

AME-106 MAINTENANCE PRACTICES- WORK SHOP

COURSE TITLE:	MAINTENANCE PRACTICE- WORKSHOP	COURSE CODE:	AME-106
Semester:	I	Course group:	Core
Teachingschemein periods:	4:1:0	Credits:	3
Methodology:	Lecture+ Tutorial	TotalContact periods:	75
CIE:	60 Marks	SEE:	40 Marks

COURSEOUTCOMES

Onsuccessfulcompletionofthecourse, the studentswill be ableto:

COURSEOUTCOMES	
CO1	Attaintheknowledgeoftools and equipment used inCarpentryand Sheet Metal works
CO2	Knowthe fittingtools andoperations. Know the drilling operations.
CO3	Atta in the knowledge ofMechanicalWorkingof Metalsand differentiate Hot working and cold working processes
CO4	Attain the knowledge of Lathe &Lathe Work
CO5	Attain the knowledge of Milling, Shaping, and Slotting Machines.
CO6	AttaintheknowledgeofWelding, Soldering, brazing operations

CO-POMatrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapping POs
CO1	3	3	3	2	-	-	1	1, 2,3,4,7
CO2	3	3	3	2	-	-	2	1, 2,3,4,7
CO3	3	3	3	2	-	-	2	1, 2,3,4,7
CO4	3	3	3	2	-	-	1	1,2 4, 7
CO5	3	3	3	2	-	-	2	1,2, 4,7
CO6	3	3	3	2	-	-	3	1,2,3,4,7

COURSECONTENT**UNIT-1 CARPENTRY, AND SHEETMETALTOOLS****13 PERIODS:L:10, T:03****Carpentry Tools:**

Marking &Measuring Tools - Scales, Rules, Straight Edge, Try Square, Marking gauge, Mortise gauge, Cutting gauge; Striking Tools - Hammers - Claw hammer and mallet specifications and uses. Cutting Tools - Saws - Ripsaw, Cross cut saw (Hand saw), Tenon saw. Chisels - Firmer chisel, Bevelled edge firmer chisel, Parting chisel, Mortise chisel, Inside and Outside gauges. Planes - Jack plane (Wooden jack plane), Metal jack plane.

Sheet Metal Tools:

Cutting and Measuring Tools –Snips, Straight snip, Bent or curved snip, Double shears, Bench Shear, Riveting hammer, Setting hammer, Raising hammer, Mallet. Stakes - Double seaming stake, Break horn stake, Bevel edged square stake, Funnel Stack, Half-moon stack, Hatches stake, Needle stake, Blow Horn stake, Hollow mandrel stake.

UNIT-II**FITTING& DRILLING****13 PERIODS:L:10, T:03****Holding Devices:**

Vices- Bench vice, leg-vice, handvice, pinvice, toolmakersvice, pipe vice.

Cutting tools:

Hand hacksaws, Files, Chisels, Scrapers, Drill Bits, Reamers, Taps, Dies, specifications and

uses. **Marking Tools:** Surface plate, V-block, angle plate, try square, scribe, punch, prick punch, centre punch, number punch, and letter punch.

Fitting Operations: Marking, Sawing, Chipping, Filing, Methods of Filing, Scrapping, Grinding, Drilling, Reaming, Tapping and Dieing.

Drilling: Introduction, classification of drills, twist drills, straight flute drills, Working principle of drilling Sensitive drilling machine. Classification of drilling Machines.

UNIT-III**MECHANICAL WORKING OF METALS****12 PERIODS:L: 10, T:02**

Introduction: Hot working and cold working,

Hot working Processes: Rolling - types of rolling, two high mill, three high mills, four high mills, piercing or seamless tubing, reeling, drawing or cupping, spinning, Extrusion - direct or forward extrusion, indirect or backward extrusion, tube extrusion, Impact extrusion. Effects of hot working of metals, advantages & limitations of hot working of metals.

Cold Working Processes: Rolling, drawing- wire drawing, tube drawing, Stretch forming, Cold extrusion, Squeezing Operation-Cold Heading, Cold reeling, Cold swaging, Stamping, Cold chocking, Shot peening, Thread rolling, Shearing Operations- Blanking, Piercing, Notching, Bending-Roll bending, Angle bending, Cold spinning, Effects of cold working of metals, advantages & limitations of cold working.

UNIT- IV**LATHE& LATHEWORKS 12 PERIODS L:10, T:02**

Working Principle of Lathe, Types of Lathes - Engine lathe – construction details– specifications. Geometry and nomenclature of single point cutting tool, tool signature. Cutting speed, feed, depth of cut, cutting tool materials, General and special operations – (Turning, facing, taper turning thread cutting, knurling, forming, drilling, boring, reaming, key way cutting)..

UNIT-V-**MILLING, SHAPING AND SLOTTING****12 PERIODS:L:10, T:02**

Milling- Introduction- Principles of Milling- Types of Milling Machines- Construction and working principle of Colum and Knee type milling - Milling operations- Plain milling, Slab milling, Face milling, Side milling, Angular milling, Gang milling, Face milling, end milling, profile milling, key way milling, T-Slot milling.

