	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
Matrix Method Structural Analysis *)	8320502001		T=2	P=0	ECTS=3.18	7	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

	P.O

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

Short Course Description	1. Understanding Structure, Structural Analysis Methods, Role of Matrix Algebra and Computation in Structural Analysis.2. Displacement Method: Method Description, Bar Stiffness Matrix, Global Stiffness Matrix, Global Equation.3. Flexibility Method: Method Description, Flexibility Matrix, Static Matrix, Support Reaction of Continuous Beam Structures, Certain Static Plane Truss Structures.4. Learning is carried out using the Direct Learning Method (MPL) and ends with discussion activities.
References	**Main :**

1. [1]. Sunggono. 1984. Buku TeknikSipil. Jakarta: PenerbitNova.
[2]. Wang, Chu-Kia. 1985. Pengantar Analisis Struktur dengan CaraMatriks, Ismoyo Penterjemah. Jakarta : Erlangga.
[3]. Sabariman,Bambang. 2011. Mektek IV. Surabaya: JTS FT Unesa.
[4]. Sabariman,Bambang & Dani, Hasan. 2015. Pemanfaatan Gambar Gaya Lintang dalam Perhitungan MomenStatis Tertentu, Jurnal JKPTB Vol.01 No.01 2015 ISSN 1271-2012, hal142-147.
[5]. Kho HongGeh. 1989. Singkat Tepat Jelas MathCad Menyelesaikan Problem Numerik danMatematika. Jakarta: PT. Elex Media Komputindo.
[6]. Szilard, Rudolph. 1989. Teori dan Analisis PelatMetode Klasik dan Numerik, Wira Penterjemah. Jakarta : Erlangga.
[7]. Anonimous.2010. Panduan Praktis Analisis Struktur Bangunan dan Gedung dengan SAP2000versi 14. Yogyakarta: Wahana Komputer & Andi Offset.

	Supporters:
Supporting lecturer	Dr. Ir. Bambang Sabariman, 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	Able to use matrices in statically indeterminate structural analysis	1. Explain the use of matrices in statically indeterminate (STT) structural analysis. 2. Explains software-based matrix analysis	**Criteria:** Score 40 if you can explain the various matrices used in the analysis of statically indeterminate structures. Score 40 if you can explain the meaning/function of the matrix resulting from matrix operations. Score 20 if you can use applicable software to create and perform matrix operations.	MPL question and answer discussion lecture. 2 X 50			0%
2	Able to form simple beam matrices and STT continuous beams	Explains matrix formation and analysis of simple beams and STT continuous beams	**Criteria:** A score of 70 if the moment calculation using the ASMM method is correct. A score of 15 if the free body diagram calculation includes the positioning reactions of latitude forces and normal forces. A score of 15 if the depiction of the MN and D planes is correct.	Lectures, question and answer discussions, practice discussions on simple beams & continuous beams, STT MPL. 4 X 50			0%
3							0%
4	Able to form a fixed portal matrix	Explains matrix formation and fixed portal analysis	**Criteria:** A score of 70 if the moment calculation using the ASMM method is correct. A score of 15 if the free body diagram calculation includes the positioning reactions of latitude forces and normal forces. A score of 15 if the depiction of the MN and D planes is correct.	Lecture, discussion, question and answer practice, MPL fixed portal. 4 X 50			0%
5							0%
6	Able to form a swaying portal matrix	Explains matrix formation and sway portal analysis	**Criteria:** A score of 70 if the moment calculation using the ASMM method is correct. A score of 15 if the free body diagram calculation includes the positioning reactions of latitude forces and normal forces. A score of 15 if the depiction of the MN and D planes is correct.	Lecture discussion question and answer MPL swaying portal exercise. Task 1. 4 X 50			0%
7							0%
8	UTS	Able to complete MN and D analysis of STT sway portals using ASMM method.	**Criteria:** A score of 70 if the moment calculation using the ASMM method is correct. A score of 15 if the free body diagram calculation includes the positioning reactions of latitude forces and normal forces. A score of 15 if the depiction of the MN and D planes is correct.	Written exam and collect assignments 1. 2 X 50			0%

9	Able to form simple beam matrices and STT continuous beams	Explains matrix formation and analysis of simple beams and STT continuous beams	**Criteria:** A score of 70 if the moment calculation using the ASMM method is correct. A score of 15 if the free body diagram calculation includes the positioning reactions of latitude forces and normal forces. A score of 15 if the depiction of the MN and D planes is correct.	Lectures, question and answer discussions, practice discussions on simple beams & continuous beams, STT MPL. 2 X 50			0%
10	Able to form a fixed portal matrix	Explains matrix formation and fixed portal analysis	**Criteria:** A score of 70 if the moment calculation using the ASMM method is correct. A score of 15 if the free body diagram calculation includes the positioning reactions of latitude forces and normal forces. A score of 15 if the depiction of the MN and D planes is correct.	Lecture, discussion, question and answer practice, MPL fixed portal. 4 X 50			0%
11							0%
12	Able to form a swaying portal matrix	Explains matrix formation and sway portal analysis	**Criteria:** A score of 70 if the moment calculation using the ASMM method is correct. A score of 15 if the free body diagram calculation includes the positioning reactions of latitude forces and normal forces. A score of 15 if the depiction of the MN and D planes is correct.	Lecture, question and answer discussion, MPL swaying portal practice. 4 X 50			0%
13							0%
14	Able to analyze SAP2000 or ETABS computer-aided structures.	Explains structural analysis assisted by applicable software.	**Criteria:** Score 70 if the moment calculation assisted by applicable software is correct. Score 15 if the free body diagram display includes the positioning reactions of latitude forces and normal forces. Score 15 if the display of the MN and D plane images is correct.	Lecture, question and answer discussion, 2D & 3D MPL swaying portal practice. Task 2. 4 X 50			0%
15							0%
16							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.