

## **2.1 COMMUNICATING EFFECTIVELY IN ENGLISH II SEMESTER SYLLABUS**

### **RATIONALE**

Interpersonal communication is a natural and necessary part of organizational life. Yet communicating effectively can be challenging because of our inherent nature to assume, overreact to and misperceive what actually is happening. Poor or lack of communication is often cited as the cause of conflict and poor teamwork. In today's team-oriented workplace, managing communication and developing strategies for creating shared meaning are crucial to achieving results and creating successful organizations. The goal of the *Communicating Effectively in English* course is to produce civic-minded, competent communicators. To that end, students must demonstrate oral as well as written communication proficiency. These include organizational and interpersonal communication, public address and performance.

### **II SEMESTER 48 hrs**

#### **1. LISTENING COMPREHENSION 4hrs**

- 1.1 Locating Main Ideas in a Listening Excerpt
- 1.2 Note-taking

#### **2. ORAL COMMUNICATION SKILLS 14 hrs**

- 2.1 Offering-Responding to Offers
- 2.2 Requesting-Responding to Requests
- 2.3 Congratulating
- 2.4 Expressing Sympathy and Condolences
- 2.5 Expressing Disappointments
- 2.6 Asking Questions-Polite Responses
- 2.7 Apologizing,  
Forgiving
- 2.8 Complaining
- 2.9 Persuading
- 2.10 Warning
- 2.11 Asking for and Giving Information
- 2.12 Giving Instructions
- 2.13 Getting and Giving Permission
- 2.14 Asking For and Giving Opinions

- 3. GRAMMAR AND USAGE** **10hrs**
- 3.1 Prepositions
  - 3.2 Pronouns
  - 3.3 Determiners
  - 3.4 Conjunctions
  - 3.5 Question and Question Tag
  - 3.6 Tenses (Simple Present, Simple Past)

\*One chapter revising the topics discussed during the first semester. (Punctuation, Articles, Framing questions, Verbs, Word formation)

- 4. WRITING SKILLS** **10hrs**
- 4.1 Writing Notice
  - 4.2 Writing Circular
  - 4.3 Writing a Memo
  - 4.4 Agenda for a Meeting
  - 4.5 Minutes of the Meeting
  - 4.6 Telephonic Messages

\* Writing a paragraph will be a continuous exercise through out the session. (Writing will be based on verbal stimuli, tables and graphs.)

- 5. READING SKILLS** **10hrs**

- 5.1 Vocabulary Enhancement
- 5.2 Techniques of reading: Skimming, Scanning, Intensive and Extensive Reading

**NOTE: The Reading Skills of the learners (along with vocabulary enhancement) will be through reading thematic articles/essays and/or stories.**

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## 2.2 APPLIED MATHEMATICS-II

### RATIONALE

Applied Mathematics forms the backbone of engineering discipline. Basic elements of differential calculus, integral calculus, differential equations and coordinate geometry have been included in the curriculum as foundation course and to provide base for continuing education to the students

### DETAILED CONTENTS

#### 1.Co-ordinate Geometry (18 hrs)

- 1.1 Area of a triangle, centroid and incentre of a triangle (given the vertices of a triangle), Simple problems on locus
- 1.2 Equation of straight line in various standard forms (without proof) with their transformation from one form to another, Angle between two lines and perpendicular distance formula (without proof)
- 1.3 Circle: General equation and its characteristics given:
  - ¾ The center and radius
  - ¾ Three points on it
  - ¾ The co-ordinates of the end's of the diameter
- 1.4 Conics (parabola, ellipse and hyperbola), standard equation of conics (without proof), given the equation of conic to calculate foci, directrix, eccentricity, latus rectum, vertices and axis related to different conics

#### 2.Differential Calculus(22 hrs)

- 2.1 Concept of function, four standard limits
$$\lim_{x \rightarrow a} (x^n - a^n) / (x - a), \lim_{x \rightarrow 0} \frac{\sin x}{x}, \lim_{x \rightarrow 0} \frac{(a^x - 1)}{x}, \lim_{x \rightarrow 0} (1+x)^{1/x}$$
- 2.2 Concepts of differentiation and its physical interpretation
  - ¾ Differentiation by first principle of  $x^n$ ,  $(ax + b)^n$ ,  $\sin x$ ,  $\cos x$ ,  $\tan x$ ,  $\sec x$ ,  $\operatorname{cosec} x$  and  $\cot x$ ,  $e^x$ ,  $a^x$ ,  $\log x$ . Differentiation of a function of a function and explicit and implicit functions
  - ¾ Differentiation of sum, product and quotient of different functions
  - ¾ Logarithmic differentiation. Successive differentiation excluding  $n^{\text{th}}$  order

