

1.1 COMMUNICATION SKILLS – I

L T P
3 - 2

RATIONALE

Interpersonal communication is a natural and necessary part of organizational life. Yet, communicating effectively can be challenging because of our inherent nature to assume, overreact to and misperceive what actually is happening. Poor communication or lack of communication is often cited as the cause of conflict and poor teamwork. In today's team-oriented workplace, managing communication and developing strategies for creating shared meaning are crucial to achieve results and create successful organizations. The goal of the Communicating Skills course is to produce civic-minded, competent communicators. To that end, students must demonstrate oral as well as written communication proficiency. These include organizational and interpersonal communication, public address and performance. The objectives of this subject are understanding how communication works, gaining active listening and responding skills, understanding the importance of body language, acquiring different strategies of reading texts and increasing confidence by providing opportunities for oral and written expressions

DETAILED CONTENTS

- | | | |
|-----|--|----------|
| 1. | Communication Skills | (12 Hrs) |
| 1.1 | Verbal and Non-verbal Communication | |
| 1.2 | Process of Communication | |
| 1.3 | Barriers to Communication; Overcoming Strategies | |
| 1.4 | Listening and Speaking Skills and Sub-Skills
(All topics should be in detail) | |
| 2. | Grammar and Usage | (12 Hrs) |
| 2.1 | Punctuation | |
| 2.2 | Articles-a, an, the | |
| 2.3 | Framing Questions | |
| 2.4 | Verbs-Classification: Main Verb, Auxiliary Verb, Transitive and Intransitive Verbs | |
| 2.5 | Word Formation | |
| 3. | Writing Skills | (10 Hrs) |
| 3.1 | Writing Paragraphs | |
| 3.2 | Picture Composition | |
| 4. | Reading Skills | (14 Hrs) |
| | Unseen comprehension passages (at least 5 passages). | |

LIST OF PRACTICALS

(Note: The following contents are only for practice. They should not be included in the final theory examination)

Developing Oral Communication Skills

- Greeting, Starting a Conversation
- Introducing Oneself
- Introducing Others
- Leave Taking
- Thanking, Wishing Well
- Talking about Oneself
- Talking about Likes and Dislikes

INSTRUCTIONAL STRATEGY

Looking into the present day needs of effective communication in every field, it is imperative to develop necessary competencies in students by giving practical tips and emphasis on grammar, vocabulary and its usage in addition to practical exercises. The teacher should give report writing assignments, projects etc. while teaching this subject.

LIST OF RECOMMENDED BOOKS

1. Communicating Effectively in English, Book-I by Revathi Srinivas; Abhishek Publications, Chandigarh.
2. High School English Grammar and Composition by Wren & Martin; S. Chand & Company Ltd., New Delhi.
3. Communication Techniques and Skills by R. K. Chadha; Dhanpat Rai Publications, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	25
2	12	25
3	10	20
4	14	30
Total	48	100

1.2 ARCHITECTURAL DRAWING – I

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RATIONALE

Architectural Drawing forms a core subject for preparing scale drawings, three dimensional views, furniture drawings and layouts.

Teachers are expected to lay considerable stress on practical work so that students attain sufficient skills in lettering, printing and desired competencies for preparing good quality architectural drawings.

Teachers are also expected to stress upon appropriate line work, dimensioning and lettering.

DETAILED CONTENTS

1. Introduction and relevance (need and importance) of the architectural drawing
2. Introduction to the Studio Environment

- i) Basics of drafting instruments, starting off
- ii) Basics of stationery (Pencils, sharpening, types of sheets, erasers, cutter etc.)
- iii) Demonstration by the teacher on holding pencils, fixing parallel bar and handling other tools and equipment used in Architectural Drawing

(Demonstration sheet to be put up for better understanding)

3. Line Work (5 sheets)

Basic line work, with different pencil thickness & intensities H, HB, 2B, 4B, 6B

- i) Horizontal lines
- ii) Vertical lines
- iii) Grid
- iv) Diagonal lines
- v) Composition, pattern making in line work

(Using different grades of pencils to understand the tonal variation)

