



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

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date																																	
Application Ecology	1234502007	Compulsory Study Program Subjects	T=2	P=0	ECTS=4.48	1	October 20, 2023																																	
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator																																		
	Dr. Tarzan Purnomo, M.Kes.		Prof. Dr. Fida Rachmadiarti, M.Kes.			Prof. Dr. Yuliani, M.Si.																																		
Learning model	Project Based Learning																																							
Program Learning Outcomes (PLO)	PLO study program which is charged to the course																																							
	PLO-9	Able to manage learning and solve problems in the field of Biology education by developing an innovative model (HOTS or TPACK) characterized by eduecopreneurship based on local wisdom.																																						
	Program Objectives (PO)																																							
	PLO-PO Matrix																																							
		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">P.O</td> <td style="padding: 5px;">PLO-9</td> </tr> </table>		P.O	PLO-9																																			
P.O	PLO-9																																							
PO Matrix at the end of each learning stage (Sub-PO)																																								
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td rowspan="2" style="padding: 5px;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="padding: 5px;">1</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;">3</td> <td style="padding: 5px;">4</td> <td style="padding: 5px;">5</td> <td style="padding: 5px;">6</td> <td style="padding: 5px;">7</td> <td style="padding: 5px;">8</td> <td style="padding: 5px;">9</td> <td style="padding: 5px;">10</td> <td style="padding: 5px;">11</td> <td style="padding: 5px;">12</td> <td style="padding: 5px;">13</td> <td style="padding: 5px;">14</td> <td style="padding: 5px;">15</td> <td style="padding: 5px;">16</td> </tr> </table>	P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16						
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																								
Short Course Description	This course examines the application of ecological concepts to urban, rural and industrial environments based on local wisdom, by highlighting various solutions to environmental problems in these areas. Global environmental problems are also the subject of study which includes how the ecological crisis, environmental change, pollution, ecotoxicology, bioremediation and globalization of environmental damage occur. This course is presented in theory and assignments.																																							
References	Main :																																							
	<ol style="list-style-type: none"> 1. Anonim. 1990. Undang-undang No:5 tentang Konservasi Sumber Daya Alam. Jakarta. 2. Anonim. 2009. Undang-undang No: 32 tahun 2009 tentang Pengelolaan Lingkungan Hidup. Jakarta. 3. Edward I, Newman. 2007. Applied Ecology and Enviromental Management. England: Blackwell Publishing. 4. Guy R, McPheron and Stephen DeStefano. 2013. Applied Ecology and Natura Resourche Management. Cambridge University Press. 5. Luciano M Verdade, Maria Carolina Lyra-Jorge, Carlos I Piña (eds.). 2014. Ecology and Applied Environmental Science. CRC Press. 6. Sven E Jørgensen, Liu Xu, Robert Costanza. 2010. Handbook of Ecological Indicators for Assessment of Ecosystem Health, Second Edition (Applied Ecology and Environmental Management) [2 ed]. Taylor & Francis. 																																							
	Supporters:																																							
	1. https://www.scientific.net/AST.128.83																																							
Supporting lecturer	Prof. Dr. Fida Rachmadiarti, M.Kes. Dr. Tarzan Purnomo, M.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	Understand various ecological theories and principles and their application in solving environmental problems in urban areas based on local wisdom	<ol style="list-style-type: none"> 1.Analyze environmental problems in urban areas and their impacts. 2.Describe the causes of environmental problems in urban areas 3.Provide examples of the application of ecological theory and principles in solving environmental problems in urban areas based on local wisdom 	Form of Assessment : Project Results Assessment / Product Assessment	Discuss material on ecological theories and principles and their application in urban ecology based on PPT and source books (1 x 50 minutes) Visit the website for online lectures Chat regarding the nature of urban ecological theory Give feedback regarding the nature of urban ecological theory (1 x 50 minutes) Phase 1. Students observe phenomena in real life (Amount of domestic/organic waste) Phase 2. Students determine basic questions (Causes of large piles of domestic/organic waste) Phase 3. Students design project plans (Management of domestic waste into organic fertilizer) 2 X 50			0%
2	Understand various ecological theories and principles and their application in solving environmental problems in rural areas based on local wisdom	<ol style="list-style-type: none"> 1.Analyzing environmental problems in rural areas and their impacts. 2.Describe the causes of environmental problems in rural areas 3.Provide examples of the application of ecological theory and principles in solving environmental problems in rural areas based on local wisdom 		Discussing material on ecological theories and principles and their application in rural ecology based on PPT and source books (1 x 50 minutes) Visiting the website for online lectures Presentation and discussion of concepts in rural ecological theory Giving responses between students (2 x 50 minutes) Phase 4. Students prepare schedule and carry out project activities (Manufacture of organic fertilizer from organic waste) 2 X 50			0%
3	Understand various ecological theories and principles and their application in solving environmental problems in industrial areas based on local wisdom	<ol style="list-style-type: none"> 1.Analyze environmental problems in industrial areas and their impacts. 2.Describe the causes of environmental problems in industrial areas 3.Provide examples of the application of ecological theory and principles in solving environmental problems in industrial areas based on local wisdom 	Form of Assessment : Project Results Assessment / Product Assessment	Discussing material on ecological theories and principles and their application in industrial ecology based on PPT and source books (1 x 50 minutes) Visiting the website for online lectures Presentation and discussion of industrial ecology concepts (1 x 50 minutes) 2 X 50			0%
4	Skilled in applying ecological theories and principles for sustainable urban environmental management through the recommendations he makes.	Provide examples of the application of ecological theories and principles in sustainable urban environmental management		Applying ecological theory and principles for sustainable urban environmental management (2 x 50 minutes) Visiting the web for online lectures Presentation and discussion of urban ecology application concepts (1 x 50 minutes) Phase 5. Lecturer monitors project implementation (Manufacture of organic fertilizer) 2 50			0%
5	Skilled in applying ecological theories and principles for sustainable rural environmental management through the recommendations he makes.	Provide examples of the application of ecological theory and principles in sustainable rural environmental management		Applying ecological theory and principles for sustainable rural environmental management (2 x 50 minutes) Visiting the web for online lectures Presentation and discussion of rural ecological application concepts (1 x 50 minutes) 2 X 50			0%

