



**Universitas Negeri Surabaya**  
**Faculty of Mathematics and Natural Sciences**  
**Undergraduate Chemistry Study Program**

Document  
Code

### SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
POLYFUNCTIONAL ORGANIC COMPOUNDS	4720103192	Compulsory Study Program Subjects	T=3	P=0	ECTS=4.77	3	July 18, 2023
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
	Dr. Ratih Dewi Saputri, M.Si		Prof. Dr. Suyatno, M.Si			Dr. Amaria, M.Si.	

<b>Learning model</b>	<b>Case Studies</b>
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**Program Learning Outcomes (PLO)** PLO study program that is charged to the course

Program Objectives (PO)	
PO - 1	Explain the structure, properties and uses of polyfunctional organic compounds
PO - 2	Explain the nomenclature, structure, properties and uses of polycyclic and heterocyclic aromatic compounds
PO - 3	Explain the nomenclature, structure, properties and uses of carbohydrates
PO - 4	Explain the nomenclature, structure, properties and uses of amino acids and proteins
PO - 5	Explain the nomenclature, structure, properties and uses of lipids
PO - 6	Explain the nomenclature, structure, properties and uses of biological organic compounds

**PLO-PO Matrix**

	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>P.O</td></tr> <tr><td>PO-1</td></tr> <tr><td>PO-2</td></tr> <tr><td>PO-3</td></tr> <tr><td>PO-4</td></tr> <tr><td>PO-5</td></tr> <tr><td>PO-6</td></tr> </table>	P.O	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6
P.O								
PO-1								
PO-2								
PO-3								
PO-4								
PO-5								
PO-6								

**PO Matrix at the end of each learning stage (Sub-PO)**

	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </tr> </thead> <tbody> <tr><td>PO-1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>PO-6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	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																	PO-5																	PO-6																
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<b>Short Course Description</b>	Study of polyfunctional organic compounds, polycyclic and heterocyclic aromatic hydrocarbons, carbohydrates, proteins, lipids and biological organic compounds.
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<b>References</b>	<b>Main :</b>
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<ol style="list-style-type: none"> <li>Solomon, T.W.G. &amp; Fryhle, C.B. (2011). Organic Chemistry. New York: John Wiley &amp; Sons, Inc</li> <li>Robert V. Hoffman, 2004, Organic Chemistry, an Intermediate Text, Second Edition, Canada, John Wiley and Sons. Inc. Publications</li> <li>Smith JG, 2011, Organic Chemistry, third edition, New York, Mc Graw-Hill Companies</li> <li>Fessenden, R.J. dan Fessenden, J.S. (1998). Kimia Organik. Jilid I dan 2. Penerjemah AH Pudjaatmaka. Jakarta: Erlangga.</li> <li>Hart, H., Craine, L.E. &amp; Hart, D.J. (2003). Kimia Organik. Suatu Kuliah Singkat. Edisi ke XI. Penerjemah: Achmadi, S.S., Jakarta: Erlangga</li> </ol>							
<b>Supporters:</b>							
<ol style="list-style-type: none"> <li>Carey, F.A. (2000). Organic Chemistry. 4rd Ed. New York: McGraw-Hill Companies, Inc.</li> <li>Artikel dalam jurnal ilmiah yang relevan dengan materi perkuliahan</li> <li>Robert V, Hoffman (2004). Organic Chemistry, an Intermediate Text, 2nd Ed, Canada: John Wiley and Sons, Inc</li> </ol>							
<b>Supporting lecturer</b>	Prof. Dr. Suyatno, M.Si. Prof. Dr. Tukiran, M.Si. Dr. Ratih Dewi Saputri, S.Si., M.Si. Nurina Rizka Ramadhania, S.Si. M.Si. Dr. First Ambar Wati, S.Si.						
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	<ol style="list-style-type: none"> <li>Understand the Polyfunctional Organic Chemistry lecture system</li> <li>Explain the structure, properties and uses of polyfunctional organic compounds</li> </ol>	<ol style="list-style-type: none"> <li>Explain the chemical reactions of dicarboxylic acids</li> <li>Explain the formation of lactones and lactides from hydroxy carboxylic acids</li> <li>Explain the decarboxylation reaction in oxocarboxylic acid</li> <li>Explain the Diels Alder reaction</li> </ol>	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer.</p> <p><b>Form of Assessment :</b> Participatory Activities, Tests</p>	<p>Lecture, question and answer, discussion, problem solving, case method 3x50 minutes</p>	<p>Lecture, question and answer, discussion, problem solving, case method 3x50 minutes</p>	<p><b>Material:</b> Dicarboxylic acids, hydroxy carboxylic acids, phenolic acids, keto carboxyl acids, dicarbonyl compounds, and diene compounds <b>References:</b> <i>Fessenden, RJ and Fessenden, JS (1998). Organic Chemistry. Volumes 1 and 2. Translator AH Pudjaatmaka. Jakarta: Erlangga.</i></p>	4%
2	Explain the structure, properties and uses of polyfunctional organic compounds	<ol style="list-style-type: none"> <li>Explain the chemical reactions of dicarboxylic acids</li> <li>Explain the formation of lactones and lactides from hydroxy carboxylic acids</li> <li>Explain the decarboxylation reaction in oxocarboxylic acid</li> <li>Explain the Diels Alder reaction</li> </ol>	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer.</p> <p><b>Form of Assessment :</b> Participatory Activities, Tests</p>	<p>Lecture, question and answer, discussion, problem solving, case method 3x50 minutes</p>	<p>Lecture, question and answer, discussion, problem solving, case method 3x50 minutes</p>	<p><b>Material:</b> Dicarboxylic acids, hydroxy carboxylic acids, phenolic acids, keto carboxyl acids, dicarbonyl compounds, and diene compounds <b>References:</b> <i>Fessenden, RJ and Fessenden, JS (1998). Organic Chemistry. Volumes 1 and 2. Translator AH Pudjaatmaka. Jakarta: Erlangga.</i></p>	4%

