

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

Document Code

SEMESTER LEARNING PLAN

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Courses				CODE		Course	amily		Cred	it Wei	gnt	SEMESTER	Compilation Date
Biochem	istry	Practicum		8420401246					T=1	P=0	ECTS=1.59	6	July 18, 2024
AUTHOR	RIZAT	ION		SP Developer				Course	Clus	ter Co	ordinator	Study Progr Coordinator	am
											Jtiya Azizah, .Pd.		
Learning model	I	Project Based L	earning	I									
Program		PLO study prog	gram w	/hich is charg	ed to the co	urse							
Learning Outcom		Program Objectives (PO)											
(PLO)		PLO-PO Matrix											
	P.O PO Matrix at the end of each learning stage (Sub-PO)												
		PO Matrix at the end of each learning stage (Sub-PO)											
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Short Course Descript	tion	Providing skills re well as testing fa questions and an	actors th	hat influence er									
Referen	ces	Main :											
		 Nelson D Boyer R,).L., and 2000. M	,Dasar-dasar Bi I Cox M.M., 200 Modern Experim kum Biokimia, 2	3,Lehninger F Iental Biochen	Principle of nistry. San	Biochen Franciso	co: Addis	son W	esley I	ongman	inconsin-Madis	ion
		Supporters:											
Support lecturer	upporting cturer Prof. Dr. Hj. Rudiana Agustini, M.Pd. Dr. Prima Retno Wikandari, M.Si. Prof. Dr. Nuniek Herdyastuti, M.Si. Mirwa Adiprahara Anggarani, S.Si., M.Si.												
Week-	eac sta			Eval	Evaluation			Help Learning, Learning methods, Student Assignments, [Estimated time]			ls, ents,	Learning materials [References	Assessment Weight (%)
		Ď-РО)	I	ndicator	Criteria &	Form		ine (ine)	0	nline	(online)]	
(1)		(2)		(3)	(4)		(!	5)		(6)	(7)	(8)

	Understand the basic principles of equipment used in practicum activities, basic skills for working in a Biochemistry laboratory, techniques for carrying out Biochemistry practicums and Biochemistry practicum rules	1. Explain the basics of Biochemistry practicum 2. Explain the basic principles of qualitative and quantitative testing in Biochemistry practicum Explain methods of data analysis and calculations	 Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (Assignment value x3) (UTS value x 2) UAS value (3) divided by 10 	Presentation, discussion and demonstration 3 X 50			0%
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	basic principles of practical activities for determining amino acids using the paper chromatography method and understand the basic principles of practical activities for determining blood glucose levels	princíples of paper chromatography. 2. Explain data analysis with paper chromatography; and 3. Explain the basic principles of isolating glucose in blood 4. Explain the method for analyzing blood glucose levels Explain data analysis using a UV-Vis Spectrophotometer	 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (Assignment value x 3) (UTS value (3) divided by 10 	Presentation, discussion and demonstration 3 X 50			
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	basic principles of practical activities that pH and enzyme concentration influence enzyme activity and Understand the basic principles of practical activities in determining protein using the Biuret method	1. Explain the basic principles of factors that influence enzyme activity. 2. Explain the analytical method for determining amylase enzyme activity in saliva. 3. Explain data analysis using a UV-Vis Spectrophotometer; and 4. Explain the basic principles of the Biuret method for determining protein levels. Explain the analysis of protein level data using a UV-Vis Spectrophotometer	 Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (Assignment value x3) (UTS value x 2) UAS value (3) divided by 10 	Presentation, discussion and demonstration 3 X 50			
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4	1. Able to	1. Skilled in	Critoria	Dractical		004
4	1. Able to determine the amino acids contained in the sample using paper chromatography; 2. Able to determine blood glucose levels using a UV- Vis spectrophotometer; 3. Able to prove that pH and enzyme concentration influence enzyme activity 4. Able to determine protein levels in samples using the Biuret method	 Skilled in carrying out paper chromatography using amino acid samples and analyzing the results; 2. Skilled in isolating glucose in the blood; Can analyze blood glucose levels using a UV-Vis spectrophotometer; 3. Skilled in using a UV-Vis Spectrophotometer to determine amylase enzyme activity, Can analyze the data obtained; Skilled in analyze the data obtained; Skilled in analyze the data obtained; Skilled in analyze the data obtained 	 Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (Assignment value x3) (UTS value x 2) UAS value (3) divided by 10 	Practical 3 X 50		0%

