

3.1 CLIMATOLOGY

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RATIONALE

Understanding of the basic principles of climatology and environment are very important for diploma holders in Architectural Assistantship. The knowledge of this subject will be very useful in the design of buildings.

Teachers are expected to impart instructions of the above course keeping in view the effect of above course in the design of buildings

DETAILED CONTENTS

1. Earth and Global Climate: 4 hrs.
 - Introduction to climatology
 - Movement of earth around sun,
 - Elements of climate (Wind, temp, humidity, precipitation, pressure).
 - Different climate zones.
2. Relationship of Climate and Comfort 6 hrs.
 - Micro-Macro climatic effects.
 - Concept of comfort zone and bio climatic chart.
 - Adaptation techniques as per climatic zone (Natural and Artificial methods)
3. Sun Protection Devices: 16 hrs.
 - Orientation for Sun
 - Sun chart (sun-path diagram)
 - Design of louvers (horizontal & Vertical)
 - Natural lighting
 - Introduction and objectives of solar passive design.
 - Passive Solar heating system (direct gain, indirect gain, isolated gain)
4. Wind Control (8 hrs)
 - Orientation for Wind.
 - Passive solar cooling (direct solar radiation, convective cooling, conductive cooling, evaporative cooling system.
5. Use of Building Materials with respect to climate (4 hrs)
 - (Concrete, Brick ,Glass, Plastic, insulating material)

6. Environment and Ecology (10 hrs)

- Basic elements, principles and objectives of ecology.
- Concepts of natural cycles in eco system.
- Sources of air and noise pollution and etc. effects and controls.
- Use of landscape elements for micro-macro climate control.

REFERENCE BOOKS

1. Tropical Architecture by CP Kukreja
2. Environmental Engg. And Management by Suresh K. Dhameeja.
3. Ecology by E.P. Odem.
4. Design with climate by Arvind Krishan and others

3.2 ARCHITECTURAL DRAWING-III

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RATIONALE

The students of diploma holder in Architectural Assistantship should have sufficient skills to draw perspective drawings. Besides this they should also be introduced to sciography plans, elevation. They should be given sufficient exercises in rendering of perspective drawings, so that they are able to perform well in the field/industry.

DETAILED CONTENTS

1. Perspective
 - Introduction to basic terminology (picture plane. Vanishing point. Station point, conc. & vision etc)
 - Introduction to types- 1 point. 2 point.

2. Simple Perceptive
 - Geometric shapes incorporating all views: cubes, cylinders etc.
 - Birds eye view
 - Normal eye view
 - Worms eye view (to clarify concepts - 2 sheets)
 - 2 point perspective of a given plan (with or without room - 2 sheets)
 - 1 point perspective of a given plan (drawing room and kitchen - 2 sheets)
 - 2 point perspective of simple house, dividing point wetted, perspective grid. (1 sheet)

3. Introduction to Sciography-in plans, Elevation
 - Basic Geometric shapes (cube, cylinder, cone, pyramid etc). (1 sheet)
 - Different between shade and shadow on basic geometric shapes (1 sheet)
 - Shade and shadow of a basic bldg. (single unit) (shadows of rounded bodies, shadows of circular opening projection & cantilevers) (1 sheet)

4. Introduction to Rendering
 - Demo from teacher in in different mediums-colour pencils, crayon. Colour ash. Markers etc. (Eliminate if overlapping with Design or any other topic)
 - Rendering techniques. * intensities. Textures etc. in pen and ink/ Different colour mediums (3 sheets)
 - Stenciling in ink- (1 sheet.)
 - Rendering of 3 given perspectives (3 sheet)

Total no. of sheets = 17

RECOMMENDED BOOKS

1. Rendering with pen and ink
2. Engineering Drawing by P.S Gill.

3.3 BUILDING CONSTRUCTION -II

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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 student 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: Relevant theory should be taught along with drawings/practical exercises in each topic.

