

**PROGRAM PLAN AND SEMESTER LEARNING  
ACTIVITIES  
(RPKPS)  
SCHOOL YEAR 2021/2022**



Geophysics  
Physics  
Programming  
MII 1201/ 3 credits

Mentoring Team:  
Dr. Andi Dharmawan, S.Si., M.Cs.

**GADJAH MADA UNIVERSITY  
FACULTY OF MATHEMATICS AND  
NATURAL SCIENCES  
2021**



**Gadjah Mada University**  
 Faculty of Mathematics and Natural Sciences  
 Department of Physics / S1 Geophysics Study  
 Program Academic Year 2021/2022

**Document Code:**


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**SEMESTER LEARNING PROGRAM AND ACTIVITY PLAN (RPKPS)**

Course Code	Course Name	Weight (credit)		Semester	Course Status	Prerequisite Courses
MII 1201	Rogger safe	T:3	P:-	Odd	Mandatory	-
<b>Course Brief Description</b>	<p>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 this Programming I course, more emphasis is placed on algorithms and programming because the data structure used is still relatively simple, starting from basic concepts, structures, implementations and also other components in algorithms and programming. With 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 SCL and TCL methods. Each meeting is carried out with presentations and group discussions, while lecturers will explain and solve problems that students do not understand.</p> <p>The application of the Programming I learning method is generally intended to provide debriefing to students in thinking critically, creatively and logically in analyzing and solving computer program-based problems. In particular, this course will be given new skills in terms of implementing the results of problem-solving analysis into the form of computer programs that are correct both logically and syntactically</p>					
<b>Achieveme Graduate Learning (CPL) The Banks of the Constitutional Court</b>	<b>CPL-1</b>	<b>Good Attitude:</b> Graduates have honest, disciplined, curious, critical, confident, independent, mature, cooperative, and trustworthy. Uphold norms, values, morals, religion, ethics general and professional ethics, as well as actively playing a role in the global movement of sustainable development and behaving professionally				
	<b>CPL-2</b>	<b>Mastery of knowledge :</b> Graduates are able to apply basic science (mathematics, physics, chemistry, biology, geology), and geophysics in general and their relationship with other sciences such as geology, geodesy, geochemistry, geography, computing and information technology.				
	<b>CPL-3</b>	<b>Operational and comprehensive skills :</b> Graduates are able to apply all geophysical methods (seismic, gravitational, magnetic, electrical, electromagnetic, and thermic) for energy exploration (e.g. oil and gas, coal, geothermal), materials mining (ex: iron, copper, gold, silver, tin) and groundwater and disaster mitigation				
<b>Achieveme Course Learning (CPMK)</b>	<b>After completing the learning of this course, students are expected to be able to:</b>					
	<b>CPMK-1</b>	Students have knowledge of basic programming concepts, algorithms, and can think computationally. [CPL-1] [CPL-2]				
	<b>CPMK-2</b>	Students have knowledge of simple data structures and programming languages. [CPL-1] [CPL-2]				
	<b>CPMK-3</b>	Students can create computer programs using simple data structures, such as run, matrix, and record/struct. [CPL-1] [CPL-3]				

	<b>CPMK-4</b>	Students have knowledge of modular/subprogram programming and can implement it in computer programs. [CPL-1] [CPL-3]					
	<b>CPMK-5</b>	Students can explain and are proficient in implementing searching and sorting algorithms. [CPL-1] [CPL-2] [CPL-3]					
	<b>CPMK-6</b>	Students are able and proficient in solving more complex programming problems. [CPL-1] [CPL-3]					
<b>CPL Mapping with CPMK</b>		<b>CPMK1</b>	<b>CPMK2</b>	<b>CPMK3</b>	<b>CPMK4</b>	<b>CPMK5</b>	<b>CPMK6</b>
	CPL-1						
	CPL-2						
	CPL-3						
<b>CPMK link with Material and Form of Learning, as well as Time Allocation</b>		<b>Learning Materials</b>				<b>Forms of Learning</b>	<b>Time Allocation</b>
	<b>CPMK1</b>	Introduction: (1) Explanation of lecture material, Lecture contract (2) Understanding and Components of Computer Programs (3) Understanding algorithms, data structures and programming languages (4) Stages of problem solving (5) Structured programming concepts				TCL - SCL mixed	2 Hours
	<b>CPMK1</b>	Simple algorithm/on single data 1. Algorithm presentation technique 2. Case study of algorithm for checking prime numbers				TCL - SCL mixed	2 Hours
	<b>CPMK1</b>	Simple algorithm / on single data : (1) Case study of FPB algorithm, KPK, Number system conversion				TCL - SCL mixed	2 Hours
	<b>CPMK2</b>	Introduction to Data Structures and C++ Programming Language : (1) Input/Output Statement (2) Identifier/identifier (3) Data types (4) Operator (5) Case study				TCL - SCL mixed	2 Hours
	<b>CPMK2</b>	Computer Algorithm/Program Structure: (1) Streak (2) Branching (selection) (3) Nested branching (4) Case examples and implementations				TCL - SCL mixed	2 Hours
	<b>CPMK3</b>	(1) Repetition (2) Nested repetition (3) Case examples and implementations				TCL - SCL mixed	2 Hours
	<b>CPMK3</b>	Array data type: (1) Array introduction and declaration (2) Access data on an array (3) Work with multiple arrays				TCL - SCL mixed	2 Hours

