

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

Document Code

SEMESTER LEARNING PLAN

Courses		CODE			C	Course	e Fami	ly		C	Credit V	Neigh	t	SEM	IESTER		Comp Date	oilation
Ecophysiolo	gy	462010	2042				Prograi	n Elec	tive	т	=2 P:	=0 E(CTS=3.18		5			l, 2023
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		Dr. Yulia	ani,M.Si						Dr.Yu	ıliani,I	M.Si			Dr	r. H. Sur	ıu Kunt	joro, S.S	Si., M.Si
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Program	PLO study pr	ogram that is ch	arged to	the co	ourse													
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	Program Obj	ectives (PO)																
	PO-1 Mastering ecophysiological concepts and their applications (Knowledge)																	
	PO - 2	Able to apply Ecophysiological concepts and technology in efforts to solve natural resource and environmental problems (Knowledge)																
	PO - 3	Able to make the right decisions based on information and data analysis, and able to provide guidance in choosing various alternative solutions independently and in groups in the field of ecophysiology (Special Competencies)																
	PO - 4	Able to design problem solutions by implementing transferable skills in the field of ecophysiology to develop ecopreneurship (eco- innovation, eco-opportunity, eco-commitment). (Special Competencies)																
	PO - 5	5 Able to learn throughout life and work effectively both individually and in groups, have an entrepreneurial spirit and care about the environment (general competencies)																
	PO - 6	Able to work in (Attitude) studie		ntly and	respo	nsibly,	, both	as an	indivic	lual a	and in a	a grou	p in carry	ing ou	ut tasks	related	to Eco	physiol
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Support lecturer	Prof. [tharjo, M.Si. Dr. Yuliani, M Sunu Kuntj							
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	(Sub-PO)		Indicator	Criteria & Form	Offline (offline)	Online (online)			
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6.Provide provides		
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Students are		
asked to provide		
their ideas and		
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references they		
read. In this		
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develop ideas to		
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Individual		
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3. Class Room		
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Students are		
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meeting								
22.20								
					2 ^ 50			

5	Understand various	1.explains the	Criteria:	Case method		Material: Response to	0%
	plant responses to		1.Reports and	1.Pre existing	1	environmental stress	070
	environmental	effect of low and		Material. The		Reference: Fitter AH	
	stress and be able	high	practicum products	lecturer asks		and RKM Hay. 1998.	
	to relate this	temperatures on	are assessed as	students to		Environmental	
	understanding to	plants and the	ASSIGNMENTS	individually read	1	Physiology of Plants.	
	various mechanisms of	adaptation of	with a weight of			(Sri Andani and	
	plant resistance to	plants to these	30%. performance	references			
	toxicity	conditions	is integrated during	regarding		Purbayanti. Trans)	
		2.describe the	learning	various plant		Yogyakarta: Gadjah	
		effect of anoxia	2.Form: Written Test	responses to		Mada	
		on plant roots	and Assignment	environmental			
			Criteria: Indicators	stress and be			
		3.Describe the		able to relate			
		effects of air	are achieved	this			
		pollution on	through	understanding			
		plants	assignments in	to various			
		explains plant	independent and	mechanisms of			
		resistance to air	structured tasks	plant resistance			
		pollution		to toxicity. This			
		5.Describe the	Form of Assessment :	process is an			
		properties and	Participatory Activities	assignment			
		toxicity of saline,		from the			
		calcareous,		previous			
				meeting which			
		acidic and heavy		is reinforced by			
		metal		the lecturer			
		contaminated		. 2. Activities in			
		soils		groups. The			
		6.provide		lecturer			
		examples of		provides	1		
		metal indicator		problem cases			
		plants and their		regarding the			
		coping		influence of	1		
				various			
		mechanisms		environmental			
		(phytochelatin)		factors such as	1		
		7.skilled in		low and high	1		
		carrying out		temperatures,	1		
		experimental		anoxia, air			
		activities on the					
		effects of heavy		pollution on	1		
		metals on plants		plants and plant			
				adaptation in			
				these			
				conditions.	1		
				Students are	1		
				asked to			
				conduct			
				discussions in			
				groups to solve			
				various cases	1		
1				given based on			
				the references			
				they read. In			
				this activity,			
				students can	1		
1				develop ideas or			
				thoughts to			
				solve problems.			
				Individual	1		
				students in			
				groups can			
				express their	1		
				opinions	1		
				3. Class Room			
				Discussion			
				Lecturers			
				facilitate	1		
				students to	1		
				discuss in class,			
				present the			
				results obtained			
				in groups. and			
				classically			
				obtained			
1							
				problem solving			
				and conclusions			
				from the			
				experiments			
				carried out.	1		
1				Students make			
1				reports in			
1				independent			
				assignments.			
				2 X 50	1		
1	1		1		1		

