

## Architectural Design- I (150101)

### OBJECTIVE:

- To introduce to the students the fundamentals of design and development of design vocabulary, to nurture design thinking and to enable them to apply the same thought process in developing three-dimensional compositions.
- The studio also introduces drawings and models as tools for conceptualisation, organisation and furthering of design thought process.
- This studio teaches the students to learn the basics of graphic design and three-dimensional composition. The studio also has a direct interface with the Graphic Design Studio and Architectural Workshop.

### Course Content

Introduction to elements of design like point, line, plane, solid and void. Understanding the importance of design principles like balance, harmony, rhythm, contrast, symmetry, scale, proportions, colours, tones, textures etc. Study of solids & voids to evolve sculptural forms & spaces; explore play of light & shade and application of colour. Introduction to external & internal forms, analytical appraisal of forms, their quality; Concept of space, interrelationship between space, volume and order; Variations in forms with planer juxtapositions. Anthropometric study and ergonomics of human figure (including physically handicapped persons), dimensions of furniture - relationship with human anthropometrics (like in kitchens, toilets, bedrooms, staircases etc.) with freehand drawing of human figures, vehicles, trees, buildings etc. to have a better understanding of proportion.

### Studio Project

Exercises in Point, line and shapes; Exploring colour schemes and their application in a visual composition and in architectural forms and spaces; Collage with a given theme; To achieve focus and centre of interest in design using different textural elements; Development of geometric pattern by division, subtraction, and addition, and express them with the use of colours; Two & Three dimensional Design Exercises involving real and imaginary objects, drawing compositions and models, to form an appropriate base for subsequent Architectural design and theory. Study models of different materials viz. paper, clay, wax, soap, wires etc. made by themselves. Understanding of scale and proportions through measurement of spaces using only human body elements. Exercises in order to experiment basic proportions, body relations and spatial concepts. Layout of furniture based on anthropometrics. Anthropometrics for physically challenged persons. Exercises in order to experiment basic proportions, body relations and spatial concepts. Designing of basic building components (like kitchens, bedrooms, toilets etc.) Design exercise on threshold conditions and small-scale domestic space. Students will learn skills in problem solving, visualization, oral, and graphic communication. Field trips to relevant architectural sites.

### References:

1. Broadbent, G. (1973). Design in Architecture - Architecture and Human Science. New York : John Wiley and Sons.
2. Chauhan, P. (2005). Learning Basic Design. Mumbai : Rizvi College of Architecture.
3. Ching, F. D. K. (1997). Design Drawing. Hoboken : John Wiley & Sons.
4. Ching, F. D. K. (2012). Architecture: Form, Space and Order. 3rd Ed. Hoboken: John Wiley & Sons.
5. Roger, K. L. (1998). Architect? A Candid Guide to the Profession. Cambridge : The MIT Press.
6. Rasmussen, S. (1962). Experiencing Architecture. 2nd Rev. Ed. Cambridge : MIT Press.

## **Construction Technology & Materials-I (150102)**

### **Module 1 Brick:**

- Types of bricks.
- Bonds in brick masonry for various thicknesses of walls and various situations like ends, junctions, etc.
- Attached and detached pier.
- Jointing and pointing.
- Cavity walls.

### **Module 2 Stone:**

- Stone dressing of different types.
- Stone masonry of different types for various thicknesses of walls.
- Jointing and pointing.

### **Module 3 Foundation:**

- Types of simple foundations.
- In Bricks
- In Stones,
- Timbering to excavation.

### **Module 4 Arches and Lintels:**

- Brick Arches.
- Stones Arches.
- Brick Lintels.
- Stone lintels,
- Centering materials and methods.

### **Module 5 Construction systems and Elements of Buildings**

- Overview of method of construction of a simple two storied building.
- Plinth - filling – processes and techniques.
- Thresholds – various types
- Plinth protection, D.P.C.
- Coping
- Chhajja

### **References:**

1. S.P Arora and S.P. Bindra, Text book of Building Construction, ganpat Rai publications (P) Ltd New Delhi, 2005.
2. Klans Dukeeberg, Bambus – Bamboo, Karl Kramer verlag Stuttgart Germany, 2000.
3. Don A. Watson Construction Materials and Processes McGraw Hill 1972, WB Mckey Building construction vol 1,2, Longman UK 1981.
4. Barry, the construction of buildings Affiliated East West press put Ltd New Delhi 1999.
5. Francisa D.K. Ching Building Construction illustrated John Wiley & Sons 2000

## **Architectural Graphics-I (150103)**

**OBJECTIVE** To enable the students to have a better visualization/understanding of a three dimensional entity through Drawings: Sections- Metric views-Sciography and Sketching: Indoor-Outdoor

### **CONTENTS**

#### **Module 1I (Time-three weeks): Sections of Solids**

- Introduction and Importance of Sections, Method of drawing Sections in which Section plane parallel to VP and perpendicular to HP / parallel to HP and perpendicular to VP / perpendicular to VP and inclined to HP / perpendicular to HP and inclined to VP / inclined to both HP and VP followed by illustrative examples in each case, True shape of section / Virtual sections / Auxiliary inclined view followed by illustrative examples.