2.3 Application of derivatives for (a) rate measure (b) errors (c) real root by Newton's method (d) equation of tangent and normal (c) finding the maxima and minima of a function (simple engineering problems)

3. Integral Calculus (16 hrs)

3.1 Integration as inverse operation of differentiation

3.2 Simple integration by substitution, by parts and by partial fractions

3.3 Evaluation of definite integrals (simple problems) by explaining the general properties of definite integrals

3.4 Applications of integration for

$\frac{3}{4}$  Simple problem on evaluation of area under a curve where limits are prescribed

$\frac{3}{4}$  Calculation of volume of a solid formed by revolution of an area about axis (simple problems) where limits are prescribed

$\frac{3}{4}$  To calculate average and root mean square value of a function

$\frac{3}{4}$  Area by Trapezoidal Rule and Simpson's Rule

4. Differential Equations (8 hrs)

Solution of first order and first degree differential equation by

$\frac{3}{4}$  Variable separation

$\frac{3}{4}$  Homogeneous differential equation and reducible homogeneous differential equations

$\frac{3}{4}$  Linear differential equations and reducible linear differential equations

### RECOMMENDED BOOKS

1. Higher Engineering Mathematics by BS Grewal
2. Engineering Mathematics by BS Grewal
3. Engineering Mathematics vol. II by S Kohli and Others, IPH, Jalandhar
4. Engineering Mathematics by Ishan Publication
5. Applied Mathematics Vol. II by SS Sabharwal and Others; Eagle Parkashan, Jalandhar
6. Engineering Mathematics by IB Prasad
7. Applied Mathematics Vol. II by Dr RD Sharma
8. Advanced Engineering Mathematics by AB Mathur and VP Jagi; Khanna Publishers, Delhi
9. Higher Engineering Mathematics by BS Grewal; Khanna Publishers, Delhi
10. Engineering Mathematics by C Dass Chawla; Asian Publishers, New Delhi

## 2.3 GENERAL ENGINEERING

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### RATIONALE

A diploma holder has to assist in activities of civil construction, installation, operation and maintenance etc of different machines and equipment. These activities are not branch specific and instead require him to know basics of civil, electrical and mechanical engineering. The subject of General Engineering has been included to impart basic knowledge of civil, electrical and mechanical engineering to the students.

#### Note:

1. The students of civil engineering will be studying only Part A (Mechanical Engineering) and Part B (Electrical Engineering)
2. The students of Electrical engineering, Electronics and Communication Engineering, Instrumentation and Control Engineering, Computer Engineering and Information Technology will be studying only Part A (Mechanical Engineering ) and Part C (Civil Engineering)
3. The students of Mechanical Engineering will be studying only Part B (Electrical Engineering) and Part C (Civil Engineering)
4. The students of other branches of engineering and technology will be studying all the three Parts A (Mechanical Engineering), Part B (Electrical Engineering) and Part C (Civil Engineering), unless specified otherwise
5. A time of 2 hours per week has been allotted to Mechanical Engineering, 2 hours per week to Electrical Engineering and 1 hour per week to Civil Engineering in the lecture hours, for teaching theory and a lump-sum time of 2 hours week has been allotted for the Practicals.

### DETAILED CONTENTS

#### PART-A (MECHANICAL ENGINEERING) Theory

1. **Transmission of Power** (8 hrs)
  - 1.1 Transmission of power through belt, rope drives and pulleys, gears and chains
  - 1.2 Different type of pulleys and their application
  - 1.3 Chain drives and its comparison with belt drive
  - 1.4 Gear drives, types of gears, simple gear trains and velocity ratio
  
2. **Internal combustion Engines** (14 hrs)
  - 2.1 Classification and application of IC Engines commonly used: spark ignition and compression ignition engines.
  - 2.2 Working principles of two stroke and f
  - 2.3 Ignition system in petrol engines i.e. sp

