

FIRST YEAR (Architectural Assistantship)

Sr. No.	SUBJECTS	STUDY SCHEME HOURS / WEEK			CREDIT	MARKS IN EVALUATION SCHEME									Total Marks of Internal & External
		L	T	P		INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT						
						Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot		
1.1	English	2	-	2	6	40	25	65	60	3	50	3	110	175	
1.2	Architectural Drawing-I	-	-	4	4	-	50	50	-	-	100	3	100	150	
1.3	Sketching and Model Making	-	-	4	4	-	50	50	-	-	100	3	100	150	
1.4	Architectural Design-I	-	-	6	6	-	50	50	-	-	100	3	100	150	
1.5	Building Materials	3	-	-	6	40	-	40	60	3	-	-	60	100	
1.6	Environmental Studies	2	-	1	5	40	25	65	60	3	50	3	110	175	
1.7	Applied Science and Mathematics	3	-	-	6	40	-	40	60	3	-	-	60	100	
1.8*	Information Technology	-	-	2	2	-	50	50	-	-	50	3	50	100	
1.9	Building Construction-I	-	-	4	4	-	50	50	-	-	100	3	100	150	
#	Student Centered Activities(SCA)	-	-	2	2	-	25	25	-	-	-	-	-	25	
Total		10	-	25	45	160	325	485	240	-	550	-	790	1275	

*Common with other diploma programmes

SCA will comprise of co-curricular activities like extension lectures, games, hobby clubs, seminars, declamation

contests, educational field visits, N.C.C., N.S.S., Cultural Activities and Disaster management etc.

1.1 ENGLISH

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2 - 2

RATIONALE

Knowledge of English Language plays an important role in career development. This subject aims at introducing basic concepts of communication besides laying emphasis on developing listening, speaking, reading and writing skills as parts of Communication Skill.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

1. Understand the importance of good communication
2. Describe process of communication.
3. Identify and match the parts of speech
4. Rewrite sentences correctly
5. Modify sentences and relate them with real life situations.
6. Reproduce and match words and sentences in a paragraph.
7. Re-write the sentences according to given situation.
8. Relate and use various words using proper vocabulary and grammar.
9. Write the various types of paragraphs, notices, memos, email writing & resume writing.

DETAILED CONTENTS

1. **Basics of Communication** (06 Hrs)
 - 1.1. Definition and process of communication
2. **Functional Grammar** (22 Hrs)
 - 2.1. Noun and Pronoun
 - 2.2. Preposition
 - 2.3. Tenses (verb (Main verb and Auxiliary verb)
3. **Reading Skills** (12 Hrs)
 - 3.1. Unseen passage for comprehension. Based upon the passage, flowing aspects may be covered

- Questions from the passage
- One-word substitution
- Prefixes and Suffixes
- Antonyms and Synonyms etc.

4. Writing skills

(30 Hrs)

- 4.1. Correspondence – Business and official
- 4.2. Notice, including Press Releases
- 4.3. Memos
- 4.4. Resume Writing
- 4.5. Writing E-mail
- 4.6. Paragraph writing

LIST OF PRACTICALS

1. Self and Peer Introduction
2. Situational Conversations: Offering - Responding to offers; Requesting – Responding to requests; Congratulating; Expressing sympathy and condolence; Apologizing and Forgiving; Complaining; Warning; Asking and giving information; Getting and giving permission
3. Newspaper reading
4. Mock Interviews: Telephonic and Personal

INSTRUCTIONAL STRATEGY

Student should be encouraged to participate in role play and other student centered activities in class room and actively participate in listening exercises

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual practical work, exercises and viva-voce
- Presentation and viva-voce

