2.1 COMMUNICATION SKILLS - II

L	T	P
3	-	2

RATIONALE

Language is the most commonly used and effective medium of self-expression in all spheres of human life – personal, social and professional. A student must have a fair knowledge of English language and be able to pursue the present course of study and handle the future jobs in industry. The objective of this course is to assist the diploma holders to acquire proficiency, both in spoken (oral) and written language. At the end of the course, the student will be able to develop comprehension, improve vocabulary, develop grammatical ability, enhance writing skills, correspond with others, enhance skills in spoken English.

DETAILED CONTENTS

1. Prose Text Book (12 hrs)

   The following six chapters of A Book of English for Polytechnics – Prose Selection, Published by MacMillan India Ltd., on behalf of Technical Teachers' Training Institute, Chandigarh

   a) Uncle Podger Hangs a Picture
   b) Subash Chandra Bose
   c) A Pair of Mustachios
   d) Guru Gobind Singh
   e) With The Photographer
   f) Sir Jagdish Chandra Bose

   There will be one general question from one of these six chapters.

2. Precise writing (selected from the prescribed 6 chapters of Prose Text Book) (4 hrs)

3. Grammar (2 hrs)
   Antonyms change of words into different parts of speech

4. Correspondence (10 hrs)

   a) Business letters such as:
      - Registration as supplier
      - Floating quotations and tenders
      - Quarry for product specification, price and other details etc from a firm/Company
      - Covering letter for quoting prices against a quotation/tender
      - Placing supply order

b) Personal letters such as:

- Application for leave and extension of leave
- Application for seeking a job/employment
- Conveying congratulation messages to a relative/friend/colleague on different occasions
- Conveying condolence message to a relative/friend/colleague
- Request letter to guardian for sending money for excursion/study tour
- Letter to your brother/sister/friend describing your first day experience in the polytechnic

c) Official letters such as**:**

- Letter to editor for placing an advertisement in the newspaper for purchase/selling of goods
- Letter to Municipal Commissioner for improving water supply/ sanitation system in your locality
- Letter to General Manager, Telephone Department for restoring a dead telephone/shifting a telephone
- Letter to State Electricity Board for repair of street lighting/ correction of bills etc.
- Letter to the supplier for rectifying or replacing a defective machinery/item of purchase
- Letter to Registrar, State Board of Technical Education for allowing to improve grades/marks in diploma examination

5. Report Writing (2 hrs)

- Drafting a technical report of a visit to a factory, construction site, modern office, etc.
- Report writing on current general themes/topics related to economy, industry, social issues
- Elements of periodical progress report

6. Inspection Note (2 hrs)

- Write an inspection note after inspecting technical/industrial goods
- Write an inspection note after visiting a construction site or production shop

7. Writing “Preface” and “acknowledgement” of a project report (2 hrs)

8. A paragraph on current topics/themes (2 hrs)
   - Technology
   - Science
   - Economy
   - Politics
   - Social
   - General

9. Vocabulary (2 hrs)
   - words, idioms, phrases, antonyms and synonyms
   - Translation of 100 most popular administrative terms from English to Hindi and from Hindi to English

10. Drafting (4 hrs)
    - Press notes
    - Memos/circulars
    - Notices (lost and found: obituary/auction, etc)
    - Telegrams
    - Press releases
    - Agenda and minutes of the meeting
    - Personal resume/curriculum vitae

11. Communication Techniques (6 hrs)
    - Importance of communication
    - Types of communication – verbal and non-verbal
    - One way and two way communication
    - Process of communication – horizontal, vertical, upward, downward
    - Essentials of good communication
    - Level of communication – inter and intra personal, group to person, group to group
    - Methods of effective oral, written and non-verbal communication, Horizons – tone, frequency, rate, volume, depth
    - Barrier to communication and over coming barriers
    - Listening skill
    - Use of audio visual aids for effective communication

LIST OF PRACTICALS

1. Presentation of Technical Report, using Audio-visual aids

2. Preparation and Presentation on a Seminar of a given topic/theme using power-point

3. Telephonic conversation – Conveying and Receiving

4. Mock Exercises for an interview for a job/employment

5. Listening comprehension from a radio/cassette talk in English

6. Extempore speech

7. Oral presentation with stress on proper body language, voice modulation

Note: For reading comprehension, listening comprehension and effective speaking skills, English Language Laboratory Manual and Workbook published by State Board of Technical Education, Hyderabad (AP) may be used along with text book