1. RCC Construction 5 sheets

Substructure

- Foundations of R.C.C Columns, R.C.C Walls, Retaining Walls and their Water proofing and cavity walls (1 sheet)
- Superstructure
- R.C.C. Frame construction with columns, beams, parapets, slabs (one way and two way) with expansion joints (1 sheet)
- Form work and shuttering for R.C.C Work.

Teacher is required to prepare a key plan of a R.C.C framed building and specify section lines to cover the referred building elements of the RCC structure. External and internal brick masonry walls to enclosed spaces internally etc. may also be included in the scheme. (1 sheet)

- Prefabricated R.C.C and concrete (plain) elements: Lintels, Partially cast R.C.C Beams, Concrete Tiles. Beams and Channels etc. are to be studied and drawn in applied situations (in detail) (1 sheet)

Interior Finishes (1 sheet)

- Plaster and pointing
- False Ceiling
- Wooden Panelling and Partitions

Exterior Finishers (1 sheet)

- Textured Plasters
- Stone Cladding
- Metal Cladding

Important Note for Instructions

Teachers shall assume suitable exterior interior wall section and part detailed elevation and apply cladding material details.

The students shall be taken for visits on the construction sites by the teachers for each stage of construction being taught in class.

3.4 ARCHITECTURAL DESIGN - II

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RATIONALE

Diploma holders in Architectural Assistantship find employment with private architects and also majority of them go for self-employment. Therefore, they are required to develop aptitude/skills to design residential, commercial and other public buildings.

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

1. Study of spaces and layout of furniture for various activities in small structures comprising public utilises like Fuel Station, Milk Bar, Florist Kiosk and Guard House
2. Design of a single story structure such as weekend cottage, police checkpost. Small post office and the like.

Drawings to be produced:

- Site plan
 - Plans
 - Elevations
 - Sections
 - Views
3. Time Problems: Furniture layout and section through a given mono-functional space such as a Café, Nursery classroom etc.

3.5 HISTORY OF ARCHITECTURE - II

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RATIONALE

The course on History of Architecture develops appreciation regarding past and current trends in the field of architecture. The knowledge of this course will help the students to understand how political, physical, social, economical and technological change affect the architecture, materials and construction techniques. The course covers broad topics like: pre-historic architecture, important civilizations, (Indian, Egyptian, Greek and Roman), medieval architecture in Europe, and temple architecture and Budhish architecture in India.

The teacher should try to create interest among the students for this course by organizing site visits to the local old monuments. Audio-visual aids should also be used to explain various architectural developments. While imparting instructions, teacher should stress upon the context of form and space, construction methods structural systems and materials. The teacher should motivate the students to take general reference for form, drawings structural solutions and materials from the history, while designing their project.

DETAILED CONTENTS

1. Temple Architecture in India. (20 hrs)

- Evolution of temple and its various parts
- Dravidian style (Southern) General characteristics, planning, motifs and treatment of different parts, construction methods and materials (e.g. shore temple at Mahabalipuram, Madurai Temple).

Indo Aryan Temple

- Architectural form, planning components, construction methods, materials, motifs (ornamentation) (Lingaraja Temple at Bhubhneswar, Kandhariya Mahadeo at Khajuraho, Sun Temple at Modhera)

Jain Temple

- General architectural characteristics, construction methods, materials and ornamentation. (Dilwara Temple at Mount Abu, Ranakpur Temple).

