	Universitas Negeri Surabaya **Faculty of Engineering** **Civil Engineering Undergraduate Study Program**	**Document Code**

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Steel structure	2220103150	Compulsory Study Program Subjects	**T=3**	**P=0**	**ECTS=4.77**	4	July 17, 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 which is charged to the course**
	Program Objectives (PO)
	PO - 1 — Students are able to explain the calculation analysis for LRFD and ASD steel building structures, working loads and combination loads based on LRFD and ASD regulations
	PO - 2 — Students are able to calculate and explain steel structure design analysis, control and calculation results by mentioning the safety of a structure
	PO - 3 — Students are able to differentiate steel structural components between beams (bending and shear conditions), truss elements (tension and compression conditions), bending in bar elements, torsional bending, and interaction of beams and columns, as well as the design and control of connections that will be used
	PO - 4 — Students have an attitude and responsibility in calculating steel construction buildings
	PLO-PO Matrix

P.O
PO-1
PO-2
PO-3
PO-4

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																
PO-3																
PO-4																

Short Course Description	Introduction to the manufacture of steel construction materials, various steel profiles in the trade, allowable stresses, connection planning in steel construction including bolted and welded connections. Section analysis includes tension members, compression members, columns, beams (bending and shear conditions), beam-column interactions, bending and bending-torsion conditions. Steel construction building planning (industrial buildings). Learning is carried out by applying a constructivist approach. Evaluation uses an exercise in making an assessment rubric for each student in discussion and reflection activities.

References	**Main :**

1. SNI-03-1729. 2002. Tata Cara Perencanaan Struktur Baja Untuk Bangunan Gedung.
2. SNI-1729. 2015. Spesifikasi Untuk Bangunan Gedung Baja Struktural.
3. SNI-03.1729. 2002. Perencanaan Struktur Baja dengan Metode LRFD (Berdasarkan SNI 03-1729-2002)
4. SNI 1726. 2012. Tata Cara Perencanaan Ketahanan Gempa Untuk Struktur Bangunan Gedung dan Non Gedung
5. William T Segui. 2007. Steel Design.
6. Jack Mc. Cormac. 2008. Structural Steel Design.
7. Dennis Lam. 2004. Structural Steel Work .
8. Agus Setiawan. 2008. Perencanaan Struktur Baja dengan Metode LRFD. Jakarta: Erlangga
9. Rudy Gunawan. 2000. Tabel Profil Konstruksi Baja.

Supporters:	
1. Persepsi Mahasiswa Terhadap Efektifitas Pembelajaran Daring MK Bidang Keilmuan Struktur Mahasiswa JTS FT Unesa Dalam Mendukung Program WFH dan Penanggulangan Covid-19	

Supporting lecturer	Arie Wardhono, S.T., M.MT., M.T., Ph.D. Yogie Risdianto, 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	Get to know the characteristics of steel construction	Explain the characteristics of steel	**Criteria:** Full marks if the report is bound, the report is arranged sequentially, and in accordance with theory **Form of Assessment** : Project Results Assessment / Product Assessment		Lectures, discussions and questions and answers 3 X 50	**Material:** Steel construction characteristics **Reader:** *Dennis Lam. 2004. Structural Steel Work.* **Material:** Effectiveness of online learning in the field of science student structure **Reference:** *Student Perceptions of the Effectiveness of Online Learning MK in the Field of Science JTS FT Unesa Student Structure in Supporting the WFH Program and Covid-19 Management*	3%
2	Students are able to plan connections in steel construction	1. Explain the planning of ASD and LRFD methods 2. Explains connections in steel construction: bolts, rivets, and welds	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises		**Material:** Connections in steel construction **Reader:** *Agus Setiawan. 2008. Steel Structure Design using the LRFD Method. Jakarta: Erlangga*	3%

3	Students are able to plan connections in steel construction	1. Explain the planning of ASD and LRFD methods 2. Explains connections in steel construction: bolts, rivets, and welds	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 2 X 50 exercises			**Material:** Connections in steel construction **Reference:** *SNI-1729. 2015. Specifications for Structural Steel Buildings.*	3%
4	Students are able to plan connections in steel construction	1. Explain the planning of ASD and LRFD methods 2. Explains connections in steel construction: bolts, rivets, and welds	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises			**Material:** Connections in steel construction **Reference:** *SNI-1729. 2015. Specifications for Structural Steel Buildings.*	3%
5	Students are able to plan connections in steel construction	1. Explain the planning of ASD and LRFD methods 2. Explains connections in steel construction: bolts, rivets, and welds	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises			**Material:** Connections in steel construction **Reference:** *SNI-1729. 2015. Specifications for Structural Steel Buildings.*	4%
6	Students are able to plan tensile rods	Explain ASD and LRFD planning for tension members	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises			**Material:** Tensile rod **Reference:** *SNI-1729. 2015. Specifications for Structural Steel Buildings.*	4%
7	Students are able to plan tensile rods	Explain ASD and LRFD planning for tension members	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises			**Material:** Tensile rod **Reference:** *SNI-1729. 2015. Specifications for Structural Steel Buildings.*	4%
8	Completing the Last Semester Exam (UTS)	Complete assignments in the time provided and get maximum marks.	**Form of Assessment** : Project Results Assessment / Product Assessment, Test	Written exam 3 X 50				20%
9	Students are able to plan compression members (columns)	Explain ASD and LRFD planning for compression members (columns)	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises			**Material:** Press rod (column) **Reference:** *SNI-1729. 2015. Specifications for Structural Steel Buildings.*	4%

10	Students are able to plan compression members (columns)	Explain ASD and LRFD planning for compression members (columns)	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises		**Material:** Compressed rod (column) **Reference:** *William T Segui. 2007. Steel Design.*	4%
11	Students are able to plan blocks	Explain ASD and LRFD planning on beams	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises		**Material: Library** Blocks : *SNI-1729. 2015. Specifications for Structural Steel Buildings.*	4%
12	Students are able to plan blocks	Explain ASD and LRFD planning on beams	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises		**Material:** Blocks **Library:** *William T Segui. 2007. Steel Design.*	3%
13	Students are able to plan beam-column	Explain ASD and LRFD planning for beam-columns	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises		**Material:** Planning beams and columns **References:** *SNI 1726. 2012. Procedures for Earthquake Resistance Planning for Building and Non-Building Structures*	4%
14	Students are able to plan beam-column	Explain ASD and LRFD planning for beam-columns	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises			4%
15	Students are able to plan steel construction buildings	Explain ASD and LRFD planning in steel construction buildings	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Project Results Assessment / Product Assessment	Lectures, discussions, questions and answers, and 3 X 50 exercises		**Material:** Planning beams and columns **References:** *SNI 1726. 2012. Procedures for Earthquake Resistance Planning for Building and Non-Building Structures*	3%

16			**Form of Assessment** : Project Results Assessment / Product Assessment, Test				30%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	4%
2.	Project Results Assessment / Product Assessment	71%
3.	Test	25%
		100%

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.