RECOMMENDED BOOKS

1. Communicating Effectively in English, Book-I by Revathi Srinivas; Abhishek Publications, Chandigarh.
2. Communication Techniques and Skills by R. K. Chadha; Dhanpat Rai Publications, New Delhi.
3. High School English Grammar and Composition by Wren & Martin; S.Chand & Company Ltd., Delhi.
4. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Section	Percentage of syllabus to be covered	Units to be covered	Type of assessment	Weightage of Marks	Pass Percentage
A	20%	Unit 1.1, 2.1	1 st Internal	40%	40% (Combined in internal & final assessment) with minimum 25% marks in final assessment)
B	20%	Unit 2.2, 2.3, 4.1	2 nd Internal		
C	60%	Unit 3.1, 4.2, 4.3, 4.4, 4.5, 4.6	FINAL	60%	

1.2 ARCHITECTURAL DRAWING – I

L T P
- - 4

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 (4 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 (3 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) Projection of points
 - ii) Projections of lines
 - iii) Projection of solids

8. Reviewing orthographic projections (plans, line projections, solids) (1 sheet)

9. Section of Solids (3 sheets)
 Simple geometrical shapes e.g. cube: Elementary building sections highlighting line intensities for sectional and elevational components. (Example: parapet, chajjas in section and elevation behind)

10. Development of surface (1 sheet)
 Development with an aim to calculate areas if required

11. Isometric Views (2 sheets)
 Conversion of 2D geometrical shapes into 3D isometric views (30° – 30° , 30° – 60°) to realize the potential of each from simple to complex solid to basic building forms

12. Axonometric Views (3 sheets)
 Conversion of 2D geometrical shapes into 3D axonometric views at different angles (45° – 45°) to realize the potential of each from simple to complex solid to basic building forms. Isometric/axonometric use of any building form, from a given base plan – to be developed as per the student's imagination of the exterior/interior components (with roads, landscape elements)

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 SKETCHING & MODEL MAKING

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- - 4

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. 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

Free Hand Sketching Exercises in pencil only:

1. Free-hand line exercises of different types of lines (horizontal, vertical, diagonal grid (1 Sheets)
2. Free hand sketching of two-dimensional geometrical figures. (Square, circle, Triangles and Ellipses etc.) (1 Sheets)
3. Free hand sketching of three – dimensional geometrical objects. (Cube, Cones, Prisms, Pyramids, Spheres Cylinders etc). (1 Sheets)
4. Introduction & study of anthropometrics (1 Sheets)
5. Free hand sketching of human figures, trees furniture and vehicles etc One in - door . (2 Sheets)
6. Free hand sketching of small buildings with shade and shadow sheets. (1 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 etc.
9. Introduction and Demonstration of model making materials and techniques.
10. Block models of basic geometrical shapes like prisms, pyramids, cubes, cylinders etc., using the following materials:
 - Thermo coal (1 Exercise)
 - Mount Board/Sun Board/Balsa Wood strips (1 Exercise)
11. Composition of various geometrical shapes in different materials (1Exercises)
12. Sculpture Making (2 Exercises in all)
 - 12.1 Thermocol (Styropor)
 - 12.2 sun board
 - 12.3 Clay modeling
 - 12.4 Miscellaneous materials such as wire, board,

copper

icks,

13. Introduction to carpentry (1 Exercise)

Introduction and Demonstration of materials, tools, machines and techniques such as sawing, chiseling and planing etc.

Exercise in joint preparation under close supervision

14. Brick Masonary (1 Exercise)

Laying of bricks in different bonds

15. 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)

Total Number of Exercise: 08

Note: Students are also required to maintain sketchbooks for outdoor sketch

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 Thomos and Hudson, New Delhi
4. Architects Data by Neufert, Published by Oxford BSP Professional Books, New Delhi

1.4 ARCHITECTURAL DESIGN-I

L T P
- - 6

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.

Teachers while imparting instructions/giving assignments to students are expecting to teach various elements of design like form function, balance, light of shadow, shape, plane, volume, line, rhythm, proportions, textures and other such related elements. Teachers are also expected to show various types of designs of small building to develop and appreciation for this subject.