2. Early Christian Architecture (4 hrs)

- Development of church plan (Basilican), construction methods and general architectural characteristics. (St. Peters. Rome)

3. Byzantine Architecture (4 hrs)
 - Centralized plans and construction methods for dom (St. Sophia Church)
4. Romanesque Architecture (4 hrs)
 - General architectural characteristics, materials and construction methods. (e.g. pisa group of buildings)
5. Gothic Architecture (4 hrs)
 - Main visual and construction vocabulary of Gothic arch. (eg. Notre Dame Paris, Reims Cathedral)
6. Renaissance Architecture (8 hrs)
 - Early renaissance architecture
 - General architectural characteristics (Florence cathedral)
 - Late Renaissance architecture
 - General characteristics and Role of Michael Angelo & Palladio (eg. St. Peter's Rome. The capital Rome & Villa Capra)
7. Baroque Architecture (4 hrs)
 - General Characteristics

History of Architecture Reference Books to be added

- Urban Pattern:- Cyallion B Fischer
- History Builds the Town:- Arthur Koher
- A history Architecture:Settings and Rituals-Spiro Kostof.
- Town Building in History:-Hirons
- World Architecture:- Michael Raeburn
- Internet Sources/Various search engines may also be bio used for additional information on some topics.

3.6 BASICS OF INFORMATION TECHNOLOGY

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RATIONALE

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

Note:

1. *Teaching of theory should be dovetailed with practical work*
2. *The following topics may be taught in the laboratory along with the practical exercises.*

DETAILED CONTENTS

1. Information Technology – its concept and scope
2. Computers for information storage, information seeking, information processing and information transmission
3. Elements of computer system, computer hardware and software; data – numeric data, alpha numeric data; contents of a program, processing
4. Computer organization, block diagram of a computer, CPU, memory
5. Input devices; keyboard, mouse etc; output devices; VDU and Printer, Scanner, Plotter
6. Electrical requirements, inter-connections between units, connectors and cables
7. Secondary storage; magnetic disks – tracks and sectors, optical disk (CD and DVD Memory), primary and secondary memory: RAM, ROM, PROM etc., Capacity; device controllers, serial port, parallel port, system bus
8. Exercises on file opening and closing; memory management; device management and input – output (I/O) management with respect of windows

9. Installation concept and precautions to be observed while installing the system and software
10. Introduction about Operating Systems such as MS-DOS and Windows
11. Special features, various commands of MS word and MS-Excel
12. About the internet – server types, connectivity (TCP/IP, shell); applications of internet like: e-mail and browsing
13. Various Browsers like WWW (World wide web); hyperlinks; HTTP (Hyper Text Transfer Protocol); FTP (File Transfer Protocol)
14. Basics of Networking – LAN, WAN, Topologies

LIST OF PRACTICALS

1. Given a PC, name its various components and list their functions
2. Identification of various parts of a computer and peripherals
3. Practice in installing a computer system by giving connection and loading the system software and application software
4. Installation of DOS and simple exercises on TYPE, REN, DEL, CD, MD, COPY, TREE, BACKUP commands
5. Exercises on entering text and data (Typing Practice)
6. Installation of Windows 98 or 2000 etc.
 - (1) Features of Windows as an operating system
 - Start
 - Shutdown and restore
 - Creating and operating on the icons
 - Opening closing and sizing the windows
 - Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file
 - Creating and operating on a folder
 - Changing setting like, date, time color (back ground and fore ground)
 - Using short cuts
 - Using on line help

7. MS-WORD

- File Management:
Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, Giving password protection for a file
- Page Set up:
Setting margins, tab setting, ruler, indenting
- Editing a document:
Entering text, Cut, copy, paste using tool- bars
- Formatting a document:
Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
- Aligning of text in a document, justification of document ,Inserting bullets and numbering
- Formatting paragraph, inserting page breaks and column breaks
- Use of headers, footers: Inserting footnote, end note, use of comments
- Inserting date, time, special symbols, importing graphic images, drawing tools
- Tables and Borders:
Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
- Print preview, zoom, page set up, printing options
- Using Find, Replace options
- Using Tools like:
Spell checker, help, use of macros, mail merge, thesaurus word content and statistics, printing envelopes and labels
- Using shapes and drawing toolbar,
- Working with more than one window in MS Word,

- How to change the version of the document from one window OS to another
- Conversion between different text editors, software and MS word