- 2.4 Spark plug
- 2.5 Carburetor
- 2.6 Cooling system of IC Engines: Lubrication of IC Engines
- 2.7 General maintenance of engines

**3. Air Conditioning System** (8 hrs)

- 3.1 Basic principle of refrigeration and air conditioning
- 3.2 Working of centralized air conditioner
- 3.3 Concept of split air conditioner and its applications

**4. Pumps: Types and their uses** (2 hrs)

**PRACTICAL EXERCISES IN MECHANICAL ENGINEERING**

1. Study of main parts of 4 stroke petrol and diesel engines by actually dismantling them (The idea is to acquaint the students with the most common troubles occurring in the engines)
2. Study of main parts of 2 stroke petrol engine by actually dismantling it. (The idea is to acquaint the students with the most common trouble occurring in the engines)
3. Study of ignition system of petrol engines
4. Study of fuel and air circuit of a petrol engine
5. Study of fuel injection system and air circuit of a diesel engine
6. Study of cooling system and lubricating (including greasing) of an IC Engine
7. Study of friction clutch
8. Study of hydraulic brake
9. Study of various drives for transmission of powers. Models of belts, pulleys, gears, chains and clutches
10. Study of air conditioning system in a building

NOTE: Study will include dismantling and reassembling of actual parts

**PART B**

**ELECTRICAL ENGINEERING**

**Theory**

5. Application and Advantages of Electricity: (3 hrs)
  - 5.1 Difference between AC and DC
  - 5.2 Various applications of electricity
  - 5.3 Advantages of electrical energy over other types of energy
6. Basic Quantities of Electricity: (4 hrs)
  - 6.1 Definition of voltage, current, power a

- 6.2 Name of the instruments used for measurement of quantities given in 5.1
- 6.3 Connection of the instruments in 5.2 in electric circuit
- 7. Various Types of Power Plants: (3 hrs)
  - 7.1 Elementary block diagram of thermal, hydro and nuclear power stations
  - 7.2 Brief explanation of the principle of power generation in above power stations
- 8. Elements of Transmission Line: (4 hrs)
  - 8.1 Pictorial diagram of a three-phase transmission and distribution system showing transformers, supports, conductors, insulators and earth wire etc.
  - 8.2 Brief function of accessories of transmission lines
  - 8.3 Earthing of lines, substation and power station - need and practices adopted
- 9. Distribution System: (4 hrs)
  - 9.1 Distinction between high and low voltage distribution system
  - 9.2 Identification of three phase wires, neutral wires and the earth wire on a low voltage distribution system
  - 9.3 Identification of the voltage between phases and between one phase and neutral
  - 9.4 Distinction between three phase and single phase supply
- 10. Supply from the Poles to the Distribution Board: (3 hrs)
  - 10.1 Arrangement of supply system from pole to the distribution board
  - 10.2 Function of service line, energy meter, main switch, distribution board
- 11. Domestic Installation: (4 hrs)
  - 11.1 Distinction between light and fan circuits and single phase power circuit, sub circuits
  - 11.2 Various accessories and parts of installation, identification of wiring systems
  - 11.3 Common safety measures and earthing
  - 11.4 Introduction to BIS code of safety and wiring installation
- 12. Electric Motors and Pumps: (5 hrs)
  - 12.1 Definition and various application of single phase and three phase motors
  - 12.2 Connection and starting of three phase motors by star delta starter
  - 12.3 Conversion of horse power in watts or kilowatts
  - 12.4 Type of pumps and their applications

## PRACTICAL EXERCISES IN ELECTRICAL ENGINEERING:

1. Use of Megger:  
**Objective:** To make the students familiar with different uses of megger
  
2. Connection of a three phase motor and starter including fuses and reversing of direction of rotation.  
**Objective:** Students may be made familiar with the equipment needed to control a three-phase motor  
  
 The students must experience that by changing any two phases, the direction of rotation is reversed.
  
