

2.1 ENGLISH AND COMMUNICATION SKILLS - II

L T P
3 - 2

RATIONALE

The curriculum aims to develop the use of English for three major purposes social interaction, academic achievement and professional use. Listening, speaking, reading, and writing skills can not be thought of as independent skills. They are generally perceived as interdependent where one skill often activates the other skills as well as the paralinguistic skills required for the achievement of effective communication. It is believed that the most effective way to achieve these purposes is through the adoption of a thematic, integrated, content-based approach to teaching and learning.

DETAILED CONTENTS

1. LISTENING

Practical:

- Pre-recorded CDs of famous speeches and dialogues: Comprehension exercises based on the audio
- Note-taking
- Drawing inferences
- Summarizing

Note: Teachers are expected to give necessary demonstrations, instructions and guidelines, while teaching above topics

2. SPEAKING

Practical:

- Voice Modulation: Horizons (pitch, tone, volume, modulation)
- Word stress, rhythm, weak and strong form, pauses, group-sense, falling and rising tones, fluency, pace of delivery, dealing with problem sounds, accent, influence of mother tongue etc.
- Situational Conversation/role-playing with feedback, preferably through video recording
- Telephonic Conversation: Types of calls, agreeing and disagreeing, making and changing appointments, reminding, making complaints and handling complaints, general etiquettes,
- A small formal and informal speech
- Seminar
- Debate

Note: Teachers are expected to give necessary demonstrations, instructions and guidelines, while teaching above topics

3. READING

Theory:

(10 hrs.)

- Comprehension, Vocabulary enrichment and grammar exercises based on the following selective readings:

Section-I

- The Portrait of a Lady - Khushwant Singh
- The Lost Child by Mulk Raj Anand
- The Refugees – Pearl S. Buck

Section-II

- Life Sketch of Dr. Abdul Kalam
- Abraham Lincoln's letter to his son's Headmaster

Section-III

- All The World's A Stage – W. Shakespeare
- Say Not, The Struggle Nought Availeth – A.H. Clough
- Pipa's Song – Robert Browning
- A Viewpoint – RP Chaddah

- Comprehension exercises on unseen passages

4. WRITING

Theory:

(20 hrs.)

- The Art of Précis Writing
- Correspondence: Business and Official
- Drafting
 - Report Writing: Progress report and Project report
 - Inspection Notes
 - Notices: Lost and found; Obituary; Auction
 - Memos and Circulars
 - Notices, Agenda and Minutes of Meetings
 - Use of internet and E-Mails
 - Press Release
 - Applying for a Job: Resume writing; forwarding letter and follow-up
- Writing Telephonic messages
- Filling-up different forms such as Banks and on-line forms for Placement etc.

Note: Teachers are expected to give practical examples, while teaching above topics

5. VOCABULARY AND GRAMMAR

Theory and Practical exercises on following:

(12 hrs.)

- Vocabulary of commonly used words
- Glossary of Administrative Terms (English and Hindi)
- One word substitution
- Idioms and Phrases
- Prefixes and Suffixes
- Punctuation
- Narration
- Forms of verbs: Regular and irregular

6. EMPLOYABLE SKILLS

Theory:

(06 hrs.)

Importance of developing employable and soft skills; List and tips for developing of employable skills

Practicals:

- Group discussions
- Presentations, using audio-visual aids (including power-point)
- Interview techniques: Telephonic interviews, Group interviews, face to face interviews
- Mannerism and etiquette etc.

RECOMMENDED BOOKS

1. Spoken English (2nd Edition) by V Sasikumar & PV Dhamija; Published by Tata MC Graw Hills, New Delhi.
2. Spoken English by MC Sreevalsan; Published by M/S Vikas Publishing House Pvt. Ltd; New Delhi.
3. Spoken English –A foundation course (Part-I & Part-II) By Kamlesh Sdanand & Susheela Punitha; Published by Orient BlackSwan, Hyderabad
4. Practical Course in English Pronunciation by J Sethi, Kamlesh Sadanand & DV Jindal; Published by PHI Learning Pvt. Ltd; New Delhi.
5. A Practical Course in Spoken English by JK Gangal; Published by PHI Learning Pvt. Ltd; New Delhi.
6. English Grammar, Composition and Usage by NK Aggarwal and FT Wood; Published by Macmillan Publishers India Ltd; New Delhi.
7. Business Correspondence & Report writing (4th Edition) by RC Sharma and Krishna Mohan; Published by Tata MC Graw Hills, New Delhi.
8. Business Communication by Urmila Rani & SM Rai; Published by Himalaya Publishing House, Mumbai.
9. Business Communication Skills by Varinder Kumar, Bodh Raj & NP Manocha; Published by Kalyani Publisher, New Delhi.
10. Professional Communication by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.

