

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



Research Methodology
MFF5001 / 2 Credits

Lecturer Coordinator:
Dr. Mitrayana, S.Si., M.Si.

**UNIVERSITAS GADJAH MADA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
2022**



Universitas Gadjah Mada

Faculty of Mathematics and Natural Science

Physics Department / Study Program Master Physics

Semester Odd/Even 2022/2023

SEMESTER LEARNING ACTIVITY PLANS (SLAP)

Code	Course Name	Credits (credits)	Semester	Status	Prerequisite								
<i>MF5001</i>	<i>Research Methodology</i>	2	<i>Odd/Even</i>	<i>Compulsory</i>	<i>None</i>								
Short Description	<p>Research Methodology course is Compulsory course 2 credits (Theory) in the 2022 Curriculum Master Physics Study Program, Faculty of Mathematics and Natural Science UGM.</p> <p>The syllabus of this course is as follows: Introduction: the nature of science and research, the general framework of research as a scientific process which includes the definition of scientific research, the scientific method, and the research benefits. The rational model of the research process. Research design: research type, research substance, topic selection, implementation plan, problem formulation, research method, financing plan design. Research proposal: basic research and applied research, purpose and structure of the proposal, general guidelines for proposal preparation. Presentation, research report writing, and research publications include writing style and scientific article writing. Overview of IPR (Intellectual Property Rights) and its scope.</p> <p>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.</p> <p>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 in completing individual assignments.</p>												
Program Learning Outcomes (PLO) Imposed on the Course	<table border="1"> <tbody> <tr> <td>PLO 3</td> <td>Mastering further knowledge of classical and modern physics theory, and its relationship with other disciplines, and has mastered an advanced field of physics specialization that allows him to keep up with the latest international research developments.</td> </tr> <tr> <td>PLO 5</td> <td>Able to plan, manage and carry out experiments and conclude the results, or be able to create and use modeling and simulations based on the basic principles of physics to study and solve a problem in a scientific field of Physics or applied Physics that produces models, methods, or theories tested and innovative.</td> </tr> <tr> <td>PLO 6</td> <td>Able to apply knowledge to analyze, synthesize, formulate problems and solve problems comprehensively in one of advanced field of physics, through experimental or theoretical research, then be able to classify and draw conclusions about their findings for the development of science and technology.</td> </tr> <tr> <td>PLO 7</td> <td>Able to communicate and discuss orally and in writing the results of studies, and mastery of various problems in the field of physics and other related fields in Indonesian and English, as well as being able to document and save the</td> </tr> </tbody> </table>					PLO 3	Mastering further knowledge of classical and modern physics theory, and its relationship with other disciplines, and has mastered an advanced field of physics specialization that allows him to keep up with the latest international research developments.	PLO 5	Able to plan, manage and carry out experiments and conclude the results, or be able to create and use modeling and simulations based on the basic principles of physics to study and solve a problem in a scientific field of Physics or applied Physics that produces models, methods, or theories tested and innovative.	PLO 6	Able to apply knowledge to analyze, synthesize, formulate problems and solve problems comprehensively in one of advanced field of physics, through experimental or theoretical research, then be able to classify and draw conclusions about their findings for the development of science and technology.	PLO 7	Able to communicate and discuss orally and in writing the results of studies, and mastery of various problems in the field of physics and other related fields in Indonesian and English, as well as being able to document and save the
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		results of the study and mastery, and publish them in reputable scientific forums or scientific journals.		
Course Outcomes (CO)	Upon completion of this course, students should be able to:			
	<i>CO1</i>	Prepare a thesis research proposal according to his interests		
	<i>CO2</i>	Analyze experimental data according to scientific rules		
	<i>CO3</i>	Explain and describe the process of making international paper		
	<i>CO4</i>	Explain and describe the process related to intellectual property rights		
	<i>CO5</i>			
	<i>CO6</i>			
	<i>CO7</i>			
	<i>CO8</i>			
The Correlation of CO to Learning Materials and Methods, and Time Allocation		Learning Materials	Learning Methods	Time Allocation
	<i>CO1</i>	Introduction: the nature of science and research, the general framework of research as a scientific process which includes the definition of scientific research, scientific methods and the benefits of research. Introduction: the nature of science and research, the general framework of research as a scientific process which includes the definition of scientific research, scientific methods and the benefits of research.	Lecture, discussion	2 x 50 minutes
	<i>CO1</i>	Research design: research type, research substance, topic selection, implementation plan, problem formulation, research method, financing plan design.	Lecture, discussion	2 x 50 minutes
	<i>CO1</i>	Research proposal: Basic research and Applied Research	Lecture, discussion	2 x 50 minutes
	<i>CO2</i>	Purpose and structure of the proposal, general guidelines for the preparation of proposals.	Lecture, discussion	2 x 50 minutes
	<i>CO2</i>	Measurement and Data analysis: Introduction, uncertainty in measurement, types of uncertainty in experiment.	Lecture, discussion	2 x 50 minutes
	<i>CO2</i>	Accuracy and Precision, Important Images, Absolute Uncertainty, fractions and percentages.	Lecture, discussion	2 x 50 minutes

