



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		
Plate Forming	MES1.61.2101	Compulsory Courses	0	3	2	
Responsible	Drs. Nelvi Erizon., Drs. Purwantono, M.Pd, Drs, Jasman, M.Kes, M.Pd, Bulkia Rahim, M.Pd, Junil Adri, 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	
Program Learning Outcome	<p>Program learning outcome of Mechanical engineering vocational education:</p> <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 thingking 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 outcomes	Course learning outcomes	
	CLO	PLO
	1. Students Know the basics of plate formation	2.1, 2.2, 2.3, 5.1
	2. Skilled Students perform the bending and rolling processes	3.1,3.3, 3.4.
	3. Skilled students do the processes of blanking, stretching, spinning and deep drawing	3.1,3.3, 3.4.
	4. Skilled in performing the formation process with fluid pressure	3.1,3.3, 3.4.
5. Skilled in carrying out the forming process and planning to make simple tools by applying the forming process method	3.1,3.3, 3.4., 5.2	
Course descriptions	Skilled in the plate forming process using thin plate materials, pre-cutting plate pre-cutting, profile cutting according to stretch drawings, and manual forming equipment with conventional machines such as the bending process, the blanking process, the rolling process, the stretching process, the spinning process, deep drawing process, hydro forming process and application of forming techniques for making simple objects.	
References	Main Reference (RU):	
	1. Fabrication Team (2012)) Teaching Materials for the Establishment of the Mechanical Engineering Department, FT UNP Padang	
	2. Ambiyar DKK (2008) Metal Forming Engineering Department of Mechanical Engineering, FT UNP Padang 3. Fabrication Team (2012) Job Sheet Formation Technique Fabrication Labor T.Mesin FT UNP Padang	
Learning Media	Additional Reference (RP)	
	1.	
Learning Media	Software:	Hardware:
		Computer, LCD Projector and Whiteboard and peripherals
Team Teaching		
Assessment	Mid-Test Exam, Final Exam, Independent & group assignments, Group presentations	
Requirements Subject	No	

Course Objects

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(1)	CLO-1: [PLO-2.1, 2.2, 2.3.] Students are capable Understand the characteristics of thin plates and their application to various forming processes.	Introducing various kinds of thin plates and their properties (characteristics) include: 1.Voltage, 2.Strain, 3.Hardness, 4. Formability 5. Elasticity modulus	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x190 '] Conclusion [1x10 ']	1. Listening to an explanation of the characteristics of the thin plates material 2. Questions and answers about material that is still doubtful or not understood	Be able to explain characteristics of thin plates and their application to various forming processes.	RU-1, RU-2
(2)	CLO-2: [PLO-2.1, 2.2, 2.3] Students are able to explain the process of cutting thin plates, pre cutting and cutting profiles and their application in the plate forming process	Thin plates cutting techniques and procedures: 1. Introduction of the cutting tool 2. The working principle of cutting tools	Lecture [1x50 '] Discussion [1x30 '] Demonstration [1x20 '] Practice [1x200 ']	Make a summary and description of the material presented in the resume book, Make practicum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(3)	CLO-2: [PLO-2.1, 2.2, 2.3] Students are able to explain functions of manual forming tools, welds, hammer forming and forming machines for various forming processes	Introduction of manual forming tools 1.Dimensions and shape of the forming tools 2.The function of forming from forming tools 3.Principle of using forming tools	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make practicum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(4)	CLO-2: [PLO-5.1, 5.2, 5.3.] College student Skilled in using manual forming equipment and its application in the thin plate forming process	Techniques and procedures for using manual forming tools. 1. Apply various forming processes to form thin plates	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make practicum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(5)	CLO-2: [PLO-5.1, 5.2, 5.3.] College student Skilled in doing the bending process and can analyze every process of forming plate bending	Perform the bending formation process on a thin plate 1. Analyze the length of the stretch 2. Calculate the actual length of the stretch. 3 Paint the length of the plate stretch for the bending process 4 Working on the plate bending process	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make practicum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(6)	CLO-2: [PLO-5.1, 5.2, 5.3.] College student Skilled in the process of forming a cylinder by (rolling) and can analyze each plate rolling process	Carrying out the forming process by rolling to form a cylinder. 1. Paint a stretch image 2 Calculate the plate material requirements to be rolled 3 Analyze the stages of the rolling process 4 Carry out the rolling process according to the correct technique and procedure	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make practicum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(7)	CLO-3.1: [PLO-5.1, 5.2, 5.3.] College student Skilled in doing the forming process (blanking). And can analyze every blanking process on a thin plate	Doing the blanking process on thin plates. 1. Determine the desired form of blanking. 2. Determine the blanking center of gravity 3. Determine the stages of the blanking process.	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make practicum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(8)	CLO-3.2: [PLO-5.1, 5.2, 5.3.] College student Skilled in doing the forming process	Perform the shaping process by stretching the plate to be formed.	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 ']	Make a summary and description of the material presented in	Attitude Performance Product results	

