



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

# **SEMESTER LEARNING PLAN**

Courses			CODE	Course Family		Cred	lit We	ight	SEMESTER	Compilation Date	
Plant Structu	re and Developm	ent	8420504226	Compulsory Stu Program Subject		T=4	P=0	ECTS=6.36	3	April 27, 2023	
AUTHORIZA	LION		SP Developer			Clus	ter Co	oordinator	Study Progran	n Coordinator	
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Learning model	Project Based L	earnin	g								
Program	PLO study pro	gram t	hat is charged to the co	ourse							
Learning Outcomes (PLO)	PLO-7		to demonstrate knowledge onment.	of biology at the mo	lecular, c	ell and	l orgai	nism levels ar	nd their interactio	ns with the	
	PLO-11		to demonstrate knowledge onment	of biology at the mo	lecular, c	ell and	l orgai	nism levels ar	nd their interactio	ns with the	
	Program Object	tives (	(PO)								
	PO - 1		rstand the concept of plant unction and role.	cells while mastering	ng problei	m solv	ing sk	tills to conduc	t studies of plant	cells regarding	
	PO - 2		stand the concept of pla ding their function and role.		stering pr	oblem	-solvii	ng skills to c	arry out studies	of plant tissue	
	PO - 3	Under condu	rstand the concept of mo act studies of the morpholog	rphological characte gical characteristics	eristics of plant s	f plan tems r	t sten elated	ns while mas I to their funct	tering problem s ion and external	solving skills to environment.	
	PO - 4	Under relate	rstand the concept of plant d to their function and exte	stems while masteri rnal environment.	ng proble	m sol	ving sl	kills to study t	he anatomical str	ucture of stems	
	PO - 5		rstand the concept of morp is on the morphological cha								
	PO - 6	Maste	ring problem solving skills	to study the anatom	y of plant	roots	regard	ding their fund	tion and role.		
	PO - 7	Under condu	derstand the concept of morphological characteristics of plant leaves while mastering problem solving skills to duct studies on the morphological characteristics of plant leaves related to their function and external environment.								
	PO - 8	Maste	ring problem solving skills	to conduct studies o	n plant le	aves i	egard	ing their funct	ion and role.		
	PO - 9	Under	stand the concept of flowe	r morphological cha	racters						
	PO - 10		rstand the concept of morp dy the morphological chara								

## PLO-PO Matrix

P.O	PLO-7	PLO-11
PO-1		
PO-2		
PO-3		
PO-4		
PO-5		
PO-6		
PO-7		
PO-8		
PO-9		
PO-10		

PO Matrix at the end of each learning stage (Sub-PO)

P.O									Wee	k						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PO-1																
PO-2																
PO-3																
PO-4																
PO-5																
PO-6																
PO-7																
PO-8																
PO-9																
PO-10																

#### Short Course Description

This course studies groups of open-seeded and closed-seeded plants in terms of external structure (morphology), internal structure (anatomy) and their development related to various external factors. The study includes the concept of structure and function of cells, tissues and organs that make up the Organum Nutritivum and Organum Reproductivum. This course is presented through theory and practice with emphasis on the process of solving problems related to the concepts studied. At the end of the lecture, students master knowledge related to the concept of plant development structure while also having relevant problem solving skills.

#### References

## Main:

- 1. Bell, A.D. 1991. Plant Form. An Illustrated Guide to Flowering Plant Morphology. Oxford University Press. New York.
- 2. Bendre, A. dan A. Kumar. 1980. A Textbook of Practical Botany . Rastogi Publications. New Delhi
- 3. Cutler, D.F. Botha, C.E.J. & Stevenson, D.W. 2007. Plant Anatomy An Applieid Approach. New York. Blackwell Publishing.
- 4. Esau, K. 1965. Plant Anatomy . John Wiley & Sons, New York, Toronto.
- 5. Fahn, A. 1985. Plant Anatomy .Pergamon Press. New York, Toronto, Sidney
- Hidayat, E.B. 1994. Morfologi Tumbuhan. Jakarta: DEPDIKBUD. Direktorat Jenderal pendidikan Tinggi, Proyek Pendidikan Tenaga Akademik

(5)

(6)

(7)

(8)