SHAPING- Introduction - Shaping Machine – Types of Shaping Machine – Size and Specification – parts of Shaping Machine – Cutting Speed, Feed, and Depth of Cut.

SLOTTING: Classification and Mechanism, Construction, Parts and uses, Types of Slotting Machine Operations

UNIT– VIWELDING**13 PERIODS:L: 10, T: 03**

Introduction & classification of welding processes. Applications, Advantages and limitations of Welding, Principles of arc welding, Arc welding equipment, Choice of electrodes for different metals, Principle of gas (oxy – acetylene) welding. Equipment of gas welding. Soldering and Brazing techniques. Soldering methods. Inspection of Soldered joints. Brazing methods. Inspection of brazed joints. Defects in welding. Testing and inspection

SUGGESTED LEARNING OUTCOMES:

Upon completion of the course the students shall be able to;

I. CARPENTRY, FORGING AND SHEET METAL TOOLS

- 1.1. List various marking tools used in carpentry
- 1.2. List various measuring tools used in carpentry
- 1.3. Know the uses of measuring tools in carpentry
- 1.4. State various cutting tools of carpentry
- 1.5. Describe the construction and working of Plane
- 1.6. List various tools used in sheet metal work and know the purpose
- 1.7. Explain construction and working of cutting tools snips, shears used in sheet metal
- 1.8. Illustrate the purpose of measuring tools used in sheet metal
- 1.9. Explain about various stakes used in sheet metal
- 1.10. List various sheet metal joints and their uses

II. FITTING & DRILLING:

- 2.1. List various work holding devices used in fitting
- 2.2. Illustrate construction and working of Bench vice only
- 2.3. List and know construction of Hacksaw
- 2.4. Know types of files and chisels
- 2.5. Describe the construction details and usage of files
- 2.6. List various chisels and know the purpose.
- 2.7. Know types of drills, reamers, taps and dies and their purposes
- 2.8. List various marking tools in fitting and know their purposes.
- 2.9. List various measuring tools in fitting and know their purposes
- 2.10. Attain knowledge of various fitting operations.
- 2.11. State the working principle of drilling.
- 2.12. List out different types of drilling machines.
- 2.13. Understand the construction and working of sensitive drilling machine
- 2.14. Understand the construction and working of radial drilling machine.

III. MECHANICAL WORKING OF METALS

- 3.1. Differentiate hot working and cold working
- 3.2. List hot working processes
- 3.3. Describe rolling, types of rolling
- 3.4. Know about Piercing, reeling, drawing or cupping, spinning operations
- 3.5. Know how to perform direct extrusion, indirect extrusion, tube extrusion, impact extrusion
- 3.6. Explain Effect of hot working of metals, advantage and limitations of hot working.
- 3.7. List cold working processes

- 3.8. Know about cold rolling, drawing–wire drawing, tube drawing, stretch forming
- 3.9. Describe cold extrusion; squeezing operations–cold heading, cold churning, cold swaging, stamping, cold Hobbing, Shot peening, thread rolling
- 3.10. Explain shearing operations–blanking, piercing, notching; bending operations–roll forming, angle bending and cold spinning
- 3.11. Write advantages and limitations of cold working processes

IV LATHE AND LATHE WORK

- 4.1 State the working principle of lathe.
- 4.2 Classify lathes.
- 4.3 Draw the lined diagram of engine lathe and describe the functions of each part in lathe.
- 4.4 Indicate the specifications of a lathe.
- 4.5 List the various operations performed on lathe.
- 4.6 Explain the Nomenclature of single point tool with the help of a sketch.

IV- MILLING, SHAPING AND SLOTTING

- 5.1 State the working principle of Milling
- 5.2. Classification of Milling Machines
- 5.3 Explain the parts and working principle of Column and Knee type milling machine
- 5.4 Milling operations.
- 5.6 Introduction to shaping machine
- 5.7 Types of shaping machines
- 5.8 Shaping operations
- 5.9 Cutting, speed, feed, Depth of cut
- 5.10 Introduction- Classification of Slotting machines
- 5.11 Working Principle of Slotting Machine.

VI. WELDING

- 6.1 State the necessity of welding.
- 6.2 State the applications, advantages and limitations of welding.
- 6.3 Classify Electrodes
- 6.4 Explain different welding procedures in arc welding
- 6.5 Explain the principle of gas welding.
- 6.6 List and explain the tools and equipment of gas welding
- 6.7 Understand types of flames in gas welding and its uses
- 6.8 Explain the principles of soldering & brazing.
- 6.9 Differentiate soldering from brazing.
- 6.10 List the gas cutting equipment.
- 6.11 State the principle of flame cutting.
- 6.12 State the relative advantages of flame cutting over other types of cutting.

REFERENCE BOOKS

1. ProductionTechnologybyJain &Gupta(KhannaPubliahers)
2. ElementaryWorkshop Technology(Vol.I & II)byHazraChowdary
3. ManufacturingTechnology(Vol.I)byP N Rao (McGrawHill)
4. WorkshopTechnology(Vol.I& II)byRaghuvamshi
5. ProductionTechnologybyP.C.Sharma

Suggested-Learning references

1. <http://www.asme.org>
2. www.ocw.mit.edu/courses/mechanical-engineering
3. www.nptel.ac.in