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
	by stretching, and can analyze every stretching process on the formed plate	<ol style="list-style-type: none"> 1. Determine the desired shape 2. Create a landscape image 3. Determine the point of the plate to be stretched 4 Analyze the tensile force in accordance with the shape and material of the plate being worked. 	Practice [1x170 '] Conclusion [1x10 ']	the resume book, Make practicum reports		
(9)	CLO-3.3: [PLO-5.1, 5.2, 5.3.] College student Skilled in doing the forming process by spinning and forming (Spinning). And can analyze every spinning process on the formed plate.	Perform the forming process using the spinning method on the plate <ol style="list-style-type: none"> 1 Make a picture of the spread of the plate to be spinning. 2. Make the former for spinning process 3. Determine the stages of the spinning process according to the shape and material being worked 	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make practicum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(10)	CLO-3.4: [PLO-5.1, 5.2, 5.3.] College student Skilled in doing the deep drawing process, and can analyze every deep drawing process on the formed plate	Performing the forming process using the deep drawing method. <ol style="list-style-type: none"> 1 Make an image of the spread of the plate to be shaped 2 Determine the stages of the processing process using the deep drawing method 	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make practicum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(11)	CLO-4: [PLO-5.1, 5.2, 5.3.] College student Skilled in carrying out the formation process with a formation	Carry out the plate forming process using the hydro-forming method <ol style="list-style-type: none"> 1 Make an image of the 	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 ']	Make a summary and description of the material presented in the resume book, Make	Attitude Performance Product results	RU-1, RU-2 and RU-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
	system with fluid pressure (hydro forming). And can analyze the hydroforming process in the formation of thin plates.	spread of the plate to be formed 2 Calculating the fluid pressure in the pump for the forming process 3 Planning the stages of the formation process using the hydroforming method	Conclusion [1x10 ']	pracitcum reports		
(12)	CLO-5: [PLO-5.1, 5.2, 5.3.] College student Skilled in carrying out the forming process and planning to make simple tools by applying the forming process method	Planning for making simple tools using plate materials with the application of the forming process 1 Create a design drawing. 2 Create a landscape image 3 Calculate the material requirements needed 4 Determine the stages of work	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make pracitcum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(13)	CLO-5: [PLO-5.1, 5.2, 5.3.] College student Continued planning and project work to implement the shaping process	Continued stages of the formation process	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make pracitcum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(14)	CLO-5: [PLO-5.1, 5.2, 5.3.] College student Continued creation of project work to implement the shaping process	Continued stages of the formation process	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make pracitcum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3
(15)	CLO-5: [PLO-5.1, 5.2, 5.3.] College student Continued creation of project work to implement the shaping process	Continued stages of the formation process,	Lecture [1x80 '] Discussion [1x20 '] Demonstration [1x20 '] Practice [1x170 '] Conclusion [1x10 ']	Make a summary and description of the material presented in the resume book, Make pracitcum reports	Attitude Performance Product results	RU-1, RU-2 and RU-3

2,3,4,5																							
Presence		10																					
TOTAL		100																					

Assessment Component

Midterm exam	: 25%
Final exams	: 25%
Duty	: 40%
<u>Presence</u>	: 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 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				

