



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 Drawing	MES1.61.2106	Compulsory Courses Supporting tools	1	2	2	1
Responsible	Dr. Refdinal., MT, Drs. Muh. Taufik Pinat, MDP, Zainal Abadi, S.Pd., M.Eng and Budi Syahri, S.Pd., M.Pd.T			Signature		
<u>INFORMATION</u>	Dean		Head of Department		Coordinator of study program	
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Program Learning Outcome	Program learning outcome of Mechanical engineering vocational education: <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 (<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

Course learning outcomes

outcomes	CLO		PLO
	1. Provides knowledge and skills to paint pictures of vertical cone stretches, tilted cones, upright pyramids, oblique pyramids, upright cylinders, inclined cylinders, upright transformers, tilt transformers, combination transformers, misaligned surface transformers, uneven base transformers.		2.1, 2.2, 5.3
	2. Understand linear tolerances and geometric tolerances.		2.1,3.1,3.3, 3.4, 5.1, 5.3
	3. Knowing the placement of the work mark on the work drawing.		2.2,3.1,3.3, 3.4, 5.3
Course descriptions	Learn about machine image design applications in making various kinds of stretches. Understand about tolerances in machine drawing design.		
References	Main Reference (RU):		
	<ol style="list-style-type: none"> Dickason, A, (1980), The Geometry Of Sheet Metal Work, Great Britain, The Pitman Press Mazni St. Tumanggung, (1988), Drawing Base-B Technique, Jakarta, Ghalia Indonesia. Ohan Juhana and Suratman, (2000), Drawing Mechanical Engineering, Bandung, Graphic Library. Takeshi Sato and Sugiarto, (1999), Drawing Machines According to ISO Standards, Jakarta, PT Pradnya Paramita. 		
	Additional Reference (RP)		
Learning Media	Software:	Hardware:	
		Computer, LCD Projector and Whiteboard and peripherals	
Team Teaching			
Assessment	Mid Test (UTS), Final Exam (UAS), Independent assignments		
Requirements Subject	No		

Course Objects

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(1)	<p>CLO-1.1: (PLO-2.1, 2.2) Students are able to explain:</p> <ol style="list-style-type: none"> How to make a straight cone stretch obliquely How to make a top view of the cone angled upright 	Understand the steps in making an oblique beveled upright cone and understand the steps to make a view of the cone tilted perpendicular	Material explanation [1x50 ' Question and answer [1x10 ' Working on Problems[1x190]	Paint a stretch of the cone upright tilted	Able to make the cone stretch upright sloping	RU-1, RU-2 and RU-3
(2)	<p>CLO-1.2: (PLO-2.1, 2.2) Students are able to explain</p> <ol style="list-style-type: none"> How to make an oblique cone stretch oblique How to make a top view of an oblique beveled cone 	Understand the steps in making an oblique beveled beveled cone and understand the steps for making a view of an oblique beveled cone	Material explanation [1x50 ' Question and answer [1x10 ' Working on Problems[1x190]	Painting an oblique stretch of a cone tilted	Able to make sloping cone stretch inclined	RU-1, RU-2 and RU-3
(3)	<p>CLO-1.3: (PLO-2.1, 2.2) Students are able to explain:</p> <ol style="list-style-type: none"> How to make an upright stretch of Limas beveled at an angle How to make the top view of an upright pyramid beheaded obliquely 	Understand the steps in making an oblique perpendicular pyramid and understand the steps for making a view of an oblique perpendicular pyramid	Material explanation [1x50 ' Question and answer [1x10 ' Working on Problems[1x190]	Paint a stretch of the pyramid upright tilted	Able to make sloping cone stretch inclined	RU-1, RU-2 and RU-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
(4)	CLO-1.4: (PLO-2.1, 2.2) Students are able to explain 1. How to make an oblique pyramid stretch obliquely 2. How to make a top view of a slanted beveled pyramid	Understand the steps in making an oblique beveled pyramid and understand the steps for making an oblique angled pyramid view	Material explanation [1x50 ' Question and answer [1x10 ' Working on Problems[1x190]	Paint an oblique stretch of an oblique pyramid	Able to make sloping pyramid expanse inclined	RU-1, RU-2 and RU-3
(5)	CLO-1.5: (PLO-2.1, 2.2) Students are able to explain how to make Cylindrical Expanse	Understand the steps in making an Upright Cylinder Spread and understand the steps for making an Inclined Cylinder Spread	Material explanation [1x50 ' Question and answer [1x10 ' Working on Problems[1x190]	Painting an Upright Cylinder Spread and an Inclined Cylinder Spread	Able to Make Upright Cylinder Spans and Inclined Cylinders Spans	RU-1, RU-2 and RU-3
(6)	CLO-1.6: (PLO-2.1, 2.2) Students are able to explain how to make Branched Cylindrical Expanse	Understand the steps in making a T connection Cylinder Spread and understand the steps for making a Y joint Spread	Material explanation [1x50 ' Question and answer [1x10 ' Working on Problems[1x190]	Painting T-connection Cylinder Spread and Y-joint Cylinder Spread	Able to Make T connection Cylinder Spread and Y connection Cylinder Spread	RU-1, RU-2 and RU-3
(7)	CLO-1.7: (PLO-2.1, 2.2) Students are able to explain how to make Transformer expanse upright	Understand the steps in making a transformer upright	Material explanation [1x50 ' Question and answer [1x10 ' Working on Problems[1x190]	Painting a stretch of upright transformers	Able to make the transformer stretch upright	RU-1, RU-2 and RU-3
(8)	Mid-Test Exam					
(9)	CLO-1.8: (PLO-2.1, 2.2) Students are able to explain how to make	Understand the steps in making an inclined transformer stretch	Material explanation [1x50 ' Question and answer [1x10 ' Working on Problems[1x190]	Painting a sloping stretch of transformers	Able to make the transformer stretch tilted	RU-1, RU-2 and RU-3

