



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																																		
Soil Biotechnology	4620103200		T=2 P=1 ECTS=4.77	5	July 17, 2024																																		
AUTHORIZATION	SP Developer		Course Cluster Coordinator		Study Program Coordinator																																		
		Dr. H. Sunu Kuntjoro, S.Si., M.Si.																																		
Learning model	Case Studies																																						
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: 100px; 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 style="width: 50px; height: 20px;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td></td> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>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 studies the scope of biotechnology in animals, microorganism biotechnology, plant biotechnology and the use of biotechnology in various fields of life through discussions, presentations and project assignments to plan and carry out various biotechnology practices as the implementation of concepts related to biotechnology based on ecopreneurship.																																						
References	Main :																																						
	<ol style="list-style-type: none"> 1. Referensi : Clark, D.P., & Pazdernik, N.J. 2012. Biotechnology . USA: APCell Press. 2. Freshney. 2000. Animal Cell Culture. New York: Academic Press. 3. Gamborg, OI and Wetter RI. 1975. Culture Method . Canada: National Research Council 4. George, E.F. & Sherrington PD. 1984. Plant Propagation by Tissue Culture . England: Exegetis Limited 5. Gordon Ian. 2004. Reproductive Technology in Farm Animal . CABI Publishing. London. 6. Ratnasari, E. & Isnawati. 2011. Handout Bioteknologi. Surabaya: Jurusan Biologi FMIPA UNESA 7. Smith J.F. 2009. Biotechnology. New York: Cambridge University Press 8. Smith, J. E. 2011. Biotechnology. 5th Edition. Cambridge, UK: Cambridge University Press.3. 9. Thieman, W.J., and M.A.Palladino. 2012. Introduction to Biotechnology. San FranciscoUSA.: Pearson Education, Inc . 10. Thomes, D.T; B.E. Ellys; P.M. Harley; K.J. Kasha and R.I. Peterson. 1982. Application of Plant Cell and Tissue Culture in Agriculture and Industry. Canada: The University of Galeph. 																																						
	Supporters:																																						
Supporting lecturer	Dr. Nur Ducha, S.Si., 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 the basic principles of biotechnology	<p>a. Explain the meaning of biotechnology b. Explain the relationship between science and the aspects that must be present in biotechnology c. Comparing traditional and modern biotechnology in animals d. Demonstrate an independent and honest attitude in conducting questions and answers and discussions e. Planning a biotechnology product based on ecopreneurship</p>	<p>Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%</p>	Discussion and Question and Answer 2 X 50			0%
2	Understand the scope of microbial biotechnology	<p>1. Describe the scope of conventional microbial biotechnology 2. Describe the scope of modern microbial biotechnology 3. Compare conventional and modern microbial biotechnology 4. Demonstrate an honest and independent attitude in creating a resume of the differences between conventional and modern microbial biotechnology</p>	<p>Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%</p>	Discussion and assignment 2 X 50			0%
3	Understanding microbial biotechnology in the food sector	<p>1. Explain the scope of microbial biotechnology in the food sector. 2. Skilled in planning various fermented food/beverage products using local natural materials based on ecopreneurship. 3. Skilled in making various fermented food and beverage products using local natural ingredients based on ecopreneurship. 4. Comparing conventional and modern microbial biotechnology in the food sector. Demonstrating an honest and independent attitude in making reports on the results of making fermented food and beverage products in the form of research articles.</p>	<p>Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%</p>	Discussion, practicum and assignment 2 X 50			0%

