MODULE HAND BOOK

MECHANICAL ENGINEERING VOCATIONAL EDUCATION STUDY PROGRAM

FACULTY OF ENGINEERING – UNIVERSITAS NEGERI PADANG

COURSE NAME	CODE	Course classification		CU		Sem	Version
				Theory	Pract		
Computer Programming	MES1.61.2105	Study Program Compulsory Courses/ Supporting tool		1	1	3	1
Responsible		Delima Yanti Sari, MT, Ph.D, Primawati, M.Si and Dr. Refdinal, MT, Budi Syahri, S.Pd., M.Pd.T		Signature			

INFORMATION		**Dean**	**Head of Department**	**Coordinator of study program**
		Dr. Fahmi Rizal, M.Pd., MT NIP. 195912041985031004	Drs. Purwantono, M.Pd NIP. 196308041986031002	Drs. Purwantono, M.Pd NIP. 196308041986031002

Learning Outcomes of Graduates	**Study Program Graduate Learning Outcomes (PLO):**

	1. Possess a good ability to apply the basic science (mathematics and natural sciences) and other disciplines in profesional jobs / projects (Knowledge-understanding)
	    1.1. possess a good understanding and can apply the basic concept of mathematics to solve various technical problems
	    1.2. possess a good understanding and can apply basic the concept of physic to solve various technical problems
	    1.3. possess a good understanding and can apply basic the concept of chemistry to solve various technical problems
	 2. Possess a critical and creative thingking in identifying, formulating, problem solving and evaluating various problems in mechanical engineering using the most appropriate and effective scientific method ***(Engineering analysis, investigations and assessment):***
	    2.1. problem identification skills

	2.2. problem analysis skills
	2.3. problem evaluation skills
	3. Possess a good ability in designing, manufacturing and operating machines *(Engineering design)*
	3.1. able to formulate ideas/concepts into a technical drawing, design and budget plans
	3.2. able to operate various machines and other engineering equipment with the correct standard operating procedure
	3.3. able to design a machine or machinery system based on a valid scientific theory
	3.4. able to realize a concept/design into a prototype, manufacturing process and engineering system
	4. Possess a good ability to design, organize and evaluate the education and learning process in *mechanical engineering vocational education. (Education design)*
	4.1. able to design curriculum and learning process by considering various aspects
	4.2. able to organize, control, evaluate and improve the quality of the learning process
	4.3. able to develop an interesting, effective and efficient learning medias
	5. Possess a good ability to adapt to development in science and technology and apply it into professional jobs by considering any non-technical aspects. *(Engineering practice)*
	5.1. able to innovate and develop technology in the field of mechanical engineering by considering social, economic and environmental aspects
	5.2. able to carry out the optimization process and increase the efficiency of machines or machining system.
	5.3. able to improve the performance of machine/ machinery system by applying the information technology
	6. Possess a good softskil and spirit of lifelong learning *(Transferable skill / softskill)*
	6.1. possess a religious character
	6.2. possess a spirit of nasionalisme, social sensitivity and environmental consevation orientation
	6.3. possess the ability to communicate effectively and work together in teamwork
	6.4. possess the ability to transfer science and technology to society to improve the quality of life
	6.5. possess a good characters of entrepreneur
Course Learning	**Course Learning Outcomes**

Outcomes		
	CLO	**PLO**
	1. Describe the main devices of a computer system.	3.1,3.4. 5.2, 5.3
	2. Describe the steps in computer programming.	3.1,3.4. 5.2, 5.3
	3. Arrange a problem-solving algorithm according to the correct and efficient.	3.1,3.4. 5.2, 5.3
	4. Creating a computer program with the Pascal programming language based on algorithms that have been prepared previously for solving a problem either; sequential, conditional, and repetitive.	3.1,3.4. 5.2, 5.3
	5. Documenting programs that are well made.	3.1,3.4. 5.2, 5.3
	6. Able to apply programming in the Pascal language to solve simple engineering problems, especially mechanical engineering.	3.1,3.4. 5.2, 5.3