Teachers should also motivate students to maintain sketch book/portfolio of all the assignments given to the students.

DETAILED CONTENTS

Definition, examples and applications of the following:

1. Primary Elements of Design
 - 1.1 Point
 - 1.2 Line
 - 1.3 Figure
 - 1.4 Plane
 - 1.5 Volume

2. Design Elements (2 sheets)
 - 2.1 Form
 - 2.2 Space
 - 2.3 Colour

3. Principles of Design (2sheets)
 - 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
5. Relationship of Aesthetics and utility
6. Colours (4sheets)
 - 6.1 Colour chart showing primary, secondary and tertiary colours
 - 6.2 Warm and cool colours
 - 6.3 Psychological effects of colours
 - 6.4 Effects of colours on building (interior and exterior)
7. The subject includes the elements of Anthropometrics with respect to: (3sheets)
 - 7.1 Human body
 - 7.2 Furniture and fitting (standards)
 - 7.3 Vehicles (all angles movement, parking, turning, sizes etc)
 - 7.4 Street furniture
8. Proportion of Components of Human Body (1 sheet)
The proportions of the different components of the human body; Examples from Le Corbusier Modular Man, Vitruvius Marco Pollione, Vastu Pursha Mandala
9. Human Activities (2 sheets)
Requirement of space (2-D, 3-D) for various human activities (Single and multiple use of spaces such as queues etc.)
10. Furniture Standards (1sheets)
Furniture standards (sizes of domestic and public furniture); Toilet and Kitchen equipment - sizes and standards; Doors and windows - sizes, standards and locations.
11. Vehicles (1 sheet)
Vehicles in motion, parking along with turning radii for two-wheelers, cars etc. Standard road width.
12. Street furniture (2sheets)
Standards for drinking fountains, waiting queues at bus stops, garden seats, waste bins, telephone booths, public walkways etc.
13. Graphic Representation of plant material (ground cover, foliage, shrubs, trees) human figures and vehicles. (1sheets)

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

Note: Minimum of 15 sheets should be made.

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

1.5 BUILDING MATERIALS

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3 - -

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 Natural bed of stones
 - 1.5 Common building stones
 - 1.6 Storage systems/stacking system

2. Bricks (8 Hrs)
 - 2.1 Classification of bricks – properties and uses of first class, second- class, third class.
 - 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 Fire bricks, its properties, uses and availability
 - 2.6 Availability of various types of bricks in the market e.g. machine made bricks, handmade firebricks.

- 2.7 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 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 Types of cement, their properties and uses
 - 4.4 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 Properties of RCC
 - 7.8 Introduction to Ready Mix Concrete (RMC), Self-comparing 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 (2 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, etc

10. Alloys and Metals (2 hrs)

Ferrous and non-ferrous metals (Aluminum, copper, lead, zinc, tin etc) their Uses.

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.

- Wired glass
- Laminated safety glass
- Insulating glass
- Coloured glass
- Tinted glass
- Heat absorbing glass
- Glass blocks
- Toughened glass
- Structural glazing
- Stained glass
- Mirrors
- E-glass

12. Paints and Varnishes, Drying Oil, Pigment, Drier, Thinner , Adhesives Synthetic resins (their trade names, uses of synthetic resins, costs, application in various situations as compared to traditional materials and methods . Packing sizes, as given by the manufacturer and collection of catalogues and their covering capacity, uses and availability of paints and

varnishes. (8hrs)

- Water based paints
- Distempers
- Oil based paints and emulsions
- Cement paints
- Acrylic emulsions
- Varnishes
- Spirit polish, wax polish
- Stucco
- Tar and Bitumen paint

13. Floor Finishes (Laying sizes, availability, popular brand names, quality of polish, uses and current market rates) (6 hrs)

- Terrazzo Tiles and Flooring
- Glazed terracotta
- Cement Concrete Tiles
- Marble stone, Kota stone, slate, red sand stone, granite – their tiles and slabs
- PVC
- Heavy duty flooring for industrial building

