



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		
Basic Electrical Engineering	MES1.61.2103	Study program compulsory course/ MEVE core course	2	0	3	1
Responsible	Rifelino, S.Pd., MT, Zainal Abadi, S.Pd., M.Eng., Andre Kurniawan, ST, MT		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			
Program Learning Outcome	Program Learning Outcome of Mechanical engineering vocational education: <ol style="list-style-type: none"> 1. Possess a good ability to apply the basic science (mathematics and natural sciences) and other disciplines in professional jobs / projects (Knowledge-understanding) <ol style="list-style-type: none"> 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 physics 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 thinking 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): <ol style="list-style-type: none"> 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 media
- 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 soft skill and spirit of lifelong learning **(Transferable skills / soft skills)**
 - 6.1. possess a religious character
 - 6.2. possess a spirit of nationalism, social sensitivity and environmental conservation 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 outcomes

Course learning outcomes

CLO	PLO
1. Understand the basic concepts of direct current and alternating current electricity, electrical measuring instruments, and the differences between the two types of currents.	1.2, 2.1, 2.2
2. Understand the basic concepts of semiconductor diodes and transistors and their types and examples of applications	1.2, 2.1, 2.2
3. Understand the basic concepts of rules in logic circuits and their application in the engineering and electronics industry	1.2, 2.1, 2.2
4. Understand the basic concepts of generators and motors, both those that use direct current and alternating current.	1.2, 2.1, 2.2
5. Understand the basic concepts of transformers, working principles, types, and losses in transformers	1.2, 2.1, 2.2

Course description	This course provides basic knowledge about electricity which is the basis for the development of the field of mechanical science and machine systems which includes: electrical concepts of direct current and alternating current, measuring instruments for electricity, and the difference between the two types of currents, semiconductor diodes. and transistors, logic circuits, motors and generators, transformers and their applications in mechanical engineering.	
References	Main references (RU):	
	1. Fitzgerald, Charles Kingsley. (1990). Electric Machines (Translation). Jakarta: Binacipta 2. Malvino, Barmawi. (1985). Electronic Principles. Jakarta: Erlangga	
	Additional references (RP)	
	1. William H. (1992). Electric Circuits volume 1. Jakarta: Erlangga 2. Yon Rijono. (1997). Basic electrical power engineering. Yogyakarta: Andi Offset 3. Saturn. (2000). Basic Electrical Power Engineering and Power Electronics. Jakarta: Gramedia	
Learning media	Software:	Hardware:
		Computer, LCD Projector and whiteboards and other devices
Teaching team		
Assessment	Mid Test, Final Test, Individual task & team, group discussion and presentation	
Prerequisite courses	No.	