11. Business Communication and Personality Development by Bsiwajit Das and Ipseeta Satpathy; Published by Excel Books, Delhi
12. Succeeding Through Communication by Subhash Jagota; Published by Excel Books, Delhi
13. Communication Skills for professionals by Nira Konar; Published by PHI Learning Pvt. Ltd; New Delhi.
14. Developing Communication Skills (2nd Edition) by Krishna Mohan & Meera Banerji; Published by Macmillan Publishers India Ltd; New Delhi.
15. Effective Technical Communication By M .Ashraf Rizwi; Published by Tata MC Graw Hills, New Delhi.
16. Basic Communication Skills for Technology by Andrea J Rutherford; Published by Pearson Education, New Delhi
17. English & Communication Skills for students of Science & Engineering by SP Dhanavel; Published by Orient BlackSwan, Hyderabad.
18. Technical Communication- Principles & Practices by Meenakshi Raman & Sangeetha Sharma; Published by Oxford University Press, New Delhi.
19. Technical English by S. Devaki Reddy & Shreesh Chaudhary; Published by Macmillan Publishers India Ltd; New Delhi.
20. Advanced Technical Communication, by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.
21. Communication Skills for Engineer & Scientist by Sangeeta Sharma & Binod Mishra; Published by PHI Learning Pvt. Ltd; New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	-	-
2	-	-
3	10	22
4	20	40
5	12	26
6	06	12
Total	48	100

2.2 APPLIED MATHEMATICS - II

L T P
5 - -

RATIONALE

Applied mathematics forms the backbone of engineering students. Basic elements of Differential calculus and integral calculus and statistics have been included in this course. This will develop analytical abilities to apply in engineering field and will provide continuing educational base to the students.

DETAILED CONTENTS

1. Algebra

(10 hrs)

- 1.1 Determinants: Elementary properties of determinants up to 3rd order, consistency of equations, Cramer's rule.
- 1.2 Matrix: Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.
- 1.3 Application of Matrix in computer programming

2. Differential Calculus

(24 hrs)

- 2.1 Definition of function; Concept of limits.
Four standard limits $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$,
 $\lim_{x \rightarrow 0} \frac{\sin x}{x}$, $\lim_{x \rightarrow 0} \frac{a^x - 1}{x}$, $\lim_{x \rightarrow 0} (1+x)^{1/x}$
- 2.2 Differentiation of x^n , $\sin x$, $\cos x$, $\tan x$, e^x , $\log_a x$ (Please take one example of differentiation by definition)
- 2.3 Differentiation of sum, product and quotient of functions. Differentiation of function of a function.
- 2.4 Differentiation of trigonometric inverse functions. Logarithmic differentiation. Exponential differentiation, Successive differentiation (excluding nth order).
- 2.5. Application of differential calculus in:
 - (a) Rate Measures
 - (b) Errors and increments
 - (c) Maxima and minima
 - (d) Equation of tangent and normal to a curve (for explicit functions only)

3. Integral

(26 hrs)

- 3.1 Integration as inverse operation of differentiation with simple examples.
- 3.2 Simple integration by substitution, by parts and by partial fractions (for linear factors only)

3.3 Evaluation of definite integrals (simple problems)-

$$\text{Evaluation of } \int_0^{\pi/2} \sin^n x \, dx, \quad \int_0^{\pi/2} \cos^n x \, dx, \quad \int_0^{\pi/2} \sin^m x \cos^n x \, dx$$

using formulae without proof (m and n being positive integers only)

3.4 Applications of integration for :

(a) Simple problem on evaluation of area bounded by a curve and axes.

(b) Calculation of volume of a solid formed by revolution of an area about axes. (Simple problems).

(c) To calculate average and root mean square value of a function and

(d) Area by Trapezoidal Rule and Simpson's Rule

4. Statistics and Probability

(12 hrs)

4.1 Measures of Central Tendency: Mean, Median, Mode with example of daily life.

4.2. Measures of Dispersion: Mean deviation, Standard deviation

4.3. Probability definition and addition law of probability, theorem and simple numerical problems, General view of normal probability curve (No numericals)

4.4. Explanation of different sampling techniques (No numericals)

5. Differential Equations

(08 hrs)

5.1 Solution of first order and first degree differential equation by variable separation method (simple problems)

5.2. Differential equations of homogeneous equation

INSTRUCTIONAL STATREGY

Basic elements of Differential Calculus, Integral Calculus, Co-ordinate geometry and Statistics can be taught in the light of their applications in the field of engineering and technology. By laying more stress on applied part, teachers can also help in providing continuing education base to the students.