14. Wall Finishes (along with application method) (6 hrs)

- Wall board homogeneous
- Laminated fiber boards – types
- Plastic wall tiles – tiles available
- Wall papers
- Thermocol
- Foam rubber tiles and rolls
- Textured paint finishes

15. Ceiling Materials (Size, quality, their availability, types of finishes, uses, trade names, market rate and application methods. (8 hrs)

- Hession cloth
- Gypsum plaster boards plaster of Paris board
- Plain AC sheets – E board etc.
- Plywood
- Fibre Boards
- Asbestos tiles
- Medium density fibre board (MDF)

16. Roofing Materials (8 hrs)
- Asbestos sheets
 - GI sheets
 - Ferro-cement sheets
 - Fibre sheets
 - Corrugated PVC sheets
- Their standard sizes, uses, availability, prices and knowledge about supporting system
17. Additives and Admixtures (3 hrs)
- Water repellants and water proofing agents
 - Accelerators
 - Hardeners
 - Fly ash
- Their availability, uses, costs, performance specifications, and properties used under various conditions.
18. Kitchen and Toilet Fixtures (8hrs)
- Market survey of various materials and collection of data, sizes, etc. (Specifications of kitchen and toilet fittings and fixtures, their popular brand names, shapes and sizes)

Note:

Sizes, specifications and availability of sanitary fittings e.g. W.C/ Cisterns/Urinals/Wash basins/Kitchen sinks, related accessories their types, brands and costs.

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

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A	20%	Unit 1 to 5	1 st Internal	40%	40%(Combined in internal & final assessment) with minimum 25% marks in final assessment)
B	20%	Unit 6 to 10	2 nd Internal		
C	60%	Unit 11 to 18	FINAL	60%	

1.6 ENVIRONMENTAL STUDIES

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2 - 1

RATIONALE

A diploma holder must have knowledge of different types of pollution caused due to industries and constructional activities so that he may help in balancing the ecosystem and controlling pollution by various control measures. He should also be aware of environmental laws related to the control of pollution. He should know how to manage the waste. Energy conservation is the need of hour. He should know the concept of energy management and its conservation.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

1. Comprehend the importance of ecosystem and sustainable development
2. Demonstrate interdisciplinary nature of environmental issues
3. Identify different types of environmental pollution and control measures.
4. Take corrective measures for the abatement of pollution.
5. Explain environmental legislation acts.
6. Demonstrate positive attitude towards judicious use of energy and environmental protection
7. Practice energy efficient techniques in day-to-day life and industrial processes.
8. Adopt cleaner productive technologies
9. Identify the role of non-conventional energy resources in environmental protection.
10. Analyze the impact of human activities on the environment

DETAILED CONTENTS

1. Introduction (4 hrs.)

Basics of ecology, eco system- concept and sustainable development, Energy Resources-renewable and non-renewable - definition, advantages and disadvantages.

2. Air Pollution (7 hrs.)

Sources of air pollution, Effect of air pollution on human health, plants and animals. Control of air pollution.

3. Water pollution (11 hrs.)

Impurities in water, Causes of water pollution, Effect of water pollution on human health, Concept of DO, BOD, COD, Water treatment processes, water qualities standards for domestic use, control of water pollution.

4. Soil Pollution (9 hrs)

Sources of soil pollution

Types of solid waste-Household, Industrial, Agricultural, Biomedical,

Effects of solid waste

Disposal of solid waste

E- Waste

5. Noise Pollution (4 hrs.)

Sources of noise pollution, Unit of noise, Effects of noise pollution, Acceptable noise levels, control of noise pollution

6. Environmental Legislation (10 Hrs)

Introduction to Water (Prevention and Control of Pollution) Act 1974, Introduction to Air (Prevention and Control of Pollution) Act 1981 and Environmental Protection Act 1986, Role of State Pollution Control Board and National Green Tribunal (NGT), Environmental Impact Assessment (EIA).