5	1. Able to	1. Skilled in	Criteria:	Practical		0%
5	1. Able to determine the amino acids contained in the sample using paper chromatography; 2. Able to determine blood glucose levels using a UV- Vis spectrophotometer; 3. Able to prove that pH and enzyme concentration influence enzyme activity 4. Able to determine protein levels in samples using the Biuret method	 Skilled in carrying out paper chromatography using amino acid samples and analyzing the results; 2. Skilled in isolating glucose in the blood; Can analyze blood glucose levels using a UV-Vis spectrophotometer; 3. Skilled in using a UV-Vis spectrophotometer to determine amylase enzyme activity, Can analyze the data obtained; Skilled in analyzing protein levels using the Biuret method; Skilled in using a UV-Vis spectrophotometer to determine protein levels; Can analyze the data obtained 	Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (UTS value x 2) UAS value (3) divided by 10	Practical 3 X 50		0%

6	1. Able to	1. Skilled in	Criteria:	Practical		0%
	determine the amino acids contained in the sample using paper chromatography; 2. Able to determine blood glucose levels using a UV- Vis spectrophotometer; 3. Able to prove that pH and enzyme concentration influence enzyme activity 4. Able to determine protein levels in samples using the Biuret method	carying out paper chromatography using amino acid samples and analyzing the results; 2. Skilled in isolating glucose in the blood; Can analyze blood glucose levels using a UV-Vis spectrophotometer; 3. Skilled in using a UV-Vis spectrophotometer to determine amylase enzyme activity, Can analyze the data obtained; Skilled in using a UV-Vis spectrophotometer to determine Biuret method; Skilled in using a UV-Vis spectrophotometer to determine protein levels; Can analyze the data obtained	 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (Assignment value x2) UAS value (3) divided by 10 	3 X 50		

7 1. Able to determine the amino acids contained in the sample using apper chromatography: 1. Skilled in gamino acid samples and apper 1. Participation during lectures and practical 9 Factical 1.1. Participation blood glucose blood glucose peetrophotometer, spectrophotometer using the Biuret method 2. Skilled in samples and analyzing a UV-Vis spectrophotometer, spectrophotometer blood glucose levels using the Biuret method Skilled in samples and analyzing a UV-Vis spectrophotometer, spectrophotometer bode determine protein levels using the Biuret method; Skilled in analyzing anytase obtained; Skilled in analyzing anytase spectrophotometer to determine protein levels using the Biuret method; Skilled in analyzing anytase obtained; Skilled in analyzing anytase spectrophotometer to determine protein levels using the Biuret method; Skilled in analyzing anytase spectrophotometer to determine protein levels using the Biuret method; Skilled in analyzing anytase spectrophotometer to determine protein levels using the Biuret method; Skilled in analyzing protein levels; Can analyze the data obtained 3. Stocured (3. Structured assessments and practical reports are achievement of indicators 12-19, through a written exam, and the results are given a weight of 5.	0.07
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chromatography: 2 Able to determine blood glucose levels using a UV- Vis spectrophotometer; 3. Able to prove that pH and enzyme activity 4. Able to determine protein levels in samples using the Biuret methodtrsus trsus trsus trsus spectrophotometer; 3. Skilled in analyzing anylase enzyme activity 4. Able to determine protein levels in samples using the Biuret methodthrough observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given averaged, then given a weight (3)display the bianetUV-Vis spectrophotometer to determine protein levels using a analyze the data obtained. Skilled in analyze the data obtained. Skilled in analyze the data obtained.through weighting (2) 3.3. Structured assessments assignment assessments and practical reports are averaged, then given a weight (3)(3)4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5.	l
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(participation	
value x2)	
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value x 2) UAS	
value (3) divided	
by 10	

8	UTS	Understand the basic principles of biochemistry practicum	 Criteria: Participation during lectures and practicums, carried out through observation (weight 2) Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) Sub-summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) Sub-summative tests or mid-semester exams (UTS) are carried out to assessments and practical reports are averaged, then given a weight (3) A.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. The final NA is (participation 	Presentation, discussion and demonstration 3 X 50		0%
			results are given a weight of 5. 5.The final NA is			

