	Universitas Negeri Surabaya Vocational Faculty, D4 Civil Engineering Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
ANALYSIS OF INDEFINITE STATIC STRUCTURES	2230503016		T=3	P=0	ECTS=4.77	2	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Puguh Novi Prasetyono, S.Pd., M.T.

Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	Program Objectives (PO)	
	PO - 1	Students have mastery of the theoretical & applied concepts of M, N, and D towards civil engineering. Students have a responsible and honest attitude towards the results of conventional and computational static analysis
	PO - 2	Students have a responsible and honest attitude towards the results of conventional and computational static analysis
	PLO-PO Matrix	

P.O
PO-1
PO-2

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										✔						

Short Course Description	Introduction and analysis of statically indeterminate structures (continuous beam, fixed portal, swaying portal) Slope deflection, Clayperon and Cross methods. Learning is carried out using the Direct Learning Method (MPL) and ends with discussion activities

References

Main :

1. Sabariman, Bambang. 2007. Penyelesaian Statika Slope Deflection . Surabaya: JTS FTUnesa.
2. Sabariman, Bambang. 2013. Mekanika Teknik III (Metode Clapeyron). Surabaya: JTS FTUnesa.
3. Sabariman, Bambang. 2015. AnalisisStruktur Statis Tak Tentu (Metode Cross). Surabaya: JTS FTUnesa.
4. Sunggono.1984. Buku TeknikSipil. Jakarta: PenerbitNova.
5. Wang, Chu-Kia. 1987. Analisis StrukturLanjutan Jilid 1, Kusuma Wirawan & Mulyadi Nataprawira Penterjemah.Jakarta: Erlangga.
6. Hibbeler, R.C. 2012. StructuralAnalysis, Eighth Edition . NewJersey: Pearson Prentice Hall.
7. Sabariman, B. & Dani, H.2015. Pemanfaatan Gambar Gaya Lintangdalam Perhitungan Momen Statis Tertentu, Jurnal Kajian Pendidikan TeknikBangunan Vol. 1 Nomer 1/JKPTB/2015.

Supporters:

Supporting lecturer	Dr. Suprapto, S.Pd., M.T. Ir. Fransiskus Xaverius Maradona Manteiro, S.T., M.Sc. Anggi Rahmad Zulfikar, M.T. Berkat Cipta Zega, S.Pd., M.Eng.

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 differentiate between indeterminate static structures and certain static structures	Explain the difference between a statically certain structure (ST) and a statically indeterminate structure (STT).	**Criteria:** Score 15 if the explanation of the ST concept is correct. Score 15 if the explanation of the STT concept is correct. Score 10 if the explanation of the slope deflection concept is correct. Score 10 if the explanation of the Clapeyron concept is correct. Score 10 if the explanation of the Cross concept is correct. Score 10 if the explanation of the application software program concept is correct. Score 10 if the application of M to the main reinforcement is correct. Score 10 if the application of N to the stirrup reinforcement is correct. Score 10 if the application of D to the stirrup reinforcement is correct.	Discussion lectures and questions and answers 3 X 50			0%
2	Able to analyze forces in M (moment) N (normal force) and D (latitudinal force) Slope Deflection Method in beam structures.	Explains the analysis of MN and D STT beams using the Slope Deflection Method	**Criteria:** Score 70 if the moment calculation using the Slope Deflection method is correct. Score 15 if the free body diagram calculation includes the positioning reaction of latitude and normal forces. Score 15 if the depiction of the MN and D planes is correct.	Question and answer lecture and practice discussion of STT beam questions & discussion of 3 X 50			0%
3	Able to analyze forces in M (moment) N (normal force) and D (latitudinal force) Slope Deflection Method in beam structures.	Explains the analysis of MN and D STT beams using the Slope Deflection Method	**Criteria:** Score 70 if the moment calculation using the Slope Deflection method is correct. Score 15 if the free body diagram calculation includes the positioning reaction of latitude and normal forces. Score 15 if the depiction of the MN and D planes is correct.	Question and answer lecture and practice discussion of STT beam questions & discussion of 3 X 50			0%
4	Able to analyze internal forces M (moment) N (normal force) and D (latitudinal force) Slope Deflection Method on portal structures (fixed & swaying)	Able to explain MN and D portal analysis (fixed & swaying) STT Slope Deflection Method	**Criteria:** Score 70 if the moment calculation using the Slope Deflection method is correct. Score 15 if the free body diagram calculation includes the positioning reaction of latitude and normal forces. Score 15 if the depiction of the MN and D planes is correct.	Question and answer lecture and discussion practice on portal questions (fixed & swaying) STT & discussion Task 1 STT Slope Deflection Method 6 X 50			0%

