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

Data Acquisition System

MFF5073 / 3 Credits

Lecturer Coordinator:

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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
MFF5073	*Data Acquisition System*	*3*	*Odd*	*Elective*	*None*

Short Description

Data Acquisition System course is Elective course 3 credits (Theory) in the 2022 Curriculum Master Physics Study Program, Faculty of Mathematics and Natural Science UGM.

The syllabus of this course is as follows:
Introduction to data acquisition on the PC (PC as a data acquisition platform and its software), the basics of data sampling (sensors and interfaces, sampling, noise, and filters), I/O techniques (interrupt systems, data transfer, parallel buses, and serial communication), data interpretation (interpolation and linearization), examples of data acquisition.

The courses are held in class for 14 weeks, each week's session last for 3 x 50 minutes. Four weeks of course period is used for Midterm Exam and Final Exam, each held for two weeks as scheduled.

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.

Program Learning Outcomes (PLO) Imposed on the Course

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 5	Able to plan, manage and carry out experiments and conclude the results, or be able to create and use modeling and simulations based on the basic principles of physics to study and solve a problem in a scientific field of Physics or applied Physics that produces models, methods, or theories tested and innovative.
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.

Course Outcomes (CO)	**Upon completion of this course, students should be able to:**			
	CO1	Mastering the basic fields of physical science, which include the study of electrodynamics, mechanics, classical, and quantum mechanics.		
	CO2	Mastering and being able to apply one of the fields of advanced physical sciences.		
	CO3	Mastering the ability to study a problem in a field of physics through research.		
	CO4			
	CO5			
	CO6			
	CO7			
	CO8			
The Correlation of CO to Learning Materials and Methods, and Time Allocation		**Learning Materials**	**Learning Methods**	**Time Allocation**
	CO1	Basics of data acquisition.	Lecture, discussion	3 x 50 minutes
	CO1	Basics data acquisition system	Lecture, discussion	3 x 50 minutes
	CO1	Sensors and transducer	Lecture, discussion	3 x 50 minutes
	CO2	Sensors and transducer	Lecture, discussion	3 x 50 minutes
	CO2	DAQ Hardware – Arduino	Lecture, discussion	3 x 50 minutes
	CO2	Project A	Lecture, discussion	3 x 50 minutes
	CO2	Project A	Lecture, discussion	3 x 50 minutes
	CO3	DAQ Hardware – Arduino	Lecture, discussion	3 x 50 minutes
	CO3	DAQ Software – Arduino IDE	Lecture, discussion	3 x 50 minutes
	CO3	DAQ Software – Arduino IDE	Lecture, discussion	3 x 50 minutes
	CO4	DAQ Software – Arduino IDE	Lecture, discussion	3 x 50 minutes
	CO4	Project B	Lecture, discussion	3 x 50 minutes
	CO4	Project B	Lecture, discussion	3 x 50 minutes
	CO4		Lecture, discussion	3 x 50 minutes
	Final Exam/ Project Task Results/ Case Analysis Results			

Learning Methods	Lecture, discussion
Student Learning Experience	Learn to analyze and review: Basics of data acquisition., Basics data acquisition system, Sensors and transducer, Sensors and transducer, DAQ Hardware – Arduino, Project A, Project A, DAQ Hardware – Arduino, DAQ Software – Arduino IDE, DAQ Software – Arduino IDE, DAQ Software – Arduino IDE, Project B, Project B, .
Access to Learning Media/ LMS and Offline and Online Percentage	Powerpoint slide, video
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. Barrett, S. F. dan Pack, D.J., 2008: Atmel AVR Microcontroller Primer: Programming and Interfacing, Morgan & Claypool Publishers. 2. James, K., 2000: PC Interfacing and Data Acquisition, Newnes, LinacreHouse, Jordan Hill, Oxford.
Lecturers (*Team Teaching*)	1. Dr. Eko Sulistya, M.Si. 2. 3. 4.

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