5.1 EMPLOYABILITY SKILLS – I

L	T	P
-	-	2

RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. Our diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject is to prepare students for employability in job market and survive in cut throat competition among professionals.

DETAILED CONTENTS

1. Writing skills (08 hrs)

   i) Official and business correspondence
   ii) Job application - covering letter and resume
   iii) Report writing - key features and kinds

2. Oral Communication Skills (20 hrs)

   i) Giving advice
   ii) Making comparisons
   iii) Agreeing and disagreeing
   iv) Taking turns in conversation
   v) Fixing and cancelling appointments

3. Generic Skills (04 hrs)

   i) Stress management
   ii) Time management
   iii) Negotiations and conflict resolution
   iv) Team work and leadership qualities

5.2 ENVIRONMENTAL EDUCATION

L	T	P
3	-	-

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 eco system and controlling pollution by pollution control measures. He should also be aware of environmental laws related to the control of pollution.

DETAILED CONTENTS

1. Definition, Scope and Importance of Environmental Education (02 hrs)

2. Basics of ecology, biodiversity, eco system and sustainable development (03 hrs)

3. Sources of pollution - natural and manmade, causes, effects and control measures of pollution (air, water, noise, soil, radioactive and nuclear) and their units of measurement (12 hrs)

4. Solid waste management – Causes, effects and control measures of urban and industrial waste (06 hrs)

5. Mining and deforestation – Causes, effects and control measures (04 hrs)

6. Environmental Legislation - Water (prevention and control of pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981 and Environmental Protection Act 1986, Role and Function of State Pollution Control Board, Environmental Impact Assessment (EIA) (10 hrs)

7. Role of Non-conventional Energy Resources (Solar Energy, Wind Energy, Bio Energy, Hydro Energy) (04 hrs)

8. Current Issues in Environmental Pollution – Global Warming, Green House Effect, Depletion of Ozone Layer, Recycling of Material, Environmental Ethics, Rain Water Harvesting, Maintenance of Groundwater, Acid Rain, Carbon Credits. (07 hrs)

INSTRUCTIONAL STRATEGY

In addition, different activities pertaining to Environmental Education like expert lectures, seminar and awareness camps etc. may also be organized.

RECOMMENDED BOOKS

1. Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.
2. Environmental Protection Lqw and Policy in India by Thakur Kailash; Deep and Deep Publications, New Delhi.
3. Environmental Engineering and Management by Suresh K Dhamija; SK Kataria and Sons, 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; UGC University Press
7. Basic Environmental Engineering by R.C. Gaur; New Age International Publishers, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted for Lectures (Periods)	Marks Allotted (%)
1	02	04
2	03	06
3	12	24
4	06	12
5	04	10
6	10	20
7	04	10
8	07	14
Total	**48**	**100**

5.3 REINFORCED CEMENT CONCRETE

L	T	P
6	-	-

RATIONALE

Student of Architectural apprenticeship diploma are expected to understand the behaviour of structures under load. They should understand the theory and design of simple RCC structures and should be able to sketch the RCC details of reinforcement.

DETAILED CONTENTS

1. Introduction (04 hrs)

   1.1 Concept of Reinforced Cement Concrete (RCC)
   1.2 Reinforcement Materials:
   - Suitability of steel as reinforcing material
   - Physical properties of mild steel and HYSD/TMT steel
   1.3. Loading on structures as per IS: 875

2. Introduction to following methods of RCC design (04 hrs)
   2.1 Working stress method
   2.2 Limit state method

3. Shear and Development Length (06 hrs)

   3.1 Shear as per IS:456-2000 by working stress method
   i) Shear strength of concrete without shear reinforcement
   ii) Maximum shear stress
   iii) Shear reinforcement

4. Singly Reinforced Beam (working stress method) (10 hrs)

   4.1 Basic assumptions and stress strain curve, neutral axis, balanced, under-reinforcement and over reinforced beams, Moment of resistance for singly reinforced beam.

   4.2 Design of singly reinforced beam including sketches showing reinforcement details.

5. Concept of Limit State Method (as per IS 456:2000) (10 hrs)

   5.1. Definitions and assumptions made in limit state of collapse (flexure)
   5.2. Partial factor of safety for materials
   5.3. Partial factor of safety for loads
   5.4. Design loads

5.5. Stress block diagram

6. Singly Reinforced beam (12 hrs)

Theory and Design of singly reinforced beam by Limit State Method

7. Doubly Reinforced Beams (12 hrs)

Theory and design of simply supported doubly reinforced rectangular beam by Limit State Method

8. Behaviour of T beam, inverted T beam, isolated T beam and 'L' beams (No Numericals) (04 hrs)

9. One Way Slab (10 hrs)

Theory and design of simply supported one way slab including sketches showing reinforcement details (plan and section) by Limit State Method.

