

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

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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)-

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

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 APPLIED PHYSICS – II

L T P
4 - 2

RATIONALE

Applied physics includes the study of a large number of diverse topics related to things that go in the world around us. It aims to give an understanding of this world both by observation and prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology

DETAILED CONTENTS

- 1. Optics (12 hrs)**
 - 1.1 Review of basic optics laws: Reflection and Refraction
 - 1.2 Refractive index and magnification, image formation in lenses, lens formulae (thin lens only), power of lens, total internal reflection and their applications
 - 1.3 Simple concepts of interference, diffraction, Polarization and their applications like Commercial equipment, optic glasses and its manufacturing and use of Polarimeter in sugarcane industry and distilleries (No explanation required).
 - 1.4 Simple and compound microscope, astronomical telescope, magnifying power and its calculation (in each case) and their applications
- 2. Electrostatics (10 hrs)**
 - 2.1 Coulombs law, unit charge and electric lines of force
 - 2.2 Electric flux and Gauss's Law, Electric field intensity and electric potential
 - 2.3 Electric field due to point charge, straight charged conductor, plane charged sheet and charged sphere (Inside and outside the sphere)
 - 2.4 Capacitance, types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors, Dielectric and its effect on capacitance, and dielectric break down
 - 2.5 Pollution, different types of pollution and polluting agents, Use of Electronics in reducing Air and Water pollution e.g. precipitation of microbes and moisture reparation from air and gases in industry (small explanation only)
- 3. DC Circuits (15 hrs)**
 - 3.1 Concept of electricity, various applications of electricity

- 3.2 Current, voltage, resistance, potential difference and e.m.f, power, electrical energy and their units, advantages of electrical energy over other forms of energy and Alternating Current and Direct Current
- 3.3 Ohm's law and its applications, specific resistance, effect of temperature on resistance, co-efficient of resistance, series and parallel combination of resistors an Resistance, Definitions of Conductance and Super Conductor's
- 3.4 Kirchoff's laws, Wheatstone bridge principle and its applications
- 3.5 Heating effect of current and concept of electric power, energy and their units, related numerical problems and their applications
- 3.6 Examples of DC Circuits e.g. Various electrical and electronic equipment CRO, T.V., Audio system, Computers (Only examples, no explanations)

4. Electromagnetism (10 hrs)

- 4.1 Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and their units
- 4.2 Permeability and susceptibility and their applications. Electromagnetic Induction, Lenz's law and its uses like dynamo, Right hand and left hand rules, Magnetic lines of force due to straight conductor, Solenoid and Circular coil. Force on a current carrying rectangular coil placed in magnetic field and its uses in moving coil galvanometer, electric motor (Concept only). Lorentz force, Force on a current carrying conductor (straight and rectangular)
- 4.3 Moving coil galvanometer its principle, construction and working.

5. Semiconductor physics (07 hrs)

- 5.1 Energy bands, intrinsic and extrinsic semiconductors, p-n junction diode and its characteristics
- 5.2 Diode as rectifier – half wave and full wave rectifier, semiconductor transistor pnp and npn (concept only)

6. Modern Physics (10 hrs)

- 6.1 Lasers: concept of energy levels, ionizations and excitation potentials; spontaneous and stimulated emission; lasers and its characteristics, population inversion, types of lasers, Helium- Neon and ruby lasers their engineering and medical applications
- 6.2 Fibre optics: introduction to optical fiber materials, types, light propagation and applications in communication.

LIST OF PRACTICALS (To perform minimum eight experiments)

1. To find the focal length of convex lens by displacement method.
2. To determine the magnifying power of an astronomical telescope
3. To verify ohm's laws by drawing a graph between voltage and current.
4. To verify laws of resistances in series and in parallel connection.
5. To find resistance of galvanometer by half deflection method
6. To measure very low resistance and very high resistance using Wheat Stone bridge
7. To determine the capacity of a parallel plate capacitor by discharging through a voltmeter and also find out the time constant of the given capacitor.
8. To draw characteristics of a pn junction diode and determine knee and break down voltages
9. To find wave length of He Ne semiconductor LASER.
10. Use of CRO in plotting AC/DC

INSTRUCTIONAL STRATEGY

Teacher may use various instructional media like models, charts and graphs while imparting instructions. The field application should be made clear before teaching the basics of waves, sound, light, electrostatics, dc circuits, electromagnetism, and semiconductor physics etc to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students.

