



WORKSHOP TECHNOLOGY
BEG148ME

Year: I

Teaching Schedule Hours/Week			Examination Scheme				Internal Assessment		Total Marks	Remarks
			Final				Theory Marks	Practical Marks		
L	P	T	Theory		Practical					
1	2	-	Duration	Marks	Duration	Marks				
			3	-	-	-	10	40	50	

Course objectives: To familiarize the students about the basic workshop Practices using various hand tools and machine

1.0 Introductory Concepts

- 1.1 Introduction to the subject (3 Hrs)
- 1.2 Classification of Manufacturing Processes: Primary forming Processes, Secondary forming Processes, Physical forming Processes.
- 1.3 Processes affecting changes in properties
- 1.4 Simplification and Standardization
- 1.5 Interchangeability
- 1.6 Inspection and Quality Control
- 1.7 Mechanization and Automation
- 1.8 Concept of Manufacturing and the Manufacturing system
- 1.9 The use of Computers in Manufacturing

2.0 Industrial safety

- 2.1 Introduction (3 Hrs)
- 2.2 Safety measures in Construction Works
- 2.3 Safety in handling hoisting equipment and conveyors
- 2.4 Protection in Storage and manual handling of material
- 2.5 Concept of accident and its causes
- 2.6 Common Sources of accident
- 2.7 Common methods of protection
- 2.8 Electrical Hazards
- 2.9 Common Precautions against electric shocks, damages and fires
- 2.10 Treatment of electric shocks
- 2.11 Factories Act. Regulation with regard to safety

3.0 Plants and Shop Layout

- 3.1 Introduction (3 Hrs)
- 3.2 Factors in Plant Layout
- 3.3 Objectives of Plant Layout
- 3.4 Advantages of a Good Plant Layout
- 3.5 Disadvantages of an Improper Plant Layout
- 3.6 Types of Layout Product, Layout Process, Layout fixed, Position Layout, Group Layout
- 3.7 Tools and techniques of Plant Layout
- 3.8 Revising and Improving Existing Plant Layout

4.0 Metrology and Engineering Materials

(6 Hrs)

16



- 4.1 Semi-Precision Tools ; Rules and scales, Try squaring, Inside, Outside Calipers, Depth gages etc.
- 4.2 Precision Tools Micrometers, Vernier calipers, Bevel Protractor, Dial indicator, Gage blocks, Surface Plants etc.
- 4.3 Classification of Materials; Metal and Alloys, Glass and Ceramics, Organic Polymers.
- 4.4 Ferrous Materials Mild Steels, Alloy Steels, Stainless Steels, High Speed Steels (HSS) Non-Ferrous Materials Brass, Bronze, Aluminum, Copper Comparative Properties and Machinability Tool Materials: Low, Medium and High Carbon steels. Hot and Cold-Rolled steels, Alloy Steels, Classification of Iron & Steels
- 4.5 Heat Treatment (Introduction and Purposes) Hardening, Tempering, Annealing, Normalizing, Quenching

5.0 Benchwork and Fitting Shop

(12 Hrs)

- 5.1 Introduction to the familiarization with tools and their uses
- 5.2 Hammers; Hacksaws, Choice of blades & sawing techniques
- 5.3 Files with their Classification; According to their longitudinal shape & Cross section, Classification based on cuts; teeth; length of the file
- 5.4 Care of files and hand tool safety rules
- 5.5 Vices & their classification
- 5.6 Other Hand Tools; Scribers, Chisels, Scrapes, Center punch, Surface gauge, Universal scribing block, Trammel, Screw drivers, Drills, Spanners, Pliers, Taps, Dies, Reamers, Screw drivers etc.
- 5.7 Fitting Processes Marking, Chipping, Sawing, Filing, Scrapping, Drilling, Internal Threading (or Tapping), External Threading (or Dieing), and Reaming.
- 5.8 Sheet Metal Works Tools, Marking & Layout, Bending & Rolling, Cutting Operations

6.0 Machine Shop

(15 Hrs)

- 6.1 Definition, Function, Classification & Working principles of Machine Tools
- 6.2 Feed, Depth of Cut and Cutting Speed
- 6.3 Block Diagram, Names of its various parts, various machining operations along with the Specifications of the following Machines; Lathe, Shaper, Planer, Milling, Drilling, Grinding Machines:
- 6.4 Cutting Tool Materials of Lathe, Shaper and Drill

7.0 Welding Shop

(8 Hrs)

- 7.1 Gas Welding principle, equipment and types of flames
- 7.2 Arc Welding, principle and equipment
- 7.3 Arc Welding elements and gas welding rods.
- 7.4 Principle and application of Brazing and Soldering
- 7.5 Brazing and Soldering materials
- 7.6 Types of Welds and Joints: fillet and butt welds; butt, lap, corner and T joints
- 7.7 Inspection of Welds: NOT & DT

8.0 Foundry Shop

(4 Hrs)

- 8.1 Forging, Forgeable Materials & Forging Tools
- 8.2 Difference of pattern and its functions
- 8.3 Refractories and Moulding tools, equipment
- 8.4 Casting processes
- 8.5 Inspection and testing of casting defects
- 8.6 Characteristics of moulding sands
- 8.7 Working with Plastics; Extrusion, Calendering etc.



9.0 Maintenance

(3 Hrs)

- 9.1 Introduction, Objectives of Plant Maintenance
- 9.2 Organization of Maintenance Department
- 9.3 Maintenance Planning
- 9.4 Types of Maintenance
- 9.5 Running Repairs, Overhauling

10.0 Automatic Machines & Numerically Control of Machine Tools

(3 Hrs)

- 10.1 Introduction and Classification of Automatic Machines
- 10.2 Robots and uses
- 10.3 Introduction & Classification of NC System
- 10.4 Working principle of NC Machines, How NC works?
- 10.5 Advantages of NC Machines
- 10.6 Recent Trends in Machine Control
- 10.7 CNC Machine
- 10.8 Programming and Numerically Controlled Machining

Workshop Practice;

3 hrs/ Week, 12 Weeks

Project Work and Report on the following (any two)

- I) Bottle Opener
- II) Dust Bin
- III) Book Stand
- IV) Pen Holder
- V) Gate Clipper With the application
- VI) Bench Tools
- VII) Metrological Tools
- VIII) Power Tools
- IX) Machine Tools Lathe, Shaper, Milling, Drilling, and Grinding.
- X) Gas Welding and/ or, Electric Arc Welding

Works Visit(s)

Industrial Visit(s)

Arrangements to be made with local industries (if available) for students
Industrial visits. Visits to CNC Machines could also be included.

Reference Books:

1. Shop Theory, J. Anderson & E. E. Tatro, McGraw Hill.
2. A Course in Workshop Technology Volume I & II, Prof. B. S. Raghubanshi, Dhanpat Rai & Sons, Delhi
3. Workshop Technology Volume I & II, H. S. Bawa, Tata McGraw Hill Publishing Company Limited, New Delhi
4. A Course in Workshop Technology Volume I & II, Hazra & Choudhary
5. Machine Shop Operations and Setups, O. D. Lascoe, C. A. Nelson & H. W. Porter, American Technical Society.
6. Machine Shop Practice Volume I & II, Industrial Press, New York.
7. Technology of Machine Tools, K. Oswald, McGraw Hill.
8. Machinery's Hand Book, Oberg, Jones & Horton, Industrial Press.
9. CNC Machines