	(4) 2D matrix/array		
<b>UTS/Project Task Results/Case Analysis Results</b>			
<b>CPMK3</b>	Record/struct data type: (1) Record/struct declaration (2) Access record/struct data (3) Implementation examples and case studies	TCL - SCL mixed	2 Hours
<b>CPMK4</b>	Modular Programming/Subprogram : (1) Definition of subprogram (2) function (3) Global and local variables (4) Formal and actual parameters (5) Exchange parameters (6) Array on function	TCL - SCL mixed	2 Hours
<b>CPMK4</b>	Modular Programming/Subprogram : (1) Recursive definition (2) Recursive Subprograms (3) Recursive case studies	TCL - SCL mixed	2 Hours
<b>CPMK5</b>	Sorting and Searching: (1) Data sorting methods (2) Implementation example	TCL - SCL mixed	2 Hours
<b>CPMK5</b>	Sorting and Searching: (1) Data search algorithms, sequential search and binary search. (2) Examples of its implementation	TCL - SCL mixed	2 Hours
<b>CPMK6</b>	Data file : (1) Data file declaration (2) Use of data files for real problems (3) Implementation example	TCL - SCL mixed	2 Hours
<b>CPMK6</b>	Final project, Group presentation and discussion	TCL - SCL mixed	2 Hours
<b>UAS/ Project Task Results/ Case Analysis Results</b>			
<b>Learning Method</b>	TCL - SCL mixed		
<b>Student Learning Experience</b>	Text, presentation, image, beautiful,		
<b>Access Media Learning ran/ LMS and Percentage Offline &amp; Online</b>	Slides and reference books		

Method Valuation	Technique Valuation	Percentage	Criteria / Assessment	CPMK-1	CPMK-2	CPMK-3	CPMK-4	CPMK-5	CPMK-6	
n with CPMK	Activity Participation: f <sup>)</sup>									
	Result Project/Hasil Studies Case/Result PBL <sup>*)</sup>									
	Cognitive									
	Assignment	37								
	Quiz									
	UTS	30								
	UAS	33								
	Total	100								
	*) can also be obtained from UTS or UAS which is the result of participatory activities or results project/case study. In accordance with IKU 7, the percentage of participatory activities and project/study results PBL cases/results are at least 50%.									
List Reference	<ol style="list-style-type: none"> <li>1. W1: Data Structures and Algorithms, Alfred V. Aho, et al., 1988</li> <li>2. W2: Data Structures and Algorithms in Java, Adam Drozdek, 2008</li> <li>3. W3: Munir, R., 2004, Algorithms and Programming, Informatics, Bandung.</li> <li>4. Optional:</li> <li>5. A1: Data Structures Using C, Tenenbaum, A., Y. Langsam, and M. Augenstein, 1990, Prentice-Hall.</li> <li>6. A2: C++ for everyone, Cay S. Horstmann, 2009.</li> </ol>									
Name of Lecturer (Team Teaching)	Dr. Andi Dharmawan, S.Si., M.Cs.									
Authorization	Drafting Date	Course Coordinator					Coordinator of Expertise (if applicable)		Head of Study Program	
	2020								 Dr.. Sudarmaji,MS i	