RECOMMENDED BOOKS

1. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T
2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
4. Fundamentals of Physics by Resnick, Halliday and Walker, Asian Book Pvt. Ltd., New Delhi
5. Fundamentals of Optics by Francis A. Jenkins & Harvey E White, McGraw Hill International Editions, Physics Series
6. A Text Book of Optics, Subramanian and Brij Lal, S Chand & Co., New Delhi
7. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publishers
8. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
9. Applied Physics I & II by RA Banwait & R Dogra, Eagle Parkashan, Jalandhar
10. Applied Physics Vol II by Jasmer Kaur and Bhupinder Singh, Lords Publications, Jalandhar
11. Basic Electronics and Linear Circuits by NN Bhargava et al Tata Mc Graw Hill Publishers, New Delhi
12. Principles of Electronics by SK Sahdev, Dhanpat Rai and Co, New Delhi
13. Engineering Physics by Vanchna Singh and Sheetal Kumar, Cengage Learning India Pvt. Ltd. Patparganj, Delhi (year 2008)

Suggested Distribution of Marks for Facilitating Paper Setter

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Optics	12	20
2	Electrostatics	10	15
3	DC Circuits	15	20
4	Electromagnetism	10	20
5	Semiconductor Physics	07	10
6	Modern Physics	10	15
	Total	64	100

2.4 BASICS OF INFORMATION TECHNOLOGY

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- - 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 ORGANIC CHEMISTRY-I

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RATIONALE

Diploma holders in leather technology are required to supervise laboratories and should have practical and theoretical understanding which is to be applied in the leather technology (Leather Manufacturing). It is very essential that the students should have adequate knowledge of theory and practical skills for enabling them to perform effectively and efficiently on the shop-floor. Hence through this subject, it is expected from the teacher to provide/lay greater emphasis on theory and practicals in organic chemistry which are necessary element and are part and parcel of the leather manufacturing principles and processes

DETAILED CONTENTS

THEORY

1. Introduction (6 hrs)
Purification of organic compounds (crystallisation) distillation and sublimation - detection of elements(N.S and Halogens). Estimation of Hydrogen and sulphur
2. Problems on (6 hrs)
Empirical and Molecular formulae. Isomerism (structural and stereo) Hydrocarbon saturated and unsaturated. Substitution and addition reactions. Chlorination of methane
3. Unsaturated Hydrocarbons and Alkylhalides (8 hrs)
Preparation, properties and uses of Ethylene and acetylene. Polymerisation of ethylene and acetylene. Alkylhalides CH_3Cl and CH_3I
4. Petroleum Products (6 hrs)
Theories of origin of petroleum. Fractional distillation of petroleum. Petroleum products and their uses
5. Alcohols (8 hrs)
Primary, Secondary, Tertiary alcohols. Difference between preparation of ethyl alcohol by fermentation of molasses. Preparation, properties and uses of ethylene glycol and glycerol

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|----|---|---------|
| 6. | Ether | (2 hrs) |
| | Diethyl Ether - Preparation, properties and uses | |
| 7. | Aldehydes | (4 hrs) |
| | Formaldehyde and acetaldehyde. Laboratory methods of preparation, properties and uses | |
| 8. | Ketones | (2 hrs) |
| | Acetone-Laboratory method of preparation, properties and uses | |
| 9. | Acids | (6 hrs) |
| | Laboratory Methods of preparation, properties and uses of acetic, lactic, formic, citric and oxalic acids | |

LIST OF PRACTICALS

1. Detection of Cl, Br, I, S and N in organic compounds
2. Detection of functional groups like aldehyde
3. Detection of functional group of ketones
4. Detection of carboxylic group
5. Detection of amino group (nitrogen content)
6. Detection of functional groups of carbohydrates

INSTRUCTIONAL STRATEGY

The understanding of chemistry is a must for the students for better appreciation of leather technology subjects. Teachers should give brief introduction to various topics and they should try to develop a co-relation of chemistry and its applied aspects to leather technology. Teachers may give appropriate tutorial exercises to the students. Use of charts may be made during the theory classes. Experiments given in the list of practical should be performed by individual students under the supervision of teachers. The safety precautions, while working on experiments, should be taken to avoid any accidents.

