	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
Ecotoxicology	8420502086		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

	P.O

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

Short Course Description: Study the scope of ecotoxicology through understanding the basic concepts of ecotoxicology, which include the classification of toxic materials, dynamics of toxicants in the environment, mechanisms of toxicants in organisms, toxicant testing procedures, and problems and solutions to ecotoxicological problems in the environment. Learning is delivered in theoretical studies, discussions and presentations, as well as practicums.

References

Main :

1. 1. Fitrihidajati, H. dan Rachmadiarti, F. 2017. *Ekotoksikologi* . Surabay: Unesa University Press.
2. Frank C. Lu. 2006. *Basic Toxicology* **.** Washington: Hemisphere Publishing Corporation.
3. Koesnoputranto, H. 2005 **.** *Toksikologi Lingkungan* **.** Jakarta : FKM dan PPSML UI.
4. Mukono, H. J. 2006. *Toksikologi Lingkungan* . Surabaya : Airlangga University Press.
5. Rachmadiarti, F. Dan Trimulyono, G.. 2016. Pemetaan Asam Amino dan Rhizobakteri Semanggi dan Kiambang yang terpapar logam Pb. Surabaya: LPPM Unesa.
6. Sembel, Dantje T. , 2015. *Toksikologi Lingkungan* **.** Yogyakarta : Andi Press.
7. Siwiendrayanti, Arum, Eram Tunggul Pawenang dan Evi Widowati. 2016. Toksikologi. Semarang : Cipta Prima Nusantara.
8. Soemirat, Juli dan Herto Dwi Ariesyadi, 2015. *Toksikologi Lingkungan* . Yogyakarta : UGM Press.
9. Walker, C.H, R.M. Sibly, S.P.Hopkin, D.B. Peakall. 2015. *Principles of Ecotoxicology* **.** London : CRC Press.

Supporters:

Supporting lecturer: Dra. Herlina Fitrihidajati, M.Si.
Prof. Dr. Fida Rachmadiarti, 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	Understand the basic principles of ecotoxicology	1. Explain the basis of ecotoxicology 2. Explain the meaning of ecotoxicology 3. Explain terms in ecotoxicology 4. Explain the dose-response relationship	**Criteria:** 1.Practical reports and products are assessed as ASSIGNMENTS with weight 2.30% 3.USS weight 20% 4.Student activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 5.US weight 30%	Discussion, presentation, demonstration 3 X 50			0%
2	Understand the classification of toxic materials in the environment	Classifying toxic materials in the environment Toxic materials in the environment Explaining the grouping of toxic materials in the environment Explaining the impact of each type of toxic material in the environment	**Criteria:** 1.Practical reports and products are assessed as ASSIGNMENTS with weight 2.30% 3.USS weight 20% 4.Student activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 5.US weight 30%	Discussion, Presentation Demonstration 2 X 50			0%
3	Understanding the dynamics of toxic materials in the environment	Identify the factors that cause toxic materials to be in the environment. Explain the mechanisms for the spread of toxic materials in the environment	**Criteria:** 1.Practical reports and products are assessed as ASSIGNMENTS with weight 2.30% 3.USS weight 20% 4.Student activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 5.US weight 30% 6.Essay questions are assessed together at USS 7.Multiple choice questions are assessed jointly on the US 8.Performance questions are integrated during learning	Discussion and presentation 2 X 50			0%

4	Understand the mechanisms of toxic substances in the body of organisms	Describe the concepts of absorption, distribution and excretion of toxicants. Explain the mechanism of distribution of toxic materials in the body of organisms. Explains information about toxic effects	**Criteria:** 1.Practical reports and products are assessed as ASSIGNMENTS with weight 2.30% 3.USS weight 20% 4.Student activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 5.US weight 30% 6.Essay questions are assessed together at USS 7.Multiple choice questions are assessed jointly on the US 8.Performance questions are integrated during learning	Discussion and presentation 2 X 50			0%
5	Understand the factors that influence the level of poisoning and toxic effects		**Criteria:** 1.Practical reports and products are assessed as ASSIGNMENTS with weight 2.30% 3.USS weight 20% 4.Student activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 5.US weight 30% 6.Essay questions are assessed together at USS 7.Multiple choice questions are assessed jointly on the US 8.Performance questions are integrated during learning	Discussion, lecture 2 X 50			0%
6	Understand the stages and designs in testing procedures in toxicity tests	1. Identify the stages in the testing procedure 2. Explain the stages in the toxicity test testing procedure 3. Plan the preparation of the acclimatization stage toxicity test independently 4. Skilled in planning the orientation, preliminary and experimental stage toxicity test design independently. 5. Skilled in carrying out toxicity tests at the orientation, preliminary and experimental stages honestly	**Criteria:** 1.Practical reports and products are assessed as ASSIGNMENTS with weight 2.30% 3.USS weight 20% 4.Student activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 5.US weight 30% 6.Essay questions are assessed together at USS 7.Multiple choice questions are assessed jointly on the US 8.Performance questions are integrated during learning	Demonstration, Discussion and Presentation i 3 X 50			0%