4. Lettering using different pencils & pens, stencils (4 sheets)

Different styles, heights & intensities

5. Introduction to Scale (1 sheet)

Use of the modular scale - both metric system and FPS

6. Geometric Shapes (Plan, elevation etc) (2 sheets)
 - i) Simple geometric (cubes, cylinder, cones etc)
 - ii) Complex (fusion of the basic shapes)

(Incorporating the use of scale both feet & metric)
7. Orthographic Projections (Introduction to Planes) (2 sheets)
 - i) Protection of points
 - ii) Projections of lines
 - iii) Projection of solids

Total Number of minimum sheets is = 14

INSTRUCTIONAL STRATEGY

This subject is one of the most important, fundamental and practical subject for diploma in Architectural Assistantship. Teachers should lay emphasis on practical work by the students and give repetitive exercises in free hand sketching, colouring and rendering like sketching, shades and shadows, lettering, printing forms and other important component of architecture. Teachers should lay stress upon perfect line work, properties, dimensioning, lettering and printing by the students in the classroom. Students should maintain portfolio of the work done by them throughout the session. Viva voce examination may be conducted by the teacher on completion of each assignment

RECOMMENDED BOOKS

1. Engineering Drawing by N.D. Bhatt; Publisher Charotar Publishing House Pvt. Ltd., New Delhi
2. Engineering Drawing by G.S. Virdhi; Khanna Publisher, New Delhi
3. Building Construction by Sikka; Publisher Tata McGraw Hill Publisher, New Delhi
4. Time Saver Standard for landscape architecture: Design and construction by Charles W.Harris Published by Mc Graw-Hills Publishers, New Delhi
5. Time Saver Standards for Building Types by Joseph De Chiara and John Callendera Published by Mc Graw Hill, New Delhi
6. Rendering with Pencil and Ink by Gill Robert W., Published by Thomas and Hudson, New Delhi
7. Architects Data by Neufert, Published by Oxford BSP Professional Books, New Delhi

1.3 FREE HAND SKETCHING

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RATIONALE

Free hand sketching plays very important role to inculcate interest among the students in the field of drawing. It also helps in developing the skills required for preparing various types of drawings and design. Considerable emphasis on outdoor sketching should be given to attain the required skills in the subject.

DETAILED CONTENTS

Free Hand Sketching Exercises in pencil only:

1. Free-hand line exercises of different types of lines (horizontal, vertical, diagonal grid (1 Sheet)
2. Free hand sketching of two-dimensional geometrical figures. (Square, circle, Triangles and Ellipses etc.) (2 Sheets)
3. Free hand sketching of three – dimensional geometrical objects. (Cube, Cones, Prisms, Pyramids, Spheres Cylinders etc).(2 Sheets)
4. Introduction & study of anthropometrics (2 sheets)
5. Free hand sketching of human figures, trees furniture and vehicles etc One in-door & One out-doors exercise. (2 Sheets)
6. Free hand sketching of small buildings with shade and shadow sheets. (2 Sheets)
7. Free-hand sketching of buildings with trees, human figures, sky, clouds and birds and other land-scape elements, using various mediums like pencil, ink and colours (water colours and pencil colours etc)
8. Free-hand sketches of various scenes such as railway-station, parking places, bus stand, market scene, village scene etc.

Note: Students are also required to maintain sketchbooks for outdoor sketching.

INSTRUCTIONAL STRATEGY

This subject is one of the most important, fundamental and practical subject for diploma in Architectural Assistantship. Teachers should lay emphasis on practical work by the students and give repetitive exercises in free hand sketching, colouring and rendering like sketching, shades and shadows, lettering, printing forms and other important component of architecture. Teachers should lay stress upon perfect line work, properties, dimensioning, lettering and printing by the students in the classroom. Students should maintain portfolio of the work done by them throughout the session. Viva voce examination may be conducted by the teacher on completion of each assignment

RECOMMENDED BOOKS

1. Time Saver Standard for landscape architecture: Design and construction by Charles W.Harris Published by Mc Graw-Hills Publishers, New Delhi
2. Time Saver Standards for Building Types by Joseph De Chiara and John Callendera Published by Mc Graw Hill, New Delhi
3. Rendering with Pencil and Ink by Gill Robert W., Published by Thomas and Hudson, New Delhi
4. Architects Data by Neufert, Published by Oxford BSP Professional Books, New Delhi

5. 1.4 THEORY OF DESIGN

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RATIONALE

Students of diploma in Architecture Assistantship are supposed to have the knowledge about the basic elements and the principles of design and other related elements to develop skills for designing the various types of buildings. Teachers while imparting instructions/giving assignments are also expected to show various types of design of small buildings for the better application of the subject.

