



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

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date																																																
Waste Management	8420502192		T=2 P=0 ECTS=3.18	7	July 18, 2024																																																
AUTHORIZATION	SP Developer		Course Cluster Coordinator		Study Program Coordinator																																																
		Dr. Rinie Pratiwi Puspitawati, M.Si.																																																
Learning model	Project Based Learning																																																				
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																				
	Program Objectives (PO)																																																				
	PLO-PO Matrix																																																				
		<table border="1" style="margin: auto;"> <tr><td style="width: 50px; height: 20px;">P.O</td></tr> </table>					P.O																																														
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	<table border="1" style="margin: auto;"> <tr><th colspan="16">PO Matrix at the end of each learning stage (Sub-PO)</th></tr> <tr> <td rowspan="2" style="width: 50px; height: 20px;">P.O</td> <th colspan="15">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> </table>					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
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Short Course Description	Study of waste management which includes basic regulations, types of waste, both solid, liquid and gas produced from human activities on a household, regional and industrial scale. How to manage solid and liquid waste in an environmentally friendly manner and process waste using the principles of Reuse, Reduse and Recycle (3R). Learning is delivered in the form of theoretical and practical studies.																																																				
References	Main :																																																				
	<ol style="list-style-type: none"> 1. Brown,D.P., 2015. "Garbage: How Population, Landmass, and Development Interact with Culture in the Production of Waste". In <i>Resources, Conservation and Recycling</i> :41–54. 2. Destry,E., dan Purnaweni, H., dan Syafrudin, S., 2015. "Evaluasi Keberlanjutan Teknologi Dimensi Biopori Manajemen Penyerapan Lubang Untuk Konservasi Air Tanah Di Kota Semarang". Dalam <i>Jurnalllmu Tanah dan Agroklimatologi</i> , hal.1-9, 2015 3. Fitrihidajati, H., Isnawati, Ratnasari, Evie.2013. Fermentasi Eceng Gondok Sebagai Pakan Ternak Ruminansia. Laporan Penelitian Hibah Bersaing . LPPM UNESA 4. Hénault-Ethier, L., dan Martin, Jean-Philippe, dan Housset, J. 2017. "A Dynamic Model for Organic Waste Management in Quebec (D-MOWIQ) as a Tool to Review Environmental, Societal and Economic Perspectives of a Waste Management Policy". In <i>Waste Management</i> :1-14 5. Makinde, Olayinka John, 2015. "Maggot Meal: A Sustainable Protein Source for Livestock Production-A Review". In <i>Advances in Life Science and Technology</i> 31: 35-41 6. Raghav, Safaa M., dan El Meguid, Ahmed M. Abd, dan Hegazi,Hala A.,2013. "Treatment of Leachate from Municipal Solid Waste Landfill". In <i>Housing and Building National Research Center</i>: 187-192. 7. Rouf, M.A, Islam, M.S., Rabeya, T., Mondal, A.K., Khanam, M., Samadder, P.R., and Ara, Y..2016.Biogas from slaughter house waste and optimization of the process. <i>Bangladesh J. Sci. Ind. Res.</i> 51(3) , 203-214, 2016 8. Shams, Shahriar, Sahu, J.N., Rahman, Shamimur,S.M., Ahsan, Amimul, 2017. "Sustainable Waste Management Policy in Bangladesh for Reduction of Greenhouse Gas". In <i>Sustainable Cities and Society</i> :1-30. 9. Song, Qingbin, dan Li Jinhui, dan Zeng, Xianlai, 2014. "Minimizing the Increasing Solid Waste through Zero Waste Strategy". In <i>Cleaner Production</i>: 1-12. 10. . Tcobanoglous, G., Kreith, F., 2002. <i>Handbook of Solid Waste Management</i>. New York: McGraw Hill Publishing Company, New York 11. . UU 32/2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup 12. . UU nomor 18 tahun 2008 tentang Sistem Pengolahan Sampah 13. . Winarsih dan Fitrihidajati, Herlina,2018. <i>Buku Ajar Mahasiswa : Pengelolaan Limbah</i> . Surabaya : University Press 																																																				
	Supporters:																																																				

Supporting lecturer		Dra. Herlina Fitrihidajati, M.Si. Dra. Winarsih, M.Kes.					
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 can understand the basis, definition, types and properties of waste	<ul style="list-style-type: none"> · Understand laws and regulations as a basis for waste management · Explain the definition of waste · Determine the type of waste (liquid, solid/garbage, nature of waste) · Explain how waste is processed. Produces recycled production 	Criteria: <ol style="list-style-type: none"> 1.Essay questions are assessed together at USS 2.Multiple choice questions are assessed jointly on the US 3.Performance questions are integrated during learning 	Lectures, Discussions 2 X 50			0%
2	Students are able to make decisions based on observations about campus waste	Students can observe environmental conditions at Unesa (Ketintang and Lidah campuses) based on the UI Greenmetric instrument	Criteria: <ol style="list-style-type: none"> 1.Essay questions are assessed together at USS 2.Multiple choice questions are assessed jointly on the US 3.Performance questions are integrated during learning 	Lectures, discussions, observations, interviews 2 X 50			0%
3	Students are skilled at processing wet waste	Students are able to explain 4 ways to process wet waste. Students can process waste in one of the 4 existing ways	Criteria: <ol style="list-style-type: none"> 1.Essay questions are assessed together at USS 2.Multiple choice questions are assessed jointly on the US 3.Performance questions are integrated during learning 	Lecture, Practical Discussion (group investigation) 2 X 50			0%
4	Students are able to make decisions based on observations of environmental conditions in the Jambangan residential area	Students observe environmental conditions in the Jambangan residential area based on the Proklam instrument of the Ministry of Environment and Forestry/KLHK	Criteria: <ol style="list-style-type: none"> 1.Essay questions are assessed together at USS 2.Multiple choice questions are assessed jointly on the US 3.Performance questions are integrated during learning 	Observation Interview Discussion 2 X 50			0%
5	Students master theoretical concepts in the field of waste management, especially waste management and are able to formulate procedures for solving waste (garbage) problems	Students present the results of field study observations on campus. Students present the results of field study observations in residential areas. Students present the results of article reviews	Criteria: <ol style="list-style-type: none"> 1.Essay questions are assessed together at USS 2.Multiple choice questions are assessed jointly on the US 3.Performance questions are integrated during learning 	Presentation and discussion 2 X 50			0%

