



# MODULE HAND BOOK

## MECHANICAL ENGINEERING VOCATIONAL EDUCATION STUDY PROGRAM

### FACULTY OF ENGINEERING – UNIVERSITAS NEGERI PADANG

COURSE NAME	CODE	Course classification	CU		Sem	Version
			Theor y	Pract		
<i>Fabrication Production Technology</i>	MES2.61.6104	Elective Courses of Study Program/ proficiency		3	6	
<b>Responsible</b>	Drs. Purwantono, M.Pd, Drs. Jasman, M. Kes., Drs. Nelvi Erizon, M. Pd., Drs. Jamsan, M. Kes., Drs. Irzal, M. Kes.			Signature		
<b>INFORMATION</b>	<b>Dean</b>		<b>Head of Department</b>		<b>Coordinator of study program</b>	
	<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	
<b>Program Learning Outcome</b>	<b>Program learning outcome of Mechanical engineering vocational education:</b> <ol style="list-style-type: none"> <li>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"> <li>1.1. possess a good understanding and can apply the basic concept of mathematics to solve various technical problems</li> <li>1.2. possess a good understanding and can apply basic the concept of physic to solve various technical problems</li> <li>1.3. possess a good understanding and can apply basic the concept of chemistry to solve various technical problems</li> </ol> </li> <li>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 (<b><i>Engineering analysis, investigations and assessment</i></b>):               <ol style="list-style-type: none"> <li>2.1. problem identification skills</li> <li>2.2. problem analysis skills</li> <li>2.3. problem evaluation skills</li> </ol> </li> </ol>					

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

<b>Course learning outcomes</b>	<b>Course learning outcomes</b>	
	<b>CLO</b>	<b>PLO</b>
	1. Students Understand the Characteristics of the Fabrication Production Work Field	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
	2. Skilled students plan Fabrication products, namely one simple tool or Appropriate Technology (TTG).	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
	3. Skilled Students calculate materials, budget and workmanship of Fabrication production	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
	4. Skilled Students make learning plans in the field of Fabrication	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 5.1, 5.2
<b>Course descriptions</b>	Provides knowledge about Fabrication Production including planning work, analysis, calculation of budget plans (RABO, and fabrication production processes related to designing simple tools or appropriate technology.	
<b>References</b>	<b>Main Reference (RU):</b>	
	1. Smith, FJM, (1977). Basic Fabrication. 2. ITB, (1977). OXI-Acetylene Welding. 3. ITB, (1977). Tungsten-Arc Gas Sheelder Welding.	
	<b>Additional Reference (RP)</b>	
	1. ITB, (1977). Tungsten-Arc Gas Sheelder Welding.	
<b>Learning Media</b>	<b>Software:</b>	<b>Hardware:</b>
		Main Equipment, Assistive Devices, Work safety equipment, SMAW Welding, Asitelin Oxy Welding, TIG and MIG, LCD Projector and Whiteboard and its devices
<b>Team Teaching</b>		
<b>Assessment</b>	Mid-Test Exam, Final Exam, Practicum Results and attendance	
<b>Requirements Subject</b>	Fabrication, Plate Building Techniques, Occupational Health and Safety, Metal Welding Technology	

## COURSE SUBJECTS

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(1)	<b>CLO-1: [PLO-2.1, 2.2, 2.3, 6.3,)</b> Students are capable : 1. Characteristics of the Fabrication Production Work Field	Scope of Fabrication Work, fields: 1. Sheet metal forming 2. Welding 3. Forging 4. Cutting	Lecture [1x120 '] Discussion [1x50 '] Demonstration [1x50 '] Conclusion [1x30 ']	1. Make a summary and description of the material presented in the resume book	Oral, written	RU-1,2 RP-1
(2)	<b>CLO-1: [PLO-2.1, 2.2, 2.3, 6.3,)</b> Students understand the characteristics of metallic materials, their properties, types, dimensions and availability in the market	Metallic and non-metal materials and properties: 1. Weldability 2. Sifat is able to form 3. Machine capability 4. Shape and dimensions	Lecture [1x120 '] Discussion [1x50 '] Demonstration [1x50 '] Conclusion [1x30 ']	Make a summary and description of the material presented in the resume book	Oral and written	RU-1,2 RP-1
(3)	<b>CLO-2: [PLO-2.1, 2.2, 2.3, 6.3)</b> Skilled students plan Fabrication products, namely one simple tool or Appropriate Technology (TTG).	Planning basics with the following considerations: 1. Function 2. Capacity 3. Transmission 4. Movers 5. maintenance 6. ergonomic	Project-Based Learning [1x300 ']	Project design	Result Project design	RU-1,2 RP-1
(4)	<b>CLO-3: [CP-2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 6.3]</b> Skilled students calculate the materials and budget for making Fabricated products, namely one simple tool or Appropriate Technology (TTG).	Basic calculation tools 1. function 2. material 3. work difficulties 4. precision	Project-Based Learning [1x300 ']	Project design	Result Project design	RU-1,2 RP-1
(5)	<b>CLO-3: [CP-2.1, 2.2, 2.3,</b>	Material cutting method	Project-Based Learning [1x300	Project production	Result project	RU-1,2 RP-1