## Supporters:

(2)

- 1. Pratiwi, R. 2018. Anatomi Tumbuhan. Surabaya. Universitas Negeri Surabaya Press
- 2. Schweingruber, F.H. Borner, A. & Schulze, E-D. 2011. Atlas of Stem Anatomy in Herbs, Shrubs and Trees

# Supporting lecturer

(1)

Dr. Rinie Pratiwi Puspitawati, M.Si. Dr. Novita Kartika Indah, S.Pd., M.Si. Ahmad Bashri, S.Pd., M.Si. Sari Kusuma Dewi, S.Si., M.Si. Dr. Yustina Carolina Febrianti Salsinha, S.Si

(3)

Week- Final abilities of each learning stage (Sub-PO)

| Final abilities of each learning stage (Sub-PO) | Indicator | Criteria & Form | Offline (offline) | Online (online) | References | Assessment Weight (%)

(4)

st tis to fu rc 2.C sp cd of re ca 3.lc pr re ca	telate cell tructures to ssues related to their unctions and oles. Communicate pecific pytological characteristics f plant cells elated to plant ell function dentify roblems elated to cell unction and ole	1.1. Describe the parts that make up plant cells. 2.2. describe the differences in the concepts of plastids, cell walls, and ergastic compounds 3.3. Explain the relationship between specific cytological characteristics of plant cells and their role. 4.4. Draw conclusions based on the collected facts regarding the specific cytological characteristics of plant cells	Criteria:  1.Assessment is based on benchmarks (PAP). The assessment components consist of subsummative, assignment, summative and participation scores.  2.Participation assessment is an assessment in the form of presentation performance is carried out integrated during learning as an assignment grade  Form of Assessment: Participatory Activities	1. Presentation and discussion with Small Group Discussion and Class Discussion 2. Exploratory practicum with problem solving strategies regarding the cytological characteristics of plant cells related to their function 4 X 50	Colpla Proc Cyrl Enrich Mit Plan Divided State of the Proc Substantial Processing Proces	bliography: dayat, EB 94. Plant orphology. karta: EPDIKBUD. rectorate meral of gher lucation, ademic rsonnel lucation oject  aterial: Cell all ference: atiwi, R. 18. Plant atomy. rrabaya. rrabaya State viversity ess  aterial: Cell	3%

1			T	1		
2	1.Relate the structure of various types of tissue to their function and role as structures that respond to the environment. 2.Describe embryonal tissue as the initial tissue of the plant body 3.Identify various types of vascular tissue and their logical reasons. 4.Communicate plant tissue concepts related to their role and the environment in which they live. 5.Identifying problems regarding plant tissue related to the morphological structure of plant organs	1.Describe embryonal tissue as the initial tissue of the plant body 2.Explain basic networking concepts 3.Explain the concept of periderm tissue 4.Explain the concept of vascular tissue 5.Explain epidermal tissue 6.Identify parenchyma, collenchyma, sclerenchyma, aerenchyma tissue and their logical reasons 7.Identify various types of vascular tissue and their logical reasons. 8.Explain the relationship	Criteria:  1. Assessment is based on benchmarks (PAP). The assessment components consist of subsummative, assignment, summative and participation scores.  2. Participation assessment is an assessment of attitudes.  3. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade  Form of Assessment: Participatory Activities	1. Exploratory practicum with problem solving strategies regarding the characteristics of plant tissues related to their function. 2. Presentation discussion about the characteristics of plant tissue related to its function. 10 X 50	Material: Plant Embryonic Tissue: 1. Protoderm 2. Procambium 3. Basic Meristem References: Hidayat, EB 1994. Plant Morphology. Jakarta: DEPDIKBUD. Directorate General of Higher Education, Academic Personnel Education Project  Material: Adult Tissue: 1. Basic Tissue • Parenchyma • Collenchyma • Chlorenchyma • Sclerenchyma • Sclerenchyma 2. Vascular Tissue • Xylem • Phloem 3. Epidermis • Stomata • Trichomata References:	3%
	and their logical reasons. 4.Communicate	tissue 6.Identify parenchyma,	3.Performance assessment in the form of	function.	Education Project	
	concepts related to their role and the environment in	collenchyma, sclerenchyma, aerenchyma	performance is carried out integrated during learning as an		Tissue: 1. Basic Tissue • Parenchyma • Collenchyma •	
	5.Identifying problems regarding plant	7.Identify various types of vascular tissue	grade Form of Assessment		Aerenchyma       Sclerenchyma     Z. Vascular     Tissue       Xylem	
	the morphological structure of	logical reasons. 8.Explain the	Participatory Activities		Epidermis • Stomata • Trichomata References: Fahn, A. 1985. Plant Anatomy .Pergamon Press. New York, Toronto,	
		9.Draw conclusions based on collected facts about plant tissues regarding their			Sidney  Material:  Vascular  tissue: xylem  and flem and  mature or  secondary	
		role and the environment in which they live			tissue References: Schweingruber, FH Borner, A. & Schulze, ED. 2011. Atlas of	
					Stem Anatomy in Herbs, Shrubs and Trees	

