UNESA	**Universitas Negeri Surabaya** **Faculty of Engineering** **, Information Technology Education Undergraduate Study Program**	**Document Code**

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Computer Graphics	8320703020	Compulsory Study Program Subjects	T=3	P=0	ECTS=4.77	5	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	Drs. Bambang Sujatmiko, M.T.	.....	Drs. Bambang Sujatmiko, M.T.

Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**	
	PLO-8	Mastering the concepts and implementation in developing software engineering, games, intelligent multimedia, and network computer engineering.
	PLO-13	Able to develop innovative educational products or learning resources using scientific design-based strategies to support teaching activities that can be integrated with ICT.
	Program Objectives (PO)	
	PLO-PO Matrix	

P.O	PLO-8	PLO-13

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	This course teaches basic principles and methods in computer graphics and is able to design, implement and analyze correct and good graphics application systems. The material studied in this course is an introduction to computer graphics, primitive drawing, 2D graphic objects, 2D affine transformations, 3D graphic objects, 3D affine transformations, creating complex 3D graphic objects.	
References	**Main :**	

1. Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL , Fifth Edition. Pearson International Inc.
2. Edward Angel. 2002. OpenGLTM: A Primer, Third Edition. Addison-Wesley.
3. Hills, Francis S Jr. 2000. Computer Graphics Using OpenGL, Second Edition . New Jersey: Prentice Hall.

Supporters:

1. Donald Hearn and M. Pauline Baker. Computer Graphics with OpenGL , 3rd Edition.
2. Alan Watt. 3D Computer Graphics. Addison-Wesley.

Supporting lecturer	Drs. Bambang Sujatmiko, M.T. Setya Chendra Wibawa, S.Pd., M.T. Ramadhan Cakra Wibawa, S.Pd., M.Kom.

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 explain the basics of graphics systems and graphics pipelines in the graphics library	1. Explaining Graphic Systems 2. Explain the meaning of Computer Graphics 3. Identify the formation of graphs/images 4. Identify models and Graphic System Architecture 5. Identify Computer Graphics applications 6. Explains the basics of the Graphics Library 7. Explains the background of the Graphics Library 8. Identify examples of Graphics Library Programs 9. Identifying 3D in Graphic Systems	**Criteria:** Cognitive Values, Character Values, and Psychomotor Values **Form of Assessment** : Participatory Activities	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 3 X 50	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, 3 x 50 online practicum	**Material:** 1. Explaining the system and meaning of computer graphics, 2. Identifying the formation of graphics/images, graphics system models and architecture, computer graphics applications, examples of graphics library programs, and 3D in graphics systems. 3. Explaining the basics of graphics libraries, background Graphics Library **Library:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	2%
2	Students are able to create and demonstrate simple graphics programs	1. Explaining Sierpinski Gaskets (2D/3D) 2. Identifying Input and Interaction 3. Explaining Graphics Library Callbacks 4. Applying the Graphic Library to the program code	**Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practicum 3 X 50	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, online Practicum 3 x 50	**Material:** Explaining 1. Sierpinski Gasket (2D/3D), 2. Graphics Library Callbacks, 3. Graphics Library in program code, and Identifying Input and **Library Interaction:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	3%
3	Students are able to create interactive graphic applications	1. Identify input, display, menu, and picking devices 2. Apply how to design and build interactive programs with the Graphic Library	**Criteria:** Cognitive Values, Character Values, and Psychomotor Values **Form of Assessment** : Participatory Activities, Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practicum 3 X 50	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, online Practicum 2 x 50	**Material:** Identify input, display, menu and picking devices and apply how to design and build interactive programs with Graphic Library Library **:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	3%