3. Connection of a lamp, ceiling fan, socket outlet, geyser, floor grinder, voltage stabiliser etc.  
**Objective:** Students may be made familiar with the different types of equipment and circuits used in the domestic installations
  
4. Trouble shooting in a three-phase motor  
**Note:** The teacher may create anyone of the following faults
  - (a) Loose connections
  - (b) Blown fuse
  - (c) Tripped overload protection
  - (d) Incorrect direction of rotation
  - (e) Single phasing
  - (f) Burnt winding to be simulated by a loose connection behind a terminal box.**Objective:** The students must be able to detect the most common faults, which may occur in a three-phase motor, using meggar wherever necessary
  
5. Trouble shooting in a domestic wiring system.  
**Note:** The teacher may introduce a fault in the existing wiring system of a classroom or workshop like
  - (a) blown fuse
  - (b) loose connection
  - (c) faulty components/accessories etc.**Objective:** Students must be able to detect common faults which may occur in a domestic wiring system
  
6. Treatment of electric shock  
**Note:** The teacher may give a demonstrat treated.

- Objective:** Students must be trained to treat the persons suffering from an electric shock
7. Study of a distribution Board  
**Note:** Students may be asked to study the distribution board in the institution and note down all accessories.  
**Objective:** Students must be made familiar with the distribution board
8. Connections and reading down an energy meter  
**Objective:** Students may be asked to connect an energy meter to a load and calibrate reading
9. Demonstration in electrical machine laboratory  
**Objective:** Students may be shown different types of electrical machines and their starters and should be told that the three phase induction motors are most commonly used.
10. Study of submersible motor pump set:  
**Objective:** To tell use of the set in water supply and irrigation works.

### PART C

#### CIVIL ENGINEERING

#### Theory

13. Construction Materials  
 Basics of various construction materials such as stones, bricks, lime, cement and timber along with their properties, physical/ field testing and uses, elements of brick masonry.
14. Foundations  
 i) Bearing capacity of soil and its importance  
 ii) Types of various foundations and their salient features, suitability of various foundations for heavy, light and vibrating machines
15. Concrete  
 Various ingredients of concrete, different grades of concrete, water cement ratio, workability, physical/ field testing of concrete, mixing of concrete
16. RCC  
 Basics of reinforced cement concrete and its use (elementary knowledge), introduction to various structural elements of a building

#### PRACTICAL EXERCISES IN CIVIL ENGINEERING

1. Testing of bricks  
 a) Shape and size

- b) Soundness test
  - c) Water absorption
  - d) Crushing strength
2. Testing of concrete
    - a) Slump test
    - b) Compressive Strength of concrete cube
  3. The students should be taken to different construction sites to show them various construction materials, concreting process and construction of RCC structural elements, foundations and other civil works

Note: While imparting instructions, teachers are expected to lay more emphasis on concepts and principles. It will be better if the classes for general engineering are conducted in the laboratories and organized demonstrations for explaining various concepts and principles.

## **RECOMMENDED BOOKS**

### **Mechanical Engineering**

1. General Mechanical Engineering by M. Adithan; TTTI, Chandigarh
2. Basic Civil and Mechanical Engineering by Jayagopal; Vikas Publications, New Delhi
3. IC Engines and Automobile Engineering by Dr.MP Poonia, Standard Publishers, New Delhi
4. Refrigeration and Air Conditioning by RK Rajput; SK Kataria and sons; Ludhiana
5. Theory of Machines by RS Khurmi and JK Gupta; S. Chand and Company Ltd., New Delhi

### **Electrical Engineering**

1. Electrical Technology Part 1: Basic Electrical Engineering by Theraja, BL; S Chand and Company, New Delhi
2. Principles of Electrical Engineering by Gupta BR, S Chand and Company, New Delhi
3. Basic Electrical Engineering by Mehta VK; S Chand and Company, New Delhi
4. Basic Electricity and Measurements by Suryanarayan NV and N Delhi; Tata McGraw Hill, 1987, New Delhi

5. Basic Electrical and Electronics Engineering by SK Sahdev; Dhanpat Rai and sons, New Delhi
6. Basic Electrical Engineering by PS Dhogal, Tata McGraw Hill, New Delhi
7. Basic Electricity by BR Sharma; Satya Parkashan, New Delhi

