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 testing	MES1.61.5102	Concentration Elective Courses / MEVE Core Course	1	2	1	1
Responsible Lecturer	Drs. Purwantono, M.Pd, Drs. Muhammad. Thaufiq Pinat, MDP		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 Outcomes	Program Learning Outcomes (PLO):
	1. Possess a good ability to apply the basic science (mathematics and natural sciences) and other disciplines in profesional jobs / projects (Knowledge-understanding) 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 ***(Engineering analysis, investigations and assessment):*** 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. Know the types of machine testing	1.2,
2. Understand the basic concepts of machine testing	1.2, 2.1, 2.2
3. Perform Testing Centrifugal pumps and data processing	1.1, .1.2, 2.1, 2.2, .3.2
4. Perform Testing Compressor and data processing	1.1, .1.2, 2.1, 2.2, .3.2
5. Perform Testing Windmill and data processing	1.1, .1.2, 2.1, 2.2, .3.2
6. Perform Testing Water Turbine and data processing	1.1, .1.2, 2.1, 2.2, .3.2
7. Conduct testing of airflow characteristics and data processing	1.1, .1.2, 2.1, 2.2, .3.2
8. Perform Crank Mechanism testing and data processing	1.1, .1.2, 2.1, 2.2, .3.2

Short course descriptions	Providing knowledge and skills about technical materials regarding the strengths, advantages and disadvantages of an engineering material.	
References	**Main references (RU):**	
	1. S. Kalpakjian, Manufacturing Processes for Engineering Materials, Prentice Hall, 2003 2.EP DeGarmo, Materials and Processes in Manufacturing, Prentice Hall Inc., 2004 3.PL Mangonon, The Principles of Materials Selection for Engineering Design, Prentice Hall Inc., 1995 4. BH Anstead, Mechanical Process (translation), Erlangga, 1979	
	Additional references (RP)	
Learning Media	**Software:**	**Hardware:**
		Computers, whiteboards and accessories, projectors, machine test equipment
Team Teaching		
Assessment	Practicum, report, UTS, UAS	
Requirements Subject	No	

COURSE SUBJECTS

Week	Expected competencies	Topics	Method and strategy for leraning	Assignment	Criterion / Assessment indicattor	References
(1)	**CLO-1: (PLO-1.1., 1.2, 1.3)** Students are able to explain the types of machine testing	• Introduction to machine testing types • test equipment needed in machine testing	Material explanation **[1x200 ']** Question and answer **[1x50 ']**	Make a summary and description of the material presented in the resume book	Be able to explain the types of machine testing	RU-1 and RU-2 RU-3

Week	Expected competencies	Topics	Method and strategy for leraning	Assignment	Criterion / Assessment indicattor	References
(2)	**CLO-2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are able to master the basic concepts of machine testing	The basic concept of testing. • Basic engine testing • Machine testing procedure	Material explanation **[1x150 ']** Question and answer **[1x50 ']** Work on assignments **[1x50 ']**	• Make a summary and description of the material presented in the resume book. • Create structured assignments	Able to master the basic concepts of machine testing	RU-1 and RU-2 RU-3
(3)	**CLO-3.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Centrifugal pumps and data processing.	Centrifugal Pump Testing • Preparation of material tools for testing Centrifugal Pumps • Retrieval of test data for the Centrifugal Pump-1	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Centrifugal Pump testing practice	Able to perform Centrifugal Pump testing	RU-1 and RU-2 RU-3
(4)	**CLO-3.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Centrifugal pumps and data processing.	Centrifugal Pump Testing • Retrieval of test data for the Centrifugal Pump-2. • Centrifugal Pump test data processing	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Centrifugal Pump testing practice	Able to perform Centrifugal Pump testing and process data	RU-1 and RU-2 RU-3
(5)	**CLO-4.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Compressor and data processing.	Compressor Testing • Preparation of material tools for Compressor testing • Compressor-1 test data retrieval	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Compressor testing practice	Able to perform Compressor testing	RU-1 and RU-2 RU-3

