SEMESTER LEARNING ACTIVITY PLANS (SLAP)

SEMESTER ODD/EVEN 2022/2023

Physics Undergraduate Study Program

Physics Department

Electronics Experiment**)

MFF 2851/ 1 Credits

Lecturer Coordinator:

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UNIVERSITAS GADJAH MADA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
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Code	Course Name	Credits (Credits)		Semester	Status	Prerequisite
MFF 2851	*Electronics Experiment **)*	*T: 1*	*P: …*	*ODD/EVEN*	*Compulsory*	*Electronics (MFF1850*)*

Short Description	The Electronics Experiment is designed to deepen students' understanding of basic electronics concepts and their application in electrical circuits. In conducting this practicum, students can identify electrical components, construct electrical circuits, apply circuit analysis methods and analyze the results to conclude. Through this practicum, students are expected to be able to improve competence in the aspects of practical skills, analytical thinking, and effective communication. The Electronics Experiment in the Odd semester of 2022/2023 will be held at the Materials and Instrumentation Physics Laboratory for five weeks. Every week, students experimented with different titles from the six titles offered. The titles are Transistor (ELK-1), Op-Amp (ELK-2), Logic Gate IC (ELK-3), 7-segment (ELK-4), Direct current Circuit (ELK-5), and Arduino (ELK-6). Before starting the practicum, a pre-test was held by the assistant to find out the students' readiness for the basic concepts or experimental material on that day. Then, the student's success in understanding electrical circuits and assembling electrical components on breadboards in groups is one of the practicum assessments. Practicum reports are compiled and collected to train students to communicate experimental results in written form. At the end of the learning period, a response is carried out to evaluate students' understanding of the basic concepts of electric circuits.	
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 3	General Skills. Able to communicate the results of problem studies and physical behavior both in writing and verbally, as well as being able to lead and collaborate at various levels of roles in a team.
	PLO 4	Special Skills. Able to design and carry out experiments/theoretical reviews, able to identify a physical problem based on the results of observations and experiments, and able to operate related technologies.
	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	Students can identify and explain the function of various electrical components.
	CO2	Students can understand and compile electrical circuits on a breadboard.
	CO3	Students can practice the fundamental laws of electric circuits.
	CO4	Students can apply digital electronics concepts.
	CO5	Students can analyze experimental results, compare them with theory and provide conclusions from experiments.
	CO6	Students can explain experimental results orally and in writing.

The Correlation of CO to Learning Materials and Methods, and Time Allocation		**Learning Materials**	**Learning Methods**	**Time Allocation**
	CO 1, CO 2, CO 3, CO 5, CO 6	ELK-1 Practical Transistor as a switch and multivibrator	CBL	***1X50 minutes***
	CO 1, CO 2, CO 4, CO 5, CO 6	ELK-2 Practicum Operational Amplifier (Op-Amp)	CBL	***1X50 minutes***
	CO 1, CO 2, CO 4, CO 5	ELK-3 Practical Integrated Circuit (IC)	CBL	***1X50 minutes***
	Midterm exam/Project Task Results/Case Analysis Results			
	CO 1, CO 2, CO 4, CO 5	ELK-4 Seven-Segment Practicum	CBL	***1X50 minutes***
	CO 2, CO 3, CO 5, CO 6	ELK-5 Practical Direct Current (DC) Circuits	CBL	***1X50 minutes***
	CO 2, CO 4, CO 5, CO 6	ELK-6 Arduino Practicum as a proximity and temperature sensor.	CBL	***1X50 minutes***
	CO 1, CO 2, CO 3, CO 4, CO 5, CO 6	**Final Test**	CBL	***4X50 minutes***
	Final exams/ Project Task Results/Case Analysis Results			
Learning Methods	**CBL (Case Based Learning): Pretest, Presentation of material and some display material, Hands-on experiments using available set-ups, Making reports**			
Student Learning Experience	**Students are active in discussions regarding the material and cases they face, students solve problems in a coherent and logical (scientific) way, students review findings in practicum with existing literature, students learn together to find solutions to the problems given.**			
Access to Learning Media/ LMS and Offline and Online Percentage	Offline (Experimental tool) 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								
	Attendance	**10**		√	√	√	√	√	√
	Pretest	**10**		√	√				

	Practicum	**30**		√	√	√	√	√	
	Practicum Report	**30**		√	√	√	√	√	√
	Final Test	**20**		√	√	√	√	√	√
	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. Buku panduan Praktikum Elektronika, Laboratorium Fisika Material dan Instrumentasi.. 2. Bunker, C.A., - UNILAB-Notes for use – Unilab Limited Clarendon Road Blackburn. 3. Hayes, T.C., Paul Horowitz, P., 2016, Learning the Art of Electronics: A Hands-On Lab Course, Cambridge, United Kingdom : Cambridge University Press. **Additional References:** 1. Sadiku, M.N.O., dan Alexander, C.K., 2016, Fundamentals of Electric Circuits, 5th edition, The McGrawHill Companies, Inc. 2. Wang, M., 2010, Understandable Electric Circuits, The Institution of Engineering and Technology, London, United Kingdom.
Lecturers (*Team Teaching*)	1. Dr. Eng. Ahmad Kusumaatmaja, S.Si, M.Sc 2. Muhammad Arifin, S.Si, M.Sc., Ph.D.

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