8. MS-EXCEL

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

9. Internet and its Applications

- a) Log-in to internet
- b) Navigation for information seeking on internet

- c) Browsing and down loading of information from internet
- d) Sending and receiving e-mail
 - Creating a message
 - Creating an address book
 - Attaching a file with e-mail message
 - Receiving a message
 - Deleting a message

RECOMMENDED BOOKS

1. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
2. Computers Today by SK Basandara, Galgotia publication Pvt ltd. Daryaganj, New Delhi
3. MS-Office 2000 for Everyone by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., New Delhi
4. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
5. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
6. Mastering Windows 95, BPB Publication, New Delhi
7. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
8. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi

3.7 SURVEYING

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RATIONALE

The important functions of a diploma holder in Architecture Assistantship includes the jobs of detailed surveying, plotting of survey data, preparation of survey maps and setting out works

While framing the curriculum for the subject of surveying, stress has been given to the development of the skill in each type of survey like chain surveying, compass surveying and levelling that the diploma holder in Architect Assistantship will normally be called upon to perform. Plane table surveying, contouring, theodolite surveying, curves and use of minor instruments have been also included in this subject.

Field work should be a selected one so that student can check his work and have an idea of the results the extent of error in the work done by him. As far as possible, the surveys done should be got plotted, as this will also reveal errors in the work and develop skill in plotting.

DETAILED CONTENTS

Part – A: THEORY

1. Introduction: (4 hrs)
 - 1.1 Basic principles of surveying
 - 1.2 Concept of surveying, purpose of surveying, measurements-linear and angular, units of measurements
 - 1.3 Instruments used for taking these measurement, classification of survey based on instruments
 - 1.4 System of conversion of land measurements from traditional revenue records to MKS/F.P.S. system methods of reconnaissance & recording of important factors/land marks/path ways& map orientation (Revenue staff may be invited for delivering a lecture in this system)
2. Chain surveying: (6 hrs)
 - 2.1 Purpose of chain surveying, principles of chain surveying
 - 2.2. Errors in chain surveying
 - 2.3 Correction for erroneous length of chain, simple problems on this.
3. Compass surveying: (6 hrs.)
 - 3.1 Purpose of compass surveying. Construction and working of prismatic compass, use of prismatic compass: Setting and taking observations
 - 3.2 Concept of:

- a) Meridian - Magnetic and true
 - b) Bearing - Magnetic, True and Arbitrary
 - c) Whole circle bearing and reduced bearing
 - d) Fore and back bearing
- 3.3 Local Attraction-courses, Detection & precautions against local attraction .
- 3.4 Dip and declination of a magnetic needle
4. Leveling: (6 hrs.)
- 4.1 Purpose of leveling, concept of a level surface, horizontal surface, vertical surface, datum, reduced level and bench marks
 - 4.2 Principle and construction of Dumpy level
 - 4.3 Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis, horizontal surface, level surface
 - 4.4 Leveling staff: single piece, folding, in various precision staff
 - 4.5 Temporary adjustment: setting up and leveling, adjusting for parallax of Dumpy level
 - 4.6 Concept of back sight, foresight, intermediates sight, station change point, to determine reduced levels
 - 4.7. Level book and reduction of levels by
 - 4.7.1 Height of collimation method and
 - 4.7.2 Rise and fall method,
 - 4.7.3 Arithmetic checks, problem on reduction of levels,
 - 4.8 Computations of Areas of regular figure and irregular figure. Simpson rule prismoidal formula and graphical, planimeter

Part – B

5. Plane Table Surveying: (8 hrs)
- 5.1 Purpose of plane table surveying, equipment used in plane table survey:
 - (a) Plane table and its accessories
 - 5.2 Setting of a plane table:
 - (a) Centering
 - (b) Leveling
 - (c) Orientation
 - 5.3 Methods of plane table surveying
 - (a) Radiation,
 - (b) Intersection
 - (c) Traversing

Errors in plane table survey and precautions to control them. Testing and adjustment of plane table and alidade

6. Contouring: (2 hrs.)
 Concept of contours, purpose of contouring, contour interval and horizontal equivalent.
7. Minor Instruments: (2 hrs.)
 Study and use of the instruments given below to be explained in addition to providing practice:
 a) Abney level
 b) Tangent clinometer
 c) Pentagraph
 d) Planimeter
8. Use of Modern Surveying equipment (2 hrs.)
9. Introduction to GIS (Geographic information system) (2 hrs.)