7	Make reports on the results of toxicity test activities	1. Write reports on the results of toxicity testing activities which include problem formulation, objectives, data presentation, data analysis and drawing honest conclusions 2. Skilled in communicating reports on the results of toxicity test activities independently	**Criteria:** Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. - on US Performance questions are integrated during learning	Discussion, presentation 2 X 50			0%
8	UTS	UTS	**Criteria:** UTS	UTS 2 X 50			0%
9	Explain various diseases as a toxic effect on organisms	1. Compare various types of diseases as a result of the effects of toxicants on organisms. 2. Analyze the mechanism of disease caused by toxicants. 3. Conclude the relationship between toxicants and disorders in organisms. Presentation	**Criteria:** Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. - on US Performance questions are integrated during learning	Presentation, discussion 2 X 50			0%
10	Explain the various target organs in organisms as a result of toxicants	1. Compare the differences between target organs and target toxicants 2. Analyze the relationship between toxicants and target organs 3. Communicate the process of toxicant effects on target organs	**Criteria:** Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. - on US Performance questions are integrated during learning	Presentation, discussion 2 X 50			0%
11	Understand the impact of toxicity through risk assessment	1. Identify the stages in risk assessment 2. Compare the stages in risk assessment 3. Summarize the stages in risk assessment 4. Conduct honest experiments on toxic substances, for example metals, pesticides on an organism, for example plants or animals	**Criteria:** Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%USS weight 20%Students' activities and responses during learning activities, especially practicums, are assessed as participation, weight 20%US weight 30%Essay questions are assessed jointly on USSMultiple choice questions are assessed jointly - on US Performance questions are integrated during learning	Experiments, Presentations and discussions 3 X 50			0%

12	Understanding the toxicity of pesticides to organisms and the environment..	1. Describe the toxicity of pesticides in the environment independently 2. Analyze the role of pesticides in the environment 3. Conclude the role of pesticides in the environment 4. Communicate the toxicity of pesticides	**Criteria:** Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%USS weight 20%Students' activities and responses during learning activities, especially practicums, are assessed as participation, weight 20%US weight 30%Essay questions are assessed jointly on USSMultiple choice questions are assessed jointly - on US Performance questions are integrated during learning	Presentation and discussion 2 X 50			0%
13	Understanding metal toxicity	1. Describe the role of metals in the environment based on literature 2. Analyze the toxicity of metals in the environment 3. Inferring metal toxicity 4. Communicates metal toxicity	**Criteria:** Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. - on US Performance questions are integrated during learning	Presentation, discussion 3 X 50			0%
14	Explain the stages in toxicological evaluation.	1. Identify the stages in a toxicological evaluation 2. Compare the specifications of each stage in a toxicological evaluation 3. Summarize the stages in the toxicological evaluation procedure	**Criteria:** Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. - on US Performance questions are integrated during learning	Presentation and discussion, Practice 3 X 50			0%
15	Communicating Project Research Results 1..	Presents information on experimental results	**Criteria:** 1. Practical reports and products are assessed as ASSIGNMENTS with weight 2. 30% 3. USS weight 20% 4. Student activities and responses during learning activities, especially practicums, are assessed as participation, with a weight of 20% 5. US weight 30% 6. Essay questions are assessed together at USS 7. Multiple choice questions are assessed jointly on the US 8. Performance questions are integrated during learning	Presentation and discussion 3 X 50			0%
16							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.