

## 5.1 ARCHITECTURAL DESIGN – IV

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### RATIONALE

Intent: To appreciate the complexities and constraints in the design of a simple building complex comprising two or more individual buildings.

### DETAILED CONTENTS

Two exercise of 6 weeks duration each to be dons individually. The exercise could be any of the following:

- a) Small housing complex (10-15 independent units).
- b) Crafts museum, exhibition centre.
- c) Small service station for cars light vehicles
- d) Tourist Resorts

Special Emphasis to be laid on site planning. Service. Parking.

**Note:** 1. Site Visits and related case studies to be carried out

## 5.2 BUILDING CONSTRUCTION - IV

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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

#### 1. Roofing:

- Galvanized iron, Fibre glass, Pre-coated metal sheets, aluminum deep trough sheets with fixing details on steel frames and covered under steel frame construction shall be undertaken in detail- 3 sheets
- R.C.C Slab Roofing with insulation and water proofing and drainage details.(1sheet)
- Expansion Joints.

#### 2. Metal Glazing for Doors and Windows

- Steel glazed windows
- Aluminum doors and windows
- Pressed metal frame joinery - 3 sheets

#### Important Note for Instructions

Teachers shall assume suitable opening sizes and demonstrate fixing details of metal sections

### 3. Ironmongery

- Various forms and types of locks, bolts, hinges, stays, latches and stoppers etc.
- Application of ironmongery in the drawings of doors and windows – 1 sheet

#### Note

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

**Total No. of sheets = 8**

### 5.3 MODEL MAKING - III

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#### RATIONALE

This is a skill-oriented course to develop abilities in the students so that they are able to make layout models of any project with site development plan and landscaping features.

#### DETAILED CONTENTS

1. Block model of any previous designs given drawings along with site development
2. Detailed model of design problems dealt in 4<sup>th</sup> semester along with site development
3. Layout model of any given project along with site development with landscaping features, vehicles, roads, street and lighting fixtures, water bodies etc.

#### Note

The materials to be chosen for making models shall be according to their availability and at the discretion of the teacher

## 5.4 BUILDING BYE-LAWS AND MUNICIPAL DRAWINGS

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### RATIONALE

In any architectural organization, diploma holders are expected to prepare the municipal drawings to get it sanctioned from the local development body. For this purpose, diploma holders in Architectural Assistantship must have the knowledge of the set of norms, rules and regulations and building bye-laws of the local body. Therefore, this course is essential to be taught to diploma holders.

Teachers should refer to local bye-laws/building bye-laws while teaching this subject.

### DETAILED CONTENTS

- |    |   |          |
|----|---|----------|
| 1. | Need of building byelaws for urban development.   | (4 hrs)  |
| 2. | Basic Terminology   | (6 hrs)  |
| 3. | Factor involving planning of bye laws:  | (6 hrs)  |
|    | <ul style="list-style-type: none"> <li>- Light and ventilation</li> <li>- Mass</li> <li>- Volume</li> <li>- Open space</li> <li>- Skyline</li> <li>- Aesthetics</li> <li>- Setbacks.</li> </ul> |          |
| 4. | Bye laws  | (12 hrs) |
|    | <ul style="list-style-type: none"> <li>- Study Bye laws of various development authorities like HUDA, PUDA, DDA</li> <li>- Study National building code.</li> </ul>                             |          |
| 5. | Zoning  | (6 hrs)  |
|    | <ul style="list-style-type: none"> <li>- Concept of zoning</li> <li>- Objectives of zoning</li> <li>- Types of zoning</li> <li>- Difference between zoning and building Bye laws</li> </ul>     |          |

6. Case Study of existing residential and commercial building with respect to implementation of local Bye laws (6 hrs)
7. Study of various performas to be used (4 hrs)
8. BIS and CPWD By-laws/standards for removing Architectural barriers for persons with disabilities (PWDs) (4 hrs)

### **TUTORIAL EXERCISES**

Preparation of one set of municipal drawings of a residential building showing all services along with various performas (To be treated as internal assignment only and not for examination purpose)

### **RECOMMENDED BOOKS**

1. Architect's Hand Book by Charanjit shah
2. HUDA Bye laws
3. PUDA Bye Laws
4. DDA Bye Laws

## 5.5 WORKING DRAWING - II

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### RATIONALE

Preparation of working drawings and detailing forms the most important activities of diploma holders in Architectural Assistantship. Students are expected to develop mastery of skills in preparing working drawings of different building components and their detailing.

Teachers while imparting instructions are expected to show various components of building under construction by organizing field visits or use models and other audio-visual media to clarify the concepts involved in preparing working drawings. Teachers are expected to lay considerable stress on proportioning, dimensioning, specification writing, lettering and composition of drawing work whilst supervising students. Teachers should also take into consideration environmental aspects while teaching preparation of working drawings.

### DETAILED CONTENTS

- |     |   |          |
|-----|---|----------|
| 1.  | Preparation of working drawings in ink of a two or three storeyed building already dealt within the design project:                 |          |
| 1.1 | Site Plan   | 1 sheet  |
| 1.2 | Foundation layout plan & sectional details  | 2 sheets |
| 1.3 | Ground Floor Plan   | 1 sheet  |
| 1.4 | Upper Floor Plans (one for each floor)  | 1 sheet  |
| 1.5 | Terrace Plan with rain water drainage and disposal details  | 1 sheet  |
| 2.  | Built-in furniture e.g. side boards, wardrobes, cupboards, niches etc.<br><br>(Plan, elevation, section of various fitting details) | 2 sheets |
| 3.  | Entrance gate, boundary wall and railing details  | 1 sheet  |
| 4.  | Electrical layout plan of an already handled design project   | 1 sheet  |
| 5.  | Water, supply, sewage & drainage layout plan & fire fighting layout of an already dealt design project.                             | 1 sheet  |

**Total No. of Sheets = 11**

## 5.6 STRUCTURE SYSTEMS AND DESIGN

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### RATIONALE

Students of diploma level are expected to understand the behavior of structures under load. They should understand the theory and design of simple RCC and steel structure, and should be able to sketch the structural details of RCC and steel Structure.