7. Impact of Energy Usage on Environment (6 Hrs)

Global Warming, Green House Effect, Depletion of Ozone Layer, Acid Rain. Recycling of Material, Concept of Green Buildings.

LIST OF PRACTICALS:

1. Determination of pH of drinking water
2. Determination of TDS in drinking water
3. Determination of TSS in drinking water
4. Determination of acidity in drinking water
5. Determination of pH of soil
6. To measure the noise level in classroom and industry.
7. To segregate the various types of solid waste in a locality.
8. To study the waste management plan of different solid waste
9. To study the effect of melting of floating ice in water due to global warming

INSTRUCTIONAL STRATEGY

In addition to theoretical instructions, different activities pertaining to Environmental Studies like expert lectures, seminars, visits etc. may also be organized.

MEANS OF ASSESSMENT

Assignments and quiz/class tests, mid-term and end-term written tests

RECOMMENDED BOOKS

1. Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.
2. Environmental Protection Law and Policy in India by Thakur Kailash; Deep and Deep Publications, New Delhi.
3. Environmental Pollution by Dr. RK Khitoliya; S Chand Publishing, New Delhi
4. Environmental Science by Deswal and Deswal; Dhanpat Rai and Co. (P) Ltd. Delhi.
5. Engineering Chemistry by Jain and Jain; Dhanpat Rai and Co. (P) Ltd. Delhi.
6. Environmental Studies by Erach Bharucha; University Press (India) Private Ltd., Hyderabad.
7. Environmental Engineering and Management by Suresh K Dhamija; SK Kataria and Sons, New Delhi.

Section	Percentage of syllabus to be covered	Units to be covered	Type of assessment	Weightage of Marks	Pass Percentage
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A	20%	Unit 1,2	1 st Internal	40%	40%(Combined in internal & final assessment)w ith minimum 25% marks in final assessment)
B	20%	Unit 3	2 nd Internal		
C	60%	Unit 4,5,6,7	FINAL	60%	

1.7 APPLIED SCIENCE AND MATHEMATICS

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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. Applied Physics contains units of measurements, force and motion, Accoustics of buildings and fundamentals of light.

Teachers while imparting instructions are expected to demonstrate various physical 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 (APPLIED PHYSICS)

1. Units of measurement in S.I system . Dimensions and use of dimensional analysis (3HRS)
2. Force and motion (9hrs)
Newton's laws, work and energy , forms of Energy and conservation of energy; stress , strain,
3. Spring mass system (8hrs)
Vibration of bodies ; amplitude , frequency and free and Forced vibrations , Resonant vibrations
4. Expansion of Solids (9hrs)
Thermal stresses; specific heat and heat capacity and concept of thermal

time

lag in buildings; laws of thermodynamics; Principles of heat engines and refrigeration Humidity and its control.

5. Acoustics (9hrs)

Acoustic of buildings and simple calculation of reverberation times; principles of acoustic modeling , sources of sound

6. Light as waves, solar energy, solar cells and green house effects; colour: primary colours, colour mixing. (9 hrs)

Radiant light flux, luminar intensity, illumination

7. Electrical nature of matter; molecular forces - cohesive and adhesive forces; application to water proofing and wetting. (6 hrs)

APPLIED MATHEMATICS

8. Algebra (7hrs)

Logarithms, laws of logarithms(withoutproof),use of logarithms to solve Problems of engineering nature.

Solution of three linear simultaneous equations by elimination.Binomial Theorem(withoutproof) for positive integral index(expansion and general term).

