PROGRAM PLAN AND SEMESTER LEARNING ACTIVITIES (RPKPS) SCHOOL YEAR 2021/2022

Physical Geophysics

Environmental Geophysics

MFG 4721/ 2 credits

Mentoring Team:

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2021

	Gadjah Mada University Faculty of Mathematics and Natural Sciences Department of Physics / S1 Geophysics Study Program Academic Year 2021/2022	**Document Code:** .....

SEMESTER LEARNING PROGRAM AND ACTIVITY PLAN (RPKPS)

Course Code	Course Name	Weight (credit)		Semester	Course Status	Prerequisite Courses
MFG 4721	*Geophysical Context*	*T: 2*	*P: -*	*Odd*	*Choice*	*All Geophysical Methods Courses*

Course Brief Description

The Environmental Geophysics course is held to provide Geophysics Study Program students with an understanding of the importance of maintaining environmental quality, and recognizing various kinds of environmental pollution. In this lecture, various geophysical techniques or methods are studied to identify various environmental problems, both caused by nature, such as earthquakes, volcanic eruptions, tsunamis, floods, landslides, and so on, as well as those caused by humans such as groundwater pollution, seawater intrusion and subsidence, mining activities, vibration, radioactivity, heat, electromagnetic waves, noise, etc.

Because of its applied nature, the Environmental Geophysics course is held by applying interactive learning methods, namely: learning methods that communicate geophysical theories or methods to be used in *problem solving* environmental problems.

In this course, students are introduced to the SCL *(Student Centered Learning)* method, meaning that in the teaching and learning process the role of students is very dominant, lecturers only act as facilitators and motivators. As reference material in this lecture, in addition to various textbooks, research journals that can be accessed via the internet, research reports, materials in various government / private agencies, and through direct measurements in the field.

After taking this course, students are expected to understand the basics of environmental geophysics, so that if they later work in industry, especially in the fields of geophysics and geology, they will have the ability to work based on environmental conservation concepts, and if they have to plan a geophysical project activity, then they will have basic knowledge about the preparation of Environmental Impact Assessment (AMDAL).

Because geographically Indonesia is located in an area prone to geological disasters, this course is also expected to equip students to have fast response and actively participate in solving various environmental problems, both personally and through the institution where they work.

This course aims to enable students to identify potential environmental problems, especially those related to the field of geophysics / geology using various geophysical techniques / methods, so as to minimize the impact caused. In addition, students are also expected to be able to contribute in solving various environmental problems that have occurred, both caused by nature and humans.

