	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
Building Design**	8320504159	Structure; Inundated; Transportation	T=4	P=0	ECTS=6.36	6	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. Gde Agus Yudha Prawira Adistana, S.T., M.T.

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program which 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	The complete civil building planning course is carried out on buildings with 4-5 floors, the tasks carried out include planning the steel construction for the roof (gording, trestle and wind ties), trusses (saddles or joglos) and if necessary column planning from the profile steel for the top floor, then planning concrete construction for floor plates (1-way plates and 2-way plates), beams (ring beams, longitudinal and transverse), columns and foundations (shallow and deep foundations). In this course, the working load planning must be described first so that the structural analysis can be calculated and phased according to the planning section. For roofs and trusses, the steel profile used must be planned and controlled for its capacity against internal forces from external loads so that the specified profile can be categorized as safe or not. For the floors, beams, columns and foundations used, the thickness and cross-section dimensions must be planned and the reinforcement requirements calculated as well as the reinforcement drawings. Structural analysis calculations using the help of civil application software (SAP and others) and drawing of building plans as well as pre-design and detailed drawings with the help of CAD. In this course, the learning model used is based on project studies and the assessments used are portfolio-based in the form of reports.
References	**Main :**

1. Segui, William T. 2007. Steel Design. Canada: Thomson.
2. McCormac, Jack C. 2008. Structural Steel Design . United States of America: Pearson International Edition.
3. Lam, Dennis, etc. 2004. Structural Steel Work. United States of America: Pearson International Edition.
4. Nawy, Edward G. 1998. Beton Bertulang Suatu Pendekatan Dasar. Bandung: PT. Refika Aditama.
5. Asroni, Ali. 2010. Balok dan Pelat Bertulang. Yogyakarta: Graha Ilmu.
6. Dipohusodo, Istimawan. 1994. Struktur Beton Bertulang . Jakarta: Gramedia Pustaka Utama.
7. Setiawan, Agus. 2002. Perencanaan Struktur Baja dengan Metode LRFD (berdasarkan SNI 03-1729-2002). Jakarta: Erlangga.
8. Suyono. 2007. Peraturan Pembebanan Indoensia untuk Gedung
9. Anonim. 2002. SNI-03-1729 - Tata Cara Perencanaan Struktur Baja Untuk Bangunan Gedung . Jakarta: DPU.
10. Anonim. 2002. SNI-03-2847 - Tata Cara Perhitungan Struktur Beton Untuk Bangunan Gedung . Jakarta: DPU.
11. Anonim. 2013. SNI-2847 - Persyaratan Beton Struktural Untuk Bangunan Gedung . Jakarta: DPU.
12. Anonim. 2012. SNI-1726 - Tata Cara Perencanaan Ketahanan Gempa Untuk Struktur Bangunan Gedung dan Non Gedung . Jakarta: DPU.

Supporters:	

Supporting lecturer	Muhammad Imaduddin, S.T., M.T. Mochamad Firmansyah Sofianto, S.T., M.Sc., M.T. Wahyu Dwi Mulyono, S.Pd., M.Pd. Meity Wulandari, 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	Students are able to design civil building planning drawings	- Describe the floor plan of a multi-storey building. - Provide clear information on the function of buildings and rooms. - Describe the roof plan plan. - Describe floor plans, beams and columns.	**Criteria:** Perfect score if answered correctly.	- Group discussion - Case study 4 X 50			0%
2	Students are able to design civil building planning drawings	- Describes the longitudinal and cross sections of the building.	**Criteria:** Perfect score if answered correctly.	- Group discussion - Case study 4 X 50			0%
3	Students are able to calculate the load from the roof for planning curtains, handlebars and wind ties and control capacity for safe conditions.	- Create a preliminary design for a building consisting of steel and concrete elements	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%
4	Students are able to calculate the truss planning loads and calculate rod forces.	- Describes the load that works from the roof to the trusses. - Calculate the amount of load acting at each truss node. - Create a structural model in a structural analysis program using a computer. - Operate computer programs to model stance, input loads and obtain support reactions and bar forces.	**Criteria:** Perfect score if answered correctly.	- Group discussion - Case study 4 X 50			0%
5	Students are able to plan connections and control for tension and compression members	- Planning connections at truss node points. - Calculate the nominal strength of the connection. - Calculate the number or length of connections used.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%

6	Students are able to plan the dimensions of plates, beams and columns.	- Planning the loading requirements for each room. - Calculating the tributary area on beams and columns. - Calculating the loading on the portal. - Calculating the load distribution on each level for equivalent static earthquake loading.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%
7	Students are able to calculate slab reinforcement plans for both 1-way slabs and 2-way slabs.	- Planning the load calculation on the plate. - Calculate moment analysis on plates in either 1 direction or 2 directions. - Calculating slab reinforcement in both 1 and 2 directions	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%
8	Students are able to calculate plans for reinforcing stairs and landings.	- Plan the thickness of the stair plate and landing, the width of the steps and the height of the steps. - Planning load calculations on stairs. - Calculating moment analysis on the ladder mechanics model. - Calculate the need for stair reinforcement.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%
9	Students are able to calculate earthquake planning for a predetermined area.	- Calculate the total weight of each floor and add up the total floor load. - Calculate the basic earthquake coefficient for the response-spectra or vibration time so that the earthquake force value can be calculated. - Calculate the distribution of earthquakes to each floor.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%

10	Students are able to determine the portal that will be calculated with the help of the SAP 2000 program.	- Create a portal model according to plans and drawings. - Provide completeness for the portal model. - Input load on portal model. - Carry out program analysis and issue analysis results from the SAP program.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%
11	Students are able to calculate longitudinal beam reinforcement plans.	- Determine the maximum field moment and maximum support moment on 1 beam. - Calculate reinforcement requirements and determine the reinforcement to be installed. - Create reinforcement calculation tables for other beam conditions.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%
12	Students are able to calculate cross beam reinforcement plans.	- Determine the maximum field moment and maximum support moment on 1 beam. - Calculate reinforcement requirements and determine the reinforcement to be installed. - Create reinforcement calculation tables for other beam conditions.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%
13	Students are able to calculate column reinforcement plans.	- Determine P(axial) and Moment (maximum) in 1 column. - Calculate the condition of the column, whether it is a short column with eccentricity or a slender column so that the moment increase can be calculated. - Determine the column reinforcement ratio based on the Pn and Mn interaction diagram.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%

14	Students are able to calculate foundation, roof, and sloof plans and reinforcement.	- Planning the size of the foundation based on the allowable soil stress. - Calculate the capacity of the foundation against shear. - Calculating mechanical analysis of the foundation to obtain moments. - Calculating flexible reinforcement for foundations. - Calculating poer and sloof.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%
15	Students are able to draw details for trusses and connections, plate and beam reinforcement.	- Draw the horses and their connections. - Drawing of plate reinforcement and reinforcement details. - Drawing of beam reinforcement and pieces of beam reinforcement. - Drawing of column reinforcement and its details. - Drawing of foundations, roofs and sloofs along with details of the reinforcement.	**Criteria:** Perfect score if answered correctly	- Group discussion - Case study 4 X 50			0%
16							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** 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.