3	Explain the structure, nomenclature, and chemical properties of polycyclic and heterocyclic aromatic hydrocarbons	<ol style="list-style-type: none"> <li>1.Explain electrophilic substitution reactions in polycyclic hydrocarbon compounds</li> <li>2.Write examples of oxidation and reduction reactions in polycyclic aromatic hydrocarbon compounds</li> <li>3.Explain the basicity of heterocyclic aromatics and their solubility in water in relation to hydrogen bonds</li> <li>4.Explain electrophilic substitution reactions in heterocyclic aromatic hydrocarbon compounds</li> </ol>	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer.</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	<p><b>Material:</b> 1. Polycyclic aromatic hydrocarbons;2. Heterocyclic aromatic hydrocarbons <b>Bibliography:</b> 2. <i>Solomon, TWG &amp; Fryhle, CB (2011.). Organic Chemistry</i></p> <hr/> <p><b>Material:</b> substitution reactions <b>References:</b> 2. <i>Solomon, TWG &amp; Fryhle, CB (2011.). Organic Chemistry</i></p>	4%
4	Explain the structure, nomenclature, and chemical properties of polycyclic and heterocyclic aromatic hydrocarbons	<ol style="list-style-type: none"> <li>1.Explain electrophilic substitution reactions in polycyclic hydrocarbon compounds</li> <li>2.Write examples of oxidation and reduction reactions in polycyclic aromatic hydrocarbon compounds</li> <li>3.Explain the basicity of heterocyclic aromatics and their solubility in water in relation to hydrogen bonds</li> <li>4.Explain electrophilic substitution reactions in heterocyclic aromatic hydrocarbon compounds</li> </ol>	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer.</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	<p><b>Material:</b> 1. Polycyclic aromatic hydrocarbons;2. Heterocyclic aromatic hydrocarbons <b>Bibliography:</b> 2. <i>Solomon, TWG &amp; Fryhle, CB (2011.). Organic Chemistry</i></p> <hr/> <p><b>Material:</b> substitution reactions <b>References:</b> 2. <i>Solomon, TWG &amp; Fryhle, CB (2011.). Organic Chemistry</i></p> <hr/> <p><b>Material:</b> oxidation and reduction reactions <b>References:</b> 3. <i>Carey, FA (2000). Organic Chemistry</i></p>	4%
5	Understand the structure, nomenclature and chemical properties of carbohydrates	<ol style="list-style-type: none"> <li>1.1. Explain the structure of carbohydrates</li> <li>2.2. Explain the cyclization process in monosaccharides</li> <li>3.3. Explain the reactions that occur in carbohydrates</li> <li>4.4. Explain the role of carbohydrates for living things</li> </ol>	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer.</p> <p><b>Form of Assessment :</b> Participatory Activities, Tests</p>	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	Lecture, question and answer, discussion, problem solving, case method 3x50 min	<p><b>Material:</b> 1. Structure and nomenclature of carbohydrates; 2. Disaccharides; 3. Polysaccharides; 4. Carbohydrate reactions <b>References:</b> 4. <i>Brewster, RQ (1976.). Organic Chemistry</i></p>	4%

