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



Physics Undergraduate Study Program Physics Department Measurement Technique in Physics MFF 1061/ 2 Credits

> Lecturer Coordinator: Drs., Sunarta, M.S.

UNIVERSITAS GADJAH MADA FACULTY OF MATHEMATICS AND NATURAL SCIENCE 2022



Universitas Gadjah Mada Faculty of Mathematics and Natural Science Physics Department / Physics Undergraduate Study Program Semester ODD 2022/2023

Document Number :

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SEMESTER LEARNING ACTIVITY PLANS (SLAP)

Code	Course Name	Credits (Credits)	Semester	Status	Pr	erequisite		
MFF 1061	Measurement	<i>T</i> : 2 <i>P</i> :	ODD	Compulsory		None		
	Technique in							
	The Mesey	romont Toohniquo	in Dhusias agurea	ia indiananaahla f	naioring in physics			
Short Description	who will later p knowledge. This cours measurements of understanding of from the criteria of the multi-me results; make gr that the results of Many physic that they can ma this course can research for the processing, so a course will give	The Measurement Technique in Physics course is indispensable for students majoring in physics, will later play a role in developing science and technology to understand better and apply their ledge. This course will be presented the Definition of Measurement and the importance of taking urements correctly; How to process measurement data; introduction of measuring instruments, standing of tolerances for measurement results, rejecting observational data that deviate too much the criteria used in data analysis, choosing the suitable measurement method; compare the results e multi-methods and conclude which method is suitable and draw conclusions about the weighted is; make graphs of observations and analyzes correctly; and taught how to make accurate reports, so he results can be justified scientifically. Many physics graduates work as research experts or lecturers who must also be able to research so hey can master measurement methodologies and be skilled in processing measurement data so that course can provide sufficient provisions for the profession. Besides that, students also have to do rch for their final project. This cannot be separated from the problem of observation and data essing, so since lectures, they must be equipped with the abilities that the measurement method e will give.						
Program Learning	rogram learningPLO 2Knowledge. Able to explain theoretical concepts and principles of classical modern physics and able to apply basic concepts of physics and related mathematical methods in finding solutions to physical problems							
Outcomes (PLO) Imposed on the Course	PLO 5	PLO 5 Long Life Learning. Able to analyze various alternative solutions to physical problems and conclude them for appropriate decision-making, both in familiar at new problems.						
	After completing this course, students are expected to be able to:							
	<i>CO1</i>	Having a "common sense" of measurement is high.						
	CO2	Mastering the process of analyzing measurement data and using measuring methods appropriately. So get accurate results.						
Course	СОЗ	Able to conduct rejection of measurement results data that is suspected of deviation from the expected data.						
Outcomes (CO)	<i>CO4</i>	Able to analyze data with correct regression.						
	<i>CO5</i>	Able to compare th	ne results of multip	ble methods, choos	methods, choose the best method, and produce			
		a weighted value.						
	<i>CO6</i> Able to appropriately develop measurement methodology and selecting instrument for object detection							
		Learning N	Materials	Learning M	lethods	Time Allocation		

