UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM
Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Kentingan Surakarta 57126 Indonesia
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Ecology

Undergraduate Programme in Biology Education **Module Handbook**

Module Name	Ecology (Ekologi)
Module level	Undergraduate Programme
Course Code	02013143006
Abbreviation, if applicable	-
Courses included in the module, if applicable	-
Semester/Term	5th
Module coordinator (s)	Dr Slamet Santosa, M.Si
Lecturer (s)	Alanindra Saputra M.Sc Puguh Karyanto, M.Si.Ph.D
Language	Bahasa Indonesia (Indonesian Language)
Classification within the curriculum	Compulsory/~~Elective~~
Teaching format/class hours per week during the semester	**Direct instruction/face to face/blended learning:** 2 x 50 minutes / Week: lecture, discussion **Structured Activity:** 2 x 60 minutes / Week (Through the case method with analysis of journal articles, current issues and problems of Ecology, through the project based learning to research on ecology) **Self-study Activity:** 2 x 60 minutes / Week (Students learn current issues and problems of ecology) **Practiucum in field:** 1 x 170 minutes/week/topic
Workload	

Type	**CSU**	**Face to Face**	**Structured Activities**	**Self-study**
T	**2**	26.7h (1.0 ECTS)	32h (1.21 ECTS)	32h (1.21 ECTS)
P	**1**	28.3 h (1.07 ECTS)		
		119 h (4.5 ECTS)		

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Credit Point	3 CSU (4,5 ECTS)
Requirements	Has taken courses in General Biology, Enviromental Science, Plant Physiology, Plant Morphology, Biodivesity and Classification, Evolution

Learning Outcome

PLO 2
They are able to apply the knowledge on basic and advanced biology to solve the problem in biology
PLO 6
They are able to demonstrate laboratory works, design and implement the experiment based on laboratory knowledge, skills, safety, environmental issue, and social ethics problem
PLO 7
Have the ability to solve problems within the scope of work, and present the results in an argumentative manner

CLO 1
Students are able to explain the complexity of interactions in ecology using ecological concepts at individual levels (autekology), populations, communities and ecosystems (synecology). (PLO 2)
CLO 2
Students are able to analyze ecological concepts at individual levels (species), populations, communities and ecosystems related to problem solving related to ecological imbalances. (PLO 2)
CLO 3
Students have practical ability to provide basic analysis in solving ecological problems. (PLO 6, PLO 7)
CLO 4
Students are able to evaluate conservation management practices using ecological concepts at individual levels (species), populations, communities and ecosystems. (PLO 5,PLO 6)

CLO/ PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO 10
CLO1		*								
CLO2		*								
CLO3							*			
CLO4						*				

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Learning Goals/Competencies	After taking this course, students are expected to be able to analyze ecological concepts in the complexity of the interaction between living things and their environment and apply them to solving problems related to ecology. Students are able to analyze interaction patterns between animals and their internal environment population and community and are able to apply understood concepts to their conservation
Content	This course is a compulsory subject for a study program that discusses: 1. Ecology science and its relation with the supporting science, 2. Species in the environment, Distribution and Abundance 3. Physiognomy (Life Form Type and Species Profile) 4. Populations ecology: Characteristics and Life History; 5. Populations ecology: survival, population growth, livelihood strategies; 6. Ecological research methodology 7. GIS and Mapping for Ecology 8. Ecology community: Characteristics of a plant community, interactions 9. Ecology community: trophic structure-energy flow-pyramid ecology, productivity 10. Ecology community: Native Species-Invasive Species 11. Ecology community: Disruption-Successi-, Biogeochemical Cycles 12. Aquatic and Terrestrial Ecosystems 13. Adaptation (Morphology, Physiology, Behavior) 14. Conservation and the Role of Plants in the Environment

Attribute Soft skill	1. Able to think conceptually, analitically, and logically Have good communication skills
Study/exam achievements	Student are required to attend the face-to-face lecture minimum 75% to be able to take Mid and Final exam. Students are considered to complete the course and pass if they obtain at least 60% of maximum final score. The final score (FS) is calculated based on the following ratio:

Aspect	(%)
Laboratory Activity	30
Paper task and Participation	10
Mid-Term Test	30
Final Exam	30
Final Score	100

Learning Methods	Lecture, discussion, and lab practices, field study
Form of Media	Power point slide, multimedia, specimen
Literature (primary references)	1. Krebs, C. J. (2009). Ecology the Experimental Analysis of Distribution and Abundance (6th ed). California: Benjamin Cummings. 2. Heddy, S. (2012). Metode Analisis Vegetasi dan Komunitas. Jakarta: Raja Grafindo Persada 3. Kareiva, P. (2014). Renewing the Dialogue between Theory and Experiments in Population Ecology. In Perspectives in ecological theory. Princeton : Princeton University Press. 4. Mathisen, K. M., & Skarpe, C. (2011). A handbook for collecting vegetation plot data in Minnesota: the releve method A handbook for collecting vegetation plot data in Minnesota. *Ecological research*, 26(3), 563-574. 5. Dombois, D.M., Heinz, E. (2016). Ekologi Vegetasi: Tujuan dan Metode. Jakarta: LIPI Press dan Yayasan Pustaka Obor Indonesia. 6. Yousman, Y. (2008). Google Earth. Yogyakarta: Penerbit Andi Offset. 7. Indrawan, M., Primack, R. B., Supriatna, J. (2012). Biologi Konservasi. Jakarta: Yayasan Obor 8. Koricheva, J., & Gurevitch, J. (2014). Uses and misuses of meta-analysis in plant ecology. *Journal of Ecology*, 102(4). Doi:10.1111/1365-2745.12224 9. Pandey, B. N. (2012). Ecology and Animal Behaviour, Vol. 4. New Delhi: Tata McGraw-Hill 10. Silvy, N. J. (2020). The Wildlife Techniques Manual: Volume 1: Research (7th ed). Baltimore: JHU Press. 11. Zsebők, S., Schmera, D., Laczi, M., Nagy, G., Vaskuti, É., Török, J., & Zsolt Garamszegi, L. (2021). A practical approach to measuring the acoustic diversity by community ecology methods. *Methods in Ecology and Evolution*, 12(5), 874-884. Doi:10.1111/2041-210X.13558 12. Steinberg, Christian, E. W. S. (2012). Stress Ecology; Environmental Stress as Ecological Driving Force and Key Player in Evolution. Dordrecht: Springer Science 13. Warchol, G., & Kapla, D. (2012). Policing the wilderness: A descriptive study of wildlife conservation officers in South Africa. *International Journal of Comparative and Applied Criminal Justice*, 36(2), 83-101. Doi:10.1080/01924036.2012.669911 14. Ryser-Degiorgis, M. P. (2013). Wildlife health

	investigations: needs, challenges and recommendations. *BMC veterinary research*, 9(1), 1-17. Doi: 10.1186/1746-6148-9-223

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Assessment

Presentation Assessment Rubric

Dimension	Weight (%)	Score	WxS	Comments
Material mastery	30			
The accuracy of solving the problem	30			
Communication skills	20			
Ability to deal with questions	10			
Props/presentations	10			
Final Score	100			