6	Understand the structure, nomenclature and chemical properties of carbohydrates	<ol style="list-style-type: none"> <li>1.1. Explain the structure of carbohydrates</li> <li>2.2. Explain the cyclization process in monosaccharides</li> <li>3.3. Explain the reactions that occur in carbohydrates</li> <li>4.4. Explain the role of carbohydrates for living things</li> </ol>	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer.</p> <p><b>Form of Assessment :</b> Participatory Activities, Tests</p>	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	<p><b>Material:</b> 1. Structure and nomenclature of carbohydrates; 2. Disaccharides; 3. Polysaccharides; 4. Carbohydrate reactions</p> <p><b>References:</b> 4. <i>Brewster, RQ (1976.). Organic Chemistry</i></p>	4%
7	Understand the structure, nomenclature and chemical properties of carbohydrates	<ol style="list-style-type: none"> <li>1.1. Explain the structure of carbohydrates</li> <li>2.2. Explain the cyclization process in monosaccharides</li> <li>3.3. Explain the reactions that occur in carbohydrates</li> <li>4.4. Explain the role of carbohydrates for living things</li> </ol>	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer.</p> <p><b>Form of Assessment :</b> Participatory Activities, Portfolio Assessment</p>	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	<p><b>Material:</b> 1. Structure and nomenclature of carbohydrates; 2. Disaccharides; 3. Polysaccharides; 4. Carbohydrate reactions</p> <p><b>References:</b> 4. <i>Brewster, RQ (1976.). Organic Chemistry</i></p> <hr/> <p><b>Material:</b> reactions that occur in carbohydrates <b>References:</b> 2. <i>Solomon, TWG &amp; Fryhle, CB (2011.). Organic Chemistry</i></p>	4%
8	Mid-Semester Exam to assess the achievement of Final Skills from TM 1 to 7	Based on the assessment rubric that has been created by the teaching lecturer.	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer.</p> <p><b>Form of Assessment :</b> Participatory Activities, Tests</p>	Students take the Mid-Semester Exam (UTS) for 100 minutes	Students take the Mid-Semester Exam (UTS) for 100 minutes	<p><b>Material:</b> material 1-7 <b>References:</b> <i>Solomon, TWG &amp; Fryhle, CB (2011). Organic Chemistry. New York: John Wiley &amp; Sons, Inc</i></p> <hr/> <p><b>Material:</b> material 1-7 <b>References:</b> 3. <i>Carey, FA (2000.). Organic Chemistry</i></p> <hr/> <p><b>Material:</b> material 1-7 <b>Bibliography:</b> <i>Robert V, Hoffman, 2004, Organic Chemistry, an Intermediate Text, Second Addition, Canada, John Wiley and Sons. Inc. Publications</i></p>	20%
9	Understand the structure, types and chemical properties of amino acids and proteins	<ol style="list-style-type: none"> <li>1.1. Explain the structure of amino acids</li> <li>2.2. Explain chemical reactions in amino acids</li> <li>3.3. Explain the reaction to form peptides</li> <li>4.4. Explain the structure and function of proteins</li> <li>5.5. Explain the process of protein denaturation</li> </ol>	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer..</p> <p><b>Form of Assessment :</b> Participatory Activities, Portfolio Assessment</p>	Lecture, question and answer, discussion, problem solving, case method 3 x 50 minutes	Lecture, question and answer, discussion, problem solving, case method 3 x 50 minutes	<p><b>Material:</b> amino acid reactions, peptide bonds and protein denaturation processes. <b>Reference:</b> <i>Robert V, Hoffman, 2004, Organic Chemistry, an Intermediate Text, Second Addition, Canada, John Wiley and Sons. Inc. Publications</i></p>	10%