**Civil Engineering**

1. Textbook of Concrete Technology 2<sup>nd</sup> Edition by Kulkarni, PD Ghosh RK and Phull, YR; New Age International (P) Ltd., Publishers, New Delhi
2. Materials of Construction by Ghose; Tata McGraw Hill Publishing Co., Ltd., New Delhi
3. Civil Engineering Materials by TTTI, Chandigarh; Tata McGraw Hill Publishing Co. Ltd., New Delhi
4. Concrete Technology by Gambhir; Tata McGraw Hill Publishing Co., Ltd., New Delhi
5. Building Construction by J Jha and Sinha; Khanna Publishers, Delhi
6. Building Construction by Vazirani and Chandola; Khanna Publishers, Delhi
7. Civil Engineering Materials by SV Deodhar and Singhai; Khanna Publishers, Delhi
8. Soil Mechanics and foundation Engineering by SK Garg; Khanna Publishers, Delhi

## **2.4 ENGINEERING DRAWING – II**

### **RATIONAL**

Drawing is said to be the language of engineers and technicians. Reading and interpreting engineering drawing is their day-to-day responsibility. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation

- Note:
1. First angle projection is to be followed
  2. Minimum of 15 sheets to be prepared by each student
  3. SP 46 – 1988 should be followed
  4. Instructions relevant to various drawings may be given along with  
Students

### **DETAILED CONTENTS**

1. Detail and Assembly Drawing (2 sheets)
  - 1.1 Principle and utility of detail and assembly drawings
  - 1.2 Wooden joints i.e. corner mortice and tenon joint, Tee halving joint, Mitre faced corner joint, Tee bridle joint, Crossed wooden joint, Cogged joint, Dovetail joint, Through Mortice and Tenon joint, Corner and Through halving joint, Closed Mortise and Tenon joint
2. Threads (3 sheets)
  - 2.1 Nomenclature of threads, types of threads (metric), single and multiple start threads
  - 2.2 Forms of various external thread sections such as V, square and acme threads, BA, BSW and Knuckle, Metric, Seller Thread, Buttress Threads
  - 2.3 Simplified conventions of left hand and right hand threads, both external and internal threads
3. Locking Devices (1 sheet)

Lock nuts, castle nuts, split pin nuts, sawn nuts, slotted nut

4. Nuts and Bolts (3 sheets)

Different views of hexagonal and square nuts; Different views of hexagonal and square nuts; Assembly of hexagonal headed, square headed, square headed with square neck bolts with hexagonal and square nuts and washers. Foundations bolts  
– Rag bolt and Lewis bolt

5. Screws, Studs and Washers (1 sheet)

5.1 Drawing various types of machine screws

5.2 Drawing various types of studs and set screws

6. Keys and Cotters (3 sheets)

6.1 Various types of keys and cotters and their practical application and preparation of drawing of various keys and cotters showing keys and cotters in position

6.2 Cotter joints (i) sleeve and cotter joint (ii) gib and cotter joint (iii) knuckle joint (iv) Spigot and socket joint

7. Rivets and Riveted Joints (2 sheets)

7.1 Types of structural and general purpose rivet heads

7.2 Caulking and fullering of riveted joints

7.3 Types of riveted joints – lap, butt (single riveted, double riveted lap joint, single cover plate and double cover plate), chain and zig – zag riveting

8. Welded Joints (1 sheet)

8.1 Various conventions and symbols of welded joints (IS 696)

8.2 Practical applications of welded joints say joints on steel frames, windows, doors and furniture

9. Couplings (2 sheets)

9.1 Muff or Box coupling, half lap muff coupling

9.2 Flange coupling (Protected and non-protected)

9.3 Flexible coupling

10. Symbols and Conventions (2 sheets)
  - 10.1 Civil engineering sanitary fitting symbols
  - 10.2 Electrical fitting symbols for domestic interior installations
  - 10.3 Building plan drawing with electrical and civil engineering symbols
11. Development of Surfaces (3 sheets)
  - 11.1 Construction of geometrical figures such as square, pentagon, hexagon
  - 11.2 Development of surfaces of cylinder, square, pentagonal and hexagonal, Prism, Cone and Pyramid, Section pentagonal and hexagonal pyramid
12. Interpenetration of (2 sheets)
  - 12.1 Cylinder to cylinder
  - 12.2 Cylinder to cone
13. AUTO CAD
  - 13.1 Concept of AutoCAD, Tool bars in AutoCAD, coordinate system, snap, grid, and ortho mode
  - 13.2 Drawing commands – point, line, arc, circle, ellipse
  - 13.3 Editing commands – scale, erase, copy, stretch, lengthen and explode
  - 13.4 Dimensioning and placing text in drawing area
  - 13.5 Sectioning and hatching
  - 13.6 Inquiry for different parameters of drawing entity

