

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



Physical Geophysics
Rock Mechanics
MFG 4715/ 2 credits

Mentoring Team:
Sismanto

**UNIVERSITAS GADJAH
MADA FACULTY OF
MATHEMATICS AND
NATURAL SCIENCES
2021**



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

**Dokume
Code n:**


.....
...

SEMESTER LEARNING PROGRAM AND ACTIVITY PLAN (RPKPS)

Course Code	Course Name	Weight (credit)		Semester	Course Status	Prerequisite Course
MFG 4715	<i>Rock Mechanics</i>	<i>T</i> : <i>2</i>	<i>P: -</i>	<i>Odd</i>	<i>Choice</i>	MFF-1 401
Course Brief Description	<p>The scope of Rock Mechanics includes stress and strain analysis; Analysis of stress on the plane, Mohr circle of stress, strain analysis. Physical properties and mechanical properties of rocks; Determination of physical and mechanical properties of rocks in the laboratory, Determination of in situ mechanical properties. Rock behavior; elastic, elastoplastic, creep rock, relaxation rock, stress and strain relationships for linear elastic behavior and isotropes. Criterion "Failure" rocks; Mohr theory, Mohr - Coulomb criterion, Maximum tensile stress criterion, Maximum shear stress criterion and in situ stress measurement within rock mass; Rosette deformation method, Flat jack method, over coring method, Hydraulic fracturing. Technical classification of rock masses; important actor-factors in the classification of rocks, the nature of rock masses, the classification of rock masses.</p> <p>After attending rock mechanics lectures, students are expected to be able to explain concepts and solve basic or simple problems of rock mechanics systems in an integrated and comprehensive manner.</p>					
Graduate Learning Outcomes (CPL) Charged to MK	CPL-1	Attitude: Graduates are honest, disciplined, curious, critical, confident, independent, emotionally mature, cooperative, and trustworthy. Uphold norms, values, morals, religion, general ethics and professional ethics, and actively play a role in the <i>global movement of sustainable development</i> and behave professionally.				
	CPL-2	Mastery of general 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.				
	CPL-3	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.				
Learning Outcomes	After completing the learning of this course, students are expected to be able to:					

Course (CPMK)	CPMK-1	Have an honest, disciplined, curious, critical, confident, independent, emotionally mature, cooperative, and trustworthy nature and uphold norms, values, morals, religion, general ethics and professional ethics, and actively play a role in the <i>global sustainable development</i> movement and behave professionally through discussions, assignment presentations, and task work. [CPL-1)																						
	CPMK-2	Provides insight into rock definition, rock composition, rock mechanics definition, rock properties, some features of rock mechanics, some issues in rock mechanics, scope of rock mechanics [CPL-2]																						
	CPMK-3	Provide stress and strain analysis; Analysis of stress on the plane, Mohr circle of stress, strain analysis. Physical properties and mechanical properties of rocks; Determination of physical and mechanical properties of rocks in the laboratory, Determination of in situ mechanical properties. Rock behavior; Elastic, elastoplastic, creep rock, relaxation rock, stress and strain relationships for linear elastic behavior and isotropes. Criterion "Failure" rocks; Mohr theory, Mohr - Coulomb criterion, Maximum tensile stress criterion, Maximum shear stress criterion [CPL-3]																						
	CPMK-4	Provides in situ stress measurement analysis within the rock mass; Rosette deformation method, Flat jack method, over coring method, Hydraulic fracturing. Technical classification of rock masses; important actor-factors in the classification of rocks, the nature of rock masses, the classification of rock masses. [CPL-2, and CPL-3]																						
CPL mapping with CPMK	<table border="1"> <thead> <tr> <th></th> <th>CPMK1</th> <th>CPMK2</th> <th>CPMK3</th> <th>CPMK4</th> </tr> </thead> <tbody> <tr> <td>CPL-1</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CPL-2</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CPL-3</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					CPMK1	CPMK2	CPMK3	CPMK4	CPL-1					CPL-2					CPL-3				
	CPMK1	CPMK2	CPMK3	CPMK4																				
CPL-1																								
CPL-2																								
CPL-3																								
The Relationship of CPMK with Learning Materials and Forms, as well as Time Allocation		Learning Materials	Forms of Learning	Time Allocation																				
	CPMK2	Rocks and rock mechanics	SCL	2 Hours																				
	CPMK2	Stress and strain analysis	SCL	2 Hours																				
	CPMK2	Physical properties and mechanical properties	SCL	2 Hours																				
	CPMK2	Rock Behavior	SCL	2 Hours																				
	CPMK2	Criteria "Failure" of rocks	SCL	2 Hours																				
	CPMK2	Voltage distribution around the tunnel	SCL	2 Hours																				
	CPMK3	Measurement of in situ stresses in rock masses	SCL	2 Hours																				
	UTS/Project Task Results/Case Analysis Results																							
CPMK3	Technical classification of rock masses	SCL	2 Hours																					

		Important factors in rock classification, rock mass properties, rock mass classification, rock lead classification methods and stand up time				
	CPMK3	Technical classification of rock masses Rock Quality Designation Index Method, rock structure rating concept method			SCL	2 Hours
	CPMK3	Technical classification of rock masses Geomechanical classification methods, Q and NATM systems			SCL	2 Hours
	CPMK3	Application Examples Technical classification of rock masses Examples of			SCL	2 Hours
	CPMK3, CPMK1	Student group presentation I			SCL	2 Hours
	CPMK3, CPMK1	Student group presentation II			SCL	2 Hours
	CPMK3, CPMK1	Student group presentation III			SCL	2 hours
UAS/ Project Task Results/ Case Analysis						
Learning Methods	SCL, discussions, assignments and lectures					
Student Learning Experience	Listen to lecturers' explanations, discussions and presentations					
Access Learning Media / LMS and Offline & Online Percentage	Classroom, Whiteboard, LCD, Powerpoint					
Assessment Methods and Alignment with CPMK	Assessment Techniques	Assessment Percentage	Criteria/ Indicators	CPMK-1	CPMK-2	CPMK-3
	Participatory Activities^{*)}	10	Attend and present			
	Project Results / Case Study / PBL Results^{*)}					
	Assignment	10	Paper/file			
	Quiz					
	UTS	40	Value			
	UAS	40	Value			
Total	100					

	*) can also be obtained from UTS or UAS which is the result of participatory activities or <i>project</i> / 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	<ol style="list-style-type: none"> 1. Rai, M.A., 1988, Rock Mechanics, Geotechnical Laboratory, PAU-Engineering Science, ITB Bandung. 2. E. FJÆR,R.M.HOLT,P.HORSRUD, and A.M. RAAEN&R.RISNES, 2008. PETROLEUM RELATED ROCK MECHANICS. 2nd EDITION, Elsevier Radarweg 29, PO Box 211 1000 AE Amsterdam The Netherlands 			
Name of Lecturer (Team Teaching)	Sismanto			
Authorization	Drafting Date	Course Coordinator	Coordinator of Expertise (if applicable)	Head of Study Progra
	2020			 Dr. Sudarmaji Msi