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



Geophysics of Heat and Mass Transfer MFG4623/ 2 credits

Mentoring Team: Heat and Mass Transfer Assistance Team

> UNIVERSITAS GADJAH MADA FACULTY OF MATHEMATICS AND NATURAL SCIENCES 2022



## Gadjah Mada University

Faculty of Mathematics and Natural Sciences Department of Physics / S1 Geophysics Study Program Odd Semester 2022/2023 **Document Code:** 

Hour

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## **SEMESTER LEARNING PROGRAM AND ACTIVITY PLAN (RPKPS) Course Code** Course Name | Weight (credit) **Course Status Prerequisite Courses** Semester Heat and Mass MFG4623 *T*: 2 *P*: -Odd Choice Transfer **Course Brief** The Heat and Mass Transfer course is held to provide an understanding of the physical processes of heat and mass transfer, Fourier's law for heat conductivity, heat transfer by conduction, the Description computational basis of heat conductivity in steady state, conservation of mass, mass momentum and energy. Mastery of knowledge: Graduates are able to apply basic science (mathematics, physics, Graduate CPL-2 chemistry, biology, geology), and geophysics in general and their relationship with other Learning sciences such as geology, geodesy, geochemistry, geography, computing and information Outcomes technology (CPL) Operational and comprehensive skills: Graduates are able to apply all geophysical methods CPL-3 Charged to (seismic, gravitational, magnetic, electrical, electromagnetic, and thermic methods) for MK energy exploration (e.g. oil and gas, coal, geothermal), mining materials (eg: iron, copper, gold, silver, tin) as well as groundwater and disaster mitigation. After completing the learning of this course, students are expected to be able to: Course Learning CPMK-1 Students are able to understand the concepts of heat and mass transfer, their use, Outcomes Fourier's law for heat conductivity, heat transfer by conduction, the computational (CPMK) basis of heat conductivity, and the 1D and 2D heat conductivity equations under steady state conditions. Students are able to understand the physical equations of conservation of mass, mass *СРМК-2* momentum, and energy, and the Reynolds transfer equation. **CPL** mapping with **CPMK** CPMK1 CPMK2 CPL-2 CPL-3 The **Learning Materials Forms of Learning Time Allocation Relationship of** CPMK1 The concept of heat transfer presentation 2 **CPMK** with 2 CPMK1 Heat transfer applications presentation Learning Materials and CPMK1 Fourier's law for heat conductivity 2 presentation Forms, as well Hour as Time CPMK1 Computing basis on heat 2 presentation Allocation

