

MODUL ECOLOGY AND ENVIRONMENTAL POLLUTION




MASTER PROGRAM OF ENVIRONMENTAL SCIENCE
SCHOOL OF POSTGRADUATE STUDIES
DIPONEGORO UNIVERSITY

Module Description::

Module Name	Ecology and Environmental Pollution
Module level, if applicable	
Code, if applicable	P-CIL-8-104
Subtitles, if any	
Course, if applicable	
Semester(s) in which the module is taught	Semester 1
Module Responsible	Prof. Dra. Norma Afiati, M.Si., Ph.D.
Teaching Lecturer	1. Prof. Dra. Norma Afiati, M.Si., Ph.D. 2. M. Arief Budihadrjo ST, M.Eng.Sc., Env.Eng. Ph. D 3. Dr. JafronWasiq Hidayat, M.Sc
Language	<i>Indonesian and English</i>
Relationship with curriculum	
Type of teaching, hours of contact	<i>Lectures: 1 x 180 minutes x 16 meetings = 48 hours/week Q&A: 1 x 30 minutes x 16 meetings = 8 hours/week Discussion: 1 x 30 minutes x 16 meetings = 8 hours/week Presentation: 1 x 30 minutes x 16 meetings = 8 hours/week Individual assignment: 60 minutes/day = 5 hours/week Total work for 1 semester = 150 hours = 6 ECTS</i>
Workload	<i>(Estimated) workload, divided into contact hours (lectures, exercises, laboratory sessions, etc.) and personal study, including test preparation, specified in hours,¹and overall.</i>
credit points	<i>3Credits / 6 ECTS</i>
Requirements according to the exam regulations	<i>Lecture attendance of at least 75%</i>
Recommended prerequisites	<i>For example, competence in...</i>

Modulethe desired learning objectives/outcomes	<ul style="list-style-type: none"> • Capable to describe that history from ecologicaldevelopment • Be able to explain the interrelationships of living things with their environment • Be able to explain important basic concepts in an ecosystem.
Fill	The Ecology and Environmental Pollution course is a compulsory subject in the Environmental Science master's program. The material presented includes an explanation of history and ecological approaches, the concept of environmental factors and their effects on living things, habitats and niches, responses and adaptations, populations, communities, ecosystems and environmental pollution.
Study and examexam requirements and forms	<ul style="list-style-type: none"> • <i>Open the book and close the book</i> • <i>Multiple choice, case studies, interviews, practicals</i>
Media used	<i>Powerpoint, youtube, website</i>
Read reference	<ul style="list-style-type: none"> • Campbell, Neil A. 2012. Biology. Issue 8. Erlangga, Jakarta. • Satrawijaya, A. Tresna. 1991. Environmental Pollution. Rinka Cipta. Jakarta • Bharti, KP and Chauhan, A. 2012. Environmental Pollution and Biodiversity. • Singh, JS, Singh, SP, and Gupta, SR 2014. Ecology and Environmental Science and Conservation. India: S. Chand Publishing. • Raven, PH, et al. 2022. Environment, 9th Edition 9th Edition. Wiley.

SEMESTER STUDY PLAN							
		Study program: Master of Environmental Science			Faculty: School of Postgraduate		
Subject:		Ecology and Environmental Pollution	Code: CIL-8-104	Credit:3 (6 ECTS)	smt:1		
Supporting lecturer:		<ol style="list-style-type: none"> 1. Prof. Norma Afiati, M.Sc, PhD 2. M. Arief Budihadrjo ST, M.Eng.Sc., Env.Eng. Ph.D 3. Dr. Jafron Wasiq Hidayat, M.Sc 					
Learning Outcomes Subject:		<ul style="list-style-type: none"> • Able to describe the history of ecological development • Able to describe the interrelationships of living things and their environment • Able to describe important basic concepts in an ecosystem. • Able to describe environmental pollution and its impact on living things 					
Short Description of Courses:		Ecology and Environmental Pollution Courses are compulsory subjects in the Environmental Science master's program. The material presented includes an explanation of the history and ecological approach, the concept of environmental factors and their effects on living things, habitats and niches, responses and adaptations, populations, communities, ecosystems and environmental pollution.					
1	2	3	4	5	6	7	
Week	Final Ability of each learning stage	Study Materials/ Subjects	Learning methods	Workload	Student Learning Experience	Evaluation	
						Criteria & Indicators	Weight (%)
1.	Introduction/ Lecture contract	Understand the preparation before face-to-face lectures and the obligation to report face-to-face lectures	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • Lecture:180 minutes • Q&A: 30 minutes • Discussion : 30 minutes • Presentation : 30 minutes Individual tasks: 60 minutes/day (16 weeks)	Understand preparation and lecture obligations	The level of students' understanding of the course contract	5