RECOMMENDED BOOKS

1. Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi.
2. Engineering Mathematics by Vol. I & II by S Kohli, IPH, Jalandhar
3. Applied Mathematics by Dr. RD Sharma
4. Applied Mathematics, Vol. I & II by SS Sabharwal & Sunita Jain, Eagle Parkashan, Jalandhar
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications
6. Engineering Mathematics by Dass Gupta
7. Engineering Mathematics by C Dass Chawla, Asian Publishers, New Delhi
8. Engineering Mathematics, Vol I, II & III by V Sundaram et.al, Vikas Publishing House (P) Ltd., New Delhi
9. Engineering Mathematics by N.Ch.S.N Iyengar et.al, Vikas Publishing House (P) Ltd., New Delhi

10. Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,
11. Engineering Mathematics, Vol I & II by AK Gupta, Macmillan India Ltd., New Delhi
12. Applied Mathematics-II, Archana Sharma, Lords Publications, Jalandhar
13. Advanced Engineering Mathematics by Peter V.O,neil, University of Alabama 2007 edition, Cengage Learning India Pvt. Ltd. Patparganj, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	15
2	24	28
3	26	32
4	12	17
5	08	08
Total	80	100

2.3 FOOTWEAR TECHNOLOGY - I

L T P
4 - 2

RATIONALE

Diploma holders in Footwear and Leather Goods Technology are supposed to acquire fundamental knowledge of history of Footwear, classification of Footwear, different types of raw materials used in Footwear. Their availability, characteristics, specifications, units of measurements, Quantity required, preservation & proper storage, methods of procurement, Enabling them to understand the importance of Footwear.

DETAILED CONTENTS

THEORY

1. Introduction (6 hrs)
History of Footwear manufacture, classification of Footwear and its importance in human life.
2. Materials (24 hrs)
Leather and synthetic materials used in Footwear for upper and lining. Their specifications, quality and characteristics, units of measurements.
 - 2.1 Fabric : Textile and fabric, coated fabrics – their classification, fabric used for upper lining, side lining, backer, tapping, socking, toe puff and their characteristics, use of elastic in footwear.
 - 2.2 Insoles : Classification of leather board, method of manufacture of leather board, characteristics of different types of leather board of insole, stiffener, toe puff and heel.

Utility and use of cellulose board, backer board, forepart and seat part board, pre-fabricated insoles
 - 2.3 Toe Puff and Stiffeners
 - a) Solvent Activated: Thermoplastics
 - b) Heat Activated : Toe Puff and Stiffeners
 - c) Leather and Leather Boards
 - 2.4 Soles:
 - a) Rubber : Utility of rubber in shoe industry and types of rubber used in footwear and their identification, characteristics of rubber sole, crepe sole, moulded rubber sole, microcellular rubber sole, synthetic and resin soles. Rubber compounding, mixing and vulcanization.
 - b) Leather PVC inserted unit sole
 - c) PVC sole (Polyvinylechloride)
 - d) Polyurethane
 - e) T.P.R. (Thermo Plastic Rubber)
 - f) EVA
 - 2.5 Wood and Metal: Wooden and metallic heels, platform dogs and shanks; Types of wood and metal used and their characteristics.

3. Procurements and Proper Storage (6 hrs)
- The sources of supply of quality leather, their selection & procurement procedure and proper storage.
4. Grindaries (6 hrs)
- All types of grindary items used in Footwear manufacturing. Their classification and suitability / availability in the market. Its specifications and storage, quality requirements and its units of measurements.
- Fixtures and Fastenings
- Eyelets, rivets, hob nails of different hands, panel pins, tingles made of different metals like iron, brass and their suitability and longevity. Special type of rivets used in selective type of footwear, brass screw, brass and steel stape selective type of footwear, brass screw, brass and steel stape and their use in footwear spikes used in sports shoes, shank, steel shank, steel toe cap and their use in special type or footwear bottom, fitting, materials like saw dust, cork, tar felt, leather shavings, glue etc. Stiffening materials like cement, elastics, thermoplastics, leather board etc.
- Fastenings such as buckle, zippers, button, threads, velcrow tapes, elastics, laces. Padding materials decorative fittings for footwear.
5. Threads and Needles (6 hrs)
- a) Thread materials, types such as cotton, linen, nylon, silk and synthetics, number and sizes
- b) Needles: Types, parts such as butt, shank, shoulder, long-grove, short grove, eye, point etc., sizes of needles
6. Adhesives (6 hrs)
- Types of adhesives, basic materials used in formulation of adhesives like starch, glue, latex, rubber solution, chloroprene based adhesive, polyurethane, neoprene hot melt etc. Application of adhesives in different industries
- Bonding strength of adhesives, time of settings comparative study of adhesives available in the market. Selection of adhesives for cemented construction.
7. Finishing materials (10 hrs)
- Creams and waxes of different varieties and their use in the formulation of finishing material like sole polish, heel ball, upper dressings, polishes and creams of different colors. Glazing materials, jacquards, binders, resins, plasticizers etc. Materials used in the formulation of glazing materials such as resin, sounders, shellac and the solvents required for their preparation.

