

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



Functional Analysis for Physicist
MFF5022 / 2 Credits

Lecturer Coordinator:
Dr.rer.nat. Muhammad Farchani Rosyid, 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 Even 2022/2023

SEMESTER LEARNING ACTIVITY PLANS (SLAP)

Code	Course Name	Credits (credits)	Semester	Status	Prerequisite														
<i>MF5022</i>	<i>Functional Analysis for Physicist</i>	2	<i>Even</i>	<i>Elective</i>	<i>None</i>														
Short Description	<p>Functional Analysis for Physicist course is Elective 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: Hilbert space, Geometry of Hilbert space, orthonormal basis, operator theory in Hilbert space, types of operators in Hilbert space, Banach space, operator theory in Banach space, Hahn-Banach theorem, spectral theorem, its application in physics.</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 4</td> <td>Mastering various mathematical disciplines related to an advanced field of physics, and able to develop physical models using various mathematical and computational tools with an inter or multidisciplinary approach to solving problems related to an advanced field of physics.</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></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></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 4	Mastering various mathematical disciplines related to an advanced field of physics, and able to develop physical models using various mathematical and computational tools with an inter or multidisciplinary approach to solving problems related to an advanced field of physics.	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.								
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Course Outcomes (CO)	Upon completion of this course, students should be able to:																		
	<i>CO1</i>	Understand and master the basic concepts of functional analysis.																	
	<i>CO2</i>	Understand and master the main theorems of functional analysis.																	

Assessment Methods and Synchronization with CO	Assessment Methods	Assessment Percentage	Criteria/Indicators	CO1	CO2	CO3	CO4	
	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. Linear Operators in Hilbert Space, Joachim Weidmann, Springer-Verlag, Berlin, 1980. 2. Elementary Functional Analysis, Barbara D. MacCluer, Springer-Verlag, Berlin, 2009.						
Lecturers (Team Teaching)	1. Dr.rer.nat. Muhammad Farchani Rosyid, M.Si. 2. 3. 4.							
Authorization	Date of Drafting	Lecturer Coordinator	Head of Curriculum Committee		Head of Study Program			
		<i>Dr.rer.nat. Muhammad Farchani Rosyid, M.Si.</i>	Dr.Ing. Ari Setiawan		Mirza Satriawan, M.Si., Ph.D			