9. Mensuration(15hrs)

9.1 Mensuration of Plane figures:

Definition : Units of Measurement,Definition and formulae of perimeter and area etc. in connection with plane figures: rectangle, square, triangle, rhombus, circle,

9.2 Mensuration of Solids : Definition : Units : Volume : surface,including curved surface area, areas of solids : Rectangular or parallelopiped, Cubes, Cuboids, Cylinders and sphere (simple problems)

10. Trigonometry (12hrs)

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 360degrees,addition and subtraction of angles in trigonometric ratios formulae and their applications (without proof).Transformation of product of sine and cosine to sum/difference and vice versa. simple problems on heights and distances

11. Differential Calculus (10hrs)

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

12. Integral Calculus(8hrs)

Integration as inverse operation of differentiation. Simple integration by substitution method. Evaluation of definite integrals (simpleproblems) Applications such as area when limit are given

INSTRUCTIONALSTRATEGY

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

RECOMMENDEDBOOKS

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. Concepts in Physics by HC Verma; Bharti Bhawan Ltd., NewDelhi
4. Applied Mathematics Vol.I by SS Sabharwal and Others by Eagle Prakashan, Jalandhar
5. Engineering Mathematics Vol.I by Ishan Publishing House
6. Engineering Mathematics Vol.I by S Kohli and Others; IPH, Jalandhar
7. Engineering Mathematics by C Dass Chawla; Asian Publishers, New Delhi

Section	Percentage of syllabus to be covered	Units to be covered	Type of assessment	Weightage of Marks	Pass Percentage
A	20%	Unit 1,2,8	1 st Internal	40%	40%(Combined in

B	20%	Unit 3,9	2 nd Internal		internal & final assessment)with minimum 25% marks in final assessment)
C	60%	Unit 4 to 7 & 10 to 12	FINAL	60%	

1.8 INFORMATION TECHNOLOGY

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- - 2

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 using MS Office/Open Office/Libre Office using internet etc.,. 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 demonstrated with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Identify Computer hardware components, network components and peripherals.
- Explain the role of an operating System.
- Install system and application software.
- Explain the function of the system components including processor, motherboard and input-output devices.
- Use Word Processing software to prepare document.
- Use spreadsheet software to create workbooks and automate calculation.
- Use presentation software to create interactive presentation.
- Perform fundamental tasks common to most application software including print, save, edit, cut, copy, paste, format, spell and grammar check.
- Find and evaluate information on the Web.
- Install antivirus.
- Safeguard against online frauds, threats and crimes.

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Basic Concepts of IT and Its Application

Information Technology concept and scope, applications of IT. in office, Air and Railway Ticket reservation, Banks financial transactions, E-Commerce and E-Governance applications etc., Ethics of IT, concept of online frauds, threats of IT crimes.

2. Computer Hardware:

Block diagram of a computer, components of computer system, CPU, Memory, Input devices; keyboard, Scanner, mouse etc; Output devices; VDU, LCD, Printers etc. Primary and Secondary Memory: RAM, ROM, magnetic disks – tracks and sectors, optical disk (CD, DVD & Blue Ray Disk.), USB/Flash Drive.

3. Software Concepts:

System software, Application software, Virtualization software and Utility software, Introduction of Operating System, Installation of Window / linux, Features of OPEN OFFICE/MS_OFFICE(MS word, Excel, PowerPoint) .

4. Internet Concepts:

Basics of Networking – LAN, WAN, Wi-Fi technologies and sharing of printers and other resources, Concept of IP addresses, DNS, introduction of internet, applications of internet like: e-mail and browsing, concept of search engine and safe searching. Various browsers like Internet explorer/Microsoft Edge, Mozilla Firefox, use of cookies and history, WWW (World Wide Web), hyperlinks, introduction to Anti-virus.

LIST OF PRACTICAL EXERCISES

1. Given a PC, name its various components and peripherals. List their functions .
2. Installing various components of computer system and installing system software and application software
3. Installation of I/O devices, printers and installation of operating system viz. Windows/BOSS/ LINUX
4. Features of Windows as an operating system
 - Start
 - Shut down and restore
 - Creating and operating on the icons
 - Opening, closing and sizing the windows and working with windows interfacing elements (option buttons, checkbox, scroll etc.)
 - Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file and folders
 - Changing settings like, date, time, colour (back ground and fore ground etc.)
 - Using short cuts
 - Using on line help

5. Word Processing (MS Office/Open Office)

a) 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

b) Page set up:

- Setting margins, tab setting, ruler, indenting

c) Editing a document:

- Entering text, cut, copy, paste using tool- bars

d) 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, autotext
- Inserting date, time, special symbols, importing graphic images, drawing tools

e) 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

f) 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 .