DETAILED CONTENTS

Definition, examples and applications of the following:

1. Primary Elements of Design (6 hrs)
 - 1.1 Point
 - 1.2 Line
 - 1.3 Figure
 - 1.4 Plane
 - 1.5 Volume
2. Design Elements (8 hrs)
 - 2.1 Line
 - 2.2 Form
 - 2.3 Space
 - 2.4 Colour
 - 2.5 Mass
3. Principles of Design (10 hrs)
 - 3.1 Harmony
 - 3.2 Balance
 - 3.3 Rhythm
 - 3.4 Texture
 - 3.5 Contrast
 - 3.6 Monotony
 - 3.7 Unity
 - 3.8 Scale
 - 3.9 Proportion
4. Relationship of form and functions (8 hrs)
5. Relationship of Aesthetics and utility (8 hrs)
6. Colours (8 hrs)
 - 6.1 Colour chart showing primary, secondary and tertiary colours
 - 6.2 Warm and cool colours
 - 6.3 Receding and Advancing colours
 - 6.4 Psychological effects of colours
 - 6.5 Effects of colours on building (interior and exterior)

Note: Teachers are required to supplement the teaching process through demonstration of the existing buildings.

INSTRUCTIONAL STRATEGY

This is one of the most important practical oriented subject for diploma in architectural assistantship. While imparting instruction, special visits may be arranged to demonstrate and explain important architectural features of different types of residential, commercial and public buildings. Practicing architects may be invited from time to time to present case studies and to deliver expert lectures on important elements like form, function, balance, light of shadow, shape, plane, volume, line, rythem, proportions, textures and other such element appropriate to various designs. Teacher may present some of the already completed design works of practicing architects to the students and explain the important features and elements. Audio-visual material available in this field may be procured and presented to the students from time to time. Students should be encouraged to visit relevant web-sites and teachers should develop the design problems/assignments which can be taken up by the students using relevant and appropriate software. Students should be given group and independent design/drawing assignments and they should also maintain sketch book/portfolio of all the assignments given to them throughout the session. Teachers may conduct viva-voce on completion of each assignment. Students may present seminars towards the end of the session.

RECOMMENDED BOOKS

1. Time Saver Standards for Building Types by Joseph De Chiara and John Callendera
2. Architects Data by Neufert
3. Space, Time and Order by DK Ching
4. Architectural Aesthetics by Sangeet Sharma, Abhishek Publication, 57-59, Sector 17, Chandigarh

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	12
2	08	16
3	10	22
4	08	16
5	08	18
6	08	16
Total	48	100

1.5 BUILDING MATERIALS - I

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5 - -

RATIONALE

Diploma holders in Architectural Assistantship are supposed to prepare working drawings of buildings. Knowledge of building materials is very essential from the point of construction for providing detailed specifications in the working drawings. Therefore, the course in building materials includes imparting basic knowledge in the properties and use of the basic materials like: stones, bricks, lime, cement, paints, timber, exterior and interior finishes, glass, plastics, building hardware, roofing materials, additives and admixtures, adhesives etc.

Teachers are expected to demonstrate the samples of different materials, discuss their properties with particular reference to their use and appearance in particular situations depending upon climate and environmental conditions of the site, where the materials are to be used. Students should be encouraged to collect samples of various materials and efforts should be made to maintain a good building material museum.

NOTE

The students are also expected to refer to Architecture Journals like inside – Outside, Interiors today, Design and Interiors, Architect and builder, Builders Friend etc. They should make scrapbook of relevant brochures.