6	Skilled in applying ecological theories and principles for sustainable industrial environmental management through the recommendations he makes.	Provide examples of the application of ecological theory and principles in sustainable industrial environmental management		Applying ecological theory and principles for sustainable industrial environmental management (2 x 50 minutes) Visiting the web for online lectures Presentation and discussion of industrial ecology application concepts (1 x 50 minutes) Phase 6. Testing project results (Analysis of nutrient content in organic fertilizer produced) 2 X 50			0%
7	Understand various ecological theories and principles and their application in solving global environmental problems and the ecological crisis	<ol style="list-style-type: none"> 1. Analyze environmental problems globally 2. Describe the factors that cause global environmental problems 3. Provide examples of the application of ecological theories and principles in solving global environmental problems 	Form of Assessment : Project Results Assessment / Product Assessment	<p>Discussing material on ecological theories and principles and their application in solving global environmental problems based on PPT and source books (1 x 50 minutes) Visiting the website for online lectures Presentation on concepts of global environmental problems based on reference books Discussion and questions and answers (2 x 50 minutes)</p> <p>Phase 7. Evaluation of experience and presentation of results (Presentation explaining the advantages of the organic fertilizer produced) 2 X 50</p>			0%
8	Midterm exam			2 X 50			0%
9	Understand various ecological theories and principles and their application in solving global environmental problems and the ecological crisis	<ol style="list-style-type: none"> 1. Describe the factors causing the ecological crisis 2. Provide examples of the application of ecological theories and principles in solving the ecological crisis 		<p>Discussing material on ecological theories and principles and their application in solving ecological crisis problems based on PPT and source books (1 x 50 minutes) Visiting the website for online lectures Presenting examples of learning strategies that can be used in solving ecological crisis problems based on reference books (1 x 50 minutes) 2 X 50</p>			0%
10	Understand various theories and principles of ecotoxicology and their application in bioremediation	<ol style="list-style-type: none"> 1. Explain the principles of ecotoxicology 2. Explain the principles of bioremediation 3. Describe and give examples of how to apply ecotoxicological principles in the bioremediation process 		<p>Discuss material on the theory and principles of ecotoxicology and its application in bioremediation based on PPT and source books (1 x 50 minutes) Visit the website for online lectures Discuss material on Principles of ecotoxicology Communicate/present the application of ecotoxicology in bioremediation based on PPT and reference books (2 x 50 minutes) 2 X 50</p>			0%
11	Understand various ecological theories and principles and their application in mitigating the impacts of climate change	<ol style="list-style-type: none"> 1. Provide examples of environmental problems that arise due to the impacts of climate change 2. Describe the factors that cause climate change 3. Provide examples of the application of ecological theory and principles in solving environmental problems due to climate change 		<p>Simulating the impact of climate change Discussing the factors that cause climate change and their application in overcoming it based on PPT and source books (1 x 50 minutes) Visiting websites for online lectures Discussing material on the causes of climate change based on PPT and reference books (2 x 50 minutes) 2 X 50</p>			0%

