SEMESTER LEARNING ACTIVITY PLANS (SLAP)

SEMESTER EVEN 2022/2023

Physics Undergraduate Study Program

Physics Department

Atomic and Molecular Detection Method

MFF 2322/ 2 Credits

Lecturer Coordinator:

Prof. Dr. Agung Bambang Setio Utomo, S.U.

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 EVEN 2022/2023	**Document Number :** ……

SEMESTER LEARNING ACTIVITY PLANS (SLAP)

Code	Course Name	Credits (Credits)		Semester	Status	Prerequisite
MFF 2322	*Atomic and Molecular Detection Method*	*T: 2*	*P: …*	*EVEN*	*Elective*	*Atomic and Molecular Physics (MFF 2310)*

Short Description	The Atomic and Molecular Detection Method course is an elective course of 2 Credits in the 2021 curriculum of the Bachelor of Physics at Gadjah Mada University, which can be taken in the Even semester. To take this course, students are advised to complete the Atomic and Molecular Physics course. In the 2021 Curriculum of the Physics Undergraduate Study Program, this course is associated with competencies in the Knowledge Aspect (PLO 2) and the Long Life Learning/self-development Aspect (PLO 5).	
Program Learning Outcomes (PLO) Imposed on the Course	***PLO 2***	Knowledge. Able to explain theoretical concepts and principles of classical and modern physics and able to apply basic concepts of physics and related mathematical methods in finding solutions to physical problems.
	PLO 5	Long Life Learning. Able to analyze various alternative solutions to physical problems and conclude them for appropriate decision-making, both in familiar and new problems.
Course Outcomes (CO)	**After completing this course, students are expected to be able to:**	
	CO1	Know and understand the atomic structure and atomic processes
	CO2	Know and understand the various types of optical radiation sources
	CO3	Knowledge and understanding of optical radiation detection
	CO4	Knowledge and understanding of optical and electronic support devices
	CO5	Knowledge and understanding of atomic spectroscopy
	CO6	Know and understand spectrum analysis and its application

The Correlation of CO to Learning Materials and Methods, and Time Allocation		**Learning Materials**	**Learning Methods**	**Time Allocation**
	CO 1	Atomic Spectroscopy	TCL-SCL mixed	***2X50 minutes***
	CO 1	Fine and hyperfine structure	TCL-SCL mixed	***2X50 minutes***
	CO 1	Atomic emission, line width, and life time	TCL-SCL mixed	***2X50 minutes***
	CO 1	Isotropic shift, atomic scattering, absorption, and fluorescence	TCL-SCL mixed	***2X50 minutes***
	CO 2	Optical radiation source	TCL-SCL mixed	***2X50 minutes***
	CO 3	Optical radiation detection: Electromagnetic radiation and its interaction with matter	TCL-SCL mixed	***2X50 minutes***
	CO 3	Radiation, photoconductive and photovoltaic detectors	TCL-SCL mixed	***2X50 minutes***
	Midterm exam/Project Task Results/Case Analysis Results			

	CO 4	optical and electronic support tools	TCL-SCL mixed	***4X50 minutes***
	CO 5	Atomic spectroscopy	TCL-SCL mixed	***4X50 minutes***
	CO 6	spectrum analysis and its applications	TCL-SCL mixed	***6X50 minutes***
	Final exams/ Project Task Results/Case Analysis Results			

Learning Methods	**SCL (Student Centered Learning): Project-based learning (Team-based Project)/Case-based learning/PBL/other SCL methods**
Student Learning Experience	**Listen, ask, answer questions and discuss**
Access to Learning Media/ LMS and Offline and Online Percentage	Offline (LCD, PPT Slide, Whiteboard, Laptop) and Online (Zoom Meeting, Google Meet, Google Classroom)

Assessment Methods and Synchronization with CO

Assessment Methods	Assessment Percentage	Criteria/ Indicators	CO1	CO2	CO3	CO4	CO5	CO6
Participatory Activity*								
Project Results/ Case Study Results/ PBL Results*								
Cognitive								
Quiz	**10**		√	√	√	√	√	√
Midterm Exam	**45**		√	√	√			
Final Exam	**45**					√	√	√
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. Svanberg, S., 1992. Atomic and Molecular Spec-trocopy, edisi 2, Springer-Verlag, New York. .
2. Boyd, R. W., 1983 : Radiometry and the Detection of Optical Radiation, John Wiley & Sons, New York..

Lecturers (*Team Teaching*)	1. Prof. Dr. Agung Bambang Setio Utomo, S.U.

Authorization	**Date of Drafting**	**Lecturer Coordinator**	**Head of Curriculum Committee**	**Head of Study Program**

		Prof. Dr. Agung Bambang Setio Utomo, S.U.		*Dr. Eng. Ahmad Kusumaatmaja, S.Si., M.Sc.*