	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
Plant Morphogenesis	4620102136		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**
Program Learning Outcomes (PLO)	**PLO study program which 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	This course discusses the development of plant organ structures, the structure and dynamics of shoot apex, embryogenesis, factors that influence morphogenesis in plants, morphogenetic factors, and abnormal growth in plants. This course is presented through discussions and simple observation and research assignments utilizing the latest information technology, which is based on the surrounding morphogenesis phenomena and relevant research results. At the end of the lecture, students master knowledge related to the concept of plant morphogenesis while also having relevant problem solving skills.
References	**Main :**

1. Ashraf, M., Ozturk, M., Ahmad, M.S.A. 2010. Plant Adaptation and Phytoremediation . New York: Springer.
2. Cutler, D.F., Botha, C.E.J., Stevenson, D.W. 2007. Plant Anatomy An Applied Approach . Australia: Blackwell Publishing.
3. Kader, J. and Delseny, M. 2010. Botanical Research, Volume 55 . London: Elsevier Ltd.
4. Steeve, T.A. and Sussex, I.M. 1994. Pattern in Plant Development . New York: Cambridge University Press

	Supporters:
Supporting lecturer	Dr. Rinie Pratiwi Puspitawati, M.Si. Ahmad Bashri, S.Pd., 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 and communicate cell division and meristem development patterns related to physiological and genetic factors. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain cell division 2. Explain the pattern of meristem development. 3. Explain the relationship between morphogenesis and the physiological factors that influence it. 4. Explain the relationship between morphogenesis and the genetic factors that influence it. 5. Communicate the results of studies on factors that influence morphogenesis 6. Be present on time according to the lecture schedule 7. Collect assignments on time. Actively express opinions during discussions and presentations	**Criteria:** 1. Assessment is based on benchmarks (PAP). 2. The assessment components consist of sub-summative, assignment, summative and participation scores. 3. Participation assessment is an assessment of attitudes. 4. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Participatory Activities	Discussion of cell division and meristem behavior in plant development. Study articles about morphogenesis related to various factors that influence implementing the 2 X 50 literacy strategy			5%
2	Understand and communicate cell division and meristem development patterns related to physiological and genetic factors. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain cell division 2. Explain the pattern of meristem development. 3. Explain the relationship between morphogenesis and the physiological factors that influence it. 4. Explain the relationship between morphogenesis and the genetic factors that influence it. 5. Communicate the results of studies on factors that influence morphogenesis 6. Be present on time according to the lecture schedule 7. Collect assignments on time. Actively express opinions during discussions and presentations	**Criteria:** 1. Assessment is based on benchmarks (PAP). 2. The assessment components consist of sub-summative, assignment, summative and participation scores. 3. Participation assessment is an assessment of attitudes. 4. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practices / Performance	Discussion of cell division and meristem behavior in plant development. Study articles about morphogenesis related to various factors that influence implementing the 2 X 50 literacy strategy			10%

3	Understand and communicate polarity in plant development patterns. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain the polarity of external structures 2. Explain the polarity of internal structures 3. Explain the relationship between polarity and plant development patterns. 4. Communicate the results of studies on polarity and plant development patterns. 5. Be present on time according to the lecture schedule 6. Collect assignments on time. Actively express opinions during discussions and presentations	**Criteria:** 1. Assessment is based on benchmarks (PAP). 2. The assessment components consist of sub-summative, assignment, summative and participation scores. 3. Participation assessment is an assessment of attitudes. 4. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Discussion about polarity and patterns of plant development. Review articles about polarity in plant development by implementing literacy strategies. 2 X 50			5%
4	Understand and communicate polarity in plant development patterns. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain the polarity of external structures 2. Explain the polarity of internal structures 3. Explain the relationship between polarity and plant development patterns. 4. Communicate the results of studies on polarity and plant development patterns. 5. Be present on time according to the lecture schedule 6. Collect assignments on time. Actively express opinions during discussions and presentations	**Criteria:** 1. Assessment is based on benchmarks (PAP). 2. The assessment components consist of sub-summative, assignment, summative and participation scores. 3. Participation assessment is an assessment of attitudes. 4. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion about polarity and patterns of plant development. Review articles about polarity in plant development by implementing literacy strategies. 2 X 50			5%

5	Understand and communicate the concept of symmetry in growth. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explaining symmetry in growth. 2. Explain symmetry related to plant shape. 3. Be present on time according to the lecture schedule 4. Collect assignments on time 5. Actively express opinions during discussions and presentations	**Criteria:** 1. Assessment is based on benchmarks (PAP). 2. The assessment components consist of sub-summative, assignment, summative and participation scores. 3. Participation assessment is an assessment of attitudes. 4. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion of symmetry in 2 X 50 growth			5%
6	Understand and communicate the concept of differentiation in growth. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain differentiation in plant growth. 2. Explains the ontogeny of differentiation related to environmental conditions. 3. Explain the concept of differentiation without growth. 4. Communicate the results of studies on differentiation related to environmental conditions and physiological factors. 5. Be present on time according to the lecture schedule 6. Collect assignments on time 7. Actively express opinions during discussions and presentations	**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion about differentiation in growth. Review of articles about differentiation related to environmental conditions and physiological factors by implementing literacy strategies. 2 X 50			5%

