SEMESTER LEARNING ACTIVITY PLANS (SLAP) SEMESTER ODD 2022/2023



Analysis and Visualization of Geoscience Data MFF5925 / 2 Credits

Lecturer Coordinator:

Dr. Theodosius Marwan Irnaka, S.Si., M.Sc.

UNIVERSITAS GADJAH MADA FACULTY OF MATHEMATICS AND NATURAL SCIENCE 2022

SEME Course Name alysis and	Credits	ING ACTIVI										
Name	Credits		SEMESTER LEARNING ACTIVITY PLANS (SLAP)									
alveis and	(credits)	Semester	Status	Prerequisite								
sualizatio n of eoscience Data	2	Odd	Elective	None								
Curriculum Master Physics Study Program, Faculty of Mathematics and Natural Science UGM. The syllabus of this course is as follows: This course contains visualization techniques and strategies in the field of geoscience. Color selection techniques, strategies, and data representation in geoscience cases. Data visualization using the relevant programming language (Python, R, Julia). Use Generic Mapping Tools (GMT) for spatial visualization of geoscientific data. Data visualization using basic software (Microsoft Office). Techniques and strategies for data representation using ArcGIS and QGIS. Compile images and graphics using Inkscape. The courses are held in class for 14 weeks, each week's session last for 2 x 50 minutes. Four weeks of course period is used for Midterm Exam and Final Exam, each held for two weeks as scheduled. Student evaluation for course assessments is performed summative and formative. The summative evaluation is implemented as written exams, both Midterm and Final Exam, which take a maximum of 120 minutes. The formative evaluation is implemented as individual assignments for each student in the form of completing an assignment individually. Monitoring is carried out by observing student activities during the course, such as attendance, Q&A and discussion about the material presented, and student performance												
LO 3 LO 4 LO 5	relationship with physics specializ research develop Mastering variou physics, and able computational to problems related Able to plan, man able to create and physics to study a Physics that prod Able to apply known	other disciplines ation that allows ments. as mathematical of to develop physical of to develop physical of to an advanced of nage and carry of d use modeling a and solve a prob luces models, ma owledge to analy chensively in one	s, and has mastered an him to keep up with the disciplines related to an ical models using vari or multidisciplinary ap field of physics. ut experiments and con nd simulations based of lem in a scientific field ethods, or theories tested vze, synthesize, formul e of advanced field of p	advanced field of he latest international n advanced field of ous mathematical and oproach to solving nclude the results, or be on the basic principles of d of Physics or applied ed and innovative. ate problems and solve ohysics, through								
	Data alysis and Vi rriculum Mass e syllabus of is course con- hniques, strat gramming la oscientific dat data represer e courses are urse period is dent evaluat luation is imp nutes. The for completing an course, such completing in	Dataalysis and Visualization of Georriculum Master Physics Study Fe syllabus of this course is as folis course contains visualizationhniques, strategies, and data repogramming language (Python, R,oscientific data. Data visualizationdata representation using ArcGIe courses are held in class for 1urse period is used for Midterm Fdent evaluation for course asuluation is implemented as writtennutes. The formative evaluationcompleting an assignment individecourse, such as attendance, Q&Acompleting individual assignmerLO 3Mastering furtherrelationship withphysics, and ablecomputational toproblems relatedAble to plan, maable to create andphysics to studyLO 5Physics that proceAble to apply knproblems compresentation	Dataalysis and Visualization of Geoscience Data cour rriculum Master Physics Study Program, Faculty of e syllabus of this course is as follows: is course contains visualization techniques and st hniques, strategies, and data representation in geo gramming language (Python, R, Julia). Use Gener oscientific data. Data visualization using basic soft data representation using ArcGIS and QGIS. Com- e courses are held in class for 14 weeks, each we urse period is used for Midterm Exam and Final Ex- dent evaluation for course assessments is performative evaluation is implemented as written exams, both Mid- nutes. The formative evaluation is implemented as completing an assignment individually. Monitoring course, such as attendance, Q&A and discussion a completing individual assignments.LO 3Mastering further knowledge of c relationship with other disciplines physics specialization that allows research developments.LO 4Able to plan, manage and carry o able to create and use modeling a physics to study and solve a probi Physics that produces models, me Able to apply knowledge to analy problems comprehensively in one experimental or theoretical resear	Data Also alysis and Visualization of Geoscience Data course is Elective course 2 corriculum Master Physics Study Program, Faculty of Mathematics and Nature e syllabus of this course is as follows: e syllabus of this course is as follows: is course contains visualization techniques and strategies in the field of funiques, strategies, and data representation in geoscience cases. Data visu gramming language (Python, R, Julia). Use Generic Mapping Tools (GMT scientific data. Data visualization using basic software (Microsoft Office) data representation using ArcGIS and QGIS. Compile images and graphics e courses are held in class for 14 weeks, each week's session last for 2 x urse period is used for Midterm Exam and Final Exam, each held for two we dent evaluation for course assessments is performed summative and duation is implemented as written exams, both Midterm and Final Exam, while utes. The formative evaluation is implemented as individual assignments completing an assignment individually. Monitoring is carried out by observ course, such as attendance, Q&A and discussion about the material present completing individual assignments. LO 3 Mastering further knowledge of classical and modern pl relationship with other disciplines, and has mastered an physics specialization that allows him to keep up with th research developments. LO 4 Mastering various mathematical disciplines related to an physics to study and solve a problem in a scientific field Physics to study and solve a problem in a scientific field Physics to study and solve a problem in a scientific field Physics that produces models, methods, or theories teste Able to plan, manage and carry out experiments and cor able to create and use modeling and simulations based or physics to study and solve a problem in a scientific field Physics that produces models								