#### **Module 2 (Time-two weeks): Intersection of Solids**

- Introduction to Lines of intersection / Curves of intersection, Method of drawing intersection of prisms /pyramids / cylinders followed by illustrative examples, making presentation drawings of these intersecting solids through Sociography.

#### **Module 3 (Time-two weeks): Development of Surfaces**

- Introduction and Importance of Surface development, Method of drawing surface development for Tetrahedron / Cube / Octahedron / Dodecahedron / Icosahedrons / Truncated Tetrahedron / Truncated Cube followed by model making of each of these examples.

#### **Module 4 (Time-two weeks): Metric Projections**

- Introduction and Importance of Metric projections, Method of drawing Isometric projection / Axonometric projection / Elevation oblique projections followed by illustrative examples, Uses of these Metric Projections

#### **Module 5 (Time- five weeks): Sketching**

- Introduction to Object drawing / Indoor sketching and its importance, Method of sketching simple objects / composition of objects freehand in proportion using pencils of different grades / water colors showing light / shade / shadow followed by situational exercises.
- Introduction to outdoor sketching through basic exercises like sketching of trees and shrubs, sketching of simple buildings with special emphasis on background and foreground and sketching of human figures using pencil of different grades/ water colors showing light / shade / shadow followed by situational exercises.

### **REFERENCE BOOKS**

- "A Textbook of Engineering Drawing", Prof. P.J. Shah, S. Chand Publishing, 2008.  
"Engineering Drawing", Dhananjay A. Jolhe,Tata McGraw Hill, 2007.  
"Architectural Shades and Shadows", Henry McGoodwin, Nabu Press, 2010.  
"Rendering with Pen and Ink", Robert W. Gill, Thames & Hudson Ltd., 1984.  
"Architectural Drawing", Tom Porter, Hamlyn, 1990.  
"Sketching the Concept", Harold Linton and Scott Sutton, Design Press, 1993.  
"Drawing the Landscape", Chip Sullivan, John Wiley & Sons; 4th Edition, 2014.

## **Basic Design & Visual Arts (150104)**

### **OBJECTIVE**

To Train the students in visual compositions by using various elements of Design and to make them familiar with the meaning and purpose of Architectural design.

### **CONTENTS**

#### **UNIT 1 (Time- three weeks)**

- Study of distinctive aspects of Architecture, inter-linkages between Architecture, Nature and Culture

#### **UNIT 2 (Time-five weeks)**

- Introduction to the Concept of design in everyday life, Objectives of design, Elements of design such as point- Line- Form- Space- Texture- Colour etc. Detailed study of color theory and its applications through geometric compositions.
- Principles of design such as Scale- Balance- Proportion- Rhythm- Harmony- Contrast- etc. Application of the same through exercises in two and three dimensional compositions; using single and multiple types of elements.

#### **UNIT 3 (Time- four weeks)**

- Introduction to Anthropology, Anthropometric data for adults& children: Standing position front & side- Arms extended- various seating positions-various working positions.

#### **UNIT 4 (Time- four weeks)**

- Designing of Habitable space for the units; Living Room, Dining Room, Bedroom, Kitchen & Toilet with furniture layout.

### **NOTE:**

- The time mentioned at the end of each of the above units indicates the tentative time taken to complete each.

### **REFERENCE:**

"Design through Discovery", M.E. Bevin, Holt, Rinehart, and Winston, 1984.

"Drawing and Perceiving", Douglas Cooper, John Wiley & Sons, 2007.

"Principles of Design in Architecture", K.W. Smithies, Van Nostrand Reinhold, 1981.

"Architectural Drawing Masterclass", Tom Porter, Charles Scribner's, 1993.

"Time-saver Standards for Architectural Design Data: The Reference of Architectural Fundamentals", Donald Watson, McGraw-Hill, 1997.

"Time Saver Standards for Building Types", John Hancock Callender, Joseph De Chiara, McGraw-Hill, New York, 1983.

"Architectural Graphic Standards", Charles George Ramsey, Harold Reeve Sleeper, Bruce Bassler John Wiley & Sons, 2008.

"Form Space & Order", 4th Ed., Francis DK Ching, John Wiley & Sons, New Jersey, 2015.

## **Structures-I (150105)**

### **OBJECTIVE**

To understand the basic principles of Structural Mechanics, so that it forms the basis for study of Structural Design

### **CONTENTS**

#### **Module I (Time- five weeks)**

Study of Force-definition, cause, effect and units. Understanding Force through vector

Study of Coplanar, Concurrent, Non-concurrent forces, Triangle of forces, Parallelogram of forces and Conditions of Equilibrium – analytical methods.

Study of Moments, Moment of forces, Moment of couples and Static equilibrium of rigid bodies.

#### **Module II (Time-six weeks)**

Introduction to types of loads and supports.