2	4 = 1	1 - "	Cuitania.	4. E	AND COLUMN	007
3	1.Relate the	1.Describe	Criteria:	1. Exploratory	Material: Plant	3%
	structure of	embryonal	1.Assessment is	practicum with	Embryonic	
	various types of	tissue as the	based on	problem	Tissue: 1.	
	tissue to their	initial tissue of	benchmarks	solving	Protoderm 2.	
	function and	the plant body	(PAP). The	strategies	Procambium 3.	
	role as	2.Explain basic	assessment	regarding the	Basic Meristem	
	structures that	networking	components	characteristics	References:	
		•	consist of sub-	of plant	Hidayat, EB	
	respond to the	concepts		tissues related	1994. Plant	
	environment.	<ol><li>Explain the</li></ol>	summative,	to their	Morphology.	
	2.Describe	concept of	assignment,	function.	Jakarta:	
	embryonal	periderm	summative and	2.	DEPDIKBUD.	
	tissue as the	tissue	participation	Presentation	Directorate	
	initial tissue of	4.Explain the	scores.	discussion	General of	
	the plant body	concept of	2.Participation	about the	Higher	
		vascular tissue	assessment is	characteristics	Education,	
	3.Identify various					
	types of	5.Explain	an assessment	of plant tissue	Academic	
	vascular tissue	epidermal	of attitudes.	related to its	Personnel	
	and their logical	tissue	3.Performance	function.	Education	
	reasons.	6.Identify	assessment in	10 X 50	Project	
	4.Communicate	parenchyma,	the form of			
	plant tissue	chlorenchyma,	presentation		Material: Adult	
			performance is		Tissue: 1.	
	concepts	collenchyma,	•		Basic Tissue •	
	related to their	sclerenchyma,	carried out		Parenchyma •	
	role and the	aerenchyma	integrated during		Collenchyma •	
	environment in	tissue and their	learning as an		Chlorenchyma	
	which they live.	logical reasons	assignment		Aerenchyma •	
	5.Identifying	7.Identify various	grade		Sclerenchyma	
	problems	types of	3			
	regarding plant	vascular tissue	Form of Assessment		2. Vascular	
	tissue related to		:		Tissue • Xylem	
		and their	Participatory Activities		• Phloem 3.	
	the	logical	· artio.parery / total inco		Epidermis •	
	morphological	reasons.			Stomata •	
	structure of	8.Explain the			Trichomata	
	plant organs	relationship			References:	
	. 3	between plant			Fahn, A. 1985.	
		tissue and its			Plant Anatomy	
		role and the			.Pergamon	
					Press. New	
		environment in			York, Toronto,	
		which it lives			Sidney	
		9.Draw			Station	
		conclusions			Material:	
		based on				
		collected facts			Vascular	
		about plant			tissue: xylem	
		tissues			and flem and	
					mature or	
		regarding their			secondary	
		role and the			tissue	
		environment in			References:	
		which they live			Schweingruber,	
		•			FH Borner, A.	
					& Schulze, ED.	
					2011. Atlas of	
					Stem Anatomy	
					in Herbs,	
					Shrubs and	
				1	Trees	