DETAILED CONTENTS

- | | | |
|------|---|---------|
| 1. | Building Stones | (6 hrs) |
| 1.1 | Utility of stones | |
| 1.2 | Classification of rocks | |
| 1.3 | Characteristics of good building stones | |
| 1.4 | Testing of stones | |
| 1.5 | Natural bed of stones | |
| 1.6 | Common building stones | |
| 1.7 | Prevailing market rates and sizes | |
| 1.8 | Transportation costs | |
| 1.9 | Standard measurements in the carriage transport | |
| 1.10 | Storage systems/stacking system | |

- 2 Bricks (8 Hrs)
- 2.1 Classification of bricks – properties and uses of first class, second-class, third class and over burnt bricks.
 - 2.2 Characteristics of good brick
 - 2.3 Size and weight of a standard brick and commonly available brick
 - 2.4 Composition of brick earth
 - 2.5 Test for burnt clay bricks – Compressive strength test, water absorption test and Efflorescence Test
 - 2.6 Fire bricks, its properties, uses and availability
 - 2.7 Availability of various types of bricks in the market e.g. machine made bricks, handmade firebricks.
 - 2.8 Transportation cost with different modes of transportation and staking of bricks on the site
 - 2.9 Brick Tiles
- 3 Lime (4 Hrs)
- 3.1 Uses of lime requirements with respect to its use as mortar since ancient times; structural strength and economics; classification of lime.
 - 3.2 Setting action of fat lime and hydraulic lime
 - 3.3 Storing of lime
 - 3.4 Present day use of lime, its strength and curing segments with respect to its use as mortar since ancient times; structural strength and economics
- 4 Cement (6 Hrs)
- 4.1 Uses of cement
 - 4.2 Composition of Portland cement
 - 4.3 Setting and hardening of cement
 - 4.4 Types of cement, their properties and uses
 - 4.5 Storage of cement – transportation and carriage capacities

5. Aggregates (types, uses and transportation) (2 hrs)
 - 5.1 Course Aggregates
 - 5.2 Fine Aggregates
6. Mortar (4 hrs)
 - 6.1 Different types of sand and other Pozzolona material
 - 6.2 Functions of Mortar
 - 6.3 Preparation of cement mortar, lime mortar, lime cement mortar and their uses.
 - 6.4 Proportion of mortar for different building works
7. Concrete (8 hrs)
 - 7.1 Definition of concrete, workability of concrete
 - 7.2 Water - Cement Ratio
 - 7.3 Compaction of concrete
 - 7.4 Curing of concrete
 - 7.5 Mixing, placing and uses of lime concrete and cement concrete, aggregate and its grading including Flyash and cement concrete
 - 7.6 Reinforced cement concrete (RCC), M15, M20
 - 7.7 Necessity of providing reinforcement
 - 7.8 Properties of RCC
 - 7.9 Handling on site, quality and quantity checking/testing and taking measurement
 - 7.10 Introduction to Ready Mix Concrete (RMC), Self-compacting concrete and Light-weight concrete.
- 8 Timber (8 hrs)
 - 8.1 Characteristics and uses of common Indian timbers i.e. Sal, Deodar, Kali, Tali, Chir, and Teak etc.
 - 8.2 Characteristics of hard wood and soft wood
 - 8.3 Defects in timber
 - 8.4 Characteristics of good timber
 - 8.5 Different methods of seasoning of timber
 - 8.6 Preservation of timber/preservative materials for timber
 - 8.7 Availability of different types of timber and their comparative market prices.

9. Plastics (4 hrs)
- 9.1 Natural (Shellac, casein and cellulose) and synthetic plastics
- 9.2 Thermosetting and thermoplastics and their uses
- 9.3 Plastics used as materials in building, industry e.g. flooring, roofing, wall paneling, pipes, doors etc
10. Alloys and Metals (6 hrs)
- Ferrous and non-ferrous metals (Aluminum, copper, lead, zinc, tin etc) their uses and applications in buildings.
11. Glass (8 hrs)
- Types, thickness, various uses in building. Basic characteristics visual and physical. Availability, sizes, usage, measurements systems and market prices transportation cost application in the construction industry.
- Sheet glass
 - Wired glass
 - Laminated safety glass
 - Plate glass
 - Insulating glass
 - Obscured glass
 - Coloured glass
 - Tinted glass
 - Heat absorbing glass
 - Glass blocks
 - Float glass
 - Toughened glass
 - Structural glazing
 - Etched glass
 - Stained glass
 - Mirrors
 - E-glass
12. Building hardware (sizes, applications) (8 hrs)
- Note:** Teacher may show these items to the students in material museum maintained by the department/market survey.
- Tower bolts
 - Hinges including concealed hinges
 - Door Handles
 - Door springs
 - Latches
 - Floor door stopper/floor springs and magnetic types stoppers
 - Fan light pivots
 - Mortice lock