10. Two Way Slab (10 hrs)

Theory and design of two-way simply supported slab with corners free to lift, no provisions for torsional reinforcement by Limit State Method including sketches showing reinforcement details (plan and two sections)

11. Axially Loaded Column (10 hrs)

11.1 Definition and classification of columns
11.2. Effective length of column,
11.3. Specifications for longitudinal and lateral reinforcement
11.4. Design of axially loaded square, rectangular and circular (with lateral ties only) short columns by Limit State Method including sketching of reinforcement (sectional elevation and plan)
11.5 Concept of foundation: shallow and deep foundation, types and suitability of foundation (no numericals)

12. Prestressed Concrete (04 hrs)

12.1. Concept of pre-stressed concrete, advantages and disadvantages
12.2. Methods of pre-stressing

Important Note:

Use of BIS: 456-2000 is permitted in the examination.

INSTRUCTIONAL STRATEGY

Teachers are expected to give simple problems for designing various RCC structural members. For creating comprehension of the subject, teachers may prepare tutorial sheets, which may be given to the students for solving. It would be advantageous if students are taken at construction site to show form work for RCC as well as placement of reinforcement in various structural members. Commentary on BIS:456 may be referred along with code for relevant clauses.

RECOMMENDED BOOKS

1. Singh Harbhajan “Design of Reinforced Concrete Structures for Architects” Abhishek Publishers, Chandigarh
2. Ramamurtham, S; "Design and Testing of Reinforced Structures", Dhanpat Rai and Sons, Delhi
3. Singh Harbhajan “Limit State Designs for Architects” Abhishek Publishers, Chandigarh
4. Gambhir, M.L., "Reinforced Concrete Design", Macmillan India Limited
5. Singh, Birinder “RCC Design and Drawing”, Kaption Publishing House, New Delhi
6. Mallick, SK; and Gupta, AP; "Reinforced Concrete", Oxford and IBH Publishing Co, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	04	04
2	04	04
3	06	06
4	10	12
5	10	12
6	12	12
7	12	12
8	04	04
9	10	10
10	10	10
11	10	10
12	04	04
Total	**96**	**100**

5.4 WORKING DRAWING - II

L	T	P
-	-	6

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 or on AutoCAD/computer of a two or three storeyed building already dealt within the design project:

   1.1 Site Plan (01 sheet)

   1.2 Foundation layout plan & sectional details (02 sheets)

   1.3 Ground Floor Plan (01 sheet)

   1.4 Upper Floor Plans (one for each floor) (03 sheets)

   1.5 Terrace Plan with rainwater drainage and disposal details with proper dimensioning and specifications so that it may be used for site execution (01 sheet)

2. Built-in furniture e.g. side boards, wardrobes, cupboards, niches etc (03 sheets)
   (Plan, elevation, section of various fitting details)

3. Entrance gate, boundary wall and railing details (01 sheet)

4. Electrical layout plan of an already handled design project (01 sheet)

5. Water supply, sewage & drainage layout plan & fire fighting layout of an already dealt design project. (01 sheet)

INSTRUCTIONAL STRATEGY

This subject forms the basis for making the students ready to work in the field and is highly practical oriented. Teachers, while imparting instructions in the class room, should lay emphasis on proportioning, dimensioning, specification writing, lettering and composition of the drawing work of the students. Field visits may be arranged to .the construction sites of residential, commercial and public buildings to demonstrate various components/stages of buildings under construction. Students should be exposed to: the system of preservation and maintenance of working drawings at the site during the field visits. Teachers may procure some working drawings of existing/live buildings and present the same to the students. The students should be encouraged to maintain portfolio,) if the work done by them throughout the session and give seminar. 'Teachers may conduct viva voce on completion of each assignment. Experts from the design organizations may be invited to present case studies, to motivate the students. Repetitive exercises should be given to the students, till they develop confidence and attain proficiency. Relevant BIS codes and conventions may be referred/followed, while imparting instructions. Teachers may introduce the topics by giving simple set of instructions before giving any assignment to the students

RECOMMENDED BOOKS

1. Instruction Details by OK Ching; Tata McGraw Hill Publishing Co Ltd. New Delhi
2. Building Drawing by MG Shah, CM Kale, SY Patki; Tata McGraw Hill Publisher, New Delhi.

5.5 COMPUTER APPLICATIONS IN ARCHITECTURE - II

L	T	P
-	-	4

RATIONALE

To enable the student to develop the confidence to prepare the drawings of a given project through knowledge acquired in previous semester by preparing a set of drawings for any one project. To enable the student to create three dimensional objects in space with special emphasis on presentation and visualization of interiors and exteriors of building using different rendering techniques using auto CAD 2007 or the latest programme.

DETAILED CONTENTS

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

1. Project (Rendering of CAD drawing) (20 hrs)

   The design problem done in 4th semester as main project shall be taken up for preparing a complete set of drawings. These include all plans, elevations (minimum 2) and sections (2 minimum), showing all interior layouts, joinery schedule, tree plantations, parking layout etc.