	PLO 7	Able to communicate and discuss of and mastery of various problems in in Indonesian and English, as well results of the study and mastery, an or scientific journals.	the field of physics and other as being able to document and	related fields save the				
Course	Upon compl	etion of this course, students should be able to:						
Outcomes	CO1	Identify and design the most appropriate visualization strategy for geoscience						
(CO)	001	data.						
	<i>CO2</i>	Create visualization results using Microsoft Office, Inkscape, Python, R, and Julia.						
	CO3	Create spatial data visualizations using the Generic Mapping Tool, QGIS, and ArcGIS.						
	<i>CO4</i>							
	CO5							
	CO6							
	<i>C07</i>							
	CO8							
The Correlation of		Learning Materials	Learning Methods	Time Allocation				
CO to								
Learning	<i>CO1</i>			2 x 50				
Materials and				minutes				
Methods, and	<i>CO1</i>			2 x 50				
Time				minutes				
Allocation	<i>CO1</i>			2 x 50				
				minutes				
	<i>CO2</i>			2 x 50				
				minutes				
	<i>CO2</i>			2 x 50				
				minutes				
	<i>CO2</i>			2 x 50				
				minutes				
	<i>CO2</i>			2 x 50				
				minutes				
	<i>CO3</i>			2 x 50				
				minutes				
	СОЗ			2 x 50				
				minutes				
	СО3			2 x 50				
				minutes				
	<i>CO4</i>			2 x 50				
				minutes				
	<i>CO4</i>			2 x 50				
				minutes				
	<i>CO4</i>			2 x 50				
				minutes				

	<i>CO4</i>							2 x 50
								minutes
Laguning		Fina	al Exam/ Proje	ect Task Re	sults/ Case .	Analysis I	Kesults	
Learning Methods								
Student	Learn to analyze and review: , , , , , , , , , .							
Learning								
Experience								
Access to Learning								
Media/ LMS								
and Offline								
and Online								
Percentage								
Assessment Methods and								1
Synchronizati	Assessment		Assessment	Criteria/I		CON	CO2	COA
on with CO	Methods		Percentage	dicators	CO1	CO2	CO3	CO4
	Participator	y						
	Project Resu	ults/						
	Case Study							
	Results/ PBI	Ĺ						
	Results*							
	Cognitive						7.50/	7.50
	Assignment Quiz		30%		7,5%	7,5%	7,5%	7,5%
	Midterm Ex	zom	35%		17,5%	17,5%		
	Final Exam	am	35%		17,570	17,570	17,5%	17,5%
				l'altanea an	Ein al En ana			1
	*) 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 referen	ces:						
	1. Graser, A. (2016). Learning Qgis. Packt Publishing Ltd.							
	 Joshi, A., & Lakhanpal, R. (2017). Learning Julia: Build high-performance applications for scientific computing. Packt Publishing Ltd. Tutorial, G. M. T. (2015). THE GENERIC MAPPING TOOLS. Yim, A., Chung, C., & Yu, A. (2018). Matplotlib for Python Developers: Effective techniques for data visualization with Python. Packt Publishing Ltd. Magister Physics Student, 							
	2014-2016, Pa	aper and	Presentation A	ssignments				
Lecturers	1. Dr. Theodo	osius Ma	rwan Irnaka, S.S	i., M.Sc.				
(Team	2. Dr.rer.nat. Herlan Darmawan, M.Sc.							
Teaching)	3. 4.							
Authorization	Date of	τ.	terror Court	H	Iead of Cur	riculum	Hea	d of Study
	Date of DraftingLecturer CoordinatorHead of Curriculum CommitteeHead of Study					•		

	Dr. Theodosius Marwan Irnaka, S.Si., M.Sc.	Dr.Ing. Ari Setiawan	Mirza Satriawan, M.Si., Ph.D
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