Course subjects

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(1)	CLO-1.1: [PLO-1.2, 2.1, 2.2, 6.5] Students are able to explain basic concepts and introduction to electricity (basic concept of electric)	Introduction to electricity: The basic concepts of current, voltage, resistance, the use of a multimeter	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion [1x20 ']	<ul style="list-style-type: none"> Make a summary and description of the material presented in the resume book 	Able to explain basic electrical concepts regarding current, voltage, and resistance and understand the use of a multimeter	RU-1 and RU-2, RP-2 and RP-3
(2)	CLO-1.2: [PLO-1.2, 2.1, 2.2, 6.5] Students are able to	The basic concept of direct current electricity (direct current)	Material description [1x70 '] Frequently asked questions [1x10 ']	<ul style="list-style-type: none"> Make a summary and description of the material 	Able to explain the basic concepts of direct current	RU-1 and RU-2, RP-2 and RP-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
	explain the basic concepts of direct current electricity		Discussion about the questions given [1x20 ']	presented in the resume book <ul style="list-style-type: none"> Group assignment to create a simple DC current circuit 	electricity	
(3)	CLO-1.3: [PLO-1.2, 2.1, 2.2, 6.5] Students are able to explain the basic concepts of alternating current electricity	The basic concept of alternating current electricity	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> Make a summary and description of the material presented in the resume book The task of analyzing the calculation of PLN payment receipts 	Be able to explain the basic concept of alternating current electricity	RU-1 and RU-2, RP-2 and RP-3
(4)	CLO-2.1: [PLO-1.2, 2.1, 2.2, 6.5] Students are able to explain the basic concepts of semiconductor diodes (semiconductor diodes)	The basic concept of a semiconductor diode (semiconductor diode)	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> Make a summary and description of the material presented in the resume book 	Be able to explain the basic concepts of semiconductor diodes and their different types	RU-1 and RU-2, RP-1, RP-2 and RP-3
(5)	CLO-2.2: [PLO-1.2, 2.1, 2.2, 6.5] Students are able to explain the types of semiconductor diodes (kind of semiconductor diodes)	Types of semiconductor diodes	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> Make a summary and description of the material presented in the resume book 	Be able to explain differences and characteristics of semiconductor diodes	RU-1 and RU-2, RP-1, RP-2 and RP-3
(6)	CLO-2.3: [PLO-1.2, 2.1, 2.2, 6.5] Students are able to	The basic concept, function, and form of the transistor (basic	Material description [1x70 '] Frequently asked questions [1x10 ']	<ul style="list-style-type: none"> Make a summary and description of the material 	Be able to explain basic concepts, functions, and	RU-1 and RU-2, RP-1, RP-2 and RP-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
	explain basic concepts, functions, and forms of transistors (basic concepts, functions, and form of transistors)	concept, function, and form of transistor)	Discussion about the questions given [1x20 ']	presented in the resume book	shapes of transistors	
(7)	CLO-2.4: [PLO-1.2, 2.1, 2.2, 6.5] Students are able to explain the types of transistors (kind of transistor)	Types of transistors	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> • Make a summary and description of the material presented in the resume book 	Be able to explain types of transistors	RU-1 and RU-2, RP-1, RP-2 and RP-3
(8)	Mid Test					
(9)	CLO-3: [PLO-1.2, 2.1, 2.2, 6.5] Students are able to explain the basic concepts of logic circuits	The basic concept of logic circuits, symbols, functions, and their combinations and applications	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> • Make a summary and description of the material presented in the resume book • Group discussion and presentation on evaluating the use of logic circuits in an electronic device 	Be able to explain the basic concepts of logic circuits and evaluate the use of logic circuits in several electronic devices	RU-1 and RU-2 RP-1 and RP-2
(10)	CLO-4.1: [PLO-1.2, 2.1, 2.2] Students are able to explain the basic concepts of generators and motors	The basic concept of generators and motors, working principles, history, and their differences	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> • Make a summary and description of the material presented in the resume book • Group discussion and presentation on generators and 	Be able to explain the basic concepts of generators and motors and their differences	RU-1 and RU-2 RP-1 and RP-2

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
				motors		
(11)	CLO-4.2: [PLO-1.2, 2.1, 2.2] Students are able to explain about DC generators	DC generator construction, the working principle, types of DC generators and their respective characteristics	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> • Make a summary and description of the material presented in the resume book 	Able to master DC generator construction, working principle, types of DC generators and their respective characteristics	RU-1 and RU-2
(12)	CLO-4.3: [PLO-1.2, 2.1, 2.2] Students are able to explain about DC motors	DC motor construction, a working principle, types of DC motors and their respective characteristics	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> • Make a summary and description of the material presented in the resume book • The group task made an electric bell using a DC motor 	Able to master kDC motor instructions, working principles, types of DC motors and their respective characteristics	RU-1 and RU-2
(13)	CLO-4.4: [PLO-1.2, 2.1, 2.2] Students are able to explain about AC generators	AC generator construction, the working principle, types of AC generators and the characteristics of each	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> • Make a summary and description of the material presented in the resume book 	Able to master AC generator construction, working principle, types of AC generators and their respective characteristics	RU-1 and RU-2
(14)	CLO-4.5: [PLO-1.2, 2.1, 2.2] Students are able to explain about AC motors	AC motor construction, working principle, types of AC motors and their respective characteristics	Material description [1x70 '] Frequently asked questions [1x10 '] Discussion about the questions given [1x20 ']	<ul style="list-style-type: none"> • Make a summary and description of the material presented in the resume book 	Able to master AC motor construction, working principles, types of AC motors and their respective characteristics	RU-1 and RU-2

CLO-5	UAS. 5	5	V	V	V																
Presence		5																			
TOTAL		100																			

Assessment components

Mid Test (UTS / Ujian Tengah Semester)	: 35%
Final test (UAS/ Ujian Akhir Semester)	: 35%
Individual assignment	: 5%
Group assignment	: 20%
<u>Presence</u>	: 5%
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
The ability to analyze	Able to analyze 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				