9	Understand the basic principles of practical activities in quantitative lipid testing; and Understand the basic principles of practical activities in vitamin C analysis	1. Explain the reactions accompanying quantitative tests on fatty acids. 2. Explain the determination of peroxide and free fatty acid numbers. 3. Explain the calculation of peroxide and free fatty acid numbers; and 4. Explain the determination of vitamin C levels in fresh fruit. 5. Explain the method for analyzing vitamin C levels	 Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (Assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 	Presentation, discussion and demonstration 3 X 50			0%
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10	Understand the basic principles of	1. Explain the basic principles of DNA	Criteria: 1.1. Participation	Presentation, discussion		0%
	practical activities on DNA isolation	isolation. 2. Explain the characterization	during lectures	and		
	and	of DNA using	and practicums,	demonstration		
	characterization	electrophoresis. 3.	carried out	3 X 50		
	from samples; and Understand and	Explain the analysis of data	through			
	independently	from DNA isolation	observation			
	design one of the	results; And 4.	(weight 2)			
	biochemistry	Designing a	2.2. Sub-			
	practicum courses that has been	practical method for determining amino	summative tests			
	presented	acid levels in	or mid-semester			
	previously using	samples 5.	exams (UTS) are carried out to			
	different methods.	Designing a practical method for	assess indicators			
		determining blood	1-11 through			
		glucose levels 6.	written exams,			
		Designing a practical method for	and are given			
		determining the	weighting (2)			
		effect of pH and	3.3. Structured			
		enzyme concentration on	assignment			
		enzyme activity 7.	assessments			
		Designing a	and practical			
		method for determining protein	reports are			
		levels using the	averaged, then			
		Biuret method 8.	given a weight			
		Designing a method quantitative	(3) 4.4. The final			
		lipid test practicum	semester exam			
		9. Designing a	(UAS) is used to			
		practicum method for vitamin C	measure			
		analysis 10.	achievement of			
		Designing a	indicators 12-19,			
		practicum method	through a written			
		for isolating and characterizing DNA	exam, and the			
		from samples	results are given			
		-	a weight of 5.			
			5.The final NA is			
			(participation			
			value x2)			
			(Assignment			
			value x 3) (UTS			
			value x 2) UAS			
			value (3) divided			
			by 10			
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11	Able to determine peroxide and free fatty acid numbers in quantitative lipid tests; Able to determine vitamin C levels in samples; Able to isolate and characterize DNA from samples; Able to design biochemical practical methods for material 1-7	1. Skilled in analyzing protein levels using the Biuret method 2. Can analyze the data obtained; and 3. Skilled in analyzing vitamin C levels in fresh fruit by titration. 4. Can analyze the data obtained; and 5. Skilled in isolating DNA from samples 6. Skilled in carrying out DNA electrophoresis 7. Able to determine the size of DNA based on electrophoresis results 8. Skilled in carrying out biochemistry practical material 1- 7 with your own design	 Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given 	Practical 3 X 50		0%
			achievement of indicators 12-19, through a written exam, and the			
			(participation value x2) (Assignment value x 3) (UTS value x 2) UAS value (3) divided by 10			

12	Able to determine	1. Skilled in	Criteria:	Practical		0%
	Able to determine peroxide and free fatty acid numbers in quantitative lipid tests; Able to determine vitamin C levels in samples; Able to isolate and characterize DNA from samples; Able to design biochemical practical methods for material 1-7	 1. Skilled in analyzing protein levels using the Biuret method 2. Can analyze the data obtained; and 3. Skilled in analyzing vitamin C levels in fresh fruit by titration. 4. Can analyze the data obtained; and 5. Skilled in isolating DNA from samples 6. Skilled in carrying out DNA electrophoresis 7. Able to determine the size of DNA based on electrophoresis results 8. Skilled in carrying out biochemistry practical material 1-7 with your own design 	 Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (Assignment value x3) (UTS value x 2) UAS value (3) divided by 10 	3 X 50		U%