- Door closer – including hydraulic types
- Ventilator chains
- Wire gauze
- Magnetic cupboard closers

13. Paints and Varnishes, Drying Oil, Pigment, Drier, Thinner (8 hrs)

Packing sizes, rates, brands, performance guarantees as given by the manufacturer and collection of catalogues and their covering capacity, uses and availability of paints and varnishes.

- Water based paints
- Distempers
- Oil based paints and emulsions
- Cement paints
- Acrylic emulsions
- Melamine finishes
- Varnishes
- Spirit polish, wax polish
- Lacquers
- Stucco
- Tar and Bitumen paint
- Glazing putty

INSTRUCTIONAL STRATEGY

This is one of the fundamental subject covering basic building construction and finishing materials. Teachers should demonstrate samples of various materials while imparting classroom instruction. Teachers may also arrange some field visits to manufacturing/ production units and retailer shops like cement, kilns, timber saw mills and seasoning plants, hardware shops, glass houses etc. Students should be encouraged to collect samples of various materials and catalogues of manufacturer. The students may maintain a scrapbook for this purpose. A museum of building construction, materials may be developed where samples of latest materials their specifications, characteristics, rates, manufacturer (supplier and relevant codes may be kept) to enhance the level of understanding of the students

RECOMMENDED BOOKS

- 1) Sharma, SK; and Mathur, GC; "Engineering Materials;" Delhi-Jalandhar, S. Chand and Co.
- 2) Surendra Singh; "Engineering Materials;" New Delhi, Vikas Publishing House Pvt. Ltd.
- 3) Choudhary, N; "Engineering Materials;" Calcutta, Technical Publishers of India.

- 4) Bahl, SK; "Engineering Materials;" Delhi Rainbow Book Co. New Delhi
- 5) TTTI, Chandigarh "Civil Engineering Materials:" Tata McGraw Hill Publication, New Delhi
- 6) Kulkarni, GJ; "Engineering Materials;" Ahmedabad, Ahmedabad Book Depot.
- 7) Shahane; Engineering Materials; Poona, Allied Book Stall.
- 8) Gurcharan Singh; Engineering Materials, Standard Publishers Distributors, New Delhi
- 9) A course in Civil Engineering by VB Sikka, published by SK Kataria and Sons Publishers, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	08
2	08	10
3	04	06
4	06	08
5	02	04
6	04	04
7	08	10
8	08	10
9	04	06
10	06	08
11	08	10
12	08	08
13	08	08
Total	80	100

1.6 MODEL MAKING

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RATIONALE

Students of Architectural Assistantship at diploma level are expected to assist in the preparation of architectural models of various kinds in their professional career. This skill can also form a basis of self-employment. Architecture models as three-dimensional representations are made in different mediums. The students should be acquainted with all of these mediums/materials

DETAILED CONTENTS

1. Introduction and Demonstration of model making materials and techniques.
2. Block models of basic geometrical shapes like prisms, pyramids, cubes, cylinders etc., using the following materials:
 - 2.1 Hand made and ivory sheet (1 Exercise)
 - 2.2 Thermo coal (1 Exercise)
 - 2.3 Mount Board/Sun Board/Balsa Wood strips (1 Exercise)
3. Composition of various geometrical shapes in different materials. (2 Exercises)
4. Sculpture Making (2 Exercises in all)
 - 4.1 Thermocol (Styropor)
 - 4.2 Mount Board/ sun board/Balsa wood strips
 - 4.3 Clay modeling
 - 4.4 Miscellaneous materials such as copper wire, board, toothpicks, broken ceramics, leather etc.
5. Introduction to carpentry (1 Exercise)
 - 5.1 Introduction and Demonstration of materials, tools, machines and techniques such as sawing, chiseling and planning etc.
 - 5.2 Demonstration of preparation of joints such as lap joint, tongue and groove, dove fail, mortise and tenon joint.
 - 5.3 Exercise in joint preparation under close supervision
6. Brick Masonary (1 Exercise)

