



**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		
Material Testing	MES1.61.4103	Study Program Compulsory Courses / MEVE Core Courses	1	1	4	1
Responsible	Hendri Nurdin, ST, MT; Andril Arafat, ST, M.Eng, Ph.D; Rodesri, ST, MT			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	<b>Study Program Program Learning Outcomes (PLO):</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 thinking in identifying, formulating, problem solving and evaluating various problems in mechanical engineering using the most appropriate and effective scientific method (<b>Engineering analysis, investigations and assessment</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

**Course Learning Outcomes**

<b>Course Learning Outcomes (CLO)</b>	
<b>CLO</b>	<b>PLO</b>
1. Know the types of material testing	1.2, 1.3, 2.1, 2.2, 2.3, 3.4
2. Understand the basic concepts of materials testing	1.2, 1.3, 2.1, 2.2, 2.3, 3.4
3. Perform Testing drag and data processing	1.2, 1.3, 2.1, 2.2, 2.3, 3.4
4. Perform Testing press and data processing	1.2, 1.3, 2.1, 2.2, 2.3, 3.4
5. Perform Testing bending and data processing	1.2, 1.3, 2.1, 2.2, 2.3, 3.4
6. Perform Testing violence and data processing	1.2, 1.3, 2.1, 2.2, 2.3, 3.4
7. Perform impact testing and data processing	1.2, 1.3, 2.1, 2.2, 2.3, 3.4
8. Perform microstructure testing and data processing	1.2, 1.3, 2.1, 2.2, 2.3, 3.4

<b>Short course descriptions</b>	Providing knowledge and skills about technical materials regarding the strengths, advantages and disadvantages of an engineering material.	
<b>References</b>	<b>Main references (RU):</b>	
	1.Kompster, MHA (1975). Materials for Enggineers. Aylesbury: England. 2.Stewart, P. (1975). Materials and Processes Third Edition. Hedges & Bell Pty Ltd Sutton Road Maryborough: Victoria. 3.Surdia, T. (1985). Engineering Material Knowledge. PT. Pradnya Paramita: Jakarta	
	<b>Additional references (RP)</b>	
<b>Learning Media</b>	<b>Software:</b>	<b>Hardware:</b>
		Computers, whiteboards and accessories, projectors, engineering materials testing machines
<b>Team Teaching</b>		
<b>Assessment</b>	Assignments, Quis, UTS, UAS	
<b>Requirements Subject</b>	There is no	