RECOMMENDED BOOKS

1. Essentials of Business Communication by Pal and Rorualling; Sultan Chand and Sons

2. The Essence of Effective Communication, Ludlow and Panthon; Prentice Hall of India

3. New Design English Grammar, Reading and Writing Skills by AL Kohli (Course A and course B), Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,

4. New Design English Reading and Advanced Writing Skills for Class XI and XII by MK Kohli and AL Kohli; Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,

5. A Practical English Grammar by Thomson and Marlinet

6. Spoken English by V Sasikumar and PV Dhamija; Tata McGraw Hill

7. English Conversation Practice by Grount Taylor; Tata McGraw Hill

8. Developing Communication Skills by Krishna Mohan and Meera Banerji; MacMillan India Ltd., Delhi

9. Business Correspondence and Report Writing by RC Sharma and Krishna Mohan; Tata McGraw Hill Publishing Company Ltd. New Delhi

10. Communication Skills by Ms. R Datta Roy and KK Dhir, Vishal Publication, Jalandhar

2.2 APPLIED MATHEMATICS – II

L	T	P
4	1	-

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:
- The center and radius
- Three points on it
- 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 Differential Calculus

2. Differential Calculus (22 hrs)

2.1 Concept of function, four standard limits

$$\lim_{x\to a} (x^n - a^n)/(x-a), \quad \lim_{x\to 0} \sin x/x, \quad \lim_{x\to 0} (a^x - 1)/x, \quad \lim_{x\to 0} (1+x)^{1/x}$$

2.2 Concepts of differentiation and its physical interpretation

- Differentiation by first principle of x^n, $(ax + b)^n$, Sin x, cos x, tan x, sec x,, cosec x and cot x, e^x, a^x, log x. Differentiation of a function of a function and explicit and implicit functions
- Differentiation of sum, product and quotient of different functions
- Logarithmic differentiation. Successive differentiation excluding n^{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
- Simple problem on evaluation of area under a curve where limits are prescribed
- Calculation of volume of a solid formed by revolution of an area about axis (simple problems) where limits are prescribed
- To calculate average and root mean square value of a function
- Area by Trapezoidal Rule and Simpson's Rule

4. Differential Equations (8 hrs)

Solution of first order and first degree differential equation by
- Variable separation
- Homogeneous differential equation and reducible homogeneous differential equations
- 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 ENGINEERING DRAWING – II

L	T	P
-	-	6

RATIONALE

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 appropriate demonstration, before assigning drawing practice to the 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 Tenen 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, pentongon, hexogon

    11.2 Development of surfaces of cylinder, square, pentagonal and hexazonal, Prism, Conc and Pyramid, Sequence pentagonal and hexa 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 POLYMER CHEMISTRY

L	T	P
3	-	2

RATIONALE

Basic knowledge of organic chemistry is the foundation on which the plastic technology is built up. Manufacturing of plastic raw materials and processing of plastic will never the desirable without the understanding of basic chemistry. This course has been designed to include some relevant topics from organic chemistry to understand various subsequent courses in polymers

DETAILED CONTENTS

1. Classifications and Nomenclature of Organic Compounds (4 hrs)

   Classification of organic compounds; IUPAC nomenclature of Alkanes, Alkenes and Alkeynes; IUPAC nomenclature of compounds containing various functional groups. IUPAC nomenclature of polyfunctional compounds. Nomenclature of Benzene derivatives. Bond line notations, writing the structure of a compound whose name is given. Some commonly used abbreviations. Names of simple alphatic compounds.

2. Structure and Shape(s) of Hydrocarbons (6 hrs)

   Alkanes (structure, isomerism, conformations). Stereo isomerism and chirality (Origin of chirality, optical, geometric, recemic mixture). Alkenes (Isomerism including cis, trans) Alkynes, Arenes (structure of Benzene, resonance structure, isomerism in arenas), alcohol, carboxylic acid

3. Organic Reaction Mechanism (6 hrs)

   Reactions and their mechanism; Thermodynamic and kinetic requirements of a reaction. Thermodynamic versus kinetic control of a reaction, Transition state theory. Free energy diagrams

4. Petrochemicals (10 hrs)

   Introduction, raw materials, petroleum refining, petrochemical process technology; catalytic cracking, hydrocracking, alkylation and isomerisation

5. Industrial Chemicals (16 hrs)

   Manufacture, properties and applications of Vinyl Chloride, Ethylene, Propylene, Alkyl halides, Acrylonitrile, Styrene, Methyl Methacrylate,Ethylene Glycol, Terphthalic Acid, Phenol, Isocynates

6. Macromolecular Concept (6 hrs)

Macromolecular concept, secondary bonding in polymers. Stereo isomerism in polymers