2.	Scope of Ecology	Each student gives an example of the scope of ecology	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture: 180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Read recommended Modules and libraries; Discussion of learning outcomes; Presentation of the results of the discussion	Accuracy in explaining the scope of ecology	5
3.	Living Creatures and Their Environment	Read recommended Modules and libraries; Observe environmental conditions; Discussion of learning outcomes; Presentation of the results of the discussion	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture: 180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	<ol style="list-style-type: none"> a. Discussion of the previous week's homework b. Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss 	Accuracy in explaining the components of environmental factors, the relationship between environmental factors	5
4.	Living Creatures and Their Environment	Read recommended Modules and libraries; Observe environmental conditions; Discussion of learning outcomes; Presentation of the results of the discussion	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture: 180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	<ol style="list-style-type: none"> a. Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments 	Accuracy in explaining the interaction of animals and the environment	5
5.	Living Creatures and Their Environment	Read recommended Modules and	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of:	a. Students listen to the lecturer's explanation and	Accuracy in explaining the interaction of	5

		libraries; Observe environmental conditions; Discussion of learning outcomes; Presentation of the results of the discussion		<ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments	plants with the environment	
6.	Habitats and Niches	Observe environmental conditions; discuss habitats and niches of living things, Discussion of learning outcomes; Presentation of results	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	a. Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments (system characterization)	Accuracy in explaining the definition of Habitat, Niche and the Concept of Competitive Exclusion	5
7.	Individuals and Population	Observe environmental conditions regarding the interaction of living things, forms of adaptation; Read the recommended modules; Discussion of learning outcomes; Presentation of	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	a. Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments (influence diagram)	Accuracy in explaining the response to living things, adaptations of living things, animal behavior, local populations and ecological races,	5

		the results of the discussion					
8	Mid Term Examination	Meeting Material 1-7	Independent Written Test	330 minutes of processing time or the equivalent of 0.25 ECTS	Students working on UTS questions	Quality of answers and timeliness of collection	10
9.	Individuals and Population	Observe environmental conditions regarding the interaction of living things, forms of adaptation; Read the recommended modules; Discussion of learning outcomes; Presentation of the results of the discussion	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	a. Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments	Accuracy in explaining population characteristics and variations, population calculation methods, population interactions	5
10.	Community Structure	Read the recommended modules; Observe environmental conditions; Discussion of learning outcomes; Presentation of the results of the discussion	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	a. Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments	Accuracy in explaining Definition of community, Ecological Succession	5
11.	Ecosystem	Read the recommended modules;	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> 	a. Students listen to the lecturer's explanation and	Accuracy in explaining the concept of	5

		Observe environmental conditions; Discussion of learning outcomes; Presentation of the results of the discussion		<ul style="list-style-type: none"> • Q&A: 30 minutes • Discussion : 30 minutes • Presentation : 30 minutes • Individual tasks: 60 minutes/day (16 weeks) 	answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments	ecosystems, energy flow in ecosystems, ecosystem productivity	
12.	Ecosystem	Read the recommended modules; Observe environmental conditions; Discussion of learning outcomes; Presentation of the results of the discussion	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • Lecture:180 minutes • Q&A: 30 minutes • Discussion : 30 minutes • Presentation : 30 minutes • Individual tasks: 60 minutes/day (16 weeks) 	a. Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments	Accuracy in explaining the types of food and how to obtain food in animals	5
13.	Ecosystem	Read the recommended modules; Observe environmental conditions; Discussion of learning outcomes; Presentation of the results of the discussion	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • Lecture:180 minutes • Q&A: 30 minutes • Discussion : 30 minutes • Presentation : 30 minutes • Individual tasks: 60 minutes/day (16 weeks) 	a. Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments (model verification and validation)	Accuracy in explaining processes in biogeochemical cycles	5

14.	Ecosystem	Read the recommended modules; Observe environmental conditions; Discussion of learning outcomes; Presentation of the results of the discussion	Lectures, questions and answers, and discussions	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	a. Students listen to the lecturer's explanation and answer the lecturer's questions, as well as discuss b. Discussion of the results of the previous week's group assignments (model analysis)	Accuracy in explaining ecosystem types	5
15.	Environmental pollution	Read the recommended modules; Observe environmental conditions; Discussion of learning outcomes; Presentation of the results of the discussion	Student presentations, discussions, and questions and answers	330min (0.375 ECTS) Consist of: <ul style="list-style-type: none"> • <i>Lecture:180 minutes</i> • <i>Q&A: 30 minutes</i> • <i>Discussion : 30 minutes</i> • <i>Presentation : 30 minutes</i> • <i>Individual tasks: 60 minutes/day (16 weeks)</i> 	Final presentation of group assignments. Each group presents the results of their assignments for 1 semester followed by discussion and question and answer with other groups of students. Lecturer guides the discussion	Accuracy in explaining the definition of environmental pollution, its causes and impacts on living things on earth	5
16	Final Examination	Meeting Materials 1-15 (resume material)	Written test	330 minutes of processing time or the equivalent of 0.25 ECTS	Students working on UAS questions	Quality of answers and timeliness of collection	20
8. Reference List:		<ol style="list-style-type: none"> 1. Campbell, Neil A. 2012. Biology. Edition 8. Erlangga, Jakarta. 2. Dasman F. 1980. Principles of Ecology for Development. grammar. Jakarta. 3. 3. Lakshmi, Prihantoro. 1989. Man and Environment (Man and Environmental). FPMIPA IKIP Bandung. Bandung. 4. Soerjani, Moh., et al.; 1987. Environment: Natural Resources and Population in Development. University of Indonesia. Jakarta. 					

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| 5. Ryadi, ALS 1983. Ecology, Environmental Science, Fundamentals and Understanding. National Effort. Surabaya. |
| 6. Soeriatmadja. 1987. Environmental Science. ITB. Bandung. |
| 7. Satrawijaya, A. Tresna. 1991. Environmental Pollution. Rineka Cipta. Jakarta |