Week	Expected competencies	Topics	Method and strategy for leraning	Assignment	Criterion / Assessment indicattor	References
(6)	**CLO-4.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Compressor and data processing.	Compressor Testing • Compressor-2 test data collection. • Compressor test data processing	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Compressor testing practice	Able to perform Compressor testing and process data	RU-1 and RU-2 RU-3
(7)	**CLO-5.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Windmill and data processing.	Windmill Testing • Preparation of material tools for windmill testing • Retrieval of Windmill-1 test data	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Compressor testing practice	Able to perform Windmill testing	RU-1 and RU-2 RU-3
(8)	**CLO-5.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Windmill and data processing.	Windmill Testing • Taking the Windmill-2 test data. • Windmill test data processing	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Windmill testing practice	Able to perform Windmill testing and process data	RU-1 and RU-2 RU-3
(9)	**Mid Test (UTS)**					
(10)	**CLO-6.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Water turbine and data processing.	Water Turbine Testing • Preparation of material tools for Water Turbine testing • Retrieval of Water Turbine test data-1	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Water Turbine testing practice	Able to perform Water Turbine testing	RU-1 and RU-2 RU-3

Week	Expected competencies	Topics	Method and strategy for leraning	Assignment	Criterion / Assessment indicattor	References
(11)	**CLO-6.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Water turbine and data processing.	Water Turbine Testing • Retrieval of Water Turbine test data-2. • Water Turbine test data processing	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Water Turbine testing practice	Able to perform Water Turbine testing and process data	RU-1 and RU-2 RU-3
(12)	**CLO-7.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Airflow characteristics and data processing.	Airflow Characteristics Testing • Preparation of material tools for testing Airflow Characteristics • Retrieval of test data on Air Flow Characteristics-1	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Practice testing of airflow characteristics	Able to perform Air Flow Characteristics testing	RU-1 and RU-2 RU-3
(13)	**CLO-7.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Airflow characteristics and data processing.	Airflow Characteristics Testing • Retrieval of test data on Air Flow Characteristics-2. • Processing of air flow characteristics test data	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Practice testing of airflow characteristics	Able to perform Air Flow Characteristics testing and process data	RU-1 and RU-2 RU-3
(14	**CLO-8.1: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Crank Mechanism and data processing.	Crank Mechanism Testing • Preparation of material tools for testing Crank Mechanism • Retrieval of Crank Mechanism test data -1	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Practice Crank Mechanism testing	Able to perform testing Crank Mechanism	RU-1 and RU-2 RU-3

Week	Expected competencies	Topics	Method and strategy for leraning	Assignment	Criterion / Assessment indicattor	References
(15)	**CLO-8.2: [PLO-1.1, .1.2, 1.3, 2.1, 2.2., 3.2]** Students are capable Perform Testing Crank Mechanism and data processing.	Airflow Characteristics Testing • Retrieval of Crank Mechanism test data -2. • Crank Mechanism test data processing	Material explanation **[1x50 ']** Question and answer **[1x15 ']** Work on assignments **[1x185 ']**	• Practice Crank Mechanism testing	Able to perform testing Crank Mechanism and data processing	RU-1 and RU-2 RU-3
(16)	**Final Test (UAS)**					

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				
			1	2	3	1	2	3	1	2	3	4	1	2	3	1	2	3	1	2	3	4	5
CLO-1	TL.1, TL.2	20	V	V	V																		
CLO-2	TL.1, TL.2	10	V	V	V	V	V																
CLO-3.1	TP.1	5	V	V	V	V	V			V													
CLO-3.2	TP.1	5	V	V	V	V	V			V													
CLO-4.1	TP.2	5	V	V	V	V	V			V													
CLO-4.2	TP.2	5	V	V	V	V	V			V													
CLO-5.1	TP. 3	5	V	V	V	V	V			V													
CLO-5.2	TP. 3	5	V	V	V	V	V			V													
CLO-6.1	TP.4	5	V	V	V	V	V			V													
CLO-6.2	TP.4	5	V	V	V	V	V			V													
CLO-7.1	TP. 5	5	V	V	V	V	V			V													

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 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 analysize 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				