



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
Bridge Structure	2220102117	Compulsory Study Program Subjects	T=2	P=0	ECTS=3.18	5	August 8, 2022
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
	Drs. Andang Widjaja, S.T., M.T. ; Yogie Risdianto, S.T., M.T. ; Meity Wulandari, S.T., M.T.		-			Yogie Risdianto, S.T., M.T.	

Learning model	Case Studies
-----------------------	---------------------

Program Learning Outcomes (PLO)	PLO study program that is charged to the course				
	Program Objectives (PO)				
	PO - 1	Students are able to understand bridge design, determine bridge loads, bridge analysis, and the components inside a bridge in terms of designing and analyzing them, namely the abutments and foundations.			
	PO - 2	Students are able to describe the bridge design, bridge details, bridge connections, and other components of the bridge structure, layout and foundation			
	PO - 3	Students are able to analyze bridge designs related to working loads, analysis of bridge structures, and abutments and foundations			
	PLO-PO Matrix				
		<table border="1" style="margin-left: 40px;"> <tr><td>P.O</td></tr> <tr><td>PO-1</td></tr> <tr><td>PO-2</td></tr> <tr><td>PO-3</td></tr> </table>	P.O	PO-1	PO-2
P.O					
PO-1					
PO-2					
PO-3					

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																

Short Course Description	Bridge concept, bridge types, bridge classification, bridge planning stages, understanding steel bridges, types of steel bridges, bridge loading, bridge vehicle floor planning, girder beam planning, composite bridge planning, bridge pillar planning, bridge foundation planning
---------------------------------	--

References	Main :
-------------------	---------------

1. Supriyadi, B. 1997. Analisis Struktur Jembatan. Biro Penerbit KMTS FT UGM Yogyakarta.
2. Anonim. 1987. Pedoman Pembebanan Jembatan JalanRaya. Yayasan Badan Penerbit PU, Jakarta
3. Barker, M.R, A.J. 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Spesification. John Wiley & Sons, Inc, New York, USA
4. Nawy, E.G. 1996. Prestressed Concrete: Fundamental. Prentice Hall. New Jersey Australia.
5. Masagala, Algazt Aryad. 2022. Jembatan Truss dengan Analisis SAP2000. PACE: Padang.
6. Anonim. SNI 1725 – 2016 Pembebanan Untuk Jembatan. BSN.
7. Anonim. SNI 2833 – 2016 Perencanaan Jembatan Terhadap Beban Gempa. BSN.
8. Anonim. RSNI T-03-2005 Standar perencanaan struktur baja untuk jembatan. BSN.
9. Anonim. RSNI T-12-2004 Standar perencanaan struktur beton untuk jembatan. BSN.

Supporters:

Supporting lecturer

Muhammad Imaduddin, S.T., M.T.
Yogie Risdianto, S.T., M.T.
Meity Wulandari, S.T., M.T.
Alwan Gangsar Brilian Putra, S.Tr.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	Explain the meaning of bridge types and classifications as well as bridge design stages	<ol style="list-style-type: none"> 1.Explain several bridge concepts 2.Explain the mechanisms of bridge design stages 3.Explain orally the concept of a bridge 4.Explain verbally the mechanisms of bridge design stages 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Types and classification of bridges Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Types and classification of bridges Reference: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p>	5%

2	Explain the types of steel bridges.	<ol style="list-style-type: none"> 1.Explain the meaning of a steel bridge 2.Explain the types of steel bridges 3.Explain verbally the meaning of a steel bridge 4.Explain orally the types of steel bridges 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Steel bridge</p> <p>Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Steel bridge</p> <p>Reference: <i>Masagala, Algazt Aryad. 2022. Truss Bridge with SAP2000 Analysis. PACE: Padang.</i></p> <hr/> <p>Material: Steel bridges</p> <p>References: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p>	5%
---	-------------------------------------	--	---	--	--	---	----

3	Explain the types of loads on bridges	<ol style="list-style-type: none"> 1.Explain the meaning of bridge load 2.Explain the various types of bridge loads 3.Explain the combination of bridge loads 4.Explain verbally the meaning of bridge load 5.Explain verbally the various types of bridge loads 	Form of Assessment : Participatory Activities	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50	<p>Material: Bridge Loading</p> <p>Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Bridge Loading</p> <p>Reference: <i>Anonymous. 1987. Guidelines for Loading Highway Bridges. PU Publishing Agency Foundation, Jakarta</i></p> <hr/> <p>Material: Bridge Loading</p> <p>Reference: <i>Anonymous. SNI 1725 – 2016 Loading for Bridges. BSN.</i></p> <hr/> <p>Material: Bridge Loadings</p> <p>References: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p>	5%
---	---------------------------------------	---	---	--	---	----