Laying of bricks in different bonds

Total Number of Exercise: 10

7. Painting and Polishing

(1 Exercise)

Introduction regarding painting tools and equipments used for preparation of different colours surfaces

Exercise in

- Surface preparation before painting (steel and wood)
- Application of primer coat
- Painting wooden & Steel Items
- Spray Painting wooden & metal items
- Writing practice of lettering for name plate & sign boards

INSTRUCTIONAL STRATEGY

This is a practical oriented subject. Teacher should arrange visits to some of Model rooms of important buildings. Each student should be given independent exercises to make models. Teacher may procure some models of some residential, group housing commercial and public buildings made from different materials and demonstrate to the students

Note: Institute must develop a construction yard where students can use the building materials and make the various brick bonds under the supervision of a teacher. The construction yard can also be used during building construction classes.

1.7 APPLIED SCIENCES AND MATHEMATICS

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7 - -

RATIONALE

Applied Sciences and Mathematics are very essential to develop scientific temper, continued learning skills and appreciation of physical and chemical changes of concern in the field of Architecture. It is basic to all engineering and technology programmes to develop analytical approach and cognitive abilities in the students so that they are trained to make exact calculations, may be angular, areas and volumes and calculations of quantities of different items of building works. This course is also helpful in developing continued learning skills in the students. The course contains the knowledge of Algebra, mensuration, trigonometry, differential and integral calculus. This course also covers elements of Applied Physics and Applied Chemistry. Applied Physics contains units of measurements, force and motion, temperature and its measurement, Accoustics of buildings and fundamentals of light. Applied Chemistry part covers: metals, corrosion and its prevention, plastics, refractory and paints and varnishes.

Teachers while imparting instructions are expected to demonstrate various physical and chemical processes to clarify the concepts and principles involved in the course. They will also include examples of application of Mathematics as applied to engineering/ technology and architectural fields. The teachers should lay more stress on basic fundamentals and applications of applied sciences and mathematics by providing considerable amount of practice in problem-solving.

DETAILED CONTENTS

PART- I (APPLIED PHYSICS)

1. Units of measurement in SI system. Dimensions and use of dimensional analysis (2 hrs)
2. Force and motion (6 hrs)
Newton's laws Conservation of momentum; work and energy forms of energy and conservation of energy; stress, strain, elastic moduli.
3. Spring mass system (6 hrs)
Vibration of bodies; amplitude, frequency and energy of vibrations; free and forced vibrations, resonance, vibration of structural members

4. Temperature and its measurement (4 hrs)
Liquid in glass thermometer, Bimetallic thermometer, Thermo-electric thermometer. Platinum resistance thermometer, pyrometers
5. Expansion of solids (6 hrs)
Thermal stresses; specific heat and heat capacity and concept of thermal time lag in buildings; laws of thermodynamics; Principles of heat engines and refrigeration and air conditioning systems; Humidity and its control.
6. Acoustics (6 hrs)
Acoustic of buildings and simple calculation of reverberation times; principles of acoustic modeling, sources of sound
7. Light as waves, solar energy, solar cells and green house effects; colour: primary colours, colour mixing. (6 hrs)
Radiant light flux, luminar intensity, illumination; light efficiencies; Standards of illumination.
8. Electrical nature of matter; molecular forces - cohesive and adhesive forces; application to water proofing and wetting. (6 hrs)

PART- II (APPLIED CHEMISTRY)