**Note: A minimum of 15 sheets should be prepared by each student**

#### **RECOMMENDED BOOKS**

1. Elementary Engineering Drawing (in first angle projection) by ND Bhatt, Charotar Publishing House
2. A Text Book of Engineering Drawing by Surjit Singh Published by Dhanpat Rai and Co. Delhi
3. Engineering Drawing by PS Gill; published by SK kataria and Sons, New Delhi

## 2.5 INTRODUCTION TO TEXTILE PROCESSES

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### RATIONALE

This subject is introduced in the curriculum of diploma program in Textile Technology to give an overview of various elements/systems of processes involved in the Textile Mills, so that students, before undertaking the detailed studies of spinning and weaving, are able to correlate these elements systems.

### DETAILED CONTENTS

1. Introduction to language of textiles. (2 hrs)
2. process flow sheets for fibre production, Conventional yarn production, manufacturing of fabric and chemical processing. (8 hrs)
3. Classification of fibres, Basic requirements of fibre forming polymers and fibres. (8 hrs)
4. Definition of Crystallinity, orientation in a fibre. (2 hrs)
5. Calculation of resultant count in case of ply yarn & their conversion . Numbering system in direct and indirect methods (10 hrs)
6. Introduction to machines/instruments/equipments used in various areas of textiles. (8 hrs)
7. Introduction to fibre, Yarn and fabric properties. (8hrs)
8. Knitted and nonwoven fabrics: their types, uses and applications (6 hrs)
9. Elementary idea of processes and steps used in manufacture of yarn, manufacture of different types of fabrics and chemical processing of textiles. (10 hrs)
10. Preparation of yarn for weaving: sizing, winding, warping, drafting, lifting and denting plans. (12 hrs)
11. Inspection, folding and packing of textiles. (6 hrs)

### RECOMMENDED BOOKS

1. Textile Science by Gohl and Vilensky or EPS Gohl
2. Introduction to Textile by HH Willege
3. Chemical Processing of Polyester Cotton Blends by Atira

## 2.6 INTRODUCTION TO WET PROCESSING

L T P  
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### RATIONALE

A diploma holder in Textile Processing should have an overall view of all textile wet processes. Hence this subject.

### DETAILED CONTENTS

1. Elementary knowledge of processing department. (2 hrs)
2. Impurities in raw cotton, wool and silk (4 hrs)
3. Process flow for conversion of grey cotton goods into semi - bleached and full bleached. (3 hrs)
4. Process flow for bleaching of coloured woven fabrics. (2 hrs)
5. Objectives of different processes involved in removal of impurities. (8 hrs)
  - Shearing & cropping
  - Singeing
  - Desizing
  - Scouring
  - Bleaching
6. Introduction to machines used in scouring and bleaching (4 hrs)
7. General method of dyeing by important classes of dyes on natural and man made fibres. (12 hrs)
  - Direct dyes
  - Reactive
  - Vat
  - Acid
  - Basic
  - Disperse
8. Introduction of various dyeing machines (8 hrs)
9. Different methods of printing of textiles (2 hrs)
10. Different styles of printing of textiles

11. Introduction to equipment and machinery used in printing e.g. block printing, screen & roller printing (9 h)
12. Objectives of finishing, Classification of finishes, Introduction to various finishing treatments. (8 h)

### **LIST OF PRACTICALS**

1. To desize the given cotton sample .
2. To scour the given cotton sample.
3. To semi-bleach the given cotton sample.
4. To full bleach the given cotton sample.
5. To dye the given cotton sample with direct dye.
6. To dye the given cotton sample with vat dye.
7. To dye the given cotton sample with reactive cold brand dye.
8. To dye the given cotton sample with hot brand reactive dye.
9. To dye the given wool sample with acid dye.

### **RECOMMENDED BOOKS**

1. Technology of Bleaching by V.A Shenai; Sewak Publication, Mumbai.
2. Technology of Dyeing by V.A Shenai; Sewak Publication, Mumbai.
3. Technology of Printing by V.A Shenai; Sewak Publication, Mumbai.
4. Technology of Finishing by V.A Shenai; Sewak Publication, Mumbai.
5. Textile Finishing by Prayag.
6. Chemical Technology of Textile Fibres Vol. I & II by R.R Chakarvorthy; Mahajan Publishers Ahmedabad.
7. Dyeing and Chemical Technology of Textile Fibres by E.R Trotman; B.I Publishers Delhi.
8. Scouring, Bleaching and Mercessising by E.R Trotman; B.I Publishers Delhi.
9. Textile Processing by J. L. Smith, Abhishek Publication, Chandigarh.