4	Explain the types of loads on bridges	<ol style="list-style-type: none"> 1.Explain the meaning of bridge load 2.Explain the various types of bridge loads 3.Explain the combination of bridge loads 4.Explain verbally the meaning of bridge load 5.Explain verbally the various types of bridge loads 	Form of Assessment : Participatory Activities	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Bridge Loading Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Bridge Loading Reference: <i>Anonymous. 1987. Guidelines for Loading Highway Bridges. PU Publishing Agency Foundation, Jakarta</i></p> <hr/> <p>Material: Bridge Loading Reference: <i>Anonymous. SNI 1725 – 2016 Loading for Bridges. BSN.</i></p> <hr/> <p>Material: Bridge Loadings References: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p>	5%
---	---------------------------------------	---	---	--	--	---	----

5	Analyze vehicle floor planning	<ol style="list-style-type: none"> 1.Explain the stages of vehicle floor planning 2.Explain the types of loads acting on the vehicle floor 3.Analyze the moments acting on the vehicle floor 4.Explains the combination of vehicle floor moments 5.Analyzing bridge floor reinforcement planning 6.Explain verbally the stages of planning a bridge floor 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Vehicle floor planning Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. 1987. Guidelines for Loading Highway Bridges. PU Publishing Agency Foundation, Jakarta</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. SNI 1725 – 2016 Loading for Bridges. BSN.</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. RSNI T-03-2005 Standard for planning steel structures for bridges. BSN.</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p>	5%
---	--------------------------------	---	---	--	--	--	----

6	Analyze vehicle floor planning	<ol style="list-style-type: none"> 1.Explain the stages of vehicle floor planning 2.Explain the types of loads acting on the vehicle floor 3.Analyze the moments acting on the vehicle floor 4.Explains the combination of vehicle floor moments 5.Analyzing bridge floor reinforcement planning 6.Explain verbally the stages of planning a bridge floor 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Vehicle floor planning Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. 1987. Guidelines for Loading Highway Bridges. PU Publishing Agency Foundation, Jakarta</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. SNI 1725 – 2016 Loading for Bridges. BSN.</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. RSNI T-03-2005 Standard for planning steel structures for bridges. BSN.</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p>	5%
---	--------------------------------	---	---	--	--	--	----

7	Analyze vehicle floor planning	<ol style="list-style-type: none"> 1.Explain the stages of vehicle floor planning 2.Explain the types of loads acting on the vehicle floor 3.Analyze the moments acting on the vehicle floor 4.Explains the combination of vehicle floor moments 5.Analyzing bridge floor reinforcement planning 6.Explain verbally the stages of planning a bridge floor 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Vehicle floor planning Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. 1987. Guidelines for Loading Highway Bridges. PU Publishing Agency Foundation, Jakarta</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. SNI 1725 – 2016 Loading for Bridges. BSN.</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. RSNI T-03-2005 Standard for planning steel structures for bridges. BSN.</i></p> <hr/> <p>Material: Vehicle floor planning Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p>	5%
8	U.S.S			2 X 50			0%

9	Analyzing girder beam planning	<ol style="list-style-type: none"> 1.Explain the stages of girder beam planning 2.Explain the loading of girder beams 3.Explain the calculation of moments in girder beams 4.Analyzing girder beam strength planning 5.Explain verbally the planning of girder beams 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Analysis of girder beam planning</p> <p>Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Analysis of girder beam planning.</p> <p>Reference: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LFRD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p> <hr/> <p>Material: Girder beam planning analysis</p> <p>Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p>	10%
---	--------------------------------	---	---	--	--	---	-----

10	Analyzing girder beam planning	<ol style="list-style-type: none"> 1.Explain the stages of girder beam planning 2.Explain the loading of girder beams 3.Explain the calculation of moments in girder beams 4.Analyzing girder beam strength planning 5.Explain verbally the planning of girder beams 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Analysis of girder beam planning</p> <p>Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Analysis of girder beam planning.</p> <p>Reference: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LFRD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p> <hr/> <p>Material: Girder beam planning analysis</p> <p>Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p>	10%
----	--------------------------------	---	---	--	--	---	-----

11	Analyzing composite bridge planning	<ol style="list-style-type: none"> 1.Explain the stages of composite bridge planning 2.Explain the loading of composite bridges 3.Explain the calculation of moments in composite bridges 4.Analyzing composite bridge strength planning 5.Explain orally the planning of a composite bridge 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Composite bridge planning analysis</p> <p>References: <i>Navy, EG 1996. Prestressed Concrete: Fundamentals. Prentice Hall. New Jersey Australia.</i></p> <hr/> <p>Material: Composite bridge planning analysis</p> <p>Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Composite bridge planning analysis</p> <p>References: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p> <hr/> <p>Material: Composite bridge planning analysis</p> <p>Reference: <i>Anonymous. RSNI T-03-2005 Standard for planning steel structures for bridges. BSN.</i></p> <hr/> <p>Material: Composite bridge planning analysis</p> <p>Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p>	5%
----	-------------------------------------	---	---	--	--	--	----