9. Raw materials and admixtures used in the manufacture of copper, aluminum, iron and steel. Manufacturing processes to be dealt in brief with flow diagrams. (6 hrs)
10. Properties and uses of copper, aluminium, iron and steel. Corrosion: Meaning of corrosion, Prevention of corrosion by various methods. (6 hrs)
11. Plastics (10 hrs)
Review of saturated and unsaturated hydrocarbons (Methane, ethane, Ethylene Acetylene and Vinyl chloride etc) Condensation and polymerization. Thermosetting and thermo plastics. Cold setting and hot setting. Emphasis should be given to name of common varieties of plastics and their uses. Adhesives and epoxy resins.
12. Refractories: Meaning of refractory material: General methods of Manufacture of (4 hrs)
- a) Acid refractories
 - b) Basic refractories

PART- III (APPLIED MATHEMATICS)

13. ALGEBRA (6 hrs)

Logarithms, laws of logarithms (without proof), use of logarithms to solve problems of engineering nature.

Solution of three linear simultaneous equations by elimination. Binomial Theorem (without proof) for positive integral index (expansion and general term), binomial theorem (without proof) for any index (expansion only).

14. MENSURATION (14 hrs)

14.1 Mensuration of Plane figures:

Definition: Units of Measurement, Definition and formulae of perimeter and area etc. in connection with plane figures: rectangle, square, triangle, quadrilateral rhombus, trapezium (trapezoid), polygon, circle, irregular figures (trapezoidal Rule and Simpson's Rule) (simple problems)

14.2 Mensuration of Solids: Definition: Units: Volume: surface, including curved surface area and lateral surfaces areas of solids: Rectangular or parallelepiped, Cubes, Cuboids, Prisms, Cylinders and Hollow Cylinder, Pyramid, Frustum of right circular cone, sphere (simple problems)

15. TRIGNOMETRY (12 hrs)

Measurement of angles in degrees and radians and their conversions. Trigonometric ratios and their relations. Allied angles (without proof). Trigonometric tables and their use, trigonometric ratios of angles between 0 degree and 360 degrees, sum difference formulae and their applications (without proof). Ratio of multiple and sub-multiple angles ($2A$, $3A$, $A/2$). Product formulae, statements of cosine rule, sine rule, Napier's analogy, solution of triangles (simple cases, excluding ambiguous case), simple problems on heights and distances.

16. DIFFERENTIAL CALCULUS (6 hrs)

Meaning and scope of differentiation. Graphical differentiation concept of limits. Differentiation of x^n , $\sin x$, $\cos x$, $\tan x$, $\log_a x$, $\log_e x$, e^x . Differentiation of sum, product and quotient of functions. Differentiation of function of a function.

17. INTEGRAL CALCULUS (6 hrs)

Integration as inverse operation of differentiation. Graphical integration. Simple integration by substitution, by parts and by partial fractions.

Evaluation of definite integrals (simple problems). Applications such as area

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on fundamentals of Sciences and Mathematics, with their relevance and applications in engineering and technology.

RECOMMENDED BOOKS

1. Applied Physics Vol. I, TTTI Publication Tata McGraw Hill, New Delhi
2. Basic Applied Physics by RK Gaur; Dhanpat Rai Publications, New Delhi
3. Simple Course in Electricity and Magnetism by CL Arora; S Chand and Co, New Delhi
4. Physics Laboratory Manual by PK Palanisamy, Scitech Publications India, New Delhi
5. Concepts in Physics by HC Verma; Bharti Bhawan Ltd., New Delhi
6. "A Text Book of Applied Chemistry-I" by Sharma and Others; Technical Bureau of India, Jalandhar
7. Progressive Applied Chemistry –I and II by Dr. G.H. Hugar; Eagle Prakashan, Jalandhar
8. Applied Mathematics Vol. I by SS Sabharwal and Others by Eagle Prakashan, Jalandhar
9. Engineering Mathematics Vol. I by Ishan Publishing House
10. Engineering Mathematics Vol. I by S Kohli and Others; IPH, Jalandhar
11. Higher Engineering Mathematics by BS Grewal; Khanna Publishers, Delhi
12. Engineering Mathematics by C Dass Chawla; Asian Publishers, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	02
2	06	06
3	06	04
4	04	04
5	06	04
6	06	06
7	06	06
8	06	04
9	06	08
10	06	08
11	10	10
12	04	04
13	06	04
14	14	10
15	12	10
16	06	06
17	06	04
Total	112	100