12	Understand ecological theories and their application in overcoming the impacts of air pollution	<ol style="list-style-type: none"> 1. Provide examples of environmental problems that arise due to the impact of air pollution 2. Describe the factors that cause environmental problems due to air pollution 3. Provide examples of the application of ecological theory and principles in solving environmental problems due to air pollution 		<p>Communicate/present air pollution concepts Discuss material on ecological theory and principles and their application in solving air pollution problems based on PPT and source books (1 x 50 minutes)</p> <p>Visit the website for online lectures Presentation and discussion of student-made biology worksheets (1 x 50 minutes)</p> <p>2 X 50</p>			0%
13	Understand ecological theories and their application in overcoming the impacts of water pollution	<ol style="list-style-type: none"> 1. Provide examples of environmental problems that arise due to the impact of water pollution 2. Describe the factors that cause environmental problems due to water pollution 3. Provide examples of the application of ecological theory and principles in solving environmental problems due to water pollution 		<p>Communicate/present water pollution concepts Discuss material on ecological theory and principles and their application in solving water pollution problems based on PPT and source books (1 x 50 minutes) Visit the website for online lectures Presentation and discussion on water pollution (1 x 50 minutes)</p> <p>2 X 50</p>			0%
14	Understand ecological theories and their application in overcoming the impacts of land pollution	<ol style="list-style-type: none"> 1. Provide examples of environmental problems that arise due to the impact of land pollution 2. Describe the factors that cause environmental problems due to soil pollution 3. Provide examples of the application of ecological theory and principles in solving environmental problems resulting from land pollution 		<p>Communicating/presenting land pollution concepts Discussing material on ecological theories and principles and their application in solving land pollution problems based on PPT and source books (1 x 50 minutes) Visiting the website for online lectures Discussion on land pollution theory (1 x 50 minutes)</p> <p>2 X 50</p>			0%
15	Skilled in applying ecological theory and principles for sustainable environmental management through the recommendations he makes.	Provide examples of the application of ecological theory and principles in sustainable environmental management		<p>Communicate/present environmental management concepts Discuss material on ecological theory and principles and their application in sustainable environmental management based on PPT and source books (1 x 50 minutes) Visiting the website for online lectures Communicating/presenting environmental management methods based on reference books Observing environmental management learning videos • Carrying out reflection after watching the video • Have a responsible attitude according to ethics in applying ecological principles for sustainable environmental development (2x50 minutes)</p> <p>2 X 50</p>			0%
16	Final exams			2 X 50			0%

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.