pavement.	**Criteria:** Full marks are obtained if you do all the questions correctly.	Discussion presentation and question and answer. 3 X 50			0%
8	-	-	**Criteria:** -	- 3 X 50			0%
9	Understand the factors that influence flexible pavement planning.	Be able to mention the factors that influence the planning of flexible road pavement.	**Criteria:** Full marks are obtained if you do all the questions correctly.	Question and answer discussion presentation. 3 X 50			0%
10	Recognizing stress in flexible and rigid pavement layers. Bearing capacity of subgrade: CBR subgrade reaction modulus (k) subgrade stiffness modulus (E) CBR correlation plan between CBR k and E DDT.	Be able to state the relationship between stress in flexible and rigid pavement layers. Bearing capacity of subgrade: CBR modulus of subgrade reaction (k) modulus of subgrade stiffness (E) CBR planned correlation between CBR k and E DDT.	**Criteria:** Full marks are obtained if you do all the questions correctly.	Question and answer discussion presentation. 3 X 50			0%
11	Understand the bearing capacity of each hard layer, relative strength coefficient, planned traffic load and regional factors.	Be able to explain the bearing capacity of each hard layer. Be able to relate relative strength coefficients. Capable of planned traffic loads and regional factors.	**Criteria:** Full marks are obtained if you do all the questions correctly.	Question and answer discussion presentation. 3 X 50			0%
12	Planning flexible pavement using the Bina Marga Method (Component Analysis Method).	Able to calculate the thickness of flexible pavement using the Bina Marga Method (Component Analysis Method).	**Criteria:** Full marks are obtained if you do all the questions correctly.	Presentation, question and answer discussion, exercises and assignments. 3 X 50			0%

13	Planning overlay and gradual layer construction using the Bina Marga Method (Component Analysis Method).	Able to calculate the thickness of overlay pavement. Able to calculate the thickness of gradual layer construction pavement using the Bina Marga Method (Component Analysis Method).	**Criteria:** Full marks are obtained if you do all the questions correctly.	Presentation, question and answer discussion, exercises and assignments. 3 X 50			0%
14	Understand the factors that influence highway rigid pavement planning.	Be able to mention the factors that influence rigid pavement planning	**Criteria:** Full marks are obtained if you do all the questions correctly.	Question and answer discussion presentation. 3 X 50			0%
15	Planning rigid pavement using the Highways Method.	Able to calculate the thickness of rigid pavement using the Bina Marga Method.	**Criteria:** Full marks are obtained if you do all the questions correctly.	Presentation, question and answer discussion, exercises and assignments. 3 X 50			0%
16							0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	30%
2.	Project Results Assessment / Product Assessment	15%
		45%

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.