10	Understand the structure, types and chemical properties of amino acids and proteins	<ol style="list-style-type: none"> <li>1.1. Explain the structure of amino acids</li> <li>2.2. Explain chemical reactions in amino acids</li> <li>3.3. Explain the reaction to form peptides</li> <li>4.4. Explain the structure and function of proteins</li> <li>5.5. Explain the process of protein denaturation</li> </ol>	<p><b>Criteria:</b> Based on the assessment rubric that has been created by the teaching lecturer.</p> <p><b>Forms of Assessment :</b> Participatory Activities, Portfolio Assessment, Tests</p>	Students solve the stunting problem by linking several fields of science that support problem solving 3 x 50 minutes	3x50 minutes	<p><b>Material:</b> amino acid reactions, peptide bonds and protein denaturation processes.</p> <p><b>Reference:</b> <i>Robert V, Hoffman, 2004, Organic Chemistry, an Intermediate Text, Second Addition, Canada, John Wiley and Sons. Inc. Publications</i></p>	10%
11	Understand the structure, nomenclature, chemical properties of lipids	<ol style="list-style-type: none"> <li>1.1. Explain the structure and function of lipids</li> <li>2.2. Explain the chemical reactions of lipids</li> <li>3.3. Explain the structure of steroids and their role as hormones</li> </ol>	<p><b>Criteria:</b> essay test 25% while summative and performance assessment 75%</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	Lecture, question and answer, discussion, problem solving, case method 3 x 50 minutes	Lecture, question and answer, discussion, problem solving, case method 3 x 50 minutes	<p><b>Material:</b> 1. Structure and function of lipids 1. Hydrogenation of vegetable oils 2. Saponification of oils and fats 3. Production of detergents 4. Phospholipids 5. Steroids</p> <p><b>References:</b> 4. <i>Brewster, RQ (1976. ). Organic Chemistry</i></p>	10%
12	Understand the structure, nomenclature, chemical properties of lipids	<ol style="list-style-type: none"> <li>1.1. Explain the structure and function of lipids</li> <li>2.2. Explain the chemical reactions of lipids</li> <li>3.3. Explain the structure of steroids and their role as hormones</li> </ol>	<p><b>Criteria:</b> essay test 25% while summative and performance assessment 75%</p> <p><b>Form of Assessment :</b> Participatory Activities, Tests</p>	case study regarding the application of steroids in everyday life, presentation, discussion 150	case study regarding the application of steroids in everyday life, presentation, discussion 150	<p><b>Material:</b> 1. Structure and function of lipids 1. Hydrogenation of vegetable oils 2. Saponification of oils and fats 3. Production of detergents 4. Phospholipids 5. Steroids</p> <p><b>References:</b> 4. <i>Brewster, RQ (1976. ). Organic Chemistry</i></p>	3%
13	Explain the bioactive compounds (secondary metabolites including terpenoids, steroids, flavonoids and alkaloids) of plants and state their benefits in the pharmaceutical industry	<ol style="list-style-type: none"> <li>1.1. Explain the types of bioactive compounds (secondary metabolites) from plants</li> <li>2.2. Name the types of plants native to Indonesia that have medicinal properties</li> </ol>	<p><b>Criteria:</b> essay test 25% while summative and performance assessment 75%</p> <p><b>Form of Assessment :</b> Participatory Activities, Portfolio Assessment</p>	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	<p><b>Material:</b> Discuss the content of bioactive compounds in Indonesian medicinal plants and their functions.</p> <p><b>Reference:</b> 3. <i>Carey, FA (2000.). Organic Chemistry</i></p> <p><b>Material:</b> plant bioactive compounds</p> <p><b>References:</b> <i>Solomon, TWG &amp; Fryhle, CB (2011). Organic Chemistry. New York: John Wiley &amp; Sons, Inc</i></p>	3%