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4	1.Apply telom theory to explain the development of microphylls and megaphylls. 2.Explain the differences between the development of dicot stems and monocot stems. 3.Conclude various results of trunk and branch modifications based on relevant facts.	1.Comparing the branching of true dichotomies with pseudo. 2.Explain the development of microphylls and megaphylls 3.Explain the differences between the development of dicot stems and monocot stems 4.Identify the shape of the rod in relation to its function. 5.Prepare reports on branching construction patterns along with logical reasons through exploration. 6.Conclude various results of trunk and branch modifications based on relevant facts. 7.Collect assignments on time 8.Actively express opinions during discussions and presentations	Criteria:  1.Assessment is based on benchmarks (PAP). The assessment components consist of subsummative, assignment, summative and participation scores.  2.Participation assessment is an assessment of attitudes.  3.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	Practical exploration of the morphological characteristics of plant stems related to their function. Presentation discussion on the morphological characteristics of plant stems related to their function Designing a project to observe selected stem morphology in relation to special structures and environmental conditions 4 X 50		Material: Morphological structure of stems and stem modifications References: Bell, AD 1991. Plant Form. An Illustrated Guide to Flowering Plant Morphology. Oxford University Press. New York.  Material: stem morphology observations along with stem modifications References: Bendre, A. and A. Kumar. 1980. A Textbook of Practical Botany. Rastogi Publications. New Delhi	10%

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5	Concludes changes in stem	1.Comparing the	Criteria:	Exploratory	Material:	10%
	structure due to	branching of	1.Assessment is	practicum with	anatomical	
	secondary growth	true	based on	problem	structure of	
	processes.	dichotomies	benchmarks	solving	stems	
		with pseudo.	(PAP). The	strategies	References:	
		<ol><li>Explain the</li></ol>	assessment	regarding the	Fahn, A. 1985.	
		development of	components	anatomy of	Plant Anatomy	
		microphylls	consist of sub-	plant stems related to their	.Pergamon	
		and	summative.	functions.	Press. New	
		megaphylls	assignment,		York, Toronto,	
		3.Explain the	summative and	Presentation discussion on	Sidney	
		differences	participation	the		
		between the	scores.	anatomical	Material:	
		development of	2.Participation	properties of	anatomical	
		dicot stems	assessment is	plant stems	structure of the	
			an assessment	related to their	stem	
		and monocot	of attitudes.	function.	References:	
		stems		Develop a	Schweingruber,	
		4.Identify the	3.Performance	project design	FH Borner, A.	
		shape of the	assessment in	to explore the	& Schulze, ED. 2011. Atlas of	
		rod in relation	the form of	morphological		
		to its function.	presentation	and	Stem Anatomy in Herbs.	
		<ol><li>5.Prepare</li></ol>	performance is	anatomical	Shrubs and	
		reports on	carried out	characteristics	Trees	
		branching	integrated during	of stems with	11663	
		construction	learning as an	unique		
		patterns along	assignment	structures		
		with logical	grade	related to the		
		reasons		conditions in		
		through	Form of Assessment	which they		
		exploration.	:	live.		
		6.Conclude	Project Results	At this 5th		
		various results	Assessment / Product	meeting the		
		of trunk and	Assessment	project design		
		branch		to explore the		
		modifications		morphological		
		based on		and		
		relevant facts.		anatomical		
		7.Collect		characteristics		
		assignments		of stems was		
		on time		finalized and		
		8.Actively		presented.		
		,		Project		
		express		activities in		
		opinions during		phase one of		
		discussions		the		
				4 X 50 project		
		presentations				
		and presentations		4 X 50 project		