6. Spread Sheet Processing (MS Office/Open Office)

a) Starting excel, open worksheet, enter, edit, data, formulae to calculate values, format data, save worksheet, switching between different spread sheets

b) Menu commands:

Create, format charts, organise, manage data, solving problem by analyzing data. Programming with Excel Work Sheet, getting information while working

c) 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

Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet, conditional formatting

d) 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

e) Retrieve data with query:

Create a pivot table, customizing a pivot table. Statistical analysis of data

f) Exchange data with other application:

Embedding objects, linking to other applications, import, export document.

7. PowerPoint Presentation (MS Office/Open Office)

a) Introduction to PowerPoint

- How to start PowerPoint
- Working environment: concept of toolbars, slide layout & templates.
- Opening a new/existing presentation
- Different views for viewing slides in a presentation: normal, slide sorter.

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
- Editing objects
- Working with Clip Art

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, timing, order etc.

f) Use of Pack and Go Options.

8. Internet and its Applications

a) Establishing an internet connection.

- b) Browsing and down loading of information from internet.
- c) 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
- d) Assigning IP Addresses to computers and use of domain names.

9. Functioning of Antivirus

- a) Installation and updation of an antivirus.
- b) How to scan and remove the virus.

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/Open Office 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. Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi
3. Computers Today by SK Basandara, Galgotia publication Pvt Ltd. Daryaganj, New Delhi.
4. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
5. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
6. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar

1.9 BUILDING CONSTRUCTION – I

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- - 4

RATIONALE

The aim is to develop an understanding of the behaviour and function of various components of buildings. For this it is essential that the students are taught the various components of building such as foundations, floors, super structure, joints, opening, roofs etc. The first year timber construction and RCC will be dealt with.

Teachers must supplement their lectures with models, audio-visuals and on site study of various building components.

For drawing work, stress must be laid on scale, dimensioning, lettering, and composition of the drawing.

At the end of the first year, the students should be able to draw a complete vertical section through a simple single storied flat roof building.

The subject teacher shall introduce the theory component of the topic to the students before drawing sheets are attempted by the students.

DETAILED CONTENTS

Note: The theoretical constructions should be imparted to the students along with building construction drawings

1. Masonry Construction

1.1 Brick work (2 sheet)

- Study of standard brick (FPS and MKS system) its dimensions
- Brick moulding and manufacturing technique in a brick kiln
- Specially formed bricks

1.2 Brick work in Foundation (2 sheet)

Trenching concrete bedding and brick work in Section and Plan.

1.3 Stone work (1 sheet)

Various types of stones used for masonry work with special reference to locally available stone. Exposure to cutting of stones and their finishing. Classification of stone masonry.

1.4 DPC (1 sheet)

- Sources of dampness and effects of

dampness

- Treatment of building components for effective damp proofing
- 1.5 Brick work in super structure (Different Bonds) (4 sheets)

- 1.6 Openings in Walls (1 sheets)
Classification of Arches and Lintels (2 sheets)
- 1.7 Basement (2 sheets)

2. Joinery (3 sheets)

- Doors and windows frames – their fixing

3. Building hardware (sizes, applications) (2sheets)

- Tower bolts
- Hinges including concealed hinges
- Door springs
- Latches
- Fan light pivots
- Mortice lock
- Ventilator chains

4. Flooring (2 sheets)

- types of flooring and constituents (ground and upper flooring)
- different type of floor finishes.

Note: Minimum 20 sheets should be made