SEMESTER LEARNING ACTIVITY PLANS (SLAP)

SEMESTER ODD 2022/2023

Physics Undergraduate Study Program

Physics Department

Programming

MII 1201/ 3 Credits

Lecturer Coordinator:

Dr. Andi Dharmawan, S.Si., M.Cs.

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 :** ……

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Code	Course Name	Credits (Credits)		Semester	Status	Prerequisite
MII 1201	*Programming*	*T: 3*	*P: …*	*ODD*	*Compulsory*	*None*

Short Description	This course is a core compulsory course, this course provides knowledge and skills to students to analyze problems, design algorithms and determine the right data structure so that the resulting computer program is structured and efficient. In Programming I course, the focus is more on algorithms and programming because the data structure used is still relatively simple, starting from basic concepts, structures, implementations as well as other components in algorithms and programming. By giving this lecture, it is hoped that students will have new abilities to analyze problems and also implement them in computer programs using the C++ programming language. The learning method in this lecture is a combination of the SCL and TCL methods. Each meeting is carried out with presentations and group discussions, while the lecturer will explain and solve problems that have not been understood by students. The application of the Programming I learning method is generally intended to provide supplies to students in thinking critically, creatively and logically in analyzing and solving problems based on computer programs. Specifically in this course, new skills will be given in terms of implementing the results of problem solving analysis into the correct form of computer programs both logically and syntactically.	
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.
Course Outcomes (CO)	**After completing this course, students are expected to be able to:**	
	CO1	Students have knowledge of basic programming concepts, algorithms, and can think computationally.
	CO2	Students have knowledge of simple data structures and programming languages.
	CO3	Students can create computer programs using simple data structures, such as arrays, matrices, and records/structs.
	CO4	Students have knowledge of modular/subprogram programming and can implement it in computer programs.
	CO5	Students can explain and proficient in implementing searching and sorting algorithms.
	CO6	Students are able and proficient in solving more complex programming problems.

The Correlation of CO to Learning Materials and Methods, and Time Allocation		**Learning Materials**	**Learning Methods**	**Time Allocation**
	CO 1	Introduction: 1. Explanation of course material, Lecture contract 2. Understanding and Components of Computer Programs	TCL - SCL mixed	***3X50 minutes***

		3. Understanding algorithms, data structures and programming languages 4. Stages of problem solving 5. Structured programming concept		
	CO 1	Simple algorithm/on single data 1. Algorithm presentation technique 2. Case study of algorithms to check prime numbers	TCL - SCL mixed	***3X50 minutes***
	CO 1	***Simple algorithm/on single data: (1) Case study of FPB algorithm, KPK, Number system conversion***	TCL - SCL mixed	***3X50 minutes***
	CO 2	Introduction to Data Structures and C++ Programming Language: 1. Input/Output Statement 2. Identifier 3. Data types 4. Operators 5. Case study	TCL - SCL mixed	***3X50 minutes***
	CO 2	Algorithm/Computer Program Structure: 1. Sequence 2. Branching (selection) 3. Nested branching 4. Case and implementation examples	TCL - SCL mixed	***3X50 minutes***
	CO 3	1. Repetition 2. nested repetition 3. Case and implementation examples	TCL - SCL mixed	***3X50 minutes***
	CO 3	Array data type: 1. Array recognition and declaration 2. Accessing data on array 3. Working with multiple arrays 4. 2D matrix/array	TCL - SCL mixed	***3X50 minutes***
	Midterm exam/Project Task Results/Case Analysis Results			
	CO 3	Data type record/struct: 1. Record/struct declaration 2. Accessing data records/structs 3. Implementation examples and case studies	TCL - SCL mixed	***3X50 minutes***
	CO 4	Modular Programming/Subprogram: 1. Definition of subprogram	TCL - SCL mixed	***3X50 minutes***

		2. function 3. Global and local variables 4. Formal and actual parameters 5. Parameter swap ***6.*** Array on function		
	CO 4	Modular Programming/Subprogram: 1. Definition of recursive 2. Recursive Subprogram 3. Recursive case studies	TCL - SCL mixed	***3X50 minutes***
	CO 5	Sort and Search: 1. Data sorting methods 2. Implementation examples	TCL - SCL mixed	***3X50 minutes***
	CO 5	Sort and Search: 1. Data search algorithm, sequential search and binary search. 2. Examples of implementation	TCL - SCL mixed	***3X50 minutes***
	CO 6	Data files: 1. Data file declaration 2. Use of data files for real problems 3. Implementation examples	TCL - SCL mixed	***3X50 minutes***
	CO 6	Final project, group presentation and discussion	TCL - SCL mixed	***3X50 minutes***
	Final exams/ Project Task Results/Case Analysis Results			
Learning Methods	TCL - SCL mixed			
Student Learning Experience	Text, presentation, image, beautiful,			
Access to Learning Media/ LMS and Offline and Online Percentage	Slides and reference books			

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	**37**		√	√	√	√	√	√

	Quiz	**-**							
	Midterm Exam	**30**		√	√	√			
	Final Exam	**33**				√	√	√	√
	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. W1: Data Structures and Algorithms, Alfred V. Aho,dkk., 1988 2. W2: Data Structures and Algorithms in Java, Adam Drozdek, 2008 3. W3: Munir, R., 2004, Algoritma dan Pemrograman, Informatika, Bandung. Optional: 1. A1: Data Structures Using C, Tenenbaum, A., Y. Langsam, and M. Augenstein, 1990, Prentice-Hall. 2. A2: C++ for everyone, Cay S. Horstmann, 2009.
Lecturers (*Team Teaching*)	Dr. Andi Dharmawan, S.Si., M.Cs. dkk

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