14	Explain the bioactive compounds (secondary metabolites including terpenoids, steroids, flavonoids and alkaloids) of plants and state their benefits in the pharmaceutical industry	1.1. Explain the types of bioactive compounds (secondary metabolites) from plants 2.2. Name the types of plants native to Indonesia that have medicinal properties	<b>Criteria:</b> essay test 25% while summative and performance assessment 75%  <b>Forms of Assessment :</b> Participatory Activities, Portfolio Assessment, Tests	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	Lecture, question and answer, discussion, problem solving, case method 3x50 minutes	<b>Material:</b> Discuss the content of bioactive compounds in Indonesian medicinal plants and their functions. <b>Reference:</b> 3. Carey, FA (2000.). <i>Organic Chemistry</i>  <b>Material:</b> plant bioactive compounds <b>References:</b> Solomon, TWG & Fryhle, CB (2011). <i>Organic Chemistry</i> . New York: John Wiley & Sons, Inc	3%
15	Explain the bioactive compounds (secondary metabolites including terpenoids, steroids, flavonoids and alkaloids) of plants and state their benefits in the pharmaceutical industry	1.1. Explain the types of bioactive compounds (secondary metabolites) from plants 2.2. Name the types of plants native to Indonesia that have medicinal properties	<b>Criteria:</b> essay test 25% while summative and performance assessment 75%  <b>Form of Assessment :</b> Participatory Activities, Portfolio Assessment	Presentation, question and answer, discussion, problem solving, case method 3x50 minutes	Presentation, question and answer, discussion, problem solving, case method 3x50 minutes	<b>Material:</b> Discuss the content of bioactive compounds in Indonesian medicinal plants and their functions. <b>Reference:</b> 3. Carey, FA (2000.). <i>Organic Chemistry</i>  <b>Material:</b> plant bioactive compounds <b>References:</b> Solomon, TWG & Fryhle, CB (2011). <i>Organic Chemistry</i> . New York: John Wiley & Sons, Inc	3%
16	Students understand the concepts, attitudes and skills in Polyfunctional Organic Compounds MK from TM-9 to TM-15	Understand the concepts, landscape and skills in Polyfunctional Organic Compounds MK	<b>Criteria:</b> The final semester exam (UAS) is used to measure the achievement of the TM 9-15 indicators, through a written exam, and the results are given a weight of 3.  <b>Form of Assessment :</b> Participatory Activities, Tests	Final Semester Exam 100 minutes	Final Semester Exam 100 minutes	<b>Material:</b> Lecture material for weeks 9-15 <b>References:</b> 1. Hart, H., Craine, LE & Hart, DJ (2003.). <i>Organic Chemistry</i>  <b>Material:</b> Lecture material for weeks 9-15 <b>References:</b> 2. Solomon, TWG & Fryhle, CB (2011.). <i>Organic Chemistry</i>  <b>Material:</b> Lecture material for weeks 9-15 <b>References:</b> 3. Carey, FA (2000.). <i>Organic Chemistry</i>  <b>Material:</b> Lecture material for weeks 9-15 <b>References:</b> 4. Brewster, RQ (1976). <i>Organic Chemistry</i>	10%

#### Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	56.83%
2.	Portfolio Assessment	14.33%
3.	Test	28.83%
		99.99%

## 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.