5	Able to analyze internal forces M (moment) N (normal force) and D (latitudinal force) Slope Deflection Method on portal structures (fixed & swaying)	Able to explain MN and D portal analysis (fixed & swaying) STT Slope Deflection Method	**Criteria:** Score 70 if the moment calculation using the Slope Deflection method is correct. Score 15 if the free body diagram calculation includes the positioning reaction of latitude and normal forces. Score 15 if the depiction of the MN and D planes is correct.	Question and answer lecture and discussion practice on portal questions (fixed & swaying) STT & discussion Task 1 STT Slope Deflection Method 6 X 50			0%
6	UTS 1	Able to complete MN and D sway portal analysis STT Slope Deflection Method.	**Criteria:** Score 70 if the moment calculation using the Slope Deflection method is correct. Score 15 if the free body diagram calculation includes the positioning reaction of latitude and normal forces. Score 15 if the depiction of the MN and D planes is correct.	Written exam and collect assignments 1. 2 X 50			0%
7	Able to analyze forces in M (moment) N (normal force) and D (latitudinal force) Clapeyron method (three moments postulate) in beam structures	Explain the analysis of MN and D STT beams Clapeyron Method (three moments postulate)	**Criteria:** Score 70 if the moment calculation using the Clapeyron method is correct Score 15 if the calculation of the free body diagram includes the positioning reaction of latitude and normal forces correctly Score 15 if the depiction of the MN and D planes is correct	Question and answer lecture and practice discussion of STT beam questions & discussion of 6 X 50			0%
8	Able to analyze forces in M (moment) N (normal force) and D (latitudinal force) Clapeyron method (three moments postulate) in beam structures	Explain the analysis of MN and D STT beams Clapeyron Method (three moments postulate)	**Criteria:** Score 70 if the moment calculation using the Clapeyron method is correct Score 15 if the calculation of the free body diagram includes the positioning reaction of latitude and normal forces correctly Score 15 if the depiction of the MN and D planes is correct	Question and answer lecture and practice discussion of STT beam questions & discussion of 6 X 50			0%
9	Able to analyze forces in M (moment) N (normal force) and D (Latitudinal force) Clapeyron Method (three moments postulate) in portal structures (fixed & swaying)	Explain the analysis of MN and D portals (fixed & swaying) STT Clapeyron Method (three moment postulate)	**Criteria:** Score 70 if the moment calculation using the Clapeyron method is correct Score 15 if the calculation of the free body diagram includes the positioning reaction of latitude and normal forces correctly Score 15 if the depiction of the MN and D planes is correct	Question and answer lecture and practice discussion of STT portal questions & discussionTask 2 STT Clapeyron Method 6 X 50			0%
10			**Form of Assessment** : Portfolio Assessment, Test	Question and answer lecture and discussion practice on portal questions (fixed & swaying) STT & discussion Task 1 STT Clyperon Method	Presentation		0%

11	UTS 2.	Able to complete MN and D analysis of the Clapeyron Method STT portal.	**Criteria:** Score 70 if the moment calculation using the Clapeyron method is correct Score 15 if the calculation of the free body diagram includes the positioning reaction of latitude and normal forces correctly Score 15 if the depiction of the MN and D planes is correct	collect assignment 2. 2 X 50	Presentation		0%
12	Able to analyze forces in M (moment) N (normal force) and D (Latitudinal force) Cross Method in beam structures	Explains the analysis of MN and D STT beams using the Cross Method	**Criteria:** Score 70 if the Cross method moment calculation is correct Score 15 if the free body diagram calculation includes the reaction to the placement of latitude forces and normal forces correctly Score 15 if the depiction of the MN and D planes is correct	Question and answer lecture and practice discussion of STT beam questions & discussion of 6 X 50			0%
13	Able to analyze forces in M (moment) N (normal force) and D (Latitudinal force) Cross Method in beam structures	Explains the analysis of MN and D STT beams using the Cross Method	**Criteria:** Score 70 if the Cross method moment calculation is correct Score 15 if the free body diagram calculation includes the reaction to the placement of latitude forces and normal forces correctly Score 15 if the depiction of the MN and D planes is correct	Question and answer lecture and practice discussion of STT beam questions & discussion of 6 X 50			0%
14	Able to analyze internal forces M (moment) N (normal force) and D (Latitudinal force) Cross Method on portal structures (fixed & swaying)	Explains the analysis of MN and D portals (fixed & swaying) STT Cross Method	**Criteria:** Score 70 if the Cross method moment calculation is correct Score 15 if the free body diagram calculation includes the reaction to the placement of latitude forces and normal forces correctly Score 15 if the depiction of the MN and D planes is correct **Form of Assessment** : Participatory Activities	Question and answer lecture and practice discussing portal questions (fixed & swaying) STT & discussion Task 3 STT Cross Method. 6 X 50			0%
15	Able to analyze internal forces M (moment) N (normal force) and D (Latitudinal force) Cross Method on portal structures (fixed & swaying)	Explains the analysis of MN and D portals (fixed & swaying) STT Cross Method	**Criteria:** Score 70 if the Cross method moment calculation is correct Score 15 if the free body diagram calculation includes the reaction to the placement of latitude forces and normal forces correctly Score 15 if the depiction of the MN and D planes is correct **Form of Assessment** : Participatory Activities	Question and answer lecture and practice discussing portal questions (fixed & swaying) STT & discussion Task 3 STT Cross Method. 6 X 50			0%
16			**Form of Assessment** : Test	UAS			0%

Evaluation Percentage Recap: Project Based Learning

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** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities 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.