Study of Structural system design such as Fundamental characteristics, Strength, Stability, Ability, Rigidity, Economy and Aesthetics.

Determination of Center of gravity, Moment of Inertia of square, rectangle, and I shaped cross-sections.

#### **Module III (Time- five weeks)**

Stress, strain, Hooke's Law, stress-strain curve, stressed streams in simple and composite sections, temperature stresses, Poisson's ratio, state of simple shear, shear strain.

Basic concepts of Bending moment and shear force, bending moment and shear force diagram for simple beams and frames for various types of loadings and support conditions

### **NOTE:**

The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

### **REFERENCE BOOKS**

"Basic Structural Analysis (SI Units)", C.S. Reddy, Tata McGraw-Hill, 1981.

"Analysis of Structures", V.N.Vazirani, M.M.Ratwani and S.K.Duggal, Khanna Publishers, 2003.

"A Textbook of Engineering Mechanics", R.S.Khurmi, S. Chand Publishing, 2011.

"Mechanics of Structure", S.B. Junnarkar, Charotar Publishing House Pvt. Ltd., 2011.

## Communication Skills (150106)

### CONTENTS

#### Module I Aids to Correct Writing

- Tenses
- Models
- Conditionals
- Infinitives, gerunds and participles
- Active and passive voice narration

#### Module 2 Composition-I

- Essay
- Paragraph
- Copy Writing for advertisements — characteristics of a good advertisement, aids to make advertisement attractive and effective.

#### Module 3 Composition-II

- Technical reports and letter writing
- Speeches, profile of speaker, characteristics of speech.
- Aesthetic and critical writing, kinesics.
- Appreciation of scene, figures and images.

#### Module 4 Enriching vocabulary:

- Nuances, jargon, foreign word and phrases sometimes used in correspondence.
- Roots and origin of words
- Words often confused
- Synonyms
- Antonyms
- Homonym
- Words followed by preposition, Prefixes and suffixes

#### Module 5 Presentation Skills:

- Communication skills in architecture through write up and graphic, graphs, sketches audio presentation, supplemented by drawings, transparencies, photographs, epidiascope, slides, video presentation, script writing dubbing, cue sheet, ending vision, mixing.

### REFERENCE BOOKS

1. Effective technical Communication by M. Ashraf Rizvi Pub: Tata McGraw Hill (2009)
2. Developing Communication Skills by Krishna Mohan Pub: Mac Millan India Limited (2009)
3. An approach to Communication Skills by Indrajit Bhattacharya Pub: Dhanpat Rai Co.Pvt.Lt New Delhi(2007)
4. Handbook of practical Comm. Skills by Wright, Chrissie, Pub: Jaico Publishing house. Mumbai (2007)
5. the skill of Communicating by Bill Scott. Jaico Publishing House, Mumbai (2009)..

## Workshop Modelling & Site Exposure-I (150107)

The aim of the subject is to introduce to the students to the various tools used in carpentry, metal work, masonry, painting etc. and get a reasonable skill in handling the materials and tools there off.

**Plastic materials:** Use of clay, plaster of Paris, wax, soap etc.

**Paper Craft:** Introduction to modeling with paper, board, plastic sheets etc.

**Carpentry:** Handling different carpentry tools, carpentry processes, carpentry joints and wood working machines.

**Masonry:** Handling the bricks, mixing the mortar, bond work of bricks, stones and masonry tools

## **Architectural Design- II (150201)**

### **OBJECTIVES**

- To familiarize students with a simplest residential unit.
- Understanding the use of traditional indigenous materials & construction systems in basic building forms.
- Comprehension of arrangement / organization of spatially/ functionally similar units resulting in varied outdoor spaces.
- To assimilate the modifying spatial qualities of indoor & outdoor spaces due to varying configurations.

### **Module-1 Study**

Lecture on concept of vernacular & lessons to be learnt.

Detailed study of a vernacular settlement remarkable for its spatial quality, material, and construction technology usage should be characteristic for that region.

### **Module-2 Analysis**

- Lectures on Elements of Space making like Floor, Wall, Door, Window, Column, Stairs, and Roof.
- Analysis of the selected settlement in light of their spatial roles and consequently the design considerations.
- Lectures on the spatial attributes of the resultant open & built of the vernacular and lessons to be learnt from the study & their juxtaposition.
- Analysis of the selected settlement with relationship to human scale, activity, space & form & other parameters pertaining to spatial aspects.

### **Module-3 Design & Application through Case Studies**

- Lecture on interpreting spatial configuration for specific design programme. Configuration / array of multiple repetitive units of preferably on single floor organized on basis of functional, geometric and visual order.

### **SUGGESTED STUDIO EXERCISES**

1. Detailed drawings for the settlements.
2. Analysis drawings on basis of selected parameters underlining lessons learnt.
3. Design of buildings like Residence, Panchayat bhawan, Ashrams, Hostels, Tourist Cottages, Primary School etc.
4. Study tours to relevant rural/urban destinations for primary