2. Fundamentals of 3-D Drafting (08 hrs)

   2.1 Basic Features
   2.2 Coordinate system
   2.3 3-D entities and surfaces

   Exercises – 1: Converting simple geometric shapes into 3-D Objects

3. Making an existing 2-D plan drawing compatible to 3-D drafting (12 hrs)

   3.1 Commands and modifications to 2-D drawings
   3.2 B. Poly, rectangle, elevation, extrude – requirements and applications
   3.3 3-D of exterior of blocks – preparation, modification of 2-D drawing
   3.4 3-D of interiors of block – preparation, modification of 2-D drawings

4. 3-D Modeling (20 hrs)

   4.1 Wire frame, surface and 3-D solid modeling
   4.2 Viewing 3-D models
   4.3 Rendering, shading , hide commands, lights and Camera
   4.4 Material representation
   4.5 Importing, exporting library and printing 3-D

Exercises – 2: 4th Semester design proposal to be converted in 3-D model

5. Demonstration of 3D max, Corel Draw, Adobe Photoshop as rendering tool for 3D blocks/ walk through etc. (4 hrs)

Exercises

1. Converting simple geometrical shapes into 3-D objects
2. Students will take their second year design proposals and convert them in 3-dimensional presentation models

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 be laid in training the students, to avail help from the user friendly software so that they develop confidence and are able to work independently.

Note :- The Board will set the Question Paper for exercises for external examination

5.6 BUILDING CONSTRUCTION - IV

L	T	P
-	-	6

RATIONALE

Students of architectural Assistantship at diploma level are supposed to prepare structural drawings, working drawings and detailed drawings of various components of buildings. Also students are expected to design small residential building. For this purpose, it is essential that students are taught various components of building construction comprising of foundation, super structure, openings, roofs, staircases, flooring and finishing and other allied building components.

Therefore, the subject of building construction is very important for students undergoing diploma course in architectural assistantship.

Teachers while imparting instructions are expected to show various components of buildings under construction, make use of models or other audio-visual media to clarify the concepts. While preparing drawings, teachers should lay considerable stress on proportioning, dimensioning, specification writing and printing and composition of drawing work.

Students should be asked to maintain a sketchbook for recording mistakes done by students in the preparation of drawings.

DETAILED CONTENTS

1. Riveted Connections and Welded Joints (1 sheet)

2. Steel Sections

   - Steel doors and windows using standard rolled sections (2 sheets)
   - Rolling and collapsible structure (2 sheets)

3. Steel Roofs

   - Line diagram of steel roofs for various spans
   - Construction details of steel roofs
   - Roof covering: AC, GI sheets (2 sheets)
   - North light truss (1 sheet)

4. Frame and Sealed Connections Built Up Steel Columns and Beams

   - Beam to beam framed connection
   - Beam to column framed connection
   - Beam to column seated connection (2 sheets)

Total - 10 sheets

INSTRUCTIONAL STRATEGY

This subject is of practical in nature. While imparting instruction for preparation of various drawings of different types of buildings and their components, the teacher should organize demonstration and field/site visits to show various stages, sizes and scales of operations involved in building construction. The teacher should involve the theoretical aspects of the instructions to the students before drawings are attempted by the students. Students may prepare the port-folio of the work done by them throughout the session. Teacher may also organize viva-voce after each drawing assignment so as to test the level of understanding of the students about unlying concepts, princples, and procedures.

RECOMMENDED BOOKS

1. Building Construction by WB Mackay; Khanna Publisher, New Delhi
2. Building Construction by SP Bindra and SP Arora; ; publisher Dhanpat Rai & Co. New Delhi
3. Building Construction by BC Punmia; Publisher Laxmi Publication, New Delhi
4. Building Construction by Sushil Kumar; Standard Publisher, New Delhi
5. Construction of Buildings (Vol I and II) by Barry
6. Building Construction by VB Sikka; Publisher Tata McGraw Hill Publisher, New Delhi
7. Building Construction by Rangwala; Publisher Charotar Publishing House Pvt. Ltd., New Delhi

5.7 ARCHITECTURAL DESIGN – IV

L	T	P
-	-	8

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 exercises of upto 3-storied buildings of 8 weeks duration each to be done individually. The exercise could be any of the following:

a) Small housing complex.
b) Museum, exhibition centre.
c) Motel
d) Shopping centre
e) High school

Special Emphasis to be laid on site planning. Services, Parking.

Note: 1. Case study and library study must be done for each exercise.
Note: 2 Site Visits and related case studies to be carried out

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, Chandigarh

PERSONALITY DEVELOPMENT CAMP

This is to be organized at a stretch for two to three days during fifth or sixth semester. Extension Lectures by experts or teachers from the polytechnic will be delivered on the following broad topics. There will be no examination for this subject.

1. Communication Skills
2. Correspondence and job finding/applying/thanks and follow-up
3. Resume Writing
4. Interview Techniques: In-Person Interviews; Telephonic Interview' Panel interviews; Group interviews and Video Conferencing etc.
5. Presentation Techniques
6. Group Discussions Techniques
7. Aspects of Personality Development
8. Motivation
9. Leadership
10. Stress Management
11. Time Management
12. Interpersonal Relationship
13. Health and Hygiene