6 Understand the concept of plant stems while mastering problem solving skills to secondary Solving skills to Secondary Solving skills to Secondary Secondar	10%
stems while mastering problem primary and based on problem solving	
mastering problem   primary and   saced on   coluing	
solving skills to secondary benchmarks solving	
study the stem structure. (PAP). The strategies	
anatomical 2.Identify the assessment regarding the	
structure of stems   network that   components   anatomy of	
related to their	
ovtornal stam along summative	
environment Have	
a responsible, reasons summative and	
independent and honest attitude 3.Presenting the participation the	
towards results of scores. morphological	
performance in studies on the 2.Participation characteristics	
lectures on the anatomical assessment is of plant stems	
structure of plant development structure of an assessment related to their	
stems related of attitudes. function.	
to their 3.Performance Presentation	
adaptation to assessment in of the results	1
the the form of of the	1
environment presentation practicum as	
4.Designing performance is a basis for preparing a	
solutions to carried out project plan	
problems integrated during integrated that will be	
related to the learning as an completed	
anatomical assignment until week 14.	
structure of grade 4 x 50	
stems as a	
form of Form of Assessment	
adaptation to Project Results	
Assessment / Product	
environment. Assessment	
5.Prepare	
problem	
solving reports related to the	
anatomical	
structure of	
stems as a	
form of	
adaptation to	
the	
environment.	
6.Be present on	
time according	
to the lecture	
schedule	
7.Collect	
assignments	
on time	
8.Actively	
express	
opinions during	
discussions	
and	
presentations	

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7	Understand the concept of morphological characteristics of plant roots while mastering problem solving skills to conduct studies on the morphological characteristics of plant roots related to their function and external environment. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development	1.Compare the processes of formation of tap and fibrous root systems. 2.Distinguish between the morphological structures of tap roots and fiber roots. 3.Identify the types of specialized roots (photosynthetic roots, suction roots, contractile roots, post roots, buttress roots, knee roots, and hanging roots, reproductive roots). 4.Present the function or role of specialized root types for these plants (photosynthetic roots, suction roots, suction roots). 5.Write down the results of the study, a logical prediction of the process of forming specialized roots. 6.Be present on time according to the lecture schedule 7.Collect assignments on time 8.Actively express opinions during discussions	Criteria:  1. Assessment is based on benchmarks (PAP). The assessment components consist of subsummative, assignment, summative and participation scores.  2. Participation assessment is an assessment of attitudes.  3. 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	Practical exploration of root morphology related to its function. Presentation discussion about the morphological characteristics of roots related to their function. Presentation discussion of project results related to stem studies related to environmental conditions 4 X 50		10%
		and presentations				
8	MIDTERM EXAM	ргозептанопа				E04
8	WIIDTERM EXAM		Form of Assessment	4 X 50		5%
			Test			

9	Mastering problem- solving skills to	1.Describe the	Criteria: 1.Assessment is	Exploratory practicum with	Material: Morphological	10%
	study the anatomy	arrangement of		problem	structure and	
	of plant roots	tissues that	based on	solving	root	
	related to their	make up	benchmarks	strategies	modification	
	function and role.	primary and	(PAP). The			
	Having a	secondary	assessment	regarding the	References:	
	responsible, independent and	roots	components	anatomy of	Cutler, DF	
	honest attitude	2.Identify the	consist of sub-	plant roots	Botha, CEJ &	
	towards	primary and	summative,	related to their	Stevenson, DW	
	performance in	secondary	assignment,	function	2007. Plant	
	lectures on the	constituent	summative and	Presentation discussion on	Anatomy An	
	structure of plant	tissues of	participation	the	Application	
	development	monocot and	scores.	anatomical	Approach. New York. Blackwell	
		dicot roots.	2.Participation		Publishing.	
		_	assessment is	properties of roots related	Publishing.	
		3.Explain the		to their		
		relationship	an assessment	function	Material:	
		between the	of attitudes.	Designing a	Morphological	
		structure of	3.Performance	project to	structure and	
		root tissue and	assessment in	study the	root	
		its role.	the form of	study the special	modification	
		4.Explain the	presentation	morphological	References:	
		process of	performance is	structure of	Bell, AD 1991.	
		secondary	carried out	roots related	Plant Form. An Illustrated	
		growth of	integrated during	to	Guide to	
		roots.	learning as an	environmental		
		5.Designing	assignment	conditions	Flowering Plant	
		solutions to	grade	4 X 50	Morphology. Oxford	
		problems			University	
		related to the	Form of Assessment		Press. New	
		anatomical	:		York.	
		structure of	Project Results		TOTA.	
		roots as a form	Assessment / Product			
		of adaptation	Assessment			
		to the				
		environment.				
		_				
		6.Prepare				
		problem				
		solving reports				
		related to the				
		anatomical				
		structure of				
		roots as a form				
		of adaptation				
		to the				
		_ environment.				
		7.Be present on				
		time according				
		to the lecture				
		schedule				
		8.Collect				
		assignments				
		on time				
		9.Actively				
		express				
		opinions during				
		discussions				
		and				
		presentations				
		presentations				