Week	Expected competencies	Topics	Method and strategy for learning	Assignment	Criterion / Assessment indicator	References
	Transformer stretch is tilted					
(10)	CLO-1.9: (PLO-2.1, 2.2) Students are able to explain how to make Misaligned Surface Transformer Expanse	Understand the steps in creating Misaligned Surface Transformer Spans	Material explanation [1x50 '] Question and answer [1x10 '] Working on Problems[1x190]	Painting Misaligned Surface Transformer Expansions	Able to Make Surface Transformer Expanse Unequal	RU-1, RU-2 and RU-3
(11)	CLO-1.10: (PLO-2.1, 2.2) Students are able to explain how to make Uneven Base Transformer Expanse	Understand the steps in making Misaligned Base Transformer Spreads	Material explanation [1x50 '] Question and answer [1x10 '] Working on Problems[1x190]	Painting Outline of Uneven Base Transformers	Able To Make The Base Transformer Expanse Misaligned	RU-1, RU-2 and RU-3
(12)	CLO-1.11: (PLO-2.1, 2.2) Students are able to explain how to make Combined Transformer Expanse	Understand the steps in creating a Combined Transformer Expanse	Material explanation [1x50 '] Question and answer [1x10 '] Working on Problems[1x190]	Painting Combination Transformer Expansions	Able to Make Combination Transformer Expanse	RU-1, RU-2 and RU-3
(13)	CLO-2.1: [PLO-2.1, 3.1] Students are capable explain Linear / Size Tolerance	1. Definition of Tolerance 2. Standard Tolerances 3. General Tolerance and Specific Tolerance 4. Custom Tolerance	Material explanation [1x50 '] Question and answer [1x10 '] Working on Problems[1x190]	<ul style="list-style-type: none"> Creating linear tolerances on mechanical engineering drawings 	Able to master linear tolerance in mechanical engineering drawings	RU-2, RU-4, RP-1 and RP-2
(14)	CLO-2.2: [PLO-2.1, 3.1] Students are capable explain Geometric Tolerance	1. Definition of Geometric Tolerance 2. Types of Characters and Geometric Symbols 3. Provisions for Writing Tolerance Symbols in Fig 4. Examples of Designing Geometric Tolerances	Material explanation [1x25 '] Question and answer [1x10 '] Discussion [1x15 ']	<ul style="list-style-type: none"> Creating geometric tolerances on mechanical engineering drawings Group discussion 	Able to master geometric tolerances in mechanical engineering drawings	RU-2, RU-4, RP-1 and RP-2

CLO-2.2	Presentation	20				V			V													
CLO-3	Presentation	20																				
Presence		10																				
TOTAL		100																				

Assessment Component

Midterm exam	: 35%
Final exams	: 35%
Duty	: 20%
<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				