Course descriptions	This course provides basic knowledge about the elements of programming both instructions, identification and data types that must be understood correctly in programming activities. Here the discussion begins to be accompanied by program implementation. Covers the implementation of Declarations, Statements, Procedures, Functions and Methods in the PASCAL library, including in the process of Input-Output, Control Structure and Sub Programs as well as work related to files. Sample programs are always included to make understanding easier. The program will always be directed at cases or basic concepts of the Mechanical Engineering field

References	**Main references (RU):**
	1. Munir, Rinaldi. (1999). Programming Algorithms in Bahassa Pascal and C. Bandung: CV.Informatika. 2. Sismoro, Heri and Iskandar, Kusrini. (2004). Data Structure and Programming with Pascal, Yogyakarta: Andi Offset. 3. Santoso, Insap. (1998). Programming Basics Using Turbo Pascal. Yogyakarta: Andi Offset.
	Additional references (RP)
	1. Piksi-ITB. (1989). PS-07 Programming with Pascal. Bandung: Piksi-ITB. 2. Konvalina, John & Wileman, Stanley. (1988). Programming with Pascal, New York: McGraw Hill Book Company. 3. Keller, Arthur M. (1982). A First Course Computer Programming Using Pascal. New York: McGraw-Hill, Inc.

Learning Media	**Software:**	**Hardware:**
	Turbo Pascal	Computer, LCD Projector and Whiteboard and peripherals

Team Teaching	
Assessment	UTS, UAS, Independent assignments
Requirements Subject	No

COURSE SUBJECTS

Week	Expected competencies	Topics	Method and strategy for leraning	Assignment	Criterion / Assessment indicattor	References
(1)	**CLO-1: (PLO-2.1,2.2)** Students are able to explain: 1. The main equipment of the computer system 2. The Role of Computers in Human Life	Types of Computers by Function. Development of Computer Technology and Information Systems. Types of Programming Languages and the reasons to learn them.	Material explanation **[1x100 ']** Question and answer **[1x20 ']** Discussion **[1x30 ']**	Make a summary and description of the material presented in the resume book	Able to explain computer as the main device and role in human life.	RU-1, RU-2 and RU-3
(2)	**CLO-2: [PLO-3.1, 3.4]** Students are able to explain every stage of the preparation of a computer program from problem identification to documentation.	The stages of compiling a computer program. Compilation of Algorithm, Flowchart and Pseudocode. Error forms in computer programming	Material explanation **[1x100 ']** Question and answer **[1x20 ']** Discussion **[1x30 ']**	• Make a summary and description of the material presented in the resume book • Task work on questions	Be able to explain every stage of the preparation of a computer program.	RU-1, RU-2 and RU-3
(3)	**CLO-3: [PLO-3.1, 3.4,5.3]** College student Be able to explain the characteristics of Pascal as a procedural programming language and be able to explain data types in Pascal, and able to convert between number systems	Pascal language and its development as a structured procedural language. Pascal language structure. Default Pascal programming interactions. Data type (basic, structured, enumerated and pointer). Number Systems and	Material explanation **[1x100 ']** Question and answer **[1x20 ']** Discussion **[1x30 ']**	• Make a summary and description of the material presented in the resume book • Task work on questions	Be able to explain Pascal characteristics as a procedural programming language and is able to explain data types in Pascal, and is able to convert between number systems	RU-1, RU-2 and RU-3

