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

Physical Geophysics

Aero and Satellite Geophysics

MFG4629/ 2 credits

Mentoring Team:

Aero and Satellite Geophysics

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	**Document Code:** .....

SEMESTER LEARNING PROGRAM AND ACTIVITY PLAN (RPKPS)

Course Code	Course Name	Weight (credit)		Semester	Course Status	Prerequisite Courses
MFG4975	*Aero and Satellite Geophysics*	*T: 2*	*P: -*	*Odd*	*Choice*	MFG-2102

Course Brief Description	The Aero and Satellite Geophysics course is held to provide understanding to S1 Geophysics Study Program students about measurement/data acquisition, data processing, and interpretation of data taken aero/satellite, either using airplanes, UAVs (Unmanned Aerial Vehicles), or satellites. In this course, various methods and techniques of geophysical surveys will be discussed in more depth using aircraft, UAVs and satellites. Because of its applied nature, the Aero and Satellite Geophysics course is held by applying interactive learning methods, namely: learning methods that communicate theoretical theories to be applied in carrying out research. 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 are only facilitators and motivators. As reference material in this lecture, in addition to textbooks, research journals, research reports, as well as other materials that can be accessed via the internet. The preparation of the Semester Learning Program and Activities Plan (RPKPS) is intended to provide an overview of the learning plan of a course held in one semester. The purpose of this course is for students to be able to understand data measurement/acquisition, data processing, and interpretation of data taken aero/satellite, whether using aircraft, UAV, or satellite.	
Graduate Learning Outcomes (CPL) Charged to MK	***CPL-2***	**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
	CPL-4	**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
	CPL-5	**Synthesis and Evaluation Skills** : Graduates are able to interpret geophysical data in the form of solving advanced and reverse problems (inverse problems) in an integrated manner that have ambiguous characters, carry out interpretation by making models and / or solving simple forward and reverse problems and are skilled in the use of computers both for the purposes of solving geophysical problems and for communication and internet access
Learning Outcomes	**After completing the learning of this course, students are expected to be able to:**	

Course (CPMK)	***CPMK-1***	Students are able to understand the use of satellite data for earth science and are able to explain satellite data acquisition techniques for radar, optics, altimetry, airborne magnetic, gravity, and drone photogrammetry [CPL-2]
	CPMK-2	Students are able to apply, and utilize satellite data and drone photogrammetry for earth science [CPL-4]
	CPMK-3	Students present the results of drone data collection and processing and interpretation through weekly presentations [CPL-5]
CPL mapping with CPMK		

	CPMK1	CPMK2	CPMK3
CPL-2			
CPL-4			
CPL-5			

The Relationship of CPMK with Learning Materials and Forms, as well as Time Allocation		**Learning Materials**	**Forms of Learning**	**Time Allocation**
	CPMK1	Applications of satellite data for earth science	presentation	2 Hour
	CPMK1	Basic Theory of Radar Satellites	presentation	2 Hours
	CPMK1	Amplitude and phase radar data processing techniques for mapping flood and deformation areas	presentation	2 Hours
	CPMK1	Theoretical basis of optical satellites, processing and interpretation	presentation	2 Hour
	CPMK1	Theoretical basis of satellite altimetry, processing, and interpretation	presentation	2 Hour
	CPMK1	Basic magnetic airborne theory, processing, and interpretation	presentation	2 Hour
	UTS/Project Task Results/Case Analysis			
	CPMK1	Basic theory of airborne gravity, processing, and interpretation	presentation	2 Hour
	CPMK1	Students understand the basic theory of structure from motion	Drones and equipment	2 Hour
	CPMK2	Photogrammetry drone acquisition	presentation	2
	CPMK2	Drone data processing for 3D model reconstruction	presentation	2 Hour
	CPMK3	Map creation and interpretation of drone data	presentation	2 Hour
	CPMK3	Presentation of mapping, processing, and interpretation results	presentation	4 Hour
	UAS/ Project Task Results/ Case Analysis			
Learning Methods	**Blended Learning and Student Based Learning**			
Student Learning Experience	Class lectures, discussions, data acquisition and processing, presentations			
Access Learning Media / LMS	LCD, Whiteboard, Laptop, Zoom Meeting and Google meet			

and Offline &; Online Percentage						
Assessment Methods and Alignment with CPMK	**Assessment Techniques**	**Assessment Percentage**	**Criteria/ Indicators**	**CPMK-1**	**CPMK-2**	**CPMK -3**
	Participatory Activities*)					
	***Project Results/*Case Study Results/PBL Results*)**	**50**	**Project Assessment**			
	Cognitive					
	Assignment					
	Quiz					
	UTS	**25**	**UTS scores**			
	UAS	**25**	**UAS value**			
	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. K Hehl - Gravity and Geoid, 1995. Fundamentals And Applications of Digital Filtering in Airborne Gravimetry. Springer. 2. LP Kgotlhang - 2008. Application of airborne geophysics in large scale hydrological mapping; Okavango Delta, Botswana. e-collection. library. ethz.ch 3. W. M. Telford, W. M. Telford, L.P. Geldart, R.E. Sheriff – 1990. Applied Geophysics. books.google.com. 4. https://sentinel.esa.int/web/sentinel/home 5. http://www.radartutorial.eu 6. Szelinski, R. 2010. Computer Vision: Algorithm and Applications. Springer 7. And websites about other satellite data					
Name of Lecturer (*Team Teaching*)	Dr. rer. Nat. Herlan Darmawan, M.Sc					
Authorization	**Drafting Date**	**Course Coordinator**		**Coordinator of Expertise (if applicable)**		**Head of Study Program**
	August 10 2022	*Dr.rer.nat. Herlan Darmawan,MSc*		Dr. rer.nat. Ade Anggraini, M.T.		 Dr. Sudarmaji, MSi