PRACTICALS

1. Identification of Hides & Skins, Leathers and Synthetics, Rubber and Textiles.
2. Examine the general qualities of various types of Leathers.

- i) Lines of tightness and stretchness.
- ii) Quality variation in Leather.
- iii) Substance variation in Leather.
- iv) General defects in Leather.
3. Quality examination of all sort of Grindary items used in Footwear manufacturing.
4. Exercises in units of measurement.
5. Demonstration of selection and grading of Leather and all other raw materials.
6. Visit to Leather market.
7. Visit to Tanneries.
8. Visit to Laboratories (CLRI).
9. Guest lectures of Leather manufacturers.
10. Visit to some Ancillary units such as :-
 - i) Leather Board manufacturing unit.
 - ii) Adhesives manufacturing units.
 - iii) Shoe Lasts manufacturing units.
 - iv) Bottom components making units.
 - v) Rubber sheet manufacturing units.
 - vi) P.V.C. moulded unit soles industry.
11. Skill practice – leather cutting/clicking, skirving, beading, binding and different types of stickning.

INSTRUCTIONAL STRATEGY

The teachers should demonstrate various operations of leather footwear in the relevant industries and expert lectures from industrial personnel may be arranged.

RECOMMENDED BOOKS

1. An Introduction to Principles of Leather Manufacture by SS Dutta, Indian Leather Technologists Association, Kolkota
2. Theory and Practice of Leather Manufacture by KT Sarkar
3. Leather Technicians Handbook by JH Sharpouse, Lather Producers Association, Northampton, UK
4. Chemistry and Technology of Leather by O’ Flaherty, Roddy and Lollar, Vol. I and II, Robert E. Krieger Publishing Company, USA
5. Vegetable Tanning Materials of India by VS Sundara Rao
6. Practical Leather Technology by TC Thorstensen, Robert E. Krieger Publishing Co., Florida

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	10
2	24	36
3	6	10
4	6	10
5	6	10
6	6	10
7	10	14
Total	64	100

2.4 BASICS OF INFORMATION TECHNOLOGY

L T P
- - 4

RATIONALE

Information technology has great influence on all aspects of life. Primary purpose of using computer is to make the life easier. Almost all work places and living environment are being computerized. The subject introduces the fundamentals of computer system for using various hardware and software components. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools of MS office; using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

Note:

Explanation of Introductory part should be dovetailed with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Information Technology – its concept and scope, applications of IT, impact of computer and IT in society.
2. Computers for information storage, information seeking, information processing and information transmission
3. Computer Application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, Air and Railway Ticket reservation, robotics, Military, banks, Insurance financial transactions and many more
4. Elements of computer system, computer hardware and software; data types – numeric data, alpha numeric data; contents of a program, processing
5. Computer organization, block diagram of a computer, CPU, memory
6. Input devices; keyboard, Scanner, mouse etc; output devices; VDU and Printer, Plotter
7. Electrical requirements, inter-connections between units, connectors and cables
8. Secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD), primary and secondary memory: RAM, ROM, PROM etc., Capacity; device controllers, serial port, parallel port, system bus
9. Installation concept and precautions to be observed while installing the system and software
10. Introduction about Operating Systems such as MS DOS, Windows, Windows NT etc. as an interface to Computer System
11. Special features, various commands of MS word and MS-Excel, MS PowerPoint
12. About the internet – server types, connectivity (TCP/IP, shell); applications of internet like: e-mail and browsing
13. Various Browsers like Internet explorer, Mozilla Fire fox, WWW (World wide web); hyperlinks; HTTP (Hyper Text Transfer Protocol); FTP (File Transfer Protocol)

14. Basics of Networking – LAN, WAN, Topologies
15. Ethics and information Technology
16. Future with information Technology

LIST OF PRACTICALS

1. *Given a PC, name its various components and peripherals. List their functions*
2. Practice in installing a computer system by giving connection and loading the system software and application software
3. Exercises on entering text and data (Typing Practice)
4. Installation of operating System viz. Windows XP, Windows 2007 etc.
Features of Windows as an operating system
 - Start
 - Shutdown and restore
 - Creating and operating on the icons
 - Opening closing and sizing the windows
 - Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file
 - Creating and operating on a folder
 - Changing setting like, date, time, colour (back ground and fore ground)
 - Using short cuts
 - Using on line help
5. MS-Word
 - File Management:
 - Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, Giving password protection for a file
 - Page Set up:
 - Setting margins, tab setting, ruler, indenting
 - Editing a document:
 - Entering text, Cut, copy, paste using tool- bars
 - Formatting a document:
 - Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
 - Aligning of text in a document, justification of document, Inserting bullets and numbering
 - Formatting paragraph, inserting page breaks and column breaks, line spacing
 - Use of headers, footers: Inserting footnote, end note, use of comments
 - Inserting date, time, special symbols, importing graphic images, drawing tools
 - Tables and Borders:

- Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
- Print preview, zoom, page set up, printing options
- Using Find, Replace options
- Using Tools like:
 - Spell checker, help, use of macros, mail merge, thesaurus word content and statistics, printing envelopes and labels
 - Using shapes and drawing toolbar,
 - Working with more than one window in MS Word,
 - How to change the version of the document from one window OS to another
 - Conversion between different text editors, software and MS word

6. MS-Excel

- Starting excel, open worksheet, enter, edit, data, formulae to calculate values, format data, create chart, printing chart, save worksheet, switching between different spread sheets
- Menu commands:
 - Create, format charts, organise, manage data, solving problem by analyzing data, exchange with other applications. Programming with MS-Excel, getting information while working
- Work books:
 - Managing workbooks (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations, working with arrays
- Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet
- Creating a chart:
 - Working with chart types, changing data in chart, formatting a chart, use chart to analyze data
- Using a list to organize data, sorting and filtering data in list
- Retrieve data with query: Create a pivot table, customising a pivot table. Statistical analysis of data
- Exchange data with other application: embedding objects, linking to other applications, import, export document.

7. MS PowerPoint

- a) Introduction to PowerPoint
 - How to start PowerPoint
 - Working environment: concept of toolbars, slide layout, templates etc.
 - Opening a new/existing presentation
 - Different views for viewing slides in a presentation: normal, slide sorter etc.
- b) Addition, deletion and saving of slides
- c) Insertion of multimedia elements
 - Adding text boxes

- Adding/importing pictures
 - Adding movies and sound
 - Adding tables and charts etc.
 - Adding organizational chart
- d) Formatting slides
- Using slide master
 - Text formatting
 - Changing slide layout
 - Changing slide colour scheme
 - Changing background
 - Applying design template
- e) How to view the slide show?
- Viewing the presentation using slide navigator
 - Slide transition
 - Animation effects etc.
8. Working with MS Access
- a) Understanding different data types
 - b) Creation of table
 - c) Entering data in a table and modify it.
 - d) Creating simple Queries
9. Internet and its Applications
- a) Log-in to internet
 - b) Navigation for information seeking on internet
 - c) Browsing and down loading of information from internet
 - d) Sending and receiving e-mail
 - Creating a message
 - Creating an address book
 - Attaching a file with e-mail message
 - Receiving a message
 - Deleting a message

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals, connections and proficient in making use of MS office, MS Excel, MS Power Point and MS Access in addition to working on internet. The student should be made capable of working on computers independently

RECOMMENDED BOOKS

1. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
2. Information Technology for Management by Henery Lucas, 7th edition, Tata Mc Graw Hills, New Delhi
3. Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi
4. Computers Today by SK Basandara, Galgotia publication Pvt Ltd. Daryaganj, New Delhi.
5. MS-Office 2000 for Everyone by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., New Delhi
6. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
8. Mastering Windows 95, BPB Publication, New Delhi
9. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
10. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
11. On Your Marks - Net...Set...Go... Surviving in an e-world by Anushka Wirasinha, Prentice Hall of India Pvt. Ltd., New Delhi
12. Learning MS Office XP by Ramesh Bangia, Khanna Book Publishing Co. (P) Ltd., New Delhi.
13. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar

2.5 BASIC ENGINEERING

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3 - 2

RATIONALE

A diploma holder has to assist in activities of 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.

DETAILED CONTENTS

PART-A

MECHANICAL ENGINEERING

Theory

- 1. Transmission of Power** (6 hrs)
 - 1.1 Belt Drives:
Types of belts, belt materials, cross and flat belt drives, advantages of V-belt drive over flat belt drive.
 - 1.2 Gears Drives:
Types of gears, types of gear trains
- 2. Internal combustion Engines** (4 hrs)
 - 2.1 Classification of IC engines
 - 2.2 Working principles of two stroke and four stroke engines
 - 2.3 Working principles of petrol engine and diesel engines
- 3. Refrigeration and Air Conditioning System** (4 hrs)
 - 3.1 Principle of refrigeration
 - 3.2 Working of domestic refrigerator
 - 3.3 Working of Window type AC system
- 4. Hydraulics:** (2 hrs)
 - 4.1 Classification of pumps (reciprocating and centrifugal)
 - 4.2 Working principle of reciprocating and centrifugal pumps

PRACTICAL EXERCISES IN MECHANICAL ENGINEERING

1. Demonstration and study of various drives for transmission of power i.e. models of belts and gears.
2. Demonstration and study of main parts of 4 stroke petrol and diesel engines
3. Demonstration and study of main parts of 2 stroke petrol engine
4. Demonstration and study of domestic refrigerating system

5. Demonstration and study of air conditioning system in a building
6. Demonstration and study of different hydraulic pumps

PART B

ELECTRICAL ENGINEERING

Theory

Electrical:

1. Basic Quantities of Electricity: (4 hrs)
 - 1.1 Definition of voltage, current, power and energy with their units
 - 1.2 Name of the instruments used for measurement of quantities such as voltmeter, ammeter, wattmeter, energy meter.
 - 1.3 Connection of the instruments in electric circuit
2. Various Types of Power Plants: (3 hrs)
 - 2.1 Elementary block diagram of thermal, hydro and nuclear power stations
 - 2.2 Brief explanation of the principle of power generation in above power stations
3. Transmission and Distribution System (4 hrs)
 - 3.1 Key diagram of 3 phase transmission and distribution system
 - 3.2 Distinction between high and low voltage distribution system
 - 3.3 Identification of three phase wires, neutral wires and the earth wire on a low voltage distribution system
 - 3.4 Identification of the voltage between phases and between one phase and neutral
4. Domestic Installation: (3 hrs)
 - 4.1 Distinction between light and fan circuits and single phase power circuit, sub circuits
 - 4.2 Various accessories and parts of installation, identification of wiring systems, earthing
5. Electric Motors and Pumps: (2 hrs)
 - 5.1 Definition and various application of single phase and three phase motors
 - 5.2 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 stabilizer etc.

Objective: Students may be made familiar with the different types of equipment and circuits used in the domestic installations

4. Treatment of electric shock

Note: The teacher may give a demonstration how an electric shock must be treated.

Objective: Students must be trained to treat the persons suffering from an electric shock

5. Demonstration and study of Domestic installation components used in single phase and three phase wiring

6. Demonstration and study of distribution line components

7. Demonstration and 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 taking reading of an energy meter (1f & 3f)

Objective: Students may be asked to connect an energy meter to a load and calibrate reading

9. Demonstration and study of submersible motor pump set and its working

Objective: To tell use of the set in water supply and irrigation works.

PART C

CIVIL ENGINEERING

Theory

1. Construction Materials (5 hrs)
Basics of various construction materials such as stones, bricks, lime, cement and timber along with their uses, elements of brick masonry.
2. Foundations (4 hrs)
 - i) Bearing capacity of soil and its importance
 - ii) Types of various foundations, suitability of various foundations for heavy, light and vibrating machines
3. Basic concept of concrete (4 hrs)
Various ingredients of concrete, different grades of concrete, water cement ratio, workability
4. RCC (3 hrs)
Basics of reinforced cement concrete and its use (elementary knowledge)

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 2nd 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

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
Part-A		
1	6	14
2	4	8
3	4	8
4	2	4
Part-B		

1	4	8
2	3	6
3	4	8
4	3	6
5	2	4
Part-C		
1	5	10
2	4	8
3	3	8
4	3	8
Total	48	100

2.6 ELEMENTS OF LEATHER TECHNOLOGY

L T P
3 - 3

RATIONALE

Diploma holders in Footwear and Leather Goods Technology are supposed to acquire elementary knowledge of history of leather manufacture, composition of hides, skins, curing, preservation, pre-tanning operations, chrome tanning, vegetable tanning etc. For this purpose it is essential that student should be given elementary knowledge and skill development exercises for enabling them to perform effectively on the floor.

DETAILED CONTENTS

THEORY

- | | | |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1. | General information about leather manufacture | (4 hrs) |
| 2. | Raw hides and skins, their structure, defects, flaying and curing. | (4hrs) |
| 3. | Brief description of pretanning processes. | (6 hrs) |
| 4. | Vegetable and chrome tanning. | (6 hrs) |
| 5. | Post tanning and finishing operations. | (4hrs) |
| 6. | Types of finished leathers, common defects in finished leathers. | (4 hrs) |
| 7. | Characteristics of leather required for the manufacture of footwear. | (6 hrs) |
| 8. | Inherent difference in fibre structure in different parts of hide and its influence in the cutting of footwear components. | (4 hrs) |
| 9. | Physical properties of leather: Tensile strength, Tear strength, Plasticity, Elasticity, Thermo-static property and their bearing on foot and body comfort. | (4 hrs) |
| 10. | Selection criteria for the purchase of different types of leather. | (6 hrs) |

LIST OF PRACTICALS

1. Demonstration of pretanning, tanning and post tanning operations.
2. Physical and microscopic testing of leather.
3. Visual examination of defects in hides and leather.
4. Visit to hide market / Flaying Centre.
5. Visit to Tanneries.
6. Visit to laboratories, CLRI
7. Guest Lectures of representatives of tanning units.

INSTRUCTIONAL STRATEGY

The teachers should demonstrate various operations taught in the theory classes by arranging industrial visits in leather manufacturing units. Experts from industry may be invited to deliver lectures. Due emphasis should be given on developing skills in the students.