Week	Expected competencies	Topics	Method and strategy for leraning	Assignment	Criterion / Assessment indicattor	References
		Conversions				
(4)	**CLO-4.1: [CP-3.1, 3.4, 5.3]** Students are capable 1. State the elements of Pascal programming. 2. Explain the meaning of identifier, type and implementation.	programming elements. Organizing instructions, identifiers. Types of identifiers, variables, and constants.	Material explanation **[1x90 ']** Question and answer **[1x20 ']** Work on assignments **[1x40 ']**	• Make a summary and description of the material presented in the resume book • Task work on questions	Be able to explain Pascal programming elements. Explain the meaning of identifier, type and implementation.	RU-1, RU-2 and RU-3
(5)	**CLO-4,2: [CP-3.1, 3.4, 5.3]** Students are capable describes several types of declarations in the Input-Output process	Explain about Input-Output; assignment, read, readln, write, writeln, GotoXY.	Material explanation **[1x90 ']** Question and answer **[1x20 ']** Work on assignments **[1x40 ']**	• Make a summary and description of the material presented in the resume book • Task work on questions	Be able to explain several types of declarations in the Input-Output process	RU-1, RU-2 and RU-3
(6)	**CLO-4,3: [CP-3.1, 3.4, 5.3]** Students are able to explain conditional control structure.	• IF - THEN • IF - THEN - ELSE • CASE - OF	Material explanation **[1x90 ']** Question and answer **[1x20 ']** Work on assignments **[1x40 ']**	• Make a summary and description of the material presented in the resume book • Task work on questions	Be able to explain conditional control structure	RU-1, RU-2 and RU-3
(7)	**CLO-4.4: [CP-2.1, 2.2, 2.3, 3.3]** Students are able to explain repeat control	• FOR - DO • WHILE - DO • REPEAT - UNTIL	Material explanation **[1x90 ']** Question and answer **[1x20 ']** Work on assignments **[1x40 ']**	• Make a summary and description of the material presented in the	Be able to explain repeat control	RU-1, RU-2 and RU-3

Week	Expected competencies	Topics	Method and strategy for leraning	Assignment	Criterion / Assessment indicattor	References
				resume book • The task of making a summary of scientific articles		
(8)	Mid-Test (Ujian Tengah Semester)					
(9)	CLO-5.1: [CP-3.4] Students are able to explainModular Programming	What do you mean with modular programming and top-down design.	Material explanation [1x90 '] Question and answer [1x20 '] Work on assignments [1x40 ']	• Make a summary and description of the material presented in the resume book • Task work on questions	Be able to explain Modular Programming	RU-1, RU-2 and RU-3
(10)	CLO-5.2: [CP-3.4] Students are capable identify and implement elements of modular programming	• Procedure • Function • Definition and concepts of sub-programs (procedures and functions)	Material explanation [1x90 '] Question and answer [1x20 '] Work on assignments [1x40 ']	• Make a summary and description of the material presented in the resume book • Task work on questions	Be able to explain implements modular programming elements	RU-1, RU-2 and RU-3
(11)	CLO-5.3: [CP-3.4] Students are capable identify and implement elements of modular programming	Global and Local Identifier, Definition of parameters	Material explanation [1x90 '] Question and answer [1x20 '] Work on assignments [1x40 ']	• Make a summary and description of the material presented in the resume book • Task work on questions	Able to master modular programming elements	RU-1, RU-2 and RP-1, RP-2, RP-3
(12)	CLO-5.4: [CP-3.4]	By valued and by	Material explanation [1x90 ']	• Make a summary	Able to master	RU-1, RU-2