12	Analyzing composite bridge planning	<ol style="list-style-type: none"> 1.Explain the stages of composite bridge planning 2.Explain the loading of composite bridges 3.Explain the calculation of moments in composite bridges 4.Analyzing composite bridge strength planning 5.Explain orally the planning of a composite bridge 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Composite bridge planning analysis</p> <p>References: <i>Navy, EG 1996. Prestressed Concrete: Fundamentals. Prentice Hall. New Jersey Australia.</i></p> <hr/> <p>Material: Composite bridge planning analysis</p> <p>Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Composite bridge planning analysis</p> <p>References: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p> <hr/> <p>Material: Composite bridge planning analysis</p> <p>Reference: <i>Anonymous. RSNI T-03-2005 Standard for planning steel structures for bridges. BSN.</i></p> <hr/> <p>Material: Composite bridge planning analysis</p> <p>Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p>	5%
13	Analyzing bridge pillar planning	<ol style="list-style-type: none"> 1.Explain the stages of planning bridge pillars 2.Explain the loading of bridge pillars 3.Explain the calculation of 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Bridge pillar planning</p> <p>Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p>	10%

moments on
bridge pillars
4.Analyzing
composite
bridge
strength
planning
5.Explain orally
the planning
of bridge
pillars

Material:
Bridge pillar
planning
Reference:
Supriyadi, B.
1997. *Bridge
Structural
Analysis.*
KMTS FT
UGM
Yogyakarta
Publishing
Bureau.

Material:
Bridge pillar
planning
Reference:
Anonymous.
1987.
*Guidelines for
Loading
Highway
Bridges.* PU
Publishing
Agency
Foundation,
Jakarta

Material:
Bridge pillar
planning
Reference:
Barker, MR,
AJ 1997.
*Design of
Highway
Bridges:*
Based on
AASHATO
LRFD Bridges
Design
Specification.
John Wiley &
Sons, Inc.,
New York,
USA

Material:
Bridge pillar
planning
Reference:
Navy, EG
1996.
*Prestressed
Concrete:
Fundamentals.*
Prentice Hall.
New Jersey
Australia.

Material:
Planning of
bridge pillars
References:
Masagala,
Algazt Aryad.
2022. *Truss
Bridge with
SAP2000
Analysis.*
PACE:
Padang.

Material:
Bridge pillar
planning
Reference:
Anonymous.
SNI 1725 –
2016 *Loading
for Bridges.*
BSN.

Material:
Bridge pillar
planning
Reference:
Anonymous.
RSNI T-03-

						2005 Standard for planning steel structures for bridges. BSN.	
14	Analyzing bridge pillar planning	<ol style="list-style-type: none"> 1.Explain the stages of planning bridge pillars 2.Explain the loading of bridge pillars 3.Explain the calculation of moments on bridge pillars 4.Analyzing composite bridge strength planning 5.Explain orally the planning of bridge pillars 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: Bridge pillar planning Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p> <hr/> <p>Material: Bridge pillar planning Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <hr/> <p>Material: Bridge pillar planning Reference: <i>Anonymous. 1987. Guidelines for Loading Highway Bridges. PU Publishing Agency Foundation, Jakarta</i></p> <hr/> <p>Material: Bridge pillar planning Reference: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p> <hr/> <p>Material: Bridge pillar planning Reference: <i>Nawy, EG 1996. Prestressed Concrete: Fundamentals. Prentice Hall. New Jersey Australia.</i></p> <hr/> <p>Material: Planning of bridge pillars References: <i>Masagala, Algazt Aryad. 2022. Truss Bridge with SAP2000 Analysis. PACE: Padang.</i></p>	10%

						<p>Material: Bridge pillar planning Reference: <i>Anonymous. SNI 1725 – 2016 Loading for Bridges. BSN.</i></p> <p>Material: Bridge pillar planning Reference: <i>Anonymous. RSNI T-03-2005 Standard for planning steel structures for bridges. BSN.</i></p>	
15	Analyzing bridge foundation planning	<ol style="list-style-type: none"> 1.Explain the stages of bridge foundation planning 2.Explain the loading of bridge foundations 3.Explain the calculation of moments in bridge foundations 4.Analyzing bridge foundation strength planning 5.Explain orally the planning of bridge foundations 	<p>Criteria: According to the rubric, test</p> <p>Form of Assessment : Participatory Activities</p>	Collaborative Learning Approach (Discussion lecture and question and answer) 2 X 50		<p>Material: bridge foundation planning Reference: <i>Supriyadi, B. 1997. Bridge Structural Analysis. KMTS FT UGM Yogyakarta Publishing Bureau.</i></p> <p>Material: bridge foundation planning Reference: <i>Barker, MR, AJ 1997. Design of Highway Bridges: Based on AASHATO LRFD Bridges Design Specification. John Wiley & Sons, Inc., New York, USA</i></p> <p>Material: bridge foundation planning Reference: <i>Anonymous. RSNI T-12-2004 Standard for planning concrete structures for bridges. BSN.</i></p> <p>Material: bridge foundation planning Reference: <i>Anonymous. RSNI T-03-2005 Standard for planning steel structures for bridges. BSN.</i></p>	15%
16							0%

No	Evaluation	Percentage
1.	Participatory Activities	100%
		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.