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



Group Theory for Physicist MFF5005 / 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 Odd 2022/2023						
SEMESTER LEARNING ACTIVITY PLANS (SLAP)							
Code	Course Name	Credits (credits)	Semester	Status	Prerequisite		
<i>MFF5005</i>	Group Theory for Physicist	2	Odd	Elective	None		
Short Description Program	Group Theory Physics Study I The syllabus of 1. Semigroups a inverse element of subgroups, n semi-direct 2. Homomorphism (representative) 3. Action Grou action, 4. Matrix Lie C matrix, matrix single paran 5. Representative representative representation. 6. Applied in g applied in geon The courses are course period is Student evalua evaluation is im minutes. The fo of completing a the course, such in completing i	Physicist Physicist Physicist Physicist oup Theory for Physicist course is Elective course 2 credits (Theory) in the 2022 Curriculum Master system Study Program, Faculty of Mathematics and Natural Science UGM. ne syllabus of this course is as follows: Semigroups and groups: Binary operations, binary operation associations, semigroups, identity elements verse elements, group boundaries, examples of important groups in physics, subgroups, characterization subgroups, normal subgroups, conjugations, and conjugate classes, costs, factor groups, direct product mi-direct momorphism: Limitation of homomorphism, isomorphism, homomorphism properties momorphism kernel, homomorphism shadow, factor group of homomorphism, representation presentative). Action Group: action limitation, action kernel, stabilizer, rigid point, action orbit, free action, effective tion, transitive action, action, action polytic examples, exponentia matrix, kingle parameter subgroups generator, Lie Matrix Lie group boundary, examples, exponentia trix, matrix exponential properties, how to calculate exponential matrix, single parameter subgroup generator, Lie Matrix Algebra, and its properties Representation theory: group representation, representative space, dimensional representation presentative reduction, Schur's lemma, matrix representation, unitary representation, regula presentation. Applied in physics: applied in quantum mechanics, applied in crystals, applied in particle physics of urse period is used for Midterm Exam and Final Exam, each held for two weeks as scheduled. udent evaluation for course assessments is performed summative and formative. The summativaluution is implemented			e 2022 Curriculum Master higroups, identity elements, subgroups, characterization ctor groups, direct product, product. product. promorphism properties, morphism, representation orbit, free action, effective effect bijection. ary, examples, exponential ngle parameter subgroups, and its properties. mensional representation, y representation, regular pplied in particle physics, 50 minutes. Four weeks of eks as scheduled. formative. The summative ich take a maximum of 120 or each student in the form ng student activities during d, and student performance		
Learning Outcomes (PLO) Imposed on the Course	PLO 3Mastering 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 3Mastering various mathematical disciplines related to an advanced field of physics and able to develop physical models using various mathematical and						
	PLO 4 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.						

Able to apply knowledge to analyze, synthesize, formulate problems as 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 tec	and solve gh ⁷ echnology.						
	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.						
Course Upon completion of this course, students should be able to:							
(CO) CO1 Understand and master the basic concepts of group theory and importation examples in physics.	tant						
CO2 Understand and master the concepts of homomorphism and group isor	omorphism.						
CO3 Understand and master the concept of group action and its types and group	Understand and master the concept of group action and its types and group						
representation theory.	representation theory.						
<i>CO4</i> Understand and master the concept of group and matrix Lie algebra along wit properties as well as important examples that are well-known in their applicat physics.	Understand and master the concept of group and matrix Lie algebra along with their properties as well as important examples that are well-known in their application in physics.						
CO5 Understand the application of group theory in modeling, explaining, and solve problems in physics.	Understand the application of group theory in modeling, explaining, and solving problems in physics.						
CO6							
C07							
C07 C08							
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	Quiz					,		,	
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	Final Exam		35%		,	,	17.5%	17.5%	
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	can also be obtained from the Midterm or Final Exam as the result of participatory								
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NEICI CIICES	Wiain references: 1 Brian C Hall 2015 Lie groups Lie algebras, and representations: an elementary								
	introduction, Substation Text in Mathematics 222. Springer Verlag. Berlin.								
	2. J. F. Cornwell, 1999, Group Theory in Physics, Academic Press, New York.								
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Lecturers	1. Dr.rer.nat.	Muhamn	nad Farchani Ro	syid, M.Si.					
(Team	2.								
Teaching)	5. 4								
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Authorization	Date of Drafting	Lecturer Coordinator	Head of Curriculum Committee	Head of Study Program	
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