SEMESTER LEARNING ACTIVITY PLANS (SLAP)

SEMESTER ODD 2022/2023

Physics Undergraduate Study Program

Physics Department

Environmental Physics

MFF 3891/ 2 Credits

Lecturer Coordinator:

Drs. Sunarta, MS
Drs. Wagini, MSc.

UNIVERSITAS GADJAH MADA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
2022

	Universitas Gadjah Mada Faculty of Mathematics and Natural Science Physics Department / Physics Undergraduate Study Program Semester ODD 2022/2023	**Document Number :** ……

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Code	Course Name	Credits (Credits)		Semester	Status	Prerequisite
MFF 3891	*Environmental Physics*	*T: 2*	*P: …*	*ODD*	*Elective*	*None*

Short Description	Environmental Physics is an elective course to add insight and practice analysis by applying the physical/physics abilities acquired during lectures. The linkages of this course to other fields of science are extensive, such as: chemistry, Biology, health sciences, and the sciences related to the environment. The outline of the study material from this course is to identify the impact of pollution, analyze it, and provide a method of solving it. The benefits obtained by students and the strategic value for achieving a graduate profile are that students get practical problems in the field/environment and can determine solutions to existing cases, especially environmental pollution problems. Also hope to form a graduate profile as a Physics Bachelor who can directly apply the Physics knowledge he has mastered to environmental-related problems.	
Program Learning Outcomes (PLO) Imposed on the Course	***PLO 2***	Knowledge. Able to explain theoretical concepts and principles of classical and modern physics and able to apply basic concepts of physics and related mathematical methods in finding solutions to physical problems.
	PLO 5	Long Life Learning. Able to analyze various alternative solutions to physical problems and conclude them for appropriate decision-making, both in familiar and new problems.
Course Outcomes (CO)	**After completing this course, students are expected to be able to:**	
	CO1	Knowing and understanding the history of life on Earth, the thermodynamic state of the Earth, changes in environmental conditions, as well as humans and their activities
	CO2	Know and understand environmental problems; take the role of protecting and managing the environment from a physical and analytical approach.
	CO3	Get to know the sources and characteristics of environmental pollution in general.
	CO4	Recognize the types of pollution in the soil and water environment caused by heavy metals
	CO5	Analyze physically, especially the type of pollution from liquid waste and industrial waste
	CO6	Identify, analyze and conclude ways of handling pollution in the field.

		Learning Materials	Learning Methods	Time Allocation
The Correlation of CO to Learning Materials and Methods, and Time Allocation	***CO 1***	The history of life on earth, a thermodynamic review of the state of the earth, changes in environmental conditions, the environment (natural resources, living natural resources, and environmental conditions), humans and their activities	TCL-SCL mixed	***2X50 minutes***
	CO 2	Environmental problems, the role of science (physics) as a contribution to	TCL-SCL mixed	***2X50 minutes***

		maintaining and managing the environment		
	CO 3	Sources and nature of environmental pollution	TCL-SCL mixed	***2X50 minutes***
	CO 3	Environmental Radiation	TCL-SCL mixed	***2X50 minutes***
	CO 4	Pollution of soil and water	TCL-SCL mixed	***2X50 minutes***
	CO 4	Metal type pollutant	TCL-SCL mixed	***4X50 minutes***
	Midterm exam/Project Task Results/Case Analysis Results			
	CO 5	Handling and treatment of liquid waste		***4X50 minutes***
	CO 5	Identification of the home industry		***4X50 minutes***
	CO 6	Field survey		***6X50 minutes***
	Final exams/ Project Task Results/Case Analysis Results			

Learning Methods	**SCL (Student Centered Learning): Project-based learning (Team-based Project)/Case-based learning/PBL/other SCL methods**
Student Learning Experience	**Listen, ask, answer questions and discuss**
Access to Learning Media/ LMS and Offline and Online Percentage	Offline (LCD, PPT Slide, Whiteboard, Laptop) and Online (Zoom Meeting, Google Meet, Google Classroom)

Assessment Methods and Synchronization with CO

Assessment Methods	Assessment Percentage	Criteria/ Indicators	CO1	CO2	CO3	CO4	CO5	CO6
Participatory Activity*								
Project Results/ Case Study Results/ PBL Results*	**20**		√	√	√	√	√	√
Cognitive								
Assignment	**10**		√	√	√	√	√	√
Quiz	**10**		√	√	√	√	√	√
Midterm Exam	**30**		√	√	√	√		
Final Exam	**30**						√	√
Total	**100**							

*) can also be obtained from the Midterm or Final Exam as the result of participatory activities or project/ case study results. According to IKU 7, the percentage of project results/ case study/ PBL results is at least 50%.

References

Main References;

1. Smith C., 2011, Environmental Physics; .
2. Monteith J., 2007, Principles of Environmental Physics, Univ. of Nottingham.
3. Wagini, 2009, Fisika Lingkungan, Jurusan Fisika FMIPA UGM.

<table>
<tr><td>Lecturers (Team Teaching)</td><td colspan="4">1. Drs. Sunarta, MS
2. Drs. Wagini, MSc.</td></tr>
<tr><td rowspan="2">Authorization</td><td>Date of Drafting</td><td>Lecturer Coordinator</td><td>Head of Curriculum Committee</td><td>Head of Study Program</td></tr>
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