### DETAILED CONTENTS

#### STRUCTURE SYSTEM

(10 hrs)

Brief introduction about following structural systems:

1. Form Active Structure
  - 1.1 Cable
  - 1.2 Arches
2. Vector Active Structure
  - 2.1 Roof truss
  - 2.2 Space Truss
3. Bulk Active Structure
  - 3.1 Post and beam
  - 3.2 Fixed and continuous beams
  - 3.3 Portal frame
4. Surface Active Structure
  - 4.1 Slab and Folded plates
  - 4.2 Vaults and spherical shells
5. Pneumatic Structure
  - 5.1 Membrane Action
  - 5.2 Air supported and air inflated structures



**PART - I : RCC STRUCTURE** (30 hrs)

1. Concept of reinforced concrete suitability of different type of reinforcing materials.
2. Theory and design of singly reinforced beams as per BIS 456-2000. Balanced, under reinforced and over reinforced beams. Theory of doubly reinforced beams.
3. Shear and Bond stresses in beams.
4. Theory and design of one way. Two way and continuous slabs as per BIS 465-2000.
5. Theory and design of long and short RCC columns as per BIS 456-2000.

**PART-II : STEEL STRUCTURES** (14 hrs)

1. Rivetted and welded lap and butt joints (No staggered rivetting).
2. Theory and design of laterally restrained single section steel beams as per BIS:800.
3. Analysis of roof truss, tension and compression members of roof truss as per BIS:800.
4. Theory of single section long and short steel columns as per BIS:800. Column basis

**SKETCHES (Structural Drawings)** (10 hrs)

1. Structural details of RCC slabs, beams, columns and isolated column footings.
2. Structural details of steel roof truss and steel column beam junctions.

**RECOMMENDED BOOKS**

1. Structure- Daniel L Schodek
2. Structure in Architecture- Mirio Salvadori
3. Treasure of RCC design-Sushil Kumar
4. Concrete structure- VN Vazrani and MM Ratwani
5. Design of steel structures-LS Negi
6. Design of steel structure-Arya and Zmani

## 5.7 COMPUTER APPLICATIONS IN ARCHITECTURE-II

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### RATIONALE

The students of Architecture Assistantship should have sufficient knowledge and skills to add dimensions, texts, plot drawings. They should handle one minor and one major project so as to develop confidence.

### DETAILED CONTENTS

Note: Relevant theory may be taught along with practical exercises in each topic.

1. Dimensioning (8 hrs)
  - Dimension type, style, units
  - Dimension utilities
  - Dimension variables
  - Dimensioning of different drawing elements like line (horizontal, vertical, inclined), arc, circle (radius, diameter), continuous dimensioning etc
  - Editing dimension text and updating
  
2. Adding Text (6 hrs)
  - D-text, text (adding new text and editing existing text)
  - Text style – font types, height, width factor etc
  
3. Plotting Drawings (8 hrs)
  - Plot command
  - Selecting area for plotting
  - Scale of plot, scale to fit
  - Selecting plotting device
  - Selecting paper size and type
  - Selecting block and white or colored plots
  - Selecting appropriate print speed, quality
  - Print preview
  
4. Major Projects (42 hrs)

The students should draft a complete set of drawings of two projects (1 minor + 1 major)

- Minor project: small residence/office/dispensary block etc with ground floor + 1<sup>st</sup> floor (12 hrs)
- Major project : Any design problem done in 4<sup>th</sup> semester as main project shall be taken up for preparing complete set of drawings. Including all plans, elevation and sections showing all interior joinery layouts schedule, tree plantation, parking, layout etc. (30 hrs)

## **INSTRUCTIONAL STRATEGY**

This is a highly practical oriented subject. Efforts should be made by the teachers to procure relevant softwares and give practical exercises to individual students, so that they develop proficiency in operating computer softwares as applied to the profession of architecture. The theoretical instructions should be dovetailed with practical work. Toward the end of the session each student should be given independent computer based project assignment. Expert lectures from practicing architectural field may be invited to deliver talks and for presentation of live case studies on computers to motivate the students and increase their level of awareness. Special efforts should be made by the teachers to develop well defined small tutorial exercises on each topic and supervise the exercises being performed by the student throughout the session. If need be some basic operational fundamental exercises may be repeated in the beginning of the session. Special emphasis may laid in training the students, to avail help from the user friendly softwares so that they develop confidence and are able to work independently

## ENTREPRENEURIAL AWARENESS CAMP

This is to be organized at a stretch for two to three days during second year. Lectures will be delivered on the following broad topics. There will be no examination for this subject

1. Who is an entrepreneur?
2. Need for entrepreneurship, entrepreneurial career and wage employment
3. Scenario of development of small scale industries in India
4. Entrepreneurial history in India, Indian values and entrepreneurship
5. Assistance from District Industries Centres, Commercial Banks. State Financial Corporations, Small industries Service Institutes, Research and Development Laboratories and other financial and development corporations
6. Considerations for product selection
7. Opportunities for business, service and industrial ventures
8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs)
9. Legal aspects of small business
10. Managerial aspects of small business