6	Understand the	1 Evoluin the	Criteria:	Discussion.	Material: Cell	0%
Ĭ	relationship	1.Explain the composition of	1.Reports and	analysis of	biochemical reactions	070
	between oxygen availability and	the ancient	practicum products	presentation	involving oxygen,	
	animal physiology	atmosphere	are assessed as	articles	classification of living	
	allina physiology	2.Identify	ASSIGNMENTS	Lecturers	creatures' strategies.	
		biochemical	with a weight of	facilitate	Reference: Carere, C.	
		reactions	30%. performance	student-centred	and Mastripieni, D.	
		involving oxygen	is integrated during	learning through	2013. Animal	
		3.Classifying the	learning	group	Personalities Behavior,	
		way living	2.Form: Written Test	discussions and	Physiology, and	
		creatures adapt	and Assignment	are responsible	Evolution. Chicago:	
			Criteria: Indicators	for finding	The University of	
		is related to the	are achieved	concepts (based	Chicago Press	
		availability of	through	on literature		
		oxygen	0	reviews from textbooks and		
		4.Skilled in	assignments in	journals)		
		carrying out	independent and	regarding the		
		practical	structured tasks	relationship		
		activities on	Form of Assessment :	between oxygen		
		plant responses	Participatory Activities	availability and		
		to	Fancipatory Activities	animal		
		electromagnetics		physiology.		
				Students then		
				present the		
				results of their		
				group work.		
				Lecturer and		
				students		
				conclude the		
				concept of how		
				living creatures		
				adapt is related		
				to the		
				availability of		
				oxygen.		
				Students are		
				asked to read references for		
				the next		
				meeting		
				2 X 50		
				2,7,00		

7	Analyzing animal activities regarding the influence of temperature and environment	 Explain the effect of water temperature on animal O2 consumption Distinguish between the activities of ectothermic and endothermic animals under conditions of changes in environmental temperature Describe various winter animal activities explain hibernation activity Skilled in carrying out experimental activities on the effect of water temperature on fish activity 	Criteria: Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. performance is integrated during learning Form of Assessment : Participatory Activities, Practical Assessment	Case method 1.Pre existing Material. The lecturer asks students to individually read references regarding animal activity on the influence of temperature and the environment. This process is an assignment from the previous meeting which is reinforced by the lecturer. 2. Activities in groups. The lecturer provides problem cases regarding the influence of animal activities on temperature and environmental influences. Students are asked to carry out a simple experiment to prove the effect of water temperature on animal O2 consumption based on the LKM guide and the references they read. In this activity, students can develop ideas or thoughts to solve problems. Individual students in groups can express their opinions 3. Class Room Discussion Lecturers facilitate students to discuss in class, present the results obtained in groups. and classically obtained problem solving and conclusions from the experiments carried out. Students make practical reports in independent assignments. 2 X 50	Material: Effect of temperature (air, soil) and environment on animal activity; hibernation activity Bibliography: Rastogi, SC 2008. Essentials of Animal Physiology (4th Edition). New Delhi: New Age International Publishers	10%
	010		Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. USPerformance questions are integrated during learning. Practical reports and products are assessed as ASSIGNMENTS with a weight of 30% Form of Assessment : Participatory Activities	2 X 50	Material: Materials 1 to 7 References:	10%

9	Analyze the effect of ammonia toxicity on animal life	 Explain the reactions of protein metabolism in the bodies of aquatic and land animals Explain the body's mechanism for reducing ammonia toxicity. Comparing the mechanisms of ammonia removal in cartilaginous and bony fish. Explain the mechanism of ammonia disposal in land animals. 	Criteria: Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. performance is integrated during learning Form of Assessment : Participatory Activities	Presentation discussion The lecturer facilitates student- centered learning through group discussions and is responsible for finding concepts (based on literature review) regarding the effect of ammonia toxicity on aquatic animal life with LKM. Students then present the results of their group work. Lecturer and students conclude the concept of ammonia toxicity. Students are asked to read references that will be used for the next meeting 2 X 50		Material: Ammonia toxicity in animal life (protein metabolism reactions in aquatic animals; ammonia removal mechanisms for reducing the toxicity of aquatic animals. Reference: Gordon, 1977. Abimal Physiology: Principles and Adaptation. New York: Macmillan Pub. Co	5%
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10 Analyzing the completion and write blate receptor upper late in the completion and produce in the completion and completion								
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11	Analyzing animal activities regarding the influence of temperature and environment	 Explain the effect of water temperature on O2 consumption by fish Distinguish between the activities of ectothermic and endothermic animals under conditions of changes in environmental temperature Describe various winter animal activities explain hibernation activities explain hibernation activities on the effect of water temperature on fish activity 	Criteria: Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. performance is integrated during learning Forms of Assessment ? Participatory Activities, Practical Assessment, Practical / Performance	Case method 1.Pre existing Material. The lecturer asked students to individually read references regarding the concept of temperature which influencess the life of fish. This process is an assignment from the previous meeting which is reinforced by the lecturer. 2. Activities in the group. The lecturer gave a case of the problem of the influence of temperature on the life of fish (water animals). Students are asked to carry out simple experiments to solve problems. In this activity, students can develop ideas or thoughts to solve problems. Individual students in groups can express their opinions 3. Class Room Discussion Lecturers facilitate students to discuss in class, present the results obtained in groups. and classically obtained problem solving and conclusions from the experiments	Material: Water quality (pH, dissolved oxygen levels, NH3 and heavy metals) and animal survival. Reference: Rastogi, SC 2008. Essentials of Animal Physiology (4th Edition). New Delhi: New Age International Publishers	15%
				Students make practical reports in independent assignments.		
12	Understanding the potential of aquatic biota as environmental bioindicators	 Explain the aspects of indicators in aquatic biota. Explain the important role of aquatic biota as environmental bioindicators 	Criteria: 1.Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. performance is integrated during learning 2.Form: Written Test and Assignment Criteria: Indicators are achieved through assignments in independent and structured tasks Form of Assessment : Participatory Activities	2 X 50 Lecturers facilitate student- centered learning through group discussions and are responsible for finding concepts (based on literature reviews) regarding the potential of aquatic biota as environmental bioindicators. Students then present the results of their group work. Lecturer and students conclude the concept of the potential of aquatic biota as environmental bioindicators. Students are asked to read references that will be used for the next meeting 2 X 50	Material: Aquatic biota as bioindicators References: Bligh, J. Cloudesley T and McDonald, A. 1976. Environmental Animal Physiology. London: Black well Scientific Pub	5%