7	Understand and communicate the concept of differentiation in growth. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain differentiation in plant growth. 2. Explains the ontogeny of differentiation related to environmental conditions. 3. Explain the concept of differentiation without growth. 4. Communicate the results of studies on differentiation related to environmental conditions and physiological factors. 5. Be present on time according to the lecture schedule 6. Collect assignments on time 7. Actively express opinions during discussions and presentations	**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion about differentiation in growth. Review of articles about differentiation related to environmental conditions and physiological factors by implementing literacy strategies. 2 X 50			5%
8			**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Participatory Activities, Tests	2 X 50			10%
9	Understand and communicate the concept of regeneration in plants. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain about regeneration in plant growth. 2. Explain the comparison of regeneration between non-vascular plants and vascular plants. 3. Communicate the results of studies on reproductive regeneration. 4. Be present on time according to the lecture schedule 5. Collect assignments on time 6. Actively express opinions during discussions and presentations	**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion about regeneration in growth. Review of articles about reproductive regeneration by implementing literacy strategies. 2 X 50			5%

10	Understand and communicate the concept of regeneration in plants. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain about regeneration in plant growth. 2. Explain the comparison of regeneration between non-vascular plants and vascular plants. 3. Communicate the results of studies on reproductive regeneration. 4. Be present on time according to the lecture schedule 5. Collect assignments on time 6. Actively express opinions during discussions and presentations	**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion about regeneration in growth. Review of articles about reproductive regeneration by implementing literacy strategies. 2 X 50			5%
11	Understand and communicate morphogenesis due to the influence of light and water. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain the effect of light on morphogenesis 2. Explain the effect of water on morphogenesis 3. Communicate the results of studies on the influence of light and water on morphogenesis. 4. Be present on time according to the lecture schedule 5. Collect assignments on time 6. Actively express opinions during discussions and presentations	**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion about the influence of light and water on morphogenesis. Study of articles on the influence of light and water on morphogenesis by implementing literacy strategies. 2 X 50			5%
12	Understand and communicate morphogenesis due to the influence of light and water. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain the effect of light on morphogenesis 2. Explain the effect of water on morphogenesis 3. Communicate the results of studies on the influence of light and water on morphogenesis. 4. Be present on time according to the lecture schedule 5. Collect assignments on time 6. Actively express opinions during discussions and presentations	**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion about the influence of light and water on morphogenesis. Study of articles on the influence of light and water on morphogenesis by implementing literacy strategies. 2 X 50			5%

13	Understand and communicate the influence of temperature, chemical compounds and growth regulators on morphogenesis. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain the effect of temperature on morphogenesis. 2. Explain the effect of chemical compounds on morphogenesis. 3. Communicate the results of studies on the effect of growth regulators on morphogenesis. 4. Be present on time according to the lecture schedule 5. Collect assignments on time 6. Actively express opinions during discussions and presentations	**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion of the effect of temperature, chemical compounds and growth regulators on morphogenesis. Review of articles on the effect of temperature, chemical compounds and growth regulators on morphogenesis. by implementing literacy strategies. 2 X 50			5%
14	Understand and communicate the influence of temperature, chemical compounds and growth regulators on morphogenesis. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain the effect of temperature on morphogenesis. 2. Explain the effect of chemical compounds on morphogenesis. 3. Communicate the results of studies on the effect of growth regulators on morphogenesis. 4. Be present on time according to the lecture schedule 5. Collect assignments on time 6. Actively express opinions during discussions and presentations	**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Project Results Assessment / Product Assessment	Discussion of the effect of temperature, chemical compounds and growth regulators on morphogenesis. Review of articles on the effect of temperature, chemical compounds and growth regulators on morphogenesis. by implementing literacy strategies. 2 X 50			5%
15	Understand and communicate the influence of temperature, chemical compounds and growth regulators on morphogenesis. Have a responsible, independent and honest attitude towards performance in plant morphogenesis	1. Explain the effect of temperature on morphogenesis. 2. Explain the effect of chemical compounds on morphogenesis. 3. Communicate the results of studies on the effect of growth regulators on morphogenesis. 4. Be present on time according to the lecture schedule 5. Collect assignments on time 6. Actively express opinions during discussions and presentations	**Criteria:** Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation grades. Participation assessment is an assessment of attitudes. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade **Form of Assessment** : Participatory Activities	Discussion of the effect of temperature, chemical compounds and growth regulators on morphogenesis. Review of articles on the effect of temperature, chemical compounds and growth regulators on morphogenesis. by implementing literacy strategies. 2 X 50			10%
16			**Form of Assessment** : Participatory Activities				10%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	35.83%
2.	Project Results Assessment / Product Assessment	55.83%
3.	Practice / Performance	3.33%
4.	Test	5%
		99.99%

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.