DIMENSION	Scale				
	Very Good	Good	Sufficient	Deficient	Very Deficient
	≥85	71-84	60-70	50-60	<50
Organization	Well organized by presenting facts that are supported by examples that have been analyzed according to the concept	well organized and present convincing facts to support conclusions.	The presentation has focus and presents some evidence to support the conclusion	Sufficiently focused, but insufficient evidence to be used in drawing conclusions	There is no clear organization. Facts are not used to support statements.
Content	Content can inspire listeners to develop their minds.	Contents are accurate and complete. Listeners get new insights about the topic.	Content is generally accurate, but incomplete. Listeners can learn some implied facts, but they don't add new insight into the topic	The content is less accurate, because there is no factual data, it does not add to the listener's understanding	The content is inaccurate or too general. Listeners don't learn anything or are sometimes misled.
Presentation Style	Speak with passion, transmit enthusiasm and enthusiasm to listeners	The speaker is calm and uses proper intonation, speaks without relying on notes, and interacts intensively with the listener. The speaker always makes eye contact with the listener.	In general the speaker is calm, but with a flat tone and quite often relies on notes. Sometimes eye contact with the listener is ignored.	Based on the notes, no ideas are developed outside the notes, the sound is monotonous	The speaker is anxious and uncomfortable, and reads notes rather than speaking. Listeners are often ignored. There is no eye contact because the speaker is looking more at the whiteboard or screen.

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PAPER ASSESSMENT RUBRIC

ASPECT	INDICATOR	SCORE
Background	All the descriptions in this section lead to the main problem and writing of the paper	4
	Just get to the point	3
	Irrelevant general statements	2
	No background	1
The aim of writing	The formulation of the purpose of writing is clear, pithy and systematic	4
	The formulation of the goal is long, but the goal is clear enough	3
	The formulation of objectives is stated in general and the purpose is not clear	2
	No goals written	1
Formulation of the problem	Problems are formulated in a clear, pithy and systematic way	4
	The formulation of the problem is prolonged, but the purpose is quite clear	3
	The formulation of the problem is stated in general terms and the purpose is not clear	2
	There is no written problem formulation	1
Writing Systematics	The systematics of logical writing follows the rules of writing scientific reports	4
	Systematic writing logical but not sequential	3
	Systematic writing is not logical and not in sequence	2
	There is no good writing systematic	1
Discussion	A systematic, logical, original and comprehensive discussion and presents the latest research results	4
	A systematic, logical, original and comprehensive discussion but does not present the latest research results	3
	The discussion is not systematic, logical and comprehensive and does not present the latest research results	2
	Short discussion and copy paste from the internet	1
Conclusion	Conclusions are drawn based on the discussion and the data presented in a clear, concise and systematic way	4
	Conclusions are not drawn based on the discussion and the data presented in a clear, concise and systematic way	3
	Conclusions are not drawn based on the discussion and the data presented are less clear, less concise and less systematic	2
	No conclusion written	1
Reference	Bibliography from trusted sources, following the rules of writing and up to date	4
	Bibliography from trusted sources, following the rules of writing, but not up to date	3
	The bibliography is not from a trusted source, does not follow the rules of writing and is not up-to-date	2
	There is no bibliography	1

CPL Assessment Instrument 06/LO 06 Have knowledge related to biological research methodology and its learning, can apply and publish the results

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PRACTICUM PERFORMANCE ASSESSMENT

Practicum Performance Observation Sheet

No	Name	Aspects of Performance Assessment										Total Score	Note
		1	2	3	4	5	6	7	8	9	10		
1													
2													
3													
4													
5													
Dst													

Information:
1 = Practical equipment
2 = Physical appearance readiness
3 = Interpret
4 = Predict
5 = Applying the concept
6 = Planning an experiment
7= Doing an experiment
8 = Communicate