4	Students are able to implement World Windows and Viewport	1. Identify and implement World Windows and Viewport 2. Identify and apply clipping lines 3. Identify and apply regular polygons, circles and arcs	**Criteria:** Cognitive Values, Character Values, and Psychomotor Values **Form of Assessment** : Participatory Activities, Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practicum 3 X 50	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Online Practicum 2 x 50	**Material:** Identifying and applying 1. World Windows and Viewport, 2. clipping lines, and 3. regular polygons, circles and arcs **Reader:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	3%
5	Students can implement vector tools	1. Explain vectors 2. Explain dot product 3. Explain the cross product of two vectors 4. Explain the representation of key geometric objects 5. Applying vectors to the Graphic Library program	**Criteria:** Cognitive Values, Character Values, and Psychomotor Values **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practicum 3 X 50	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Online 2 x 50	**Material:** Explains 1. vectors, 2. dot product, 3. cross product of two vectors, 4. representation of key geometric objects, and Applying vectors in the Graphic Library program. **Bibliography:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	3%
6	Students can explain geometry, representation and transformation of objects	Explains geometry, representation, and transformation of objects	**Criteria:** Cognitive Values, Character Values, and Psychomotor Values **Form of Assessment** : Participatory Activities	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practicum 3 X 50	Approach: Scientific Model: Problem-based learning Method: Discussion, Online Presentation 2 x 50	**Material:** Explaining geometry, representation and transformation of objects. **Reference:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	3%
7	Students can demonstrate object transformations in interactive graphics programs	1. Identify and apply transformations to the Graphics Library 2. Implement model building in the Graphic Library program 3. Implementing an isometric cube in the Graphic Library program	**Criteria:** Cognitive Values, Character Values, and Psychomotor Values **Form of Assessment** : Participatory Activities	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practicum 3 X 50	Approach: Scientific Model: Problem-based learning Method: Discussion, Online Presentation 2 x 50	**Material:** Identify and apply 1. transformations in the Graphics Library, 2. building models in the Graphic Library program, and 3. isometric cubes in the Graphic Library program **Library:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	3%

8	Subsummative Exam / Midterm Exam	1. Subsummative Exam / Midterm Exam 2. Cognitive Values, Character Values, and Psychomotor Values	**Criteria:** 1. Subsummative Exam / Midterm Exam 2. Cognitive Values, Character Values, and Psychomotor Values **Form of Assessment** : Project Results Assessment / Product Assessment, Test	Subsummative Exam / Midterm Exam 2 X 50	Online Subsummative Exam / Midterm Exam 2 x 50	**Material:** All material that has been taught from meetings 1 to 7 **Reader:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	20%
9	Students can model shapes with Polygonal Meshes	1. Identifying Polyhedra 2. Identifying Extruded Shapes 3. Identifying Particle Systems 4. Implement Polygonal Meshes modeling in the Graphic Library program	**Criteria:** 1. Group assessment (30%) 2. Individual assessment (25 %) 3. Project assessment (25 %) 4. Report Assessment (20%) **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	1. Students observe the problem given by the lecturer, referring to the topic that has been agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50	**Material:** 1. identifying Polyhedra, 2. Extruded Shapes, 3. Particle Systems, and 4. Applying Polygonal Meshes modeling in the Graphic Library program **Library:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	3%

10	Students can implement 3D viewing	1. Identify and apply cameras 2. Identify and apply perspective projections of 3D objects 3. Identify and apply stereo view 4. Identify and apply a projection taxonomy	**Criteria:** 1. Group assessment (30%) 2. Individual assessment (25 %) 3. Assessment of projects undertaken (25%) 4. Report assessment (20 %) **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment, Practical Assessment, Practice / Performance	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50	**Material:** Identifying and applying 1. camera, 2. perspective projection of 3D objects, 3. stereo view, 4. projection taxonomy **References:** *Hills, Francis S Jr. 2000. Computer Graphics Using OpenGL, Second Edition. New Jersey: Prentice Hall.*	5%

11	Students are able to render faces in visual realism	1. Identify and apply shading models 2. Identify and apply flat shading and smooth shading 3. Identify and apply Adding hidden surface removal 4. Identify and apply texture to faces 5. Identify and apply shadows of objects	**Criteria:** 1. Group Assessment (30%) 2. Individual Assessment (25 %) 3. Project Appraisal (25%) 4. Report Assessment (20%) **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment, Practical Assessment	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed.	**Material:** Identifying and applying 1. shading models, 2. flat shading and smooth shading, 3. Adding hidden surface removal, 4. texture to faces, 5. shadows of objects **Library:** *Hills, Francis S Jr. 2000. Computer Graphics Using OpenGL, Second Edition. New Jersey: Prentice Hall.*	5%