LIST OF PRACTICALS

1. To determine specific gravity of three industrial chemicals using pyknometer

2. To determine boiling point of three industrialchemicals

3. To find out refractive index of three industrial chemicals

4. Determination of viscosity of three industrial chemicals

5. To determine the melting point of terphthalic acid

6. To determine the bulk density of terphthalic acid

Note: The industrial chemicals must be chosen from the chemicals as given in syllabus at Sr. No. 5. The values obtained practically should be compared with the standard values

RECOMMENDED BOOKS

1. Organic Chemistry by Marrison and Boyd

2. Organic Chemistry Vol. I by IL Finar

3. Text Book of Organic Chemistry by Lyod and Forguson

4. Organic Chemistry by Behl

5. Principles of Polymer Chemistry, Second Edition by A Ravve; Powell Publication, 1995

2.6 INTRODUCTION TO PLASTIC TECHNOLOGY

L	T	P
3	-	-

RATIONALE

This subject is designed to enable the student to acquire basic knowledge of plastics, their advantages, applications, classification, conversion, storage and recycling. The elementary acquired knowledge will help the students in understanding different processes in detail in later part of the course

DETAILED CONTENTS

1. Materials (6 hrs)

   Plastics as a material, their load bearing capacity, effect of temperature, sunlight, load/stress, humidity, oxidation etc. on plastics

2. Advantages (6 hrs)

   Advantages of using plastics in comparison with other conventional materials (wood, steel) such as reduction in weight by using specific weight concept, reduction in number of parts during construction, increased possibilities in number of shapes, new products, cost effectiveness and aesthetics. Reusability

3. Applications (8 hrs)

   Applications of plastics in various areas such as agriculture, packaging, electrical and electronics, automobile, construction, sports, medical, engineering and household etc

4. Conversions (16 hrs)

   Preliminary ideas of extrusion, injection molding, blow molding, rotational molding, compression and transfer molding taking examples of commonly used products made by each process

5. Storage (6 hrs)

   Storage and handling of plastics and chemicals used in plastic industry (such as resins, solvents, plasticisers, pigments etc). Problems such as flammability, toxic fumes, limitation of working under heat etc

6. Recycling (6 hrs)

Collection; Segregation. Recycling – primary, secondary and tertiary

RECOMMENDED BOOKS

1. Outlines of Polymer Technology by R Sinba

2. Polymer Science and Technoloy by Joel E Fried; Prentice Hall of India Publication, New Delhi 2000

3. Polymer Science and Technology by P Ghosh

4. Polymer Material – I and II Edition, Polymer Research Centre, Bangalore

5. Application of Polymers, CIPET

6. Plastic Technology by William J Patton, BBT Sons and Co Pvt Ltd Mumbai publication

2.7 ORIENTATION TO POLYMER ENGINEERING

L	T	P
3	-	-

RATIONALE

The subject helps the student in appreciating the role of various subjects taught during the diploma programme and their application in the world of work. It will also expose to the students various field jobs where they can join later on. The course will also impart to the students elementary knowledge regarding units and conversions, concept of unit operations and unit processes and introduction to and classification of polymers.

DETAILED CONTENTS

1. Introduction to Polymers (4 hrs)

2. What is Polymer Engineering? Brief history of Polymer Engineering (5 hrs)

3. Concept of Unit processes and Unit operations in chemical industry (5 hrs)

4. Functions of Plastic Technologist, career opportunities for Plastic Technologists (4 hrs)

5. Scope of Polymer Engineering with respect to new emerging areas like membrane separations, conducting polymers and biomedical applications (8 hrs)

6. Classification of Polymers: Natural, semisynthetic, synthetic, linear, branched, cross linked; Thermoplastic, thermoset Commodity. Engineering, Speciality, Condensation, addition. Polymer blends and alloys; Plastics, elastomers, fibers. (10 hrs)

7. System of units and unit conversions involving process variables like pressure, temperature, viscosity, density, specific gravity, thermal conductivity (6 hrs)

8. Composition of mixtures and solutions; mass fractions, mole fractions, molarity, molality and normality (6 hrs)

RECOMMENDED BOOKS

1. Polymer Science and Technology by Joel E Fried, Prentice Hall of India publication, New Delhi, 2000
2. Polymer Material – I and II edition, Polymer Research Centre, Bangalore
3. Application of Polymers, CIPET
4. Materials Science of Polymers for engineers by Tim Osswald, Powell Publication
5. Principles of Polymer Engineering second edition by NG McCrum, CB Bucknall, C P Buckley, July 1998 published by Oxford University Press