Practicum Performance Assessment Rubric

No	Aspect	Criteria	Score
Preparation			
1	**Practical equipment**	Bring/prepare all (100%) tools and materials.	4
		Not bringing 25% of the total tools/materials or 25% of the total tools/materials not in accordance with the provisions.	3
		Not bringing 50% of the total tools/materials or 50% of the total tools/materials not in accordance with the provisions	2
		Not bringing 75% of the total tools/materials or 75% of the total tools/materials not in accordance with the provisions	1
2	**Physical appearance readiness**	Wearing field clothes and neat appearance	4
		Wearing field clothes and looking untidy (wearing shorts, or not wearing shoes)	3
		Do not wear field clothes and look presentable.	2
		Not wearing field clothes and looking untidy (wearing shorts, or not wearing shoes).	1
Using tools and materials			
3	**Discipline of practical tools/materials**	All tools/materials are taken neatly and not scattered.	4
		25% of the total tools/materials were taken untidy and scattered.	3
		50% of the total tools/materials were taken untidy and scattered.	2
		75% of the total tools/materials were taken untidy and scattered.	1
4	**Appropriateness of practical tools/materials**	All tools/materials are taken as needed.	4
		Take 25% of the total tools/materials that are not as needed.	3
		Take 50% of the total tools/materials that are not as needed.	2
		Taking 75% of the total tools/materials that are not as needed.	1
5	**Correct operation of the tool**	All tools are operated properly.	4
		25% of the total tools are operated incorrectly.	3
		50% of the total tools are operated incorrectly.	2
		75% of the total tools are operated incorrectly.	1
6	**Practicum Procedure**	Do 100% of the practical steps correctly.	4
		Do 75% of the practical steps correctly.	3
		Do 50% of the practical steps correctly.	2
		Do 25% of the practical steps correctly.	1

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Result			
7	**Practical result**	Using as many senses as possible in making observations and doing it carefully according to procedures	4
		Using few senses in making observations and doing it according to procedures	3
		Using as many senses as possible in making observations but not being thorough	2
		Observing the practical results at a glance	1
8	**Practical data**	Complete the table according to the results of observations, accompanied by pictures, and accompanied by additional data (information) on the results of the practicum (3 aspects are all fulfilled)	4
		Complete the table according to the results of observations, accompanied by pictures, or accompanied by additional data (information) on the results of the practicum (2 aspects are well fulfilled)	3
		Complete the table according to the results of observations, accompanied by pictures, and accompanied by additional data (information) on the results of the practicum (1 aspect is well fulfilled)	2
		Complete the table according to the results of observations, accompanied by pictures, and accompanied by additional data (information) on the results of the practicum (no aspect is fulfilled properly)	1
Closing			
9	**Cleanliness of tools that have been used**	All tools that have been used are cleaned properly and returned	4
		Clean all tools that have been used but are not completely clean and return them	3
		Only clean half of used tools and return them	2
		Only clean one or two tools and don't restore all tools	1
10	**Practice table cleaning**	Clean the table until it's really clean	4
		Cleaning the table but still leaving dirt or trash	3
		Only clean part of the side of the table	2
		The table is still dirty, but throw away the dirt or trash	1

PRACTICUM REPORT RUBRIC ASSESSMENT

No	Aspek	Score			
		1	2	3	4
1	Write the title and purpose of the practicum correctly				
2	Formulate the problem				
3	Write the theoretical basis clearly and concisely				
4	Arrange tools, materials and work steps appropriately				
5	Presenting data systematically and communicatively				
6	Analyze data and discussion comprehensively				
7	Drawing conclusions				
8	Writing bibliography				
9	Attachments (evidence of activities, documentation, interim reports)				
10	Timely collection				

EXAM

CLO	Question	
1	In an area there is a community consisting of plants, herbivorous insects, predatory insects, grain-eating birds, eagles, insectivorous birds, mice, rabbits, foxes, spiders, snakes, frogs. Make a design that depicts the transfer of energy and food in the community	

2	In an area there is a community consisting of plants, herbivorous insects, predatory insects, grain-eating birds, eagles, insectivorous birds, mice, rabbits, foxes, spiders, snakes, frogs. Make a design that depicts the transfer of energy and food in the community	
3	do a survey to see the ecological problems that occur around your place of residence, then make an ecological research design to describe and provide alternative solutions to these problems.	
4	As the new regional head, Pak Gibran makes a regional development plan. In the design, one of the design points is the construction of a toll road that cuts through the forest area which is a conservation area. If this is done: a. What will happen to the condition of Flora & Fauna and their habitat? b. What is your opinion? Give reasons if you agree to the development and provide alternative solutions if you reject the development	