



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

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date
Bioexploration	4620102023		T=2 P=0 ECTS=3.18	6	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	Dr. H. Sunu Kuntjoro, S.Si., M.Si.

Learning model	Project Based Learning
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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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	PO Matrix at the end of each learning stage (Sub-PO)																																	
	<table border="1" style="margin: auto;"> <tr> <td rowspan="2" style="width: 30px; height: 20px;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="width: 20px;">1</td> <td style="width: 20px;">2</td> <td style="width: 20px;">3</td> <td style="width: 20px;">4</td> <td style="width: 20px;">5</td> <td style="width: 20px;">6</td> <td style="width: 20px;">7</td> <td style="width: 20px;">8</td> <td style="width: 20px;">9</td> <td style="width: 20px;">10</td> <td style="width: 20px;">11</td> <td style="width: 20px;">12</td> <td style="width: 20px;">13</td> <td style="width: 20px;">14</td> <td style="width: 20px;">15</td> <td style="width: 20px;">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	Bioexploration is the study of biological materials (animals, plantae, fungi, protista and monera), as bioenergy, bioprocess, biomining, bioreactors, bioplastics. Bioexploration is studied to increase the body of knowledge and develop and utilize it for human benefit with an environmental perspective. This course is presented with presentations, discussions and assignments.
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References	Main : <ol style="list-style-type: none"> 1. Clarke, K.B. 2014. Bioproses Engineering .Woodlead Publishing 2. Laque, R., Campelo, J., Clark J. 2016. Handbook of Biofuels Production (Process and Technologic). Woodhead Publishing Series in Energy. 3. Rawling, D.E, Johnsons, D.B. 2006. Biomining 1st Edition . Kindle Edition. Berlin: Springer Berlin Heidelberg 4. Sawyer, D.T, Martell, A.E. 1992. Waste Minimazion in industrial Process and Remediation of Hazardolics Waste . London: Plenum Press. 5. Seadi,TA., D. Rutz, H. Praok, M. Kottners, T. Firtirwalder, S. Volk, R. Jansen. 2008. Biogas Handbook . University of Southern Denmark Esbjerg, Niels Bohrg. Vol 9-10. 6. Pilla, Sri Kanth. 2011. Handbook of Bioplastics and Biocomposits Engineering . Canada: Serivener Publishing
	Supporters:

Supporting lecturer	Prof. Dr. Fida Rachmadiarti, M.Kes. Prof. Dr. Yuliani, M.Si. Guntur Trimulyono, S.Si., M.Sc.
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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 the use of organisms as a substitute for fuel/Bioenergy-Briquettes independently and honestly	1.Explain the meaning of bioenergy 2.Explain the mechanism for producing briquettes	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
2	Understand the use of organisms as a substitute for fuel / Bioenergy-Biogas independently and honestly	1.Explain the meaning of biogas 2.Explain the mechanism for producing biogas	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
3	Understand the use of organisms as a substitute for fuel / Bioenergy-Biofuel independently and honestly	1.Explain the meaning of biofuel 2.Explain the mechanism for producing biofuel	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
4	Understand the use of organisms as a substitute for fuel / bioenergy-solar cells independently and honestly	1.Explain the meaning of solar cells 2.Explain the mechanism for producing solar cells	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
5	Understand the use of organisms as a substitute for fuel / bioenergy-solar cells independently and honestly	1.Explain the meaning of solar cells 2.Explain the mechanism for producing solar cells	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
6	Analyzing the use of plants in bioprocesses	Analyzing the use of plants in bioprocesses	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%

7	Analyzing the use of animals in bioprocesses	Analyzing the use of animals in bioprocesses	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
8	USS meeting materials 1 to 7	Meeting indicators 1 to 7	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Meetings 1 to 7 2 X 50			0%
9	Understanding the biomining mechanisms of plants	1.Explain the meaning of biomining 2.Explain the biomining mechanism of plants	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
10	Understanding biomining mechanisms based on microbial applications	Explains the biomining mechanism based on microbial applications	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
11	Linking the bioreactor process with ecosystem restoration	1.Explain the meaning of a bioreactor 2.Explain the bioreactor mechanism	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
12	Understand the mechanism for producing secondary metabolites through bioreactors	Explain the mechanism for producing secondary metabolites from plants	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%

13	Understanding the mechanisms of bioplastics from plants and microbes	Explain the mechanism of bioplastics from plants and animals	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
14	Presenting work resulting from assignments in seminar forums	1.Create scientific papers from various assignment projects 2.Skilled in making presentations	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
15	Presenting work resulting from assignments in seminar forums	1.Create scientific papers from various assignment projects 2.Skilled in making presentations	Criteria: 1.Tasks with a weight of 30% 2.USS/UTS weight 20% 3.Student activities and responses during learning activities are assessed as participation, weight 20% 4.US weight 30%	Presentations, discussions and assignments 2 X 50			0%
16							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.