## 2.7 GENERAL WORKSHOP PRACTICE - I & II

### RATIONAL

Manual abilities to handle engineering materials with hand tools need to be developed in the students. They will be using different types of tools/equipment in different shops for fabrication purposes. Besides developing the necessary skills, the students will appreciate the importance of quality and safety measures.

### DETAILED CONTENTS

- Note:**
1. The students are supposed to come in proper workshop dress prescribed by the institute. Wearing shoes in the workshop(s) is compulsory. Importance of safety and cleanliness, safety measures and upkeep of tools, equipment and environment in each of the following shops should be explained and practiced. The students should prepare sketches of various tools/jobs in their practical Notebook.
  2. The shops to be offered in I and II semester may be decided at polytechnic level
  3. The students should be taken to various shops (not included in the curriculum) in the polytechnic in batches and should be given knowledge of the various machines/equipment. Such as machine shop, foundry shop, sheet metal shop, etc.
  4. Students of Diploma in Chemical Engineering will undergo Shops 1 to 6 only

Following seven shops are being proposed:

1. **Carpentry shop**
2. **Fitting and plumbing shop**
3. **Welding shop**
4. **Paint shop**
5. **Forging and sheet metal shop**
6. **Electric shop**
7. **Electronics Shop**

#### 1. **Carpentry Shop**

- 1.1 Introduction to various types of wood, carpentry tools - their identification with sketches. Different types of wood joints.
- 1.2 Simple operations viz. hand sawing, marking, planning
- 1.3 Introduction and sharpening of wood working tools and practice of proper adjustment of tools

rip saw, bow saw and trammels. Universal wood working machine and wood turning lathe

- 1.5 Making of various joints (Also draw the sketches of various wooden joints in the Practical Note Book)
  - a) Cross lap joint b) T-lap joint
  - c) Corner lap joint
  - d) Mortise and tenon joint e) Dovetail joint
  - f) Prepare a file handle or any utility items by wood turning lathe

## **2. Fitting and Plumbing Shop**

- 2.1. Introduction to fitting shop, common materials used in fitting shop, description and demonstration of various types of work-holding devices and surface plate, V-block
- 2.2 Demonstration and use of simple operation of hack-sawing, demonstration of various types of blades and their uses
- 2.3 Demonstrate and use of all important fitting shop tools with the help of neat sketches (files, punch, hammer, scraper, taps and dies etc.)
- 2.4 Introduction of chipping, demonstration on chipping and its applications. Demonstration and function of chipping tools.
- 2.5 Description, demonstration and practice of simple operation of hack saw, straight and angular cutting.
- 2.6 Demonstrations, description and use of various types of blades - their uses and method of fitting the blade.
- 2.7 Introduction and use of measuring tools used in fitting shop like: Try square, Steel rule, Measuring Tape, Outside micrometer, Vernier Caliper and Vernier Height Gauge
- 2.8 Description, demonstration and practice of thread cutting using taps and dies
- 2.9 Plumbing: Descriptions and drawing of various plumbing shop tools, Safety precautions. Introduction and demonstration of pipe dies, Pipe holding devices, Demonstration and practice of Pipe Fittings such as Sockets, Elbow, Tee, Reducer, Nipple, Union coupling, plug, Bend, Float valves and Taps

Job: Cutting and filing practice on a square of 45 X 45 mm<sup>2</sup> from MS flat

- Job: Preparation of stud (to cut external threads) with the help of dies (mm or BSW)
- Job: Drilling, counter drilling and internal thread cutting with Taps
- Job: H-Fitting in Mild steel (ms) square
- Job: Pipe cutting practice and thread cutting on GI Pipe with pipe dies