	<i>CO1</i>	Introduction to PHYSICS TCL-SCL mixed				b	2X50 minutes				
		Measurement	Vietnods			T	1	<u> </u>			
	CO3	Determination Method				1	2X50 minutes				
		Determination Method				4	2850				
	03	Error propagai			TCL-SC		1	2AJU MUNUUUS			
	<i>c</i>	Presentation of final results & ICL-SCL mixed				1					
	03	significant figures (significant				2A50 minutes					
		<u>(Composition of</u>	mparison of measuring TCL-SCL mixed								
	CO2	methods and weighted average				u	2X50 minutes				
	02	values					mules				
The Correlation		The use of linear regression TCL SCL mixed									
of CO to	<i>CO4</i>	method in data	analysis		2X5			2X50 m	minutes		
Learning		The use of line	ar regression		TCL-SCL mixed						
Materials and	<i>CO4</i>	method in data						2X50 minutes			
Methods, and	Midterm evem/Project Task Results/Case Analysis Results										
Time Allocation		Graph of obser	bservation and TCL-SCL mixed			d l					
	<i>CO4</i>	analysis	vation and		ICL SC		4	2X50 minutes			
		Normal Distril	oution and		TCL-SC	L mixe	d	+			
	CO5	Gaussian Func	tions			2X50 mi			inutes		
		Measurement	Data Rejection		TCL-SCL mixed						
	CO3	Method					2X50 minutes				
	<i>CO5</i>	Calibration Method TCL-SCL mixed				d	2X50 minutes				
	<i>CO5</i>	Bridge Method	1	TCL-SCL mixed			d	2X50 minutes			
	<i>CO6</i>	Experiment Re	eport	TCL-SCL mixed			2X50 minutes				
	<i>CO6</i>	Experiment Re	eport		TCL-SC	L mixe	d	2X50 minutes			
		Final exan	ns/ Project Task R	esults/C:	ase Ana	lysis Re	sults				
Learning	SCL (Student Centered Learning): Project-based learning (Team-based Project)/Case-based										
Methods	learning/PBL/other SCL methods										
Student Learning Experience	 (1) Read teaching materials before lectures. (2) Fill out the questionnaire. (3) Practice calculating errors with a calculator. (4) Working on practice questions, discussed. 										
	(1) Read teachin (2) Fill out the c practice question	ng materials be juestionnaire. (. ns, discussed.	fore lectures. 3) Practice calcula	ting erro	ors with	a calcu	lator. (4) Working	g on		
Access to Learning Media/ LMS and Offline and Online Percentage	 (1) Read teachin (2) Fill out the operative question Offline (LCD, Pl Classroom) 	ng materials bef juestionnaire. (Ans, discussed. PT Slide, Whitel	Fore lectures. 3) Practice calcula board, Laptop) and	ting erro Online (2	ors with	a calcu	lator. (4 Google N) Working Meet, Goog	; on Jle		
Access to Learning Media/ LMS and Offline and Online Percentage Assessment	 (1) Read teachin (2) Fill out the opractice question Offline (LCD, Pl Classroom) Assessment 	ng materials bef juestionnaire. (2 ns, discussed. PT Slide, Whitel Assessment	Fore lectures. 3) Practice calcula board, Laptop) and board, Criteria/	ting erro Online (2	ors with Zoom M	a calcul eeting, (CO3	lator. (4 Google N) Working Meet, Goog CO5	; on ;le CO6		
Access to Learning Media/ LMS and Offline and Online Percentage Assessment Methods and	(1) Read teachin (2) Fill out the opractice question Offline (LCD, Pl Classroom) Assessment Methods	ng materials bef uestionnaire. (Ans, discussed. PT Slide, Whitel Assessment Percentage	Fore lectures. 3) Practice calcular board, Laptop) and Criteria/ Indicators	ting erro Online (2 CO1	ors with Zoom M	a calcul eeting, (CO3	lator. (4 Google N CO4) Working /leet, Goog CO5	; on ;le CO6		
Access to Learning Media/ LMS and Offline and Online Percentage Assessment Methods and Synchronizatio	 (1) Read teachin (2) Fill out the operation Offline (LCD, Pl Classroom) Assessment Methods Participatory Activity* 	ng materials bef juestionnaire. (2 ns, discussed. PT Slide, Whitel Assessment Percentage	Fore lectures. B) Practice calcula board, Laptop) and Criteria/ Indicators	ting error Online (2 CO1	ors with Zoom M CO2	a calcul eeting, (CO3	lator. (4 Google M CO4) Working Meet, Goog CO5	g on gle CO6		
Access to Learning Media/ LMS and Offline and Online Percentage Assessment Methods and Synchronizatio n with CO	 (1) Read teachin (2) Fill out the operation Offline (LCD, Pl Classroom) Assessment Methods Participatory Activity* Project 	ng materials bef questionnaire. (ans, discussed. PT Slide, Whitel Assessment Percentage	Fore lectures. 3) Practice calcula board, Laptop) and Criteria/ Indicators	ting erro Online (2 CO1	Zoom M	a calcul eeting, (CO3	lator. (4 Google N CO4) Working /Ieet, Goog CO5	; on the the CO6		

	Study Results/		[
	Cognitive								
	Homework	10		1	√	√	√	√	√
	Quiz	10		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	Midterm	40		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	Exam							ļ.,	
	Final Exam	40		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	1
	Total	100							
	*) 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 References; 1. Taylor, J. R.1992. An Introduction to Error Analysis. University Science Book.California 2. Bevington, P. R.1999. Data Reduction and Error Analysis for the Physical Science. Mc Graw- Hill Book Co 3. Dulfer G, H & Fadeli., 1974. Metode Pengukuran & Analisa Data; FIPA-UGM 4. Darmawan Djonoputro; 1984. "Teori Ketidakpastian Menggunakan satuan SI"; ITB.Bandung 5. Staf Lab. Fisika Dasar, Jurusan Fisika-FMIPA UGM; 2012; "Petunjuk Praktikum Fisika Dasar Jurusan Fisika"; FMIPA-UGM Yogyakarta 6. Sunarta; Laporan LIT-2017 "Metode Jembatan Wheatstone untuk deteksi besaran Kelistrikan"; Dana Masyarakat UGM tahun 2017. 								
Lecturers (Team Teaching)	Drs., Sunarta, M.S.								
Authorization	Date of Drafting	Lecturer	· Coordinator	H Cur Cor	ead of riculum nmittee	H	ead of S	tudy Pro	ogram
		Drs., S	unarta, M.S.			Ku.	Dr. E. sumaatn	ng. Ahma 1aja, S.Si.	d , M.Sc.