10	Mactarina problem	15 " "	Cuitouio	Evalorator:		E0/
10	Mastering problem solving skills to	1.Describe the	Criteria:	Exploratory		5%
	study the anatomy	arrangement of	1.Assessment is	practicum with problem		
	of plant roots	tissues that	based on	solving		
	related to their	make up	benchmarks	strategies		
	function and role;	primary and	(PAP); The	regarding		
	Having a responsible,	secondary	assessment	plant root		
	independent and	roots;	components	anatomy		
	honest attitude	2.Identify the	consist of sub-	related to its		
	towards	primary and	summative,	function:		
	performance in	secondary	assignment,	Presentation		
	lectures on the	constituent	summative and			
	structure of plant	tissues of	participation	discussion on		
	development		grades;	the		
		monocot and	2.Participation	anatomical		
		dicot roots;		properties of		
		3.Explain the	assessment is	roots related		
		relationship	an assessment	to their		
		between root	of attitudes;	function		
		tissue structure	3.Performance	Presentation		
		and its role;	assessment in	of project		
		<ol><li>Explain the</li></ol>	the form of	results which		
		process of	presentation	have been		
		secondary	performance is	prepared in		
		growth of	carried out	the form of a		
		roots;	integrated during	4 X 50 E-		
		5.Designing	learning as an	poster		
		solutions to	assignment			
			grade			
		problems	grade			
		related to the	Form of Assessment			
		anatomical	·			
		structure of	Portfolio Assessment			
		roots as a form	1 Ortiono Assessment			
		of adaptation				
		to the				
		environment;				
		6.Prepare				
		problem				
		solving reports				
		related to the				
		anatomical				
		structure of				
		roots as a form				
		of adaptation				
		·				
		to the				
		environment;				
		7.Be present on				
		time according				
		to the lecture				
		schedule;				
		8.Collect				
		assignments				
		on time;				
		9.Actively				
		express				
		opinions during				
		discussions				
		and				
		presentations				

11	Understand the concept of morphological characteristics of plant leaves while mastering problem solving skills to conduct studies on the morphological characteristics of plant leaves related to their function and external environment. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development	1.Explain the process of leaf formation. 2.Describe the morphological characteristics of leaves 3.Presents the explored leaf phyllotaxis 4.Describe leaf modifications 5.Explain the logical relationship between modified leaf structure and its role and habitat conditions. 6.Be present on time according to the lecture schedule 7.Collect assignments on time 8.Actively express opinions during discussions and presentations	Criteria:  1.Assessment is based on benchmarks (PAP). The assessment components consist of subsummative, assignment, summative and participation scores.  2.Participation assessment is an assessment of attitudes.  3.Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade  Form of Assessment  Portfolio Assessment	Exploration of leaf morphology related to its function. Presentation discussion on the morphological characteristics of leaves related to their function 4 X 50		5%
12	Mastering problem solving skills to study the anatomy of plant leaves related to their function and role. Having a responsible, independent and honest attitude towards performance in lectures on the structure of plant development	1.Describe the arrangement of leaf tissues. 2.Explain the relationship between leaf tissue structure and its role and habitat. 3.Designing solutions to problems related to the anatomical structure of roots as a form of adaptation to the environment. 4.Prepare problem solving reports related to the anatomical structure of roots as a form of adaptation to the environment. 5.Prepare problem solving reports related to the anatomical structure of roots as a form of adaptation to the environment 5.Be present on time according to the lecture schedule 6.Collect assignments on time 7.Actively express opinions during discussions and presentations	Criteria:  1.Assessment is based on benchmarks (PAP). The assessment components consist of subsummative, assignment, summative and participation scores.  2.Participation assessment is an assessment in the form of presentation performance is carried out integrated during learning as an assignment grade  Form of Assessment : Portfolio Assessment	4 X 50	1. Discuss the preparation of a plan to observe the anatomy of plant leaves regarding their function and habitat.  2. Work in groups to explore solving problems regarding the anatomy of plant leaves related to their function and habitat.  3. Discussion and presentation of the results of solving problems regarding the anatomy of plant leaves related to their function and habitat.  4. Presentation of reflection results on the lecture process.	5%

