



MODULE HAND BOOK

MECHANICAL ENGINEERING VOCATIONAL EDUCATION STUDY PROGRAM

FACULTY OF ENGINEERING – UNIVERSITAS NEGERI PADANG

COURSE NAME	CODE	Course classification	CU		Sem	Versio n
			Theory	Pract		
Jig and Fixture	MES2.61.6106	Elective Courses of Study Program/ Proficiency	1	2	6	1
Responsible Lecturer	Drs Abd. Azis, M.Pd., Rifelino, S.Pd., MT, Budi Syahri, S.Pd., M.Pd.T,		SigType			
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 Outcomes	Program 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 (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 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 Outcomes

Course Learning Outcomes (CLO)

CLO	PLO
1. Students have the ability to develop ideas for a tool product in the field of mechanical engineering	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
2. Students have the ability to design auxiliary products in the mechanical engineering field	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
3. Students are experts in operating lathe machines	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
4. Students are experts in operating Sekrap machines	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
5. Students are experts in operating Gurdi machines	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2

	6. Students are experts in operating Freis machines	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
	7. Skilled students present, procedures for using tools, repairing products and making tool reports.	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
Course descriptions	This course Provides knowledge about the basics of designing manufacturing process aids, production process efficiency (efficient production), production planning, ergonomics, mass production, product quality assurance (quality control).	
References	Main references (RU):	
	1. Edward G. Hoffman (2004). Jig And Fixture Design. Delmar, Cengage Learning. USA 2. Taufiq Rochim, (1993). Machine Process Theory and Technology. ITB Bandung: Bandung 3. Kalpakjian Serope & Schmid Steven, (2006). Manufacturing Engineering and Technology. Prentice Hall: Singapore.	
	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:
	CAD	Industrial machines and tools, white board.
Team Teaching	Drs Abd. Azis, M.Pd., Rifelino, S.Pd., MT, Budi Syahri, S.Pd., M.Pd.T,	
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-1.1: [PLO-2.1,2.2,3.1] Students know about directing and fitting engineering courses	<ul style="list-style-type: none"> Explain the purpose of the lecture; class rules, the evaluation RPS, Lecture Contract 	Material explanation [1x130 ' Question and answer [1x20 ' Discussion [1x100 '	Determine the design of the jig and fixture	Able to explain about directing and fitting technique courses and explanation of	RU-1 and RU-2

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
					terms contained in work drawings	
(2)	CLO-1.2: [PLO-2.1,2.2,3.1] Developing an idea about a jig and fixture product	<ul style="list-style-type: none"> Jig and fixture tools The need for jig and fixture tools in the industry 	Material explanation [1x20 '] Question and answer [1x10 '] Practice[1x220 ']	<ul style="list-style-type: none"> Development of jig and fixture tool ideas 	Able understand jig and fixture tools	RU-1 and RU-2
(3)	CLO-2.1: [PLO-3.1,3.2, .3.3,6.3] Designing a jig and fixture product	<ul style="list-style-type: none"> Design jig and fixture tools Sketch the designed jig and fixture tools 	Material explanation [1x20 '] Question and answer [1x10 '] Practice[1x220 ']	<ul style="list-style-type: none"> Design of jig and fixture tools 	Able designing jigs and fixtures	RU-1 and RU-2
(4)	CLO-2.2: [PLO-3.1,3.2, .3.3,6.3] Skilled in operating CAD in making jig and fixture work drawings	<ul style="list-style-type: none"> Using CAD to create working drawings 3D jig and fixture working drawings 	Material explanation [1x20 '] Question and answer [1x10 '] Practice[1x220 ']	<ul style="list-style-type: none"> Making jig and fixture work drawings in CAD 	Able operate CAD applications	RU-1 and RU-2
(5)	CLO-3: [PLO-3.1,3.2, .3.3,3.4,6.3] Expert in operating lathes in the manufacture of jigs and fixtures	<ul style="list-style-type: none"> Operating a lathe in the manufacture of jigs and fixtures Flat, threaded lathe Multilevel, tapered lathe 	Material explanation [1x20 '] Question and answer [1x10 '] Practice[1x220 ']	<ul style="list-style-type: none"> Practice of making workpieces 	Able operate the lathe expertly	RU-1, RU-2, and RP-2
(6)	CLO-4: [PLO-3.1,3.2, .3.3,3.4,6.3] Expert in operating Sekrap machines in jig and fixture manufacturing	<ul style="list-style-type: none"> Mounting the chisel in the tool holder Clamping of the workpiece at the vise Creasing of the workpiece 	Material explanation [1x20 '] Question and answer [1x10 '] Practice[1x220 ']	<ul style="list-style-type: none"> Practice of making workpieces 	Able operate scrap machines expertly	RU-1, RU-2, and RP-1, RP-2

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(7)	CLO-5: [PLO-3.1,3.2, .3.3,3.4,6.3] Expert in operating drilling machines in jig and fixture manufacturing	<ul style="list-style-type: none"> Setting the workpiece on the drill machine The manufacture of jigs and fixtures uses a drill machine 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> Practice of making workpieces 	Able operate the drill machine expertly	RU-1, RU-3,, RP-1
(8)	Mid Test Exams					
(9)	CLO-6: [PLO-3.1,3.2, .3.3,3.4,6.3] Expert in operating Freis machines in manufacturing jigs and fixtures	<ul style="list-style-type: none"> Setting up workpieces on the freis machine Making jigs and fixtures using a freis machine 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> Practice of making workpieces 	Able operate the freis machine expertly	RU-1, RU-3,
(10)	CLO-2.3.4.5.6: [PLO-3.1,3.2, .3.3,3.4,6.3] College student carry out the finishing process in making jig and fixture tools	<ul style="list-style-type: none"> Jig and fixture finishing process Jig and fixture assembly 	Material explanation [1x20 ' Question and answer [1x10 ' Practice[1x220 ']	<ul style="list-style-type: none"> Practice assembling workpieces 	Able finishing jigs and fixtures	RU-1, RU-2,
(11)	CLO-7: [PLO-3.4,6.3] College student made a presentation about the jig and fixture tools made	<ul style="list-style-type: none"> Presentation of jigs and fixtures Lack of jig and fixture tools made 	Material explanation [1x20 ' Question and answer [1x10 ' presentation[1x220 ']	<ul style="list-style-type: none"> Workpiece presentation 	Able present the workpiece jig and fixture made	RU-1, RU-2,
(12)	CLO-7: [PLO-3.4,6.3] Skilled students fix deficiencies in the jig and fixture tools they make	<ul style="list-style-type: none"> Shortage analysis of jig and fixture tools Improvements to jig and fixture tools 	Material description [1x20 ' Frequently asked questions [1x10 ' Practice [1x220 ']	<ul style="list-style-type: none"> Practice workpiece repair 	Able to fix tool shortages	RU-1, RU-2, RP-1,
(13)	CLO-7: [PLO-3.4,6.3] Skilled students	<ul style="list-style-type: none"> Demonstrating tool use 	Material explanation [1x20 ' Question and answer [1x10 ']	<ul style="list-style-type: none"> Demonstration 	Able demonstrate the tools	RU-1, RU-3 RP-1, RP-2

CLO-7	Workpieces and Reports	20										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	-	Postpone
60 – 64	C+	2.3	Acceptable				