13	Students are able to generalize that water quality affects the life of fish (water animals)	 1. explain the effect of acid on gill damage 2. relate the effect of DO ppm on fish respiration and metabolism 3. explains the effect of NH3 and heavy metal levels on fish activity 4. provide examples of cases of toxicity by heavy metals and other pollutants 5. Skilled in conducting experiments on the effect of dissolved O2 levels on fish activity 	Criteria: Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. performance is integrated during learning Form of Assessment : Participatory Activities, Practical Assessment	Case method 1.Pre existing Material. The lecturer asked students to individually read references regarding the concept of water quality which affects the life of fish (water animals). This process is an assignment from the previous meeting which is reinforced by the lecturer. 2. Activities in the group. The lecturer gave a case of water quality problems, namely dissolved oxygen levels which affect the life of fish (water animals). Students are asked to carry out simple experiments to solve problems. In this activity, students can develop ideas or thoughts to solve problems. In this activity, students in groups can express their opinions 3. Class Room Discussion Lecturers facilitate students to discuss in class, present the results obtained in groups. and classically obtained problem solving and conclusions from the experiments carried out. Students make practical reports in independent assignments.	Material: Water quality (pH, dissolved oxygen levels, NH3 and heavy metals) and animal survival. Reference: Carere, C. and Mastripieni, D. 2013. Animal Personalities Behavior, Physiology, and Evolution. Chicago: The University of Chicago Press	10%
14	Understanding the diversity of estuarine biota	 explain the physical properties of estuaries Explain the characteristics of estuary biota Explain the types of estuary biota Explain the behavior of estuarine biota 	Criteria: Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. performance is integrated during learning Form of Assessment : Participatory Activities	2 X 50 Presentation and discussion Lecturers facilitate student- centered learning through group discussions and are responsible for finding concepts (based on literature review) regarding the diversity of estuarine biota. Students then present the results of their group work. Lecturer and students conclude the concept of estuary biota. Students are asked to read the references that will be used for the next meeting 2 X 50	Material: Diversity of Estuarine Biota References: Yuliani, Rahardjo, Sunu Kuntjoro.2019. Ecophysiology 1: Plant Ecophysiology. Surabaya: Unesa Press.	0%

15	Understand ecophysiological concepts in the fields of animal husbandry, agriculture and fisheries	explains the influence of the environment on animal husbandry, agriculture and fisheries	Criteria: 1.Reports and practicum products are assessed as ASSIGNMENTS with a weight of 30%. performance is integrated during learning 2.Form: Written Test and Assignment Criteria: Indicators are achieved through assignments in independent and structured tasks Form of Assessment : Participatory Activities	Presentations, discussions, questions and answers Lecturers facilitate student- centered learning through group discussions and are responsible for finding concepts (based on literature reviews) regarding ecophysiological concepts in the fields of animal husbandry, agriculture and fisheries. Students then present the results of their group work. Lecturers and students summarize the concepts of ecophysiology in the fields of animal husbandry, agriculture and fisheries. 2 X 50	Material: Ecophysiological concepts in the fields of animal husbandry, fisheries and agriculture. Reference : Manuel, J.Regosa. 2001. Handbook of Plant Ecophysiology Techniques 2001st Edition. New York: Springer	0%
16			Form of Assessment : Participatory Activities			10%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage	
1.	Participatory Activities	65%	
2.	Project Results Assessment / Product Assessment	5%	
3.	Practical Assessment	25%	
4.	Practice / Performance	5%	
		100%	

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.
- 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 4. 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.