	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
Microbiology	8420503164		T=3	P=0	ECTS=4.77	3	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**

Program Learning Outcomes (PLO)

PLO study program that is charged to the course

PLO-8	Able to make decisions based on data/information in order to complete tasks as part of his responsibilities in the work he has done
PLO-11	Able to demonstrate knowledge of biology at the molecular, cell and organism levels and their interactions with the environment

Program Objectives (PO)

PO - 1	Comprehend the history and development of Microbiology

PLO-PO Matrix

P.O	PLO-8	PLO-11
PO-1		

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
PO-1																

Short Course Description	This course discusses the scope, history, and development of microbiology, the fundamentals of microbial chemistry, laboratory techniques, microbial classification, prokaryotic (bacteria and blue algae) and eukaryotic (fungi and protozoa) cell structures, the microbial growth and reproduction, the control of microbial growth, microbial metabolism, microbial genetics, the basis of virology, the basis of mycology, and the role of microbes in the various fields.

References

Main :

1. Meliah, S. 2017. Brock. Biology of Microorganisms Vol 1 Edisi 14.(terjemah). EGC.
2. Astuti, R.I. 2018. Brock. Biology of Microorganisms Vol 2 Edisi 14.(terjemah). EGC.
3. Parsaulian, L.R. 2018. Brock. Biology of Microorganisms Vol 3 Edisi 14.(terjemah). EGC.
4. Suhendry, T. 2018. Brock. Biology of Microorganisms Vol 3 Edisi 14.(terjemah). EGC.Ibrahim, M. 2008. Mikrobiologi: Prinsip dan Aplikasi. Surabaya: University Press.
5. Asri, M.T., Trimulyono, G. dan Lisdiana, L. 2019. Petunjuk Praktikum Mikrobiologi Dasar dan Terapan. Surabaya

Supporters:

Supporting lecturer	Prof. Dr. Mahanani Tri Asri, M.Si. Guntur Trimulyono, S.Si., M.Sc. Lisa Lisdiana, S.Si., M.Si., Ph.D. Dr. Pramita Yakub, S.Pd., M.Pd. Farah Aisyah Nafidiastri, 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	Comprehend the history and development of Microbiology	1. Describes the history and development of Microbiology 2. Identify the role of Microbiology in daily life	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation, discussion Practical work 3 X 50			0%
2	Classifying microbes in a particular taxon according to the description of its characteristics	1. Describes the principles of microbial classification 2. Determine microbes taxon according to its characteristics	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation, Discussion and reflection 3 X 50			0%

3	Distinguishing the cell structure of prokaryotes and eukaryotes	Comparing the cell structure of prokaryotes and eukaryotes	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation, discussion, demonstration and practice 3 X 50			0%
4	Comprehend the growth and reproduction of microbes	1. Grouping microbes based on their nutritional requirements 2. Determine culture media for particular microbes 3. Mastering cultivation techniques of microbes in the laboratory	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation, discussion and practice 3 X 50			0%

5	Comprehend the growth and reproduction of microbes	Identify growth phases of microbes	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation, discussion and reflection 3 X 50			0%
6	Comprehend the control of microbial growth	1. Define control of microbial growth 2. Define control of microbial growth	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation and discussion 3 X 50			0%

7	Comprehend the control of microbial growth	1. Describes the principles of controlling microbial growth control 2. Identify the example of controlling microbial growth physically and chemically	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation and discussion 3 X 50			0%
8			**Criteria:** US weight 30%	3 X 50			0%
9	Comprehend the microbial metabolism	1. Define microbial metabolism 2. Identify type of metabolism 3. Describe metabolic characteristics 4. Describe the role of enzymes in	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation and discussion 3 X 50			0%

10	Comprehend the microbial metabolism	1. Describe details on metabolic pathways 2. Describe biosynthesis process	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation and discussion 3 X 50			0%
11	Comprehend the principles of microbial genetics	1. Define genes, chromosomes, and genomes 2. Comparing DNA and RNA structures 3. Describe central dogma 4. Describe gene transfer in microbes	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation and discussion 3 X 50			0%

12	Comprehend the principles of microbial genetics	1. Differentiate the transcription unit in eukaryotes and prokaryotes 2. Define operon structure, types, and function 3. Describe the regulatory mechanism of gene expression in microbes	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation and discussion 3 X 50			0%
13	Describes the general characteristics of the virus, the classification, and the process of viral infection in the host	1. Identify the structure of viruses 2. Classify viruses based on their particular characteristics 3. Describes the life cycle of viruses 4. Describe the viral infection mechanism 5. Determine the role of viruses in daily life	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation, discussion and reflection 3 X 50			0%

14	Describe the general characteristics of viruses and the process of viral infection in the host	1. Describe the structure of fungi 2. Describes the role of fungi in various fields	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	Presentation and discussion and practice 3 X 50			0%
15	Understand the principles of Applied Microbiology	1. 1. Classifying fungi in a particular taxon according to the description of its characteristics 2. 2. Describe characteristics of fungal division	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Presentations and discussions; Student project (PJBL): step 10: presentation of student project results 3 X 50	Presentation and discussion 3x50		0%

16			**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% 2. USS weight 20% 3. Students' activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 4. US weight 30% 5. Essay questions are assessed together at USS 6. Multiple choice questions are assessed jointly on the US 7. Performance questions are integrated during learning	3 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** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities 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.