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
	3.1, 3.2, 3.3, 3.4, 6.3] Skilled Student Cut materials by various cutting methods.	1.Cold cutting 2. Hot cutting	']		production	
(6)	<b>CLO-3:</b> [CP-2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 6.3] Skilled Students Perform forming with the bending formation method	Bending theory 1.bending allowance 2.machine bending 3. Bending method 4. punch and dies	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1
(7)	<b>CLO-3:</b> [CP-2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 6.3] Skilled Students Perform formation by forming methods rolling	Sheet plate rolling 1. Rolling system 2. rolling method	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1
(8)	<b>Mid-Semester Evaluation through Mid-Semester Examination</b>					
(9)	<b>CLO-3:</b> [CP-2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 6.3] Skilled Students Welding Skilled Students Forming with the strecing forming method, deep drawing	Deep drawing 1.Allowance 2. Dies 3. punch	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1
(10)	<b>CLO-3:</b> [CP-2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 6.3] Skilled Students Do formation using the blanking formation method	Blanking process 1.punch type and type 2. the center of gravity of the punch 3.punch shape and type	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1
(11)	<b>CLO-3:</b> [CP-2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 6.3] Skilled students apply the welding material	Process Welding 1.spot welding 2. Tag weld 3. cascade method	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
	connection method					
(12)	<b>CLO-3: [CP-2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 6.3]</b> Skilled students apply the bolt and nut connection method	Bolts and nuts 1.Types and types of bolts and nuts 2. dimensions of bolts and nuts	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1
(13)	<b>CLO-3: [CP-2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 6.3]</b> Skilled students perform the component assembly method	Component assembly method 1. Step method 2. Cascade method 3. Baseline method	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1
(14)	<b>CLO-3: [CP-2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 6.3]</b> Skilled students test the performance of tools	Performance test 1. Engine rotation 2. Torque 3. style	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1
(15)	<b>CLO-4: [CP-3.2, 3.3, 3.4]</b> Skilled students produce reports of fabrication work	Sitimatika report 1. data tabulation 2. Graphics 3. Nomogram	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1
(16)	<b>CLO-4: [CP-3.2, 3.3, 3.4]</b> Skilled Students make learning designs in the field of Fabrication	1. Semester learning plan (RPS) 2. Teaching methods 3. Evaluation Method	Project-Based Learning [1x300']	Project production	Result project production	RU-1,2 RP-1
(17)	<b>Final Exam</b>					

**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**

MSN1.62.4007	Assessment	Point (%)	PLO-1			PLO-2			PLO-3				PLO-4			PLO-5			PLO-6			PLO-7			
			1	2	3	1	2	3	1	2	3	4	1	2	3	1	2	3	1	2	3	1	2	3	
CLO-1.1	UTS. 2.1, 2.2, 2.3	4				V	V	V																	
CLO-1.2	UTS. 2.1, 2.2, 2.3	4				V	V	V																	
CLO-2.2	UTS. 2.1, 2.2, 2.3	4				V	V	V																	
CLO-2.3	UTS. 2.1, 2.2, 2.3	4				V	V	V																	
CLO-2.4	UTS. 2.1, 2.2, 2.3	3				V	V	V																	
CLO-3.1	UTS. 2.1, 2.2, 2.3	3				V	V	V																	
CLO-3.2	UTS.2.1, 2.2, 2.3	3				V	V	V																	
CLO-3.4	UAS. 2.1, 2.2, 2.3	4				V	V	V																	
CLO-3.5	UAS. 2.1, 2.2, 2.3	4				V	V	V																	
CLO-3.6	UAS. 2.1, 2.2, 2.3	4				V	V	V																	
CLO-4.1	UAS. 3.2, 3.3, 3.4	4										V	V	V											
CLO-4.2	UAS. 3.2, 3.3, 3.4	3										V	V	V											
CLO-4.3	UAS. 3.2, 3.3, 3.4	3										V	V	V											
CLO-4.4	UAS. 3.2, 3.3, 3.4	3										V	V	V											
CLO-3	Job Practicum	40																							
Presence		10																							
TOTAL		100																							

**Assessment Component**

Midterm exam (UTS) : 25%  
 Final exams (UAS) : 25%  
 Assignment : 40%  
Presence : 10%  
 Total : 100%

### Scoring/Grading level description

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