6	Students are able to solve waste problems based on science and technology	Students are able to observe the physical and environmental conditions of wet waste processing. Students are able to make reports on the results of wet waste processing	Criteria: 1.Essay questions are assessed together at USS 2. Multiple choice questions are assessed jointly on the US 3. Performance questions are integrated during learning	Observation, Discussion, Practicum 2 X 50			0%
7	Students create recycling works	Students are able to present the results of processing wet waste. Students show the results of their dry waste recycling work	Criteria: 1. Essay questions are assessed together at USS 2. Multiple choice questions are assessed jointly on the US 3. Performance questions are integrated during learning	Presentation and discussion 2 X 50 product display			0%
8	UTS	UTS	Criteria: UTS	UTS 2 X 50			0%
9	Students are skilled at processing water hyacinth waste	Students explain the reasons for processing water hyacinth into animal feed. Students explain the principles of fermentation in processing water hyacinth weeds into animal feed. Students are able to independently prepare material tools to process water hyacinth into animal feed through fermentation. Students are able to process water hyacinth into animal feed through fermentation. Student able to make a report about the results of water hyacinth fermentation. Students are able to communicate the results of making water hyacinth fermentation	Criteria: 1. Essay questions are assessed together at USS 2. Multiple choice questions are assessed jointly on the US 3. Performance questions are integrated during learning	Lectures, Discussions, Assignments, Observations, Preparing 2 X 50 product display presentation reports			0%

10	Students are skilled at processing water hyacinth waste	Students explain the reasons for processing water hyacinth into animal feed. Students explain the principles of fermentation in processing water hyacinth weeds into animal feed. Students are able to independently prepare material tools to process water hyacinth into animal feed through fermentation. Students are able to process water hyacinth into animal feed through fermentation. Student able to make a report about the results of water hyacinth fermentation. Students are able to communicate the results of making water hyacinth fermentation	Criteria: 1.Essay questions are assessed together at USS 2. Multiple choice questions are assessed jointly on the US 3. Performance questions are integrated during learning	Lectures, Discussions, Assignments, Observations, Preparing 2 X 50 product display presentation reports			0%
11	Students are skilled at processing water hyacinth waste	Students explain the reasons for processing water hyacinth into animal feed. Students explain the principles of fermentation in processing water hyacinth weeds into animal feed. Students are able to independently prepare material tools to process water hyacinth into animal feed through fermentation. Students are able to process water hyacinth into animal feed through fermentation. Student able to make a report about the results of water hyacinth fermentation. Students are able to communicate the results of making water hyacinth fermentation	Criteria: 1.Essay questions are assessed together at USS 2. Multiple choice questions are assessed jointly on the US 3. Performance questions are integrated during learning	Lectures, Discussions, Assignments, Observations, Preparing 2 X 50 product display presentation reports			0%
12	Students observe household-scale liquid waste processing installations	Students observe liquid waste processing installations/IPAL in people's homes	Criteria: 1.Essay questions are assessed together at USS 2. Multiple choice questions are assessed jointly on the US 3. Performance questions are integrated during learning	Discussion 2 X 50			0%

13	Students observe "Tahu" Home Industry liquid waste	Students observe the home industry liquid waste disposal system "Tahu" Students are able to identify the home industry liquid waste disposal system Students are able to make a report about home industry liquid waste disposal tofu	Criteria: 1.Essay questions are assessed together at USS 2.Multiple choice questions are assessed jointly on the US 3.Performance questions are integrated during learning	Observation, Discussion 2 X 50			0%
14	Students conduct field studies on Waste Management in the Rungkut industry (SEER)	Students observe waste management installations. Students are able to make reports on observations of waste management installations at PT SIER	Criteria: 1.Essay questions are assessed together at USS 2.Multiple choice questions are assessed jointly on the US 3.Performance questions are integrated during learning	Lecture Discussion Discussion 2 X 50			0%
15	Students are able to communicate the results of waste management at PT SIER	Students are able to present reports on the results of field studies on waste management at PT SIER	Criteria: 1.Essay questions are assessed together at USS 2.Multiple choice questions are assessed jointly on the US 3.Performance questions are integrated during learning	Discussion Presentation 2 X 50			0%
16	Final exams		Form of Assessment : Project Results Assessment / Product Assessment, Test				0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
		0%

Notes

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Forms of assessment:** test and non-test.
- 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.
- 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.
- Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 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%.
- TM=Face to face, PT=Structured assignments, BM=Independent study.