Week	Expected competencies	Topics	Method and strategy for leraning	Assignment	Criterion / Assessment indicattor	References
	Students are capable identify and implement elements of modular programming	reference communication. Sub-program calling rules.	Question and answer [1x20 '] Work on assignments [1x40 ']	and description of the material presented in the resume book • Task work on questions	modular programming elements	and RP-1, RP-2, RP-3
(13)	CLO-6.1: [PLO-3.1, 3.4, 5.2, 5.3] Students are capable properly use structured data types in the problem solving process.	Non standard data types: enumeration and sub-range / interval.	Material explanation [1x90 '] Question and answer [1x20 '] Work on assignments [1x40 ']	• Make a summary and description of the material presented in the resume book • Task work on questions	Able to master structured data types in the problem solving process	RU-1, RU-2 and RP-1, RP-2, RP-3
(14)	CLO-6.2: [PLO-3.1, 3.4, 5.2, 5.3] Student mBe able to correctly use structured data types in problem solving processes.	Simple Data Structure: Array, Record, Set, File, EOLN, and EOF.	Material explanation [1x90 '] Question and answer [1x20 '] Work on assignments [1x40 ']	• Create a program Using Pascal software	Able to master structured data types in the problem solving process	RU-1, RU-2 and RP-1, RP-2, RP-3
(15)	CLO-6.3: [PLO-3.1, 3.4, 5.2, 5.3] Student mable to implement file operation facilities in Pascal	File Operations: Read, write, edit, copy and delete files	Material explanation [1x90 '] Question and answer [1x20 '] Work on assignments [1x40 ']	• Create a program • Using Pascal software	Able implement file operations facilities in Pascal	RU-1, RU-2 and RP-1, RP-2, RP-3
(16)	Final Semester Evaluation (Evaluation which is intended to determine the final achievement of student learning outcomes)					

Remark :1 credit = (50 'TM + 60' BT + 60 'BM) / Week   BM = Independent Study   T = Theory (aspects of science)

TM = Face to Face (Lecture)   PS = Simulation Practicum (160 minutes / week)   P = Practice (aspects of work skills)

The linkage between CLO and PLO and assessment methods

MSN1.62.4007	Assessment	Point (%)	PLO-1			PLO-2			PLO-3				PLO-4			PLO-5			PLO-6				
			1	2	3	1	2	3	1	2	3	4	1	2	3	1	2	3	1	2	3	4	5
CLO-1	UTS. 1	5				V	V																
CLO-2	UTS. 2	7.5							V			V											
CLO-3	UTS. 3	7.5							V			V						V					
CLO-4.1	UTS. 4	7.5							V			V						V					
CLO-4.2	UTS. 5	7.5							V			V						V					
CLO-4.4	UAS. 1	7.5							V			V						V					
CLO-5.3	UAS. 2	7.5										V											
CLO-5.4	UAS. 3	7.5										V											
CLO-6.2	UAS. 4	7.5							V			V					V	V					
CLO-6.3	UAS. 5	5							V			V					V	V					
CLO-6.2	Presentation	20							V			V					V	V					
CLO-6.3	Presentation								V			V					V	V					
Presence		10																					
TOTAL		100																					

Assessment Component

Midterm exam (UTS)	: 35%
Final exams (UAS)	: 35%
Assignment	: 20%
Presence	: 10%
Total	: 100%

Scoring/grading level description

	Excellent	Good	Satisfy	Fail
ability to describe	Able to describe correctly and completely	Able to describe correctly but not complete	Able to describe but less clear and incomplete	Unable to describe
ability to formulate	Able to formulate correctly and completely	Able to formulate correctly but not complete	Able to formulate but less clear and incomplete	Unable to formulate
ability to calculate	Able to calculate correctly and completely	Able to calculate correctly but not complete	Able to calculate but less clear and incomplete	Unable to calculate
ability to analyze	Able to analysize correctly and completely	Able to analyze correctly but not complete	Able to analyze but less clear and incomplete	Unable to analyze

Scoring and grading system

Score	Quality	Quality score	Designation	Score	Quality	Quality score	Designation
85 – 100	A	4.0	Outstanding	55 – 59	C	2.0	Acceptable
80 – 84	A-	3.6	Excellent	50 – 54	C-	1.6	Poor
75 – 79	B+	3.3	Very good	40 – 49	D	1.0	Poor
70 – 74	B	3.0	Good	≤ 39	E	0.0	Fail
65 – 69	B-	2.6	Good	-	T	-	Postpone
60 – 64	C+	2.3	Acceptable				