RECOMMENDED BOOKS

1. Principles of Physical Chemistry by Puri, Sharma and Pathania
2. Chemistry in Engineering and Technology Vol. I and II by JC Kuriaese and J Rajaram
3. Organic Chemistry V edition by RT Morison and RN Boyd; Prentice Hall of India Pvt. Ltd., New Delhi 1990

4. A Text Book of Organic Chemistry by KS Tewari SN Mehrotra and NK Vishnoi; Vikas Publishing House, New Delhi
5. Chemical Engineering Handbook by JH Perry
6. Riegel's Handbook of Industrial Chemistry by JA Kent, Ed., Van Nostrand Reinhold, 1974
7. Shreve's Chemical Process Industries 5th Edition by GT Austin; McGraw Hill International Book Co., Singapore 1984
8. Inorganic Chemistry by Cotton and Wilkinson
9. Chemical Technology by Kirk and Arthor
10. Physical Chemistry of Leather Manufacture by Bienkiewicz, 1952
11. Chemistry of Tanning Process by KH Gustavson; New York

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	12
2	6	12
3	8	16
4	6	12
5	8	16
6	2	6
7	4	8
8	2	6
9	6	12
Total	48	100

2.7 LEATHER MANUFACTURE - I

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RATIONALE

Diploma holders in Leather Technology are supposed to acquire fundamental knowledge of history of leather manufacture, anatomical structure, composition of hides, skins, proteins, curing, preservation, pretanning and post-tanning operations, , chrome tanning, syntans etc for enabling them to perform effectively on the shop floor. Hence this subject is introduced in the curriculum. Teachers are expected to provide greater emphasis on developing relevant skills in the students.

DETAILED CONTENTS

THEORY

1. Introduction (6 hrs)
History of Leather manufacture, flaying, availability, classification and grading of hides and skins, defects of hides and skins, anatomical structure of hides and skins, chemical composition and constituents of hides and skins
2. Proteins (5 hrs)
Nature and types of proteins, physical and chemical composition of skin, proteins, reactions with acids, base and salts (in brief)
3. Curing and Preservation (5 hrs)
Methods and chemistry of curing of hides and skins merits and demerits of each method, code of practice for curing and preservation of cattle hides as per latest standards specifications
4. Pretanning Operations (8 hrs)
Principles and objectives involved in desalting, soaking, liming, deliming, bating, pickling, depickling, bleaching, degreasing
5. Tanning (6 hrs)
Concept and definition of tanning, leather properties dependent on tanning. Types of tannages.
6. Chrome Tanning (10 hrs)
Warners coordination theory of chrome compounds, Chemistry of Chromium complexes, preparation of chrome liquors, self-basifying chrome powder, hydrolysis, olation, oxolation, polymerization, effect of masking salts. Factors influencing chrome tanning like pH,

concentration time, temperature, neutral salts. Basification and basicity principles and chemistry of various chrome tanning methods

7. Syntans (6 hrs)

Classification, general methods of preparation, reactions with skin protein used in leather manufacture, types and uses of various resin tanning agents.

8. Occupational Health/Safety – Introduction to Hazardous substances in tannery – Safety precautions (2 hrs)

LIST OF PRACTICALS

1. Grading of raw hides and skins as per commercial practice.
2. Tannery practice: Beam house and chrome tanning operations only.
3. Wet blue making
4. Visit to hide market and flaying centres
5. Visit to tanneries
6. Visit to laboratories, CLRI, FDDI, GLI Private testing laboratories
7. Visit to various chemical trading agencies
8. Guest Lectures of representatives of chemical dealers
9. Compulsory regular visits to some tanning/auxiliary chemical manufacturing units and ancillary units

INSTRUCTIONAL STRATEGY

This subject is one of the basic subjects for the diploma in leather technology. The teacher should lay lot of emphasis on developing thorough understanding of various facts, concepts, principles and practices involved in leather manufacturing. Teacher should design tutorial exercises and students should be given practice on solving the same using books, manuals, with the assistance of teachers. Visits to some of the small, medium and large-scale tanneries may also be arranged to expose the students about various processes. Students should be sent to market for collecting samples and catalogue of various raw materials used in tanneries.

RECOMMENDED BOOKS

1. An Introduction to Principles of Leather Manufacture by SS Dutta, Indian Leather Technologists Association, Kolkata

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	12
2	5	10
3	5	10
4	8	18
5	6	12
6	10	20
7	6	14
8	2	4
Total	48	100