SEMESTER LEARNING ACTIVITY PLANS (SLAP)

SEMESTER ODD 2022/2023

Physics Undergraduate Study Program

Physics Department

Liquid Crystal Physics and Polymers

MFF 4611/ 2 Credits

Lecturer Coordinator:

Prof. Yusril Yusuf, S.Si., M.Si., M.Eng., D.Eng., Ph.D.

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 :** ……

SEMESTER LEARNING ACTIVITY PLANS (SLAP)

Code	Course Name	Credits (Credits)		Semester	Status	Prerequisite
MFF 4611	*Liquid Crystal Physics and Polymers*	*T: 2*	*P: …*	*ODD*	*Elective*	*None*

Short Description	The Liquid Crystals Physics and Polymer course is a 2 Credits elective course in the 2021 curriculum of the Gadjah Mada University Physics Study Program, which can be taken in odd semesters. 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	Knowing and Understanding Liquid Crystal
	CO2	Know and understand the optical properties of Liquid Crystals
	CO3	Know and understand the effects of electricity on liquid crystals and Freedericksz. transitions
	CO4	Know and understand Polymer Physics
	CO5	Know and understand the properties of polymer molecules
	CO6	Knowing and understanding Polymer Liquid Crystals

The Correlation of CO to Learning Materials and Methods, and Time Allocation		**Learning Materials**	**Learning Methods**	**Time Allocation**
	CO 1	Introduction to Liquid Crystal	TCL-SCL mixed	***2X50 minutes***
	CO 1	Liquid Crystal Physics (Orientational order, elastic properties of liquid crystals, response of liquid crystals to electric and magnetic fields)	TCL-SCL mixed	***4X50 minutes***
	CO 2	Optical properties of liquid crystals	TCL-SCL mixed	***2X50 minutes***
	CO 3	Electrical Effects on the liquid crystal	TCL-SCL mixed	***4X50 minutes***
	CO 3	Frederick. Transition	TCL-SCL mixed	***2X50 minutes***
	Midterm exam/Project Task Results/Case Analysis Results			
	CO 4	Introduction to Polymer physics	TCL-SCL mixed	***4X50 minutes***

	CO 5	The properties of polymer molecules (ideal chains, distribution of segments in polymer chains, and non-ideal chains)	TCL-SCL mixed	***4X50 minutes***
	CO 6	Polymer Liquid Crystal	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								
Assignment	**10**		√	√	√	√	√	√
Quiz	**10**		√	√	√	√	√	√
Midterm Exam	**40**		√	√	√			
Final Exam	**40**					√	√	√
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. Deng-Ke Yang and Shin-Tson Wu, Fundamental of Liquid Crystal Devices, John Wiley & Sons Ltd., 2006..
2. Masao Doi, Introduction to Polymer Physics, Oxford Science Publication, Oxford University Press, 2001.

Lecturers (*Team Teaching*)

1. Prof. Yusril Yusuf, S.Si., M.Si., M.Eng., D.Eng., Ph.D.

Authorization	Date of Drafting	Lecturer Coordinator	Head of Curriculum Committee	Head of Study Program
		Prof. Yusril Yusuf, S.Si., M.Si., M.Eng., D.Eng., Ph.D.		*Dr. Eng. Ahmad Kusumaatmaja, S.Si., M.Sc.*