## COURSE SUBJECTS

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(1)	<b>CLO-1: (PLO-1.1., 1.2, 1.3)</b> Students are able to explain the types of engineering material	-Introduction of the types of engineering materials testing - materials needed in material testing	Material explanation <b>[1x100 ']</b> Question and answer <b>[1x50 ']</b> Work on Image	Make a summary and description of the material presented in the resume book	Be able to explain the types of engineering material testing.	RU-1 and RU-2 RU-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
	testing.		assignments[1x150 ']			
(2)	<b>CLO-2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are able to master the basic concepts of metal material testing.	The basic concept of testing. <ul style="list-style-type: none"> <li>• Basic material testing</li> <li>• Material testing procedure</li> </ul>	Material explanation [1x100 ' Question and answer [1x15 ' Work on assignments [1x185 ']	<ul style="list-style-type: none"> <li>• Make a summary and description of the material presented in the resume book.</li> <li>• Create structured assignments</li> </ul>	Able to master the basic concepts of material testing	RU-1 and RU-2 RU-3
(3)	<b>CLO-3.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing drag and data processing.	Tensile testing <ul style="list-style-type: none"> <li>• Preparation of material tools for tensile testing</li> <li>• Retrieval of tensile test data-1</li> </ul>	Material explanation [1x100 ' Question and answer [1x15 ' Work on assignments [1x185 ']	<ul style="list-style-type: none"> <li>• Practice tensile testing</li> </ul>	Able to perform tensile testing	RU-1 and RU-2 RU-3
(4)	<b>CLO-3.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing drag and data processing.	Tensile testing <ul style="list-style-type: none"> <li>• Tensile test data retrieval-2.</li> <li>• Tensile test data processing</li> </ul>	Material explanation [1x100 ' Question and answer [1x15 ' Work on assignments [1x185 ']	<ul style="list-style-type: none"> <li>• Practice tensile testing</li> </ul>	Able to perform tensile testing and process data	RU-1 and RU-2 RU-3
(5)	<b>CLO-4.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing press and data processing.	Press testing <ul style="list-style-type: none"> <li>• Preparation of material tools for compressive testing</li> <li>• Retrieval of press-1 test data</li> </ul>	Material explanation [1x100 ' Question and answer [1x15 ' Work on assignments [1x185 ']	<ul style="list-style-type: none"> <li>• Practice press testing</li> </ul>	Able to perform press testing	RU-1 and RU-2 RU-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(6)	<b>CLO-4.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing press and data processing.	Press testing <ul style="list-style-type: none"> <li>• Retrieval of pressure test data-2.</li> <li>• Press test data processing</li> </ul>	Material explanation [1x100 '] Question and answer [1x15 '] Work on assignments [1x185 ']	<ul style="list-style-type: none"> <li>• Practice press testing</li> </ul>	Able to perform pressure testing and process data	RU-1 and RU-2 RU-3
(7)	<b>CLO-5.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing bending and data processing.	Flexural testing <ul style="list-style-type: none"> <li>• Preparation of material tools for bending testing</li> <li>• Retrieval of bending test data-1</li> </ul>	Material explanation [1x100 '] Question and answer [1x15 '] Work on assignments [1x185 ']	<ul style="list-style-type: none"> <li>• Practice press testing</li> </ul>	Able to perform bending testing	RU-1 and RU-2 RU-3
(8)	<b>CLO-5.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing bending and data processing.	Flexural testing <ul style="list-style-type: none"> <li>• Retrieval of bending test data-2.</li> <li>• Flexural test data processing</li> </ul>	Material explanation [1x100 '] Question and answer [1x15 '] Work on assignments [1x185 ']	<ul style="list-style-type: none"> <li>• Bending testing practice</li> </ul>	Able to perform flexural testing and process data	RU-1 and RU-2 RU-3
(9)	<b>Mid Test (UTS)</b>					
(10)	<b>CLO-6.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing violence and data processing.	Hardness testing <ul style="list-style-type: none"> <li>• Preparation of material tools for hardness testing</li> <li>• Retrieval of hardness-1 test data</li> </ul>	Material explanation [1x100 '] Question and answer [1x15 '] Work on assignments [1x185 ']	<ul style="list-style-type: none"> <li>• Hardness testing practice</li> </ul>	Able to perform hardness testing	RU-1 and RU-2 RU-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(11)	<b>CLO-6.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing violence and data processing.	Hardness testing <ul style="list-style-type: none"> <li>• Retrieval of hardness-2 test data.</li> <li>• Hardness test data processing</li> </ul>	Material explanation [1x100 '] Question and answer [1x15 '] Work on assignments [1x185 ']	• Hardness testing practice	Able to perform hardness testing and process data	RU-1 and RU-2 RU-3
(12)	<b>CLO-7.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing impact and data processing.	Impact testing <ul style="list-style-type: none"> <li>• Preparation of material tools for impact testing</li> <li>• Retrieval of impact test data-1</li> </ul>	Material explanation [1x100 '] Question and answer [1x15 '] Work on assignments [1x185 ']	• Practice impact testing	Able to perform impact testing	RU-1 and RU-2 RU-3
(13)	<b>CLO-7.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing impact and data processing.	Impact testing <ul style="list-style-type: none"> <li>• Retrieval of impact-2 test data.</li> <li>• Impact test data processing</li> </ul>	Material explanation [1x100 '] Question and answer [1x15 '] Work on assignments [1x185 ']	• Practice impact testing	Able to perform impact testing and process data	RU-1 and RU-2 RU-3
(14)	<b>CLO-8.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b> Students are capable Perform Testing microstructure and data processing.	Microstructure testing <ul style="list-style-type: none"> <li>• Preparation of material tools for microstructural testing</li> <li>• Retrieval of microstructure test data - 1</li> </ul>	Material explanation [1x100 '] Question and answer [1x15 '] Work on assignments [1x185 ']	• Microstructural testing practice	Able to perform testing microstructure	RU-1 and RU-2 RU-3
(15)	<b>CLO-8.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]</b>	Impact testing <ul style="list-style-type: none"> <li>• Retrieval of</li> </ul>	Material explanation [1x100 ']	• Microstructural testing practice	Able to perform testing	RU-1 and RU-2 RU-3



CLO-7.2	TP. 5	5	V	V	V	V	V			V															
CLO-8.1	TP. 6	5	V	V	V	V	V			V															
CLO-8.2	TP. 6	5	V	V	V	V	V			V															
Presence		10																							
TOTAL		100																							

### Assessment Component

Practicum Tasks (TP) : 60%

Task reports and presentations (TL) : 30%

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	-	Tertunda
60 – 64	C+	2.3	Acceptable				