13	Able to determine peroxide and free fatty acid numbers in quantitative lipid tests; Able to determine vitamin C levels in samples; Able to isolate and characterize DNA from samples; Able to design biochemical practical methods for material 1-7	1. Skilled in analyzing protein levels using the Biuret method 2. Can analyze the data obtained; and 3. Skilled in analyzing vitamin C levels in fresh fruit by titration. 4. Can analyze the data obtained; and 5. Skilled in isolating DNA from samples 6. Skilled in carrying out DNA electrophoresis 7. Able to determine the size of DNA based on electrophoresis results 8. Skilled in carrying out biochemistry practical material 1- 7 with your own design	Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4 The final	Practical 3 X 50		0%
		Able to determine the size of DNA based on electrophoresis results 8. Skilled in	1-11 through written exams, and are given weighting (2)			
		practical material 1- 7 with your own	assignment assessments and practical reports are			
			given a weight (3) 4.4. The final semester exam			
			(UAS) is used to measure achievement of indicators 12-19, through a written			
			exam, and the results are given a weight of 5. 5.The final NA is			
			(participation value x2) (Assignment value x 3) (UTS value x 2) UAS			
			value (3) divided by 10			

14	Able to determine peroxide and free fatty acid numbers in quantitative lipid tests; Able to determine vitamin C levels in samples; Able to isolate and characterize DNA from samples; Able to design biochemical practical methods for material 1-7	1. Skilled in analyzing protein levels using the Biuret method 2. Can analyze the data obtained; and 3. Skilled in analyzing vitamin C levels in fresh fruit by titration. 4. Can analyze the data obtained; and 5. Skilled in isolating DNA from samples 6. Skilled in isolating DNA from samples 6. Skilled in carrying out DNA electrophoresis 7. Able to determine the size of DNA based on electrophoresis results 8. Skilled in carrying out biochemistry practical material 1- 7 with your own design	Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (2)	Practical 3 X 50		0%
		the size of DNA based on electrophoresis results 8. Skilled in carrying out biochemistry practical material 1- 7 with your own	written exams, and are given weighting (2) 3.3. Structured assignment assessments			
		g.	reports are averaged, then given a weight (3) 4.4. The final semester exam			
			(UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given			
			a weight of 5. 5.The final NA is (participation value x2) (Assignment value x 3) (UTS value x 2) UAS value (3) divided by 10			

15	Able to determine amino acid levels in samples; Able to determine blood glucose levels; Able to understand the effect of pH and enzyme concentration on enzyme activity; Able to determine protein levels using the biuret method; Able to carry out quantitative lipid tests; Able to analyze vitamin C; Able to isolate and characterize DNA from samples	 Skilled in carrying out analysis to determine amino acid levels in samples; 2. Skilled in carrying out analysis to determine blood glucose levels; 3. Skilled in analyzing the effect of pH and enzyme concentration on enzyme activity; 4. Skilled in carrying out protein content analysis using the biuret method 5. Skilled in carrying out quantitative lipid test analysis; 6. Skilled in carrying out vitamin C analysis; 7. Skilled in isolating and characterizing DNA from samples 	 Criteria: 1.1. Participation during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (Assignment value x 3) (UTS value x 2) UAS value (3) divided by 10 	Presentation 3 X 50			0%
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16 UAS Understand the basic principles of biochemistry practicum Criteria: inclusion during lectures and mading lectures and practicus in and madination during lectures and practicus in through observation (weight 2) 2.2. Sub-summative tests or mid-semestre exams (UTS) are carried out to rough observation 1.11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practicual reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 1.2.19, through awritten exam, and the results are given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 1.2.19, through awritten exam, and the results are given a weight (3, 4.4. The final semester exam (UAS) is used to measure achievement of indicators 1.2.19, through awritten exam, and the results are given a weight (2, 3.5. The final semester exam (UAS) is used to measure achievement of indicators 1.2.19, through awritten exam, and the results are given a weight (2, 3.5. The final NA is (participation value x2) (ASS) (UTS)							
value x 2) UAS	16	UAS	biochemistry	during lectures and practicums, carried out through observation (weight 2) 2.2. Sub- summative tests or mid-semester exams (UTS) are carried out to assess indicators 1-11 through written exams, and are given weighting (2) 3.3. Structured assignment assessments and practical reports are averaged, then given a weight (3) 4.4. The final semester exam (UAS) is used to measure achievement of indicators 12-19, through a written exam, and the results are given a weight of 5. 5. The final NA is (participation value x2) (Assignment value x3) (UTS	and demonstration		0%
				value x 2) UAS value (3) divided			

Evaluation Percentage Recap: Project Based Learning
No Evaluation Percentage
0%

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.