	CO2	Estimating uncertainty using statistics, Combining uncertainties, Linear least squares fits, Comparing results.	Lecture, discussion	2 x 50 minutes														
	CO3	Research report presentation.	Lecture, discussion	2 x 50 minutes														
	CO3	Research report writing.	Lecture, discussion	2 x 50 minutes														
	CO3	Research publications covering the style of writing and writing scientific articles 1.	Lecture, discussion	2 x 50 minutes														
	CO4	Research publications that include the style of writing and writing scientific articles 2.	Lecture, discussion	2 x 50 minutes														
	CO4	Overview of IPR (Intellectual Property Rights) and its scope 1.	Lecture, discussion	2 x 50 minutes														
	CO4	Overview of IPR (Intellectual Property Rights) and its scope 2.	Lecture, discussion	2 x 50 minutes														
	CO4	Overview of IPR (Intellectual Property Rights) and its scope 3.	Lecture, discussion	2 x 50 minutes														
	Final Exam/ Project Task Results/ Case Analysis Results																	
Learning Methods	Lecture, discussion																	
Student Learning Experience	<p>Learn to analyze and review: Introduction: the nature of science and research, the general framework of research as a scientific process which includes the definition of scientific research, scientific methods and the benefits of research.</p> <p>Introduction: the nature of science and research, the general framework of research as a scientific process which includes the definition of scientific research, scientific methods and the benefits of research.,</p> <p>Research design: research type, research substance, topic selection, implementation plan, problem formulation, research method, financing plan design., Research proposal: Basic research and Applied Research, Purpose and structure of the proposal, general guidelines for the preparation of proposals.,</p> <p>Measurement and Data analysis: Introduction, uncertainty in measurement, types of uncertainty in experiment., Accuracy and Precision, Important Images, Absolute Uncertainty, fractions and percentages., Estimating uncertainty using statistics, Combining uncertainties, Linear least squares fits, Comparing results., Research report presentation., Research report writing., Research publications covering the style of writing and writing scientific articles 1., Research publications that include the style of writing and writing scientific articles 2., Overview of IPR (Intellectual Property Rights) and its scope 1., Overview of IPR (Intellectual Property Rights) and its scope 2., Overview of IPR (Intellectual Property Rights) and its scope 3..</p>																	
Access to Learning Media/ LMS and Offline and Online Percentage	LCD, whiteboard, laptop, Zoom Meeting and Google Classroom																	
Assessment Methods and Synchronization with CO	<table border="1"> <thead> <tr> <th>Assessment Methods</th> <th>Assessment Percentage</th> <th>Criteria/Indicators</th> <th>CO1</th> <th>CO2</th> <th>CO3</th> <th>CO4</th> </tr> </thead> <tbody> <tr> <td>Participatory Activity*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Assessment Methods	Assessment Percentage	Criteria/Indicators	CO1	CO2	CO3	CO4	Participatory Activity*						
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Participatory Activity*																		

	Project Results/ Case Study Results/ PBL Results*						
	Cognitive						
	Assignment	30%		7,5%	7,5%	7,5%	7,5%
	Quiz						
	Midterm Exam	35%		17,5%	17,5%		
	Final Exam	35%				17,5%	17,5%
	*) 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. Stock, M., 1985, A Practical Guide to Graduate Research, McGraw-Hill Book Co., New York, USA. 2. Sukandarrumidi, 2002, Research Methodology, Practical Guide for Beginner Researchers, Gadjah Mada University Press, Yogyakarta. 3. Gulö, W., 2003, Research Methodology, PT Grasindo, Jakarta. 4. Suryabrata, S., 2003, Research Methodology, ed.2 Cet.15, PT Raja Grafindo Persada, Jakarta.						
Lecturers (Team Teaching)	1. Dr. Mitrayana, S.Si., M.Si. 2. Dr. Sholihun, M.Si. 3. Dr.rer.nat. Wiwit Suryanto, S.Si., M.Si. 4. Prof. Dr.Eng. Yusril Yusuf, S.Si., M.Si.						
Authorization	Date of Drafting	Lecturer Coordinator		Head of Curriculum Committee		Head of Study Program	
		<i>Dr. Mitrayana, S.Si., M.Si.</i>		Dr.Ing. Ari Setiawan		Mirza Satriawan, M.Si., Ph.D	