RECOMMENDED BOOKS

1. An Introduction to Principles of Leather Manufacture by SS Dutta, Indian Leather Technologists Association, Kolkota
2. Theory and Practice of Leather Manufacture by KT Sarkar
3. Leather Technicians Handbook by JH Sharphouse, Lather Producers Association, Northampton, UK
4. Chemistry and Technology of Leather by O' Flaherty, Roddy and Lollar, Vol. I and II, Robert E. Krieger Publishing Company, USA
5. Vegetable Tanning Materials of India by VS Sundara Rao
6. Practical Leather Technology by TC Thorstensen, Robert E. Krieger Publishing Co., Florida

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	4	8
2	4	8
3	6	12
4	6	12
5	4	10
6	4	10
7	6	12
8	4	8
9	4	8
10	6	12
Total	48	100

2.7 GENERAL WORKSHOP PRACTICE - II

L T P
- - 6

RATIONALE

As we know that, the psychomotor skills are mastered through practice, an opportunity therefore, has been extended to students through this course to refine their skills in different trades. The basic skills developed during first semester will be refined during this course by doing higher order skills jobs. In addition to developing general manual and machining skills in the students, the objective of development of sense of dignity of labour, precision, safety at work places, team working and right attitude among the students will also be met.

DETAILED CONTENTS (PRACTICALS)

The following shops are included in the syllabus. Student can opt relevant shops depending upon the need of his/her branch of diploma programme :

1. Carpentry and painting shop-II
2. Fitting shop -II
3. Welding shop -II
4. Electric shop -II
5. Smithy shop -II or Electronic shop-II
6. Sheet Metal Shop -II

Note:

1. The branches e.g. Civil Engineering, Electrical Engineering, Mechanical Engineering, Mechanical (RAC), Production and Industrial Engineering will do **Smithy Shop -II** instead of Electronic shop- II
and
2. The branches e.g. Electronics and Communication Engineering, Electronics (with Specialization in Microprocessor), will do **Electronic shop- II** instead of Smithy Shop-II
3. The instructor is to first explain the introductory part given at the beginning under each shop followed by demonstration and practice by students.

1. Carpentry and Painting Shop - II

- 1.1 Introduction to joints, their relative advantages and uses.
Job I Preparation of Dovetail joint and glued joint.
Job II Preparation of Mitre Joint
Job III Preparation of a lengthening Joint
Job IV Preparation of atleast one utility job with and without lamination.
- 1.2 Demonstration of job showing use of Rip Saw, Bow saw and Tenon saw, method of sharpening various saws.
- 1.3 Demonstration of job on Band Saw and Circular Saw, Chain and Chisel, Universal wood working machine, Saw re-sharpening machine, Saw Brazing unit.
- 1.4 Importance and need of polishing wooden items, Introduction to polishing materials.
Job V Preparation of surface before polishing including prime coat.
Job VI Polishing on wooden items.

2 Fitting Shop – II

- 2.1 Introduction to various types of threads (internal, external)-single start, multi-start, left hand and right hand threads.
- 2.2 Description and demonstration of various types of drills, taps and dies Selection of dyes for threading, selection of drills and taps for tapping operations.
Job I Making internal and external threads on a job by tapping and dieing operations (manually)
- 2.3 Precautions while drilling soft metals, e.g. Copper, Brass, Aluminium etc.
Job II Drilling practice on soft metals (Aluminum, Brass and Copper)
- 2.4 Care and maintenance of measuring tools like calipers, steel rule, try square, vernier calipers, micrometer, height gauge, combination set. Handling of measuring instruments, checking of zero error, finding of least count.
Job III Preparation of a job by filing on non-ferrous metal up to an accuracy of $\pm 0.1\text{mm}$
Job IV Preparation of job involving thread on GI pipe/ PVC pipe and fixing of different types of elbow, tee, union, socket, stopcock, taps, etc

3. Welding Shop – II

- 3.1 Introduction to gas welding, spot welding and seam welding and machinery and equipment used. Adjustments of different types of flames in gas welding, demonstration and precautions about handling welding equipment.

Job I Practice in handling gas welding equipment (Low pressure and High pressure) and welding practice on simple jobs.
- 3.2 Common welding joints generally made by gas welding.
Job II Preparation Butt joint by gas welding.
Job III Preparation of small cot frame from conduit pipe by electric arc welding/gas welding.
Job IV Preparation of square pyramid from MS rods by welding (type of welding to be decided by students themselves).
Job V Exercise of preparing a job on spot/seam welding machine.

4 Electric Shop – II

- 4.1 Importance of three-phase wiring and its effectiveness.
Job I Laying out 3 phase wiring for an electric motor or any other 3 phase machine.
- 1.1 Estimating and costing of power connection.

Job II Connecting single-phase energy meter and testing it. Reading and working out the power consumption and the cost of energy.
Job III Checking continuity of connection (with tester and series lamp) location of faults with a multimeter) and their rectification in simple machines and/or other electric circuits fitted with earthing.
- 1.2 Demonstration of dismantling, servicing and reassembling a table fan/ceiling fan/air cooler/mixer/electric iron, Electric heater, geyser, electric oven, air conditioner etc.