### **3. Welding Shop**

- 3.1 Introduction to welding, type of welding, common materials that can be welded, introduction to gas welding equipment, types of flame, adjustment of flame, applications of gas welding. Welding tools and safety precautions
- 3.2 Introduction to electric arc welding (AC and DC), practice in setting current and voltage for striking proper arc, precautions while using electric arc welding. Applications of arc welding. Introduction to polarity and their use
- 3.3 Introduction to brazing process, filler material and fluxes; applications of brazing. Use of solder. Introduction of soldering materials
- 3.4 Demonstrate and use of the different tools used in the welding shop with sketches. Hand shield, helmet, clipping hammer, gloves, welding lead, connectors, apron, goggles etc.
- 3.5 Demonstration of welding defects and Various types of joints and end preparation

- Job: Preparation of cap joint by arc welding
- Job: Preparation of Tee joint by arc welding
- Job: Preparation of single V or double V butt joint by using Electric arc welding
- Job: Brazing Practice. Use of Speltor (on MS sheet pieces) Job:  
Gas welding practice on worn-out and broken parts

### **4. Paint Shop**

Introduction of painting shop and necessity. Different types of paints. Introduction of powder coating plant and their uses.

- Job: Preparation of surface before painting such as cleaning, sanding, putty, procedure and application of primer coat, and painting steel item.
- Job: Painting practice by brush on MS sheet
- Job: Practice of dip painting
- Job: Practice of lettering: Name plates / Sign board
- Job: Polishing and painting on wooden and metallic surfaces
- Job: Practical demonstration of powder coating

### **5. Forging and sheet metal shop**

chisels, punch, anvil, swag-block etc. Forging operations.

- 5.1 Forge a L hook or Ring from MS rod 6 mm  $\phi$
- 5.2 Forge a chisel and give an idea of hardening and tempering
- 5.3 Lap joint with forge welding
- 5.4 High Strength Steel (HSS) tools – forging of Lathe shaper tools like side-tools and V-shape tools
- 5.5 Making sheet metal joints
- 5.6 Making sheet metal tray or a funnel or a computer chassis
- 5.7 Preparation of sheet metal jobs involving rolling, shearing, creasing, bending and cornering
- 5.8 Prepare a lap riveting joint of sheet metal pieces

## **6. Electric Shop**

- 6.1 Demonstration of tools commonly used in Electric Shop
- 6.2 Safety precautions , electric shock treatment
- 6.3 Demonstration of Common Electric material like: wires, fuses, ceiling roses, battens, cleats and allied items
- 6.4 Demonstration of Voltmeter, Ammeter, Multimeter and Energy meter

Job: Wiring practice in batten wiring, plastic casing-capping and conduit

Job: Control of one lamp by one switch Job: Control of one lamp by two switches

Job: Control of one bell by one switch Job: Assemble a Tube light

Job: Dismantle, study, find out fault, repair the fault, assemble and test domestic appliances like electric iron, electric mixer, ceiling and table fan, tube-light, water heater (geyser) and desert cooler

Job: Laying out of complete wiring of a house (Single-phase and Three-phase)

## **7. Electronics Shop**

- 7.1 Identification, familiarization, demonstration and use of the following electronic instruments:
  - a) Multi-meter digital

- c) Power supply , fixed voltage and variable voltage, single output as well as dual output.
- 7.2 Identification , familiarization and uses of commonly used tools; active and passive components; colour code and types of resistor and potentiometers
- 7.3 Cut, strip, join and insulate two lengths of wires/cables (repeat with different types of cables/ wires)
- 7.4 Demonstrate and practice the skill to remove components/wires by unsoldering
- 7.5 Cut, bend, tin component, leads, inserts. Solder components e.g. resistor, capacitor, diodes, transistors on a PCB
- 7.6 Wiring of a small circuit on a PCB/tag strip involving laying, sleeving and use of identifier tags
- 7.7 Demonstrate the joining (or connecting) methods/mounting and dismantling method, as well as uses of the items mentioned below:
  - a) Various types of plugs, sockets, connectors suitable for general-purpose audio video use. Some of such connectors e.g. 2 and 3 pin mains plug and sockets, Banana plugs, sockets and similar male and female connectors and terminal strips.
  - b) Various types of switches such as: normal/miniature toggle, slide, push button piano key, rotary, SPST, SPDT, DPST, DPDT, band selector, multi-way Master Mains Switch.
- 7.8 Exposure to modern soldering and de-soldering processes (Field visits)
- 7.9 De-solder pump, remove and clean all the components and wires from a given equipment, a PCB or a tag strip.