4	Understanding microbial biotechnology in the health sector	1. Explain the basic principles of using microbes to produce human health products. 2. Describe how to increase the efficiency of microbial work in producing human health products. 3. Develop a scheme for the stages of vaccine production. 4. Demonstrate an honest and independent attitude in carrying out the task of writing a paper related to examples of health products produced by microbes that have been used in everyday life	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Discussion and assignment 2 X 50			0%
5	Understanding the use of microbial biotechnology in the environmental field	. Describe the working principles of microbes in cleaning pollutants in the environment 2. Describe how to increase the efficiency of microbial work in cleaning pollutants in the environment 3. Compare conventional and modern microbial biotechnology 4. Demonstrate an honest and independent attitude in carrying out the task of writing a paper related to examples of microbes that have been used in cleaning various types of pollutants in the environment	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Discussion and assignment 2 X 50			0%
6	Understand the basic principles of plant biotechnology and plant protoplast fusion	a. Explain the development of plant biotechnology. b. Develop a plan for making plant biotechnology products using local natural materials based on ecopreneurship. c. Explain the principles and methods of protoplast isolation techniques	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Discussion, demonstration 2 X 50			0%

7	Understand secondary metabolites and methods of producing them	a. Explain the meaning of secondary metabolites b. Mention examples of secondary metabolites c. Explain how to produce secondary metabolites in vitro d. Explain the factors that influence the production of secondary metabolites e. Explain the meaning of biotransformation and its relationship with plant tissue culture. Demonstrate an honest and independent attitude in compiling a summary of secondary metabolites	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Discussion, demonstration, practicum 2 X 50			0%
8	Meetings 1-7	Meetings 1-7	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Midterm Exam 2 X 50			0%
9	Understanding biotransformation and VCO	a. Explain the meaning of biotransformation and its relationship to plant tissue culture b. Explain the benefits and manufacture of virgin coconut oil c. Explain the method of making VCO d. Skilled in making VCO from a mixture of coconut milk and local natural ingredients based on ecopreneurship.	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Discussion, demonstration, practicum 2 X 50			0%

10	Understanding haploid plants and anther culture	a. Explain the meaning of haploid plants b. Explain how haploid plants are formed c. Explain the method of making anther culture. Analyze the factors that influence anther culture	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Discussion, demonstration, practicum 2 X 50			0%
11	Understand the method of making anther culture	a. Calculating the right chemicals according to the required media composition b. Explain the procedures for sterilization, isolation and inoculation of anther culture c. Analyze the factors that influence anther culture	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Discussion, demonstration, practicum 2 X 50			0%
12	Understand the scope of animal biotechnology and spermatozoa storage technology	a. Describe the scope of animal biotechnology b. Analyze the factors that influence animal culture c. Make a table of components that must be present in cement thinning media and their benefits d. Comparing spermatozoa storage techniques at 4-5°C and freezing temperatures e. Assuming damage occurs to spermatozoa stored at low temperatures f. Skilled in making cement thinning media using local natural ingredients based on ecopreneurship. g. Demonstrate an honest and independent attitude in observing spermatozoa during storage at low temperatures and compiling reports.	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Questions and answers Discussion 2 X 50			0%

13	Understand Artificial Insemination technology	a. Describe the meaning of Artificial Insemination (AI) technology b. Create a historical scheme for the development of IB in the world c. Determine the advantages/benefits of implementing AI for animals and humans d. Develop a scheme for IB implementation stages e. Demonstrate an independent and honest attitude in conducting questions and answers and discussions	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Questions and answers, Discussion, Project assignments 2 X 50			0%
14	Understand in vitro fertilization (IVF) and cloning technology	a. Explain the main reasons for applying IVF technology to humans and animals b. Develop a scheme of stages in IVF or cloning technology c. Comparing the differences between IVF and cloning technology d. Demonstrate an independent and honest attitude in carrying out discussions related to IVF technology and cloning	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Ask Java Discussion 2 X 50			0%
15	Understand transgenic technology and the formation of monoclonal antibodies	a. Explain transgenic methods in animals b. Give examples of transgenic animals c. Determine the benefits of developing transgenic animals for humans. Make a scheme of the stages of the monoclonal antibody technology method	Criteria: 1.1. Practical papers and reports, including 30% practical value 2.2. Activeness in discussions and presentations, including 20% participation value 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20% 4.4. UAS questions are material from the 9th to 15th meeting, UAS score is 30%	Questions and answers Discussion 2 X 50			0%
16							0%

Evaluation Percentage Recap: Case Study

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.