- Job IV Dismantling, servicing and reassembling of any of the above electrical appliances.
- Job V Testing Single phase/three phase electrical motor by using voltmeters, ammeter, clip on meter, tachometer etc.
- Job VI Reversing the rotation of a motor.

5. Smithy Shop – II

- 5.1 Introduction to various heat treatment processes e.g annealing, hardening, tempering, normalizing etc.
- 5.2 Description of various types of power hammers and their usage (Demonstration only).
 - Job I To forge a ring to acquaint the students with forge welding
 - Job II To forge a chisel and acquaint the students with simple idea of hardening and tempering .
 - Job III To forge squares on both ends of a circular rod
 - Job IV To forge a single/double ended spanner.
 - Job V To prepare a job involving drawing down process

OR

6. Electronic Shop- II

- 6.1 Demonstrate the jointing methods. mounting and dismantling as well as uses of the items mentioned below:
 - a) Various types of single, multi-cored insulated screened power, audio video, co-axial, general purpose wires/cables
 - b) Various types of plugs, sockets connectors suitable for general purpose audio and video use, 2 and 3 pin mains plug and sockets.
Banana-plugs, and sockets, BNG, RCA, DIN, UHF, Ear phone speaker connector, telephone jacks and similar male and female connectors and terminal strips.
 - c) Various types of switches such as: normal/ miniature toggle, slide, push button, piano key, rotary, micro switches, SPST, SPDT, DPST, DPDT, band selector, multi way Master Mains Switch.
 - d) Various types of protective devices such as : Wire fuse, cartridge fuse, slow acting/fast acting fuse, HRC fuse, thermal fuse, single/multiple circuit breakers, over and under current relays.
- 6.2 Identification and familiarisation with active and passive components; colour code and types of resistor, capacitors and potentiometers (including VDR, LDR, and thermistor). Identification of components including LED, LCD, UJT, FET, Coils, relays, switches (SPDT, DPDT, etc.) connectors, micro switches, read relays, transformers (mains, audio and RF, etc) Linear and Digital ICs, Thyristors, etc.
- 6.3 Demonstrate the following:
 - 1) To make perfect solder joints and soldering on PCBs
 - 2) To remove components/wires by unsoldering.

- 3) To assemble components on boards, chassis, tape strips.
- 4) Various laying methods of cables
- 5) Exposure to modern soldering and de-soldering processes
- 6) Field visits to relevant work-places
 - Job I De-solder, remove and clean all the components, wires from a given equipment, a PCB or a tap strip using the following:
 - Job II Soldering Iron
 - Job III Temperature Control Soldering Iron
 - Job IV De-soldering Pump
 - Job V De-soldering Strip
 - Job VI Wiring of a small circuit on a PCB/tag strip involving lacking, sleeving and use of identifier tags

6. Sheet Metal Shop-II

- 6.1 Introduction to various metal forming processes e.g. Spinning, Punching, Blanking, cup drawing
- 6.2 Introduction to soldering and brazing.
- 6.3 Introduction to metal spinning process.
 - Job I Preparation of job involving shearing, circular shearing, rolling, folding, beading and soldering process e.g. Funnel or any other job involving above operations.
 - Job II Exercise on job involving brazing process
 - Job III Spinning a bowl/cup/saucer
 - Job IV Visit to a sheet metal industry e.g. coach builders etc.

RECOMMENDED BOOKS

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Choudhary. Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy; MacMillan India Ltd. New Delhi
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
5. Workshop Technoogy by B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi
6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi

ECOLOGY AND ENVIRONMENTAL AWARENESS CAMP

A diploma holder must have knowledge of different types of pollution caused due to industries and constructional activities so that he may help in balancing the eco system and controlling pollution by pollution control measures. He should also be aware of environmental laws related to the control of pollution.

This is to be organized at a stretch for 3 to 4 days. Lectures will be delivered on following broad topics. There will be no examination for this subject.

1. Basics of ecology, eco system and sustainable development
2. Conservation of land reforms, preservation of species, prevention of advancement of deserts and lowering of water table
3. Sources of pollution - natural and man made, their effects on living and non-living organisms
4. Pollution of water - causes, effects of domestic wastes and industrial effluent on living and non-living organisms
5. Pollution of air-causes and effects of man, animal, vegetation and non-living organisms
6. Sources of noise pollution and its effects
7. Solid waste management; classification of refuse material, types, sources and properties of solid wastes, abatement methods
8. Mining, blasting, deforestation and their effects
9. Legislation to control environment
10. Environmental Impact Assessment (EIA), Elements for preparing EIA statements
11. Current issues in environmental pollution and its control
12. Role of non-conventional sources of energy in environmental protection