<table>
<tr><td rowspan="3">Graduate Learning Outcomes (CPL) Charged to MK</td><td>CPL2</td><td>Mastery of knowledge: Graduates are able to apply basic science (mathematics, physics, chemistry, biology, geology), and geophysics in general and their relationship with other sciences such as geology, geodesy, geochemistry, geography, computing and information technology.</td></tr>
<tr><td>CPL3</td><td>Operational and comprehensive skills: Graduates are able to apply all geophysical methods (seismic, gravitational, magnetic, electrical, electromagnetic, and thermic methods) for energy exploration (e.g. oil and gas, coal, geothermal), mining materials (eg: iron, copper, gold, silver, tin) as well as groundwater and disaster mitigation</td></tr>
<tr><td>CPL4</td><td>Application and analysis skills: Graduates are able to carry out and manage a geophysical survey which includes scientific steps in the acquisition, processing and interpretation of data for the exploration of natural resources both for energy (e.g. oil and gas, coal, for energy exploration (e.g. oil and gas, coal, geothermal), mining materials (eg: iron, copper, gold, silver, tin) as well as groundwater and disaster mitigation</td></tr>
<tr><td rowspan="3">Course Learning Outcomes (CPMK)</td><td colspan="2">After completing the learning of this course, students are expected to be able to:</td></tr>
<tr><td>CPMK1</td><td>Students are able to understand environmental issues and Environmental Law [CPL-2, CPL-3]</td></tr>
<tr><td>CPMK2</td><td>Students are able to identify various environmental problems with geophysical techniques / methods [CPL-2, CPL-3, CPL-4]</td></tr>
<tr><td>CPL Mapping with CPMK</td><td colspan="2"><table><tr><th></th><th>CPMK1</th><th>CPMK2</th></tr><tr><td>CPL-2</td><td></td><td></td></tr><tr><td>CPL-3</td><td></td><td></td></tr><tr><td>CPL-4</td><td></td><td></td></tr></table></td></tr>
<tr><td rowspan="6">CPMK link with Learning Material and Form, as well as Time Allocation</td><td></td><td>Learning Materials</td><td>Forms of Learning</td><td>Time Allocation</td></tr>
<tr><td>CPMK1</td><td>Environmental definition, Environmental Law and AMDAL Document</td><td>TCL, SCL, and Discussion</td><td>2 Hours</td></tr>
<tr><td>CPMK2</td><td>Identify environmental impacts due to earthquakes with various geophysical techniques/methods</td><td>SCL and Discussion</td><td>2 Hours</td></tr>
<tr><td>CPMK2</td><td>Identification of environmental impacts due to tsunamis with various geophysical techniques / methods</td><td>SCL and Discussion</td><td>2 Hours</td></tr>
<tr><td>CPMK2</td><td>Identification of environmental impacts due to volcanic eruptions with various geophysical techniques/methods</td><td>SCL and Discussion</td><td>2 Hours</td></tr>
<tr><td>CPMK2</td><td>Identify environmental impacts due to soil</td><td>SCL and Discussion</td><td>2 Hours</td></tr>
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		Avalanches with various geophysical		
	CPMK2	Identification of environmental impacts due to flooding with various geophysical	SCL and Discussion	2 Hours
	CPMK2	Identification of environmental impacts due to groundwater pollution with various geophysical	SCL and Discussion	2 Hours
UTS/Project Task Results/Case Analysis				
	CPMK2	Identification of environmental impacts due to seawater intrusion and subsidence with various geophysical	SCL and Discussion	2 Hours
	CPMK2	Identification of environmental impacts due to household and industrial waste pollution with various geophysical techniques / methods	SCL and Discussion	2 Hours
	CPMK2	Identification of environmental impacts due to pollution in mining activities with various geophysical techniques / methods	SCL and Discussion	2 Hours
	CPMK2	Identification of environmental impacts due to vibration pollution in civil buildings with various geophysical techniques / methods	SCL and Discussion	2 Hours
	CPMK2	Identify environmental impacts due to electromagnetic wave pollution, temperature, and noise with various geophysical	SCL and Discussion	2 Hours
	CPMK2	Field practice of identifying environmental pollution with	Discussion	2 Hours
	CPMK2	Reporting of research results	SCL and Discussion	2 Hours

		small		
UAS/ Project Task Results/ Case Analysis				
Learning Methods	Lectures and Discussions			
Student Learning Experience				
Access to Learning Media an/ LMS and Offline &; Online Percentage	LCD, Geophysical Equipment, paper, google classroom/ internet			

Assessment Methods and Alignment with CPMK

Assessment Techniques	Assessment Percentage	Criteria/ Indicator	CPMK 1	CPMK 2		
Participatory Activities[*)]						
***Project Results*/Case Study Results/PBL Results**[*)]						
Cognitive						
Assignment	**20**		√	√		
Quiz	**-**					
UTS	**20**		√			
UAS	**60**			√		
Total	**100**					

[*)] can also be obtained from UTS or UAS which is the result of participatory activities or *project* / case study results. In accordance with IKU 7, **the percentage of** participatory activities and project results/case studies/PBL results is at least 50%.

Reference List

1. Ward, S.H., Editor 1990, *Geotechnical and Environmental Geophysics*, SEG.
2. Davis, M.L. and Cornwell, D.A., 1991, *Introduction to Environmental Engineering*, McGraw Hill, Inc.
3. Journals, research reports, articles on websites, etc.

Name of Lecturer	Dr.Wahyudi,, M.S.

(*Team Teaching*				
Authorization	**Drafting Date**	**Course Coordinator**	**Coordinator of Expertise (if any)**	**Head of Study Program**
	August 3 2022	*(Signature)*		