12	Students are able to render faces in visual realism	1. Identify and apply shading models 2. Identify and apply flat shading and smooth shading 3. Identify and apply Adding hidden surface removal 4. Identify and apply texture to faces 5. Identify and apply shadows of objects	**Criteria:** 1. Group Assessment (30%) 2. Individual Assessment (25 %) 3. Assessment of projects undertaken (25%) 4. Report Assessment (20%) **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment, Practical Assessment, Practice / Performance	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50	**Material:** Identifying and applying 1. shading models, 2. flat shading and smooth shading, 3. Adding hidden surface removal, 4. texture to faces, 5. shadows of objects **Library:** *Hills, Francis S Jr. 2000. Computer Graphics Using OpenGL, Second Edition. New Jersey: Prentice Hall.*	5%

13	Students can use tools for raster displays	1. Identify and implement pixmaps manipulation processes 2. Identify and apply combinations of pixmaps 3. Identify and apply Bresenham's algorithm 4. Identify and apply define and fill regions of pixels 5. Identify and apply polygon filling 6. Identify and apply aliasing and anti-aliasing techniques	**Forms of Assessment** : Participatory Activities, Portfolio Assessment, Practical Assessment, Practical / Performance	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50	**Material:** Identifying and applying 1. process of manipulating pixmaps, 2. combination of pixmaps, 3. Bresenham algorithm, 4. define and fill region of pixels, 5. filling polygons, 6. aliasing and anti-aliasing techniques **Reference:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	5%

14	Students can use tools for raster displays	1. Identify and implement pixmaps manipulation processes 2. Identify and apply combinations of pixmaps 3. Identify and apply Bresenham's algorithm 4. Identify and apply define and fill regions of pixels 5. Identify and apply polygon filling 6. Identify and apply aliasing and anti-aliasing techniques	**Criteria:** 1. Group Value (30%) 2. Individual Value (25 %) 3. Project Value (25 %) 4. Report Value (20 %) **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment, Practice / Performance	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50	**Material:** Identifying and applying 1. process of manipulating pixmaps, 2. combination of pixmaps, 3. Bresenham algorithm, 4. define and fill region of pixels, 5. filling polygons, 6. aliasing and anti-aliasing techniques **Reference:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	5%

15	Students can implement curve and surface designs	1. Identify and apply interactive curve design 2. Identify and apply Beziercurve for curve design 3. Identify and apply the properties of Bezier curve 4. Identify and implement finding better blending function 5. Identify and apply B-spline basis functions 6. Identify and apply rationalsplines and NURPS curves	**Criteria:** 1. Group value (30 %) 2. Individual value (25 %) 3. Project value (25 %) 4. Report value (20 %) **Forms of Assessment** : Participatory Activities, Portfolio Assessment, Practical Assessment	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50	1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50	**Material:** Identifying and applying 1. interactive curve design, 2. Beziercurve for curve design, 3. properties of Bezier curve, 4. finding better blending function, 5. B-spline basis function, 4. rationalsplines and NURPS curves **Reference:** *Edward Angel . 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	5%
16	Summative Exam / Final Semester Exam	Summative Exam / Final Semester Exam	**Criteria:** 1. Summative Exam / Final Semester Exam 2. Portfolio value of all projects undertaken **Forms of Assessment** : Project Results Assessment / Product Assessment, Portfolio Assessment, Tests	Summative Exam / Final Exam Semester 2 X 50	Summative Exam / Final Semester Exam 2 x 50	**Material:** All projects that have been made are used as final projects for the course and presented. **Reader:** *Edward Angel. 2009. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition. Pearson International Inc.*	26%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	21.42%
2.	Project Results Assessment / Product Assessment	26.17%
3.	Portfolio Assessment	17.09%
4.	Practical Assessment	11.17%
5.	Practice / Performance	4.5%
6.	Test	18.67%
		99.02%

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.