NOTE:

- a) For various surveying equipment relevant Indian Standards should be followed
 b) No sketch of the instruments may be asked in the examination

PRACTICAL EXERCISES

- I. Chain surveying:
- i)
 - a) Ranging a line
 - b) Chaining a line and recording in the field work
 - c) Testing and adjustment of chain
 - d) Taking offsets - perpendicular and oblique (with a tape only)
 - e) Setting out right angle with a tape
 - ii)
 - a) Chaining of a line involving reciprocal ranging
 - b) Taking off sets and setting out right angles, with cross staff and Indian optical square
 - iii)
 - a) Demarcation of land at site and cross checking the dimensions/diagrams/levels/set-backs etc of a building layout.
- II. Compass Surveying:
- i)
 - a) Study of prismatic compass
 - b) Setting the compass and taking observations
 - c) Measuring angles between the lines meeting at a point

III. Leveling:

- i)
 - a) Study of dumpy level and levelling staff
 - b) Temporary adjustments of a Dumpy level
 - c) Taking staff readings on different stations from the single setting and finding differences of level between them
- ii)
 - a) Study of IOP level
 - b) Its temporary adjustments
 - d) Taking staff readings on different stations from the single setting and finding differences of level between them
- iii) Exercise of finding R.L's of different components of an existing building e.g. Plinth, chhajja, ceiling, approach road, boundary wall etc w a given bench mark.

IV. Plane Table Surveying:

- i)
 - a) Study of the plane table survey equipment
 - b) Setting the plane table
 - c) Marking the North direction
 - d) Plotting a few points by radiation method
- ii)
 - a) Orientation by
 - Trough compass
 - Back sighting
 - b) Plotting a few points by intersection method
 - Bessel's graphical method
 - Trial and Error method
- v) Setting and checking grades with abney level
- vi) Finding heights by Indian Pattern Clinometer (Tangent Clinometer)
Enlargement/reduction of a plan by the use of pentagraph
- vii) Use of planimeter for computing areas

V. Demonstration of digital instruments like Autolevel, digital Plane meter, menoptic theodolite, digital theodolite

INSTRUCTIONAL STRATEGY

This is highly practice-oriented course. While imparting theoretical instructions, teachers are expected to demonstrate the use of various instruments in surveying, stress should be laid on correct use of various instruments so as to avoid/minimum errors during surveying. It is further recommended that more emphasis should be laid in conducting practical work by individual students

RECOMMENDED BOOKS

1. Narinder Singh; "Surveying"; New Delhi, Tata McGraw Hill Publishing Co Ltd.
2. Hussain, SK and Nagraj, MS; "Text Book of Surveying"; New Delhi, S Chand and Co Ltd.
3. Deshpande, RS; "A Text Book Surveying and Levelling"; Poona, United Book Corporation
4. Kocher, CL; "A Text Book of Surveying"; Ludhiana, Katson Publishing House
5. Kanetkar, TP and Kulkarni, SV., "Surveying and Leveling", Poona, AVG Parkashan
6. Kanetkar, TP; and Kulkarni, SV; "Surveying and Leveling-Vol.2" Poona, AVG Prakashan
7. Punima, BC; "Surveying and Leveling - Vol. 2", Delhi Standard Publishers Distributors, Delhi
8. Shahai, PB; "A Text Book of Surveying Vol. 2", Oxford and IBH Publishing Co.

ECOLOGY AND ENVIRONMENTAL AWARENESS CAMP

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

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

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