conductivity

	CPMK1	1D heat condu	ctivity equation	n steady	presentation		2	
		state condition	s	5	1		Hour	
	СРМК1	Thermal conductivity equation of			presentation		2	
		unsteady state conditions			-		Hour	
	UTS/Project Task Results/Case Analysis							
	СРМК2	Conservation of	of mass		presentation		2	
	СРМК2	Reynolds trans	sport		Drones and equipm	ient	2	
	СРМК2	Conservation of	of mass momen	ntum I	presentation		2	
	СРМК2	Conservation of mass momentum II		ntum II	presentation		2	
	СРМК2	Conservation of energy I			presentation		2	
	СРМК2	Conservation of energy II			presentation		4	
		U.	AS/ Project Ta	ask Resul	ts/ Case Analysis	•		
Learning	Blended Learnin	g and Studen	t Based Learn	ing				
Methods								
Student	<b>T</b> , <b>1</b>	1 1						
Learning	Lectures in class a	and discussions	S.					
Experience								
Access	LCD, Whiteboard, Laptop, Zoom Meeting and Google meet							
Learning Media								
/ LMS								
and Offline &;								
Online								
Assessment			Contract					
НАзасааннсни	Assessment	Assessment	Criteria/	CPMK	K-1   CPMK-	2		
Methods and	Assessment Techniques	Assessment Percentage	Indicators	СРМК	К-1 СРМК-	2		
Assessment Methods and Alignment	Assessment Techniques Participatory	Assessment Percentage	Indicators	СРМК	К-1 СРМК-	2		
Assessment Methods and Alignment with CPMK	Assessment Techniques Participatory Activities <sup>*</sup> )	Assessment Percentage	Indicators	СРМК	(-1 CPMK-	2		
Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*</sup>)</u> <i>Project</i> <i>Results/</i> Case	Assessment Percentage	Indicators	СРМК	<u> СРМК-</u>	2		
Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*)</sup></u> <i>Project</i> <i>Results/</i> Case Study	Assessment Percentage	Indicators	СРМК	<u>с-1</u> СРМК-	2		
Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*</sup>)</u> <i>Project</i> <i>Results/</i> Case Study Results/PBL	Assessment Percentage	Indicators	СРМК	<u>с-1</u> СРМК-	2		
Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*</sup>)</u> <i>Project</i> <i>Results</i> /Case Study Results/PBL <u>Results<sup>*</sup>)</u> <i>Cognitiue</i>	Assessment Percentage	Indicators	СРМК		2		
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Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*</sup>)</u> <i>Project</i> <i>Results</i> /Case Study Results/PBL <u>Results<sup>*</sup>)</u> <u>Cognitive</u> <u>Assignment</u> Quiz	Assessment Percentage	Indicators		<u>с-1</u> СРМК-	2		
Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*</sup>)</u> <i>Project</i> <i>Results/</i> Case Study Results/PBL Results <sup>*</sup> ) <u>Cognitive</u> <u>Assignment</u> <u>Quiz</u> UTS	Assessment Percentage	UTS scores		СРМК-	2		
Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*</sup>)</u> <i>Project</i> <i>Results/</i> Case Study Results/PBL <u>Results<sup>*</sup>)</u> <u>Cognitive</u> <u>Assignment</u> <u>Quiz</u> UTS UAS	Assessment Percentage	UTS scores UAS value		4-1 СРМК-			
Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*</sup>)</u> <i>Project</i> <i>Results/</i> Case Study Results/PBL Results <sup>*</sup> ) <u>Cognitive</u> <u>Assignment</u> <u>Quiz</u> UTS UAS Total <sup>*</sup> ) con also he abte	Assessment Percentage	UTS scores UAS value					
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Assessment Methods and Alignment with CPMK Reference List	Assessment Techniques Participatory Activities*) Project Results/Case Study Results/PBL Results*) Cognitive Assignment Quiz UTS UAS Total *) can also be obta study results. In results/case stud 1. Lecturer notel 2. Rajput, Er. R. 3. Lienhard, J. H	Assessment Percentage 50 50 100 ained from UT n accordance ies/PBL result book K. 2012. Heat I. 2020. A heat	UTS scores UTS scores UAS value S or UAS whi with IKU 7, s is at least 509 t and Mass Tra t transfer text b	ch is the r the perc %.	CPMK- CPMK- CPMK- Chand &; Company Sigiston press.	2	es or <i>project /</i> cas vities and projec	e
Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*</sup>)</u> <i>Project</i> <i>Results/</i> Case Study Results/PBL <u>Results<sup>*</sup>)</u> <u>Cognitive</u> <u>Assignment</u> <u>Quiz</u> <u>UTS</u> <u>UAS</u> <u>Total</u> <sup>*)</sup> can also be obta study results. In results/case stud 1. Lecturer notel 2. Rajput, Er. R. 3. Lienhard, J. H	Assessment Percentage 50 50 100 ained from UT n accordance ies/PBL result book K. 2012. Heat I. 2020. A heat	UTS scores UTS scores UAS value S or UAS whi with IKU 7, s is at least 509 t and Mass Tra t transfer text b	CPMk ch is the r the perc %. unsfer. S. C	Chand &; Company ogiston press.	2	es or <i>project</i> / cas vities and projec	e
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Assessment Methods and Alignment with CPMK	Assessment <u>Techniques</u> Participatory <u>Activities<sup>*</sup>)</u> <i>Project</i> <i>Results/</i> Case Study Results/PBL <u>Results<sup>*</sup>)</u> <u>Cognitive</u> <u>Assignment</u> <u>Quiz</u> <u>UTS</u> <u>UAS</u> <u>Total</u> <sup>*)</sup> can also be obta study results. In results/case stud 1. Lecturer notel 2. Rajput, Er. R. 3. Lienhard, J. H	Assessment Percentage 50 50 100 ained from UT n accordance ies/PBL result book K. 2012. Heat I. 2020. A heat	UTS scores UTS scores UAS value S or UAS whi with IKU 7, s is at least 50% t and Mass Tra	ch is the r the perc 26.	Chand &; Company ogiston press.	2	es or <i>project</i> / cas vities and projec	eext

Name of Lecturer ( <i>Team</i>	<ol> <li>Dr. Budi Eka Nurcahya, M.Si.</li> <li>Dr. rer. Nat. Herlan Darmawan, M.Sc</li> </ol>						
Teaching)							
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