



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		
Machine Tool Technology	MES1.52.3016	Study Program Compulsory Courses / MEVE core courses	1	2	2	1
Responsible Lecturer	Drs. Yufrizal A, M.Pd., Drs Abd. Azis, M.Pd., Drs. Nofri Helmi, M.Kes, Eko indrawan, M.Pd, Rifelino, S.Pd., MT, Budi Syahri, S.Pd., M.Pd.T, Zainal Abdi, M.Eng, Febri Prasetya, S.Pd ., M.Pd.T			Signature		
INFORMATION	Dean		Head of Department		Coordinator of study program	
	<u>Dr. Fahmi Rizal, M.Pd., MT</u> NIP. 195912041985031004		<u>Drs. Purwantono, M.Pd</u> NIP. 196308041986031002		<u>Drs. Purwantono, M.Pd</u> NIP. 196308041986031002	
Program Learning Outcomes	Study Program Graduate Learning Outcomes (PLO): <ol style="list-style-type: none"> 1. Possess a good ability to apply the basic science (mathematics and natural sciences) and other disciplines in profesional 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 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 thinking in identifying, formulating, problem solving and evaluating various problems in mechanical engineering using the most appropriate and effective scientific method (<i>Engineering analysis, investigations and assessment</i>): <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 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 (CLO)

Outcomes	CLO		PLO
	1. Students are skilled at using hand tools		3.2, 3.4,5.3
	2. Skilled students operate the basics of the lathe process		3.1,3.2, .3.3,3.4,5.2
	3. Skilled students operate the basics of the scrap process		3.1,3.2, .3.3,3.4, 5.2
	4. Skilled students operate the basics of the teacher process		3.1,3.2, .3.3,3.4, 5.2
	5. Skilled students operate the basics of the freisancing process		3.1,3.2, .3.3,3.4, 5.2
	6. Skilled students produce a finished product according to the dimensions of the work drawing using machine tools and hand tools		3.1,3.2, .3.3,3.4, 5.2
Short course descriptions	This subject is the skill of: operation of metalworking tools such as drilling machines, lathes, scrap, freis, cutting tools on industrial machines.		
References	Main references (RU):		
	1. Taufiq Rochim, (1993). Machine Process Theory and Technology. ITB Bandung: Bandung		
	2. Kalpakjian Serope & Schmid Steven, (2006). Manufacturing Engineering and Technology. Prentice Hall: Singapore.		
	3. Mikell P. Groover. (2010). Fundamentals Of Modern Manufacturing. John Wiley & Sons, INC. USA.		
	Additional references (RP)		
1. Gupta, HN & Mittal, Arun. (2009). Manufacturing processes 2nd Edition. New Age International Limited: New Delhi			
2. Youssef, Helmi & El Hofy, Hassan (2008). Machining Technology Machine Tools and Operations. CRC Press: New York			
Learning Media	Software:	Hardware:	
		Industrial machines and tools, white board.	
Team Teaching			
Assessment	UTS, UAS, Product Assessment, Reports		
Requirements Subject	No		

Course Subjects

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(1)	CLO-1: [PLO-3.2, 3.4,6.3] Students know Machine Tool Technology courses and an explanation of the terms contained in work drawings	Mini Vise	Material explanation [1x130 ' Question and answer [1x20 ' Discussion [1x100 '	Determine the work steps of making a mini vise	Able to explain about Machine Tool Technology courses and explain the terms contained in work drawings	RU-1 and RU-2
(2)	CLO-2.1.6: [PLO-3.1,3.2, .3.3,3.4,6.3] Skilled in operating the basics of a lathe (screw shaft and turning shaft)	<ul style="list-style-type: none"> • Installation of the chisel on the tool post • Clamping of the workpiece on a fixed head (headstock) 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 '	<ul style="list-style-type: none"> • Practice of making workpieces 	Able operates the basics of a lathe	RU-1 and RU-2
(3)	CLO-2.2.6: [PLO-3.1,3.2, .3.3,3.4,6.3] Skilled in operating the basics of a lathe (screw shaft and turning shaft)	<ul style="list-style-type: none"> • Selection of the workpiece rotation speed • Depth of cut price selection 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 '	<ul style="list-style-type: none"> • Practice of making workpieces 	Able operates the basics of a lathe	RU-1 and RU-2
(4)	CLO-2.3.6: [PLO-3.1,3.2, .3.3,3.4,6.3] Skilled in operating the basics of a lathe (screw shaft and turning shaft)	<ul style="list-style-type: none"> • Lathe (facing) • Flashlight hole (center drill) 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 '	<ul style="list-style-type: none"> • Practice of making workpieces 	Able operates the basics of a lathe	RU-1 and RU-2
(5)	CLO-2.4.6: [PLO-3.1,3.2, .3.3,3.4,6.3] Skilled in operating the basics of a lathe (screw shaft and turning shaft)	<ul style="list-style-type: none"> • Flat lathe • Outer tapered lathe • Chamfer lathe 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 '	<ul style="list-style-type: none"> • Practice of making workpieces 	Able operates the basics of a lathe	RU-1, RU-2, RU-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(6)	CLO-3.1.6: [PLO-3.1,3.2, .3.3,3.4,6.3] College student Skilled in operating the basics of scrap machines (Shaft position, 1 jaw, 2 jaw, jaw liner)	<ul style="list-style-type: none"> Mounting the chisel in the tool holder Clamping of the workpiece at the vise 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> Practice of making workpieces 	Able operates the basics of the Sekrap machine	RU-1, RU-2, RU-3 And RP-1, RP-2, RP-3
(7)	CLO-3.2.6: [PLO-3.1,3.2, .3.3,3.4,6.3] College student Skilled in operating the basics of scrap machines (Shaft position, 1 jaw, 2 jaw, jaw liner)	<ul style="list-style-type: none"> Initial stride free length Final stride free length 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> Practice of making workpieces 	Able operates the basics of the Sekrap machine	RU-1, RU-3, RU-2, RP-4
(8)	Mid-Test					
(9)	CLO-3.4.6: [PLO-3.1,3.2, .3.3,3.4,6.3] College student Skilled in operating the basics of scrap machines (Shaft position, 1 jaw, 2 jaw, jaw liner)	<ul style="list-style-type: none"> Feeding step speed Setting the depth of cut (depth of cut) Feeding settings 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> Practice of making workpieces 	Able operates the basics of the Sekrap machine	RU-1, RU-3, RU-2, RP-4
(10)	CLO-5.1.6: [PLO-3.1,3.2, .3.3,3.4,6.3] College student Skilled in operating the basics of the freis machine (foundation)	<ul style="list-style-type: none"> Mounting the chisel in the tool holder Clamping of the workpiece at the vise 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> Practice of making workpieces 	Able operate the basics of the freis machine	RU-1, RU-2, RU-3 RP-1, RP-2
(11)	CLO-5.2.6: [PLO-3.1,3.2, .3.3,3.4,6.3] College student Skilled in operating the basics of the freis machine (foundation)	<ul style="list-style-type: none"> Setting the depth of cut (depth of cut) Feeding settings Endmill 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> Practice of making workpieces 	Able operate the basics of the freis machine	RU-1, RU-2, RU-3 RP-1, RP-2

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(12)	CLO-4.1.6: [PLO-3.1,3.2, .3.3,3.4,6.3] Skilled students make holes using a drill machine	<ul style="list-style-type: none"> • Workpiece clamping mechanism on a Gurdi machine • Selecting the cutting edge for the Gurdi process 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> • Practice of making workpieces • Report 	Able operate the basics of the drill machine	RU-1, RU-2, RU-3 RP-1, RP-2
(13)	CLO-4.1,6: [PLO-3.1,3.2, .3.3,3.4,6.3] Skilled students make holes using a drill machine	<ul style="list-style-type: none"> • Selection of the workpiece rotation speed • Operating a drilling machine (drilling machine) 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> • Practice of making workpieces • Report 	Able operate the basics of the drill machine	RU-1, RU-2, RU-3 RP-1, RP-2
(14)	CLO-2:: [PLO-3.1,3.2, .3.3,3.4,6.3] College student Skilled in making inner threads using machines, Skilled in making outer threads using machines,	<ul style="list-style-type: none"> • The meaning of writing screw symbols on working drawings according to ISO standards • Inner Thread Specifications • Specification for the dimensions of the workpiece hole prior to the manufacture of the inner thread • Work position in the threading process with a lathe • Inner rolling process work order 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> • Practice making workpieces • Report 	Able Skilled in making inner threads using machines, Skilled in making outer threads using machines.	RU-1, RU-2, RU-3 RP-1, RP-2
(15)	CLO-2:: [PLO-3.1,3.2,	<ul style="list-style-type: none"> • Outer Thread 	Material explanation [1x20 ']	<ul style="list-style-type: none"> • Practice of making 	Able Skilled in making	RU-1, RU-2, RU-

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
	.3.3,3.4,6.3] College student Skilled in making inner threads using machines, Skilled in making outer threads using machines	<ul style="list-style-type: none"> Specifications of the workpiece diameter prior to the manufacture of the outer thread Work position in the threading process with a lathe Stages of work on the outer thread process 	Question and answer [1x10'] Practice[1x220']	workpieces • Report	inner threads using machines, Skilled in making outer threads using machines.	3 RP-1, RP-2
(16)	Final Test					

Note : 1 credit = (50 'TM + 60' BT + 60 'BM) / Week
 TM = Face to Face (Lecture)
 BT = Structured Learning.
 BM = Independent Study
 PS = Simulation Practicum (160 minutes / week)
 PL = Laboratory Practicum (160 minutes / week)
 T = Theory (aspects of science)
 P = Practice (aspects of work skills)

The linkage between CLO and PLO and assessment methods

MES1.52.3016	Assessment	Weight (%)	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-2.1.6	UTS. 1	5							V	V	V	V											V		
CLO-2.2.6	UTS. 2	7.5							V	V	V	V											V		
CLO-2.3.6	UTS. 3	7.5							V	V	V	V											V		
CLO-2.4.6	UTS. 4	7.5							V	V	V	V											V		
CLO-3.1.6	UTS. 5	7.5							V	V	V	V											V		
CLO-3.2.6	UAS. 1	7.5							V	V	V	V											V		
CLO-5.1.6	UAS. 2	7.5							V	V	V	V											V		
CLO-5.2.6	UAS. 3	7.5							V	V	V	V											V		

CLO-4.1.6	UAS. 4	7.5							V	V	V	V								V		
CLO-2	UAS. 5	5							V	V	V	V								V		
CLO-1.2.3.4.5.6	Workpieces and Reports	20							V	V	V	V								V		
Presence		10																				
TOTAL		100																				

Assessment Component

Midterm exam (UTS)	: 35%
Final exams (UAS)	: 35%
Assignment	: 20%
<u>Presence</u>	<u>: 10%</u>
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 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	-	Tertunda
60 – 64	C+	2.3	Acceptable				