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13	Mastering problem solving skills to study the anatomy of plant leaves related to their function and role. Having a responsible, independent and honest attitude towards performance in lectures on the structure of plant development	1.Describe the arrangement of leaf tissues. 2.Explain the relationship between leaf tissue structure and its role and habitat. 3.Designing solutions to problems related to the anatomical structure of roots as a form of adaptation to the environment. 4.Prepare problem solving reports related to the anatomical structure of roots as a form of adaptation to the environment. 5.Be present on time according to the lecture schedule 6.Collect assignments on time 7.Actively express opinions during discussions and presentations	Criteria:  1.Assessment is based on benchmarks (PAP). The assessment components consist of subsummative, assignment, summative and participation scores.  2.Participation assessment is an assessment in the form of presentation performance is carried out integrated during learning as an assignment grade  Form of Assessment : Portfolio Assessment	4 X 50	1. Discuss the preparation of a plan to observe the anatomy of plant leaves regarding their function and habitat. 2. Work in groups to explore solving problems regarding the anatomy of plant leaves related to their function and habitat. 3. Discussion and presentation of the results of solving problems regarding the anatomy of plant leaves related to their function and habitat. 4. Presentation of reflection results on the lecture process.		5%

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14 Understand concept of morphologic characters. responsible independer honest attitutowards performance lectures on structure of developments.	ower all Have a development of flowers.  2.Describe the parts that make up a flower.  in flower.  3.Identify the parts that	based on benchmarks (PAP). The assessment components consist of subsummative, assignment, summative and participation scores.  2. Participation assessment is an assessment is an assessment of attitudes.  3. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade  Form of Assessment: Portfolio Assessment	Work in groups to explore the morphological characteristics of flowers related to their function.  Discussion and presentation of exploration results regarding the morphological characteristics of flowers, flower formulas and diagrams.  Presentation of reflection results on the lecture process 4 X 50	Material: Flower Structure Reference: Bell, AD 1991. Plant Form. An Illustrated Guide to Flowering Plant Morphology. Oxford University Press. New York.  Material: Flower Structure References: Bendre, A. and A. Kumar. 1980. A Textbook of Practical Botany. Rastogi Publications. New Delhi  Material: Flower Structure Reference: Hidayat, EB 1994. Plant Morphology. Jakarta: DEPDIKBUD. Directorate General of Higher Education, Academic Personnel Education Project  Material: 1. Plant development structure handout Chapter 9 regarding the morphology of plant flowers. 2. Student activity sheet about the morphology of plant flowers. 3. Textbook according to references on the morphology of plant flowers. 3. Textbook according to references on the morphology of plant flowers. 4. Specimens share flower types. 5. Power point slide about flower morphology and its modifications Reference: Pratiwi, R. 2018. Plant Anatomy. Surabaya.	3%

15	Understand the concept of flower morphological characters. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development	1.Explain the development of flowers. 2.Describe the parts that make up a flower. 3.Identify the parts that make up a flower. 4.Describe flower diagrams and formulas. 5.Identify different types of inflorescences. 6.Compare various types of flowers based on their pollination 7.Be present on time according to the lecture schedule 8.Collect assignments on time 9.Actively express opinions during discussions and presentations	Criteria:  1. Assessment is based on benchmarks (PAP). The assessment components consist of subsummative, assignment, summative and participation scores.  2. Participation assessment is an assessment in the form of presentation performance is carried out integrated during learning as an assignment grade  Form of Assessment  Portfolio Assessment	Work in groups to explore the morphological characteristics of flowers related to their function.  Discussion and presentation of exploration results regarding the morphological characteristics of flowers, flower formulas and diagrams.  Presentation of reflection results on the lecture process 4 X 50		3%
16			Criteria: Written test  Form of Assessment: Test	Written Test (UAS)		10%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	9%
2.	Project Results Assessment / Product Assessment	50%
3.	Portfolio Assessment	26%
4.	Test	15%
	_	100%

#### 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.
- 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.
- 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.
- 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.
- 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.
- 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.