| | **Universitas Negeri Surabaya**
Vocational Faculty,
D4 Civil Engineering Study Program | |

SEMESTER LEARNING PLAN

Courses	**CODE**	**Course Family**	**Credit Weight**			**SEMESTER**	**Compilation Date**
Steel Structure	2230502012	Compulsory Study Program Subjects	**T=2**	**P=0**	**ECTS=3.18**	3	March 13, 2023

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 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 the 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 steel construction materials, various steel profiles available in the field based on steel quality. Analysis of steel profiles in tension members, compression members, columns, beam-column connections. Connections in steel construction. Steel construction building planning (industrial buildings).
References	**Main :**

1. SNI-03-1729. 2002. Tata Cara Perencanaan Struktur Baja Untuk Bangunan Gedung.
2. SNI-1729. 2020. Spesifikasi Untuk Bangunan Gedung Baja Struktural.
3. SNI 1726. 2012. Tata Cara Perencanaan Ketahanan Gempa Untuk Struktur Bangunan Gedung dan Non Gedung
4. William T Segui. 2007. Steel Design.
5. Jack Mc. Cormac. 2008. Structural Steel Design.
6. Dennis Lam. 2004. Structural Steel Work .
7. Agus Setiawan. 2008. Perencanaan Struktur Baja dengan Metode LRFD. Jakarta: Erlangga
8. Rudy Gunawan. 2000. Tabel Profil Konstruksi Baja.

Supporters:	

Supporting lecturer	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	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		Lectures, discussions and questions and answers 2 X 50	**Material:** Introduction to steel structures **Reference:** *SNI-03-1729. 2002. Procedures for Planning Steel Structures for Buildings.* **Material:** Introduction to SNI Steel **Library:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.* **Material:** Introduction References **Bibliography:** *William T Segui. 2007. Steel Design.* **Material:** Introduction **Bibliography reference:** *Agus Setiawan. 2008. Steel Structure Design using the LRFD Method. Jakarta: Erlangga*	0%
2	Students are able to plan tensile rods	Explain the design of tension rods	**Criteria:** Full marks if the answers are complete, sequential, clear and correct	Lectures, discussions, questions and answers, and 2 X 50 exercises		**Material:** Welded Joint Planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.*	0%

3	Students are able to plan tensile rods	Explain the design of tension rods	**Criteria:** Full marks if the answers are complete, sequential, clear and correct		Lectures, discussions, questions and answers, and 2 X 50 exercises	**Material:** Tensile rod planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.* **Material:** Steel profile selection **Reader:** *Rudy Gunawan. 2000. Steel Construction Profile Table.* **Material:** Tensile rod planning **Reference:** *William T Segui. 2007. Steel Design.*	0%
4	Students are able to plan compression members	Explain the design of compression members	**Criteria:** Full marks if the answers are complete, sequential, clear and correct	Lectures, discussions, questions and answers, and 2 X 50 exercises		**Material:** Design of compressed rods **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.* **Material:** Steel profile selection **Reader:** *Rudy Gunawan. 2000. Steel Construction Profile Table.* **Material:** Tensile rod planning **Reference:** *William T Segui. 2007. Steel Design.*	0%

5	Students are able to plan compression members	Explain the design of compression members	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Participatory Activities, Practice/Performance	Lectures, discussions, questions and answers, and 2 X 50 exercises		**Material:** Design of compressed rods **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.* **Material:** Steel profile selection **Reader:** *Rudy Gunawan. 2000. Steel Construction Profile Table.* **Material:** Design of compressed rods **Reference:** *Agus Setiawan. 2008. Steel Structure Design using the LRFD Method. Jakarta: Erlangga*	10%
6	Students are able to plan connections in steel construction (bolted connections)	Explain the planning of connections in steel construction (bolted connections)	**Criteria:** Full marks if the answers are complete, sequential, clear and correct		Lectures, discussions, questions and answers, and 2 x 50 exercises	**Material:** Bolted connection planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.*	0%
7	Students are able to plan connections in steel construction (bolted connections)	Explain the planning of connections in steel construction (bolted connections)	**Criteria:** Full marks if the answers are complete, sequential, clear and correct	Lectures, discussions, questions and answers, and 2 X 50 exercises		**Material:** Bolted connection planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.*	0%
8	Completing the Last Semester Exam (UTS)	Complete assignments in the time provided and get maximum marks.	**Form of Assessment** : Test	Written exam 2 X 50			20%
9	Students are able to plan joints in steel construction (welded joints)	Explain the planning of connections in steel construction (welded connections)	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Participatory Activities	Lectures, discussions, questions and answers, and 2 X 50 exercises		**Material:** Welded Joint Planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.*	0%
10	Students are able to plan joints in steel construction (welded joints)	Explain the planning of connections in steel construction (welded connections)	**Criteria:** Full marks if the answers are complete, sequential, clear and correct **Form of Assessment** : Practice / Performance	Lectures, discussions, questions and answers, and 2 X 50 exercises		**Material:** Welded Joint Planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.*	10%

| 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 | | Lectures, discussions, questions and answers, and 2 X 50 exercises | **Material:** Beam planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.*

 Material: Beam planning **Reference:** *SNI-03-1729. 2002. Procedures for Planning Steel Structures for Buildings.*

 Material: Beam planning **Reader:** *Jack Mc. Cormac. 2008. Structural Steel Design.* | 0% |
| 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 | Lectures, discussions, questions and answers, and 2 X 50 exercises | | **Material:** Beam planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.*

 Material: Beam planning **Reader:** *Jack Mc. Cormac. 2008. Structural Steel Design.*

 Material: Beam planning **Reference:** *SNI-03-1729. 2002. Procedures for Planning Steel Structures for Buildings.* | 0% |

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	Lectures, discussions, questions and answers, and 2 X 50 exercises		**Material:** Column beam planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.* **Material:** Earthquake load planning on columns **References:** *SNI 1726. 2012. Procedures for Earthquake Resistance Planning for Building and Non-Building Structures* **Material:** Column beam planning **Reader:** *Dennis Lam. 2004. Structural Steel Work.*	0%
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** : Practice / Performance	Lectures, discussions, questions and answers, and 2 X 50 exercises		**Material:** Column beam planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.* **Material:** Earthquake load planning **Reference:** *SNI 1726. 2012. Procedures for Earthquake Resistance Planning for Building and Non-Building Structures* **Material:** Column beam planning **Reader:** *Dennis Lam. 2004. Structural Steel Work.*	10%

| 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** : Portfolio Assessment | Lectures, discussions, questions and answers, and 2 X 50 exercises | | **Material:** Steel building construction planning **Reference:** *SNI-1729. 2020. Specifications for Structural Steel Buildings.*

 Material: Steel profile selection **Reader:** *Rudy Gunawan. 2000. Steel Construction Profile Table.*

 Material: Steel building construction planning **Reader:** *Agus Setiawan. 2008. Steel Structure Design using the LRFD Method. Jakarta: Erlangga* | 20% |
| 16 | Completing the Final Semester Examination (UAS) | | **Form of Assessment** : Project Results Assessment / Product Assessment, Test | | | | 30% |

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	5%
2.	Project Results Assessment / Product Assessment	15%
3.	Portfolio Assessment	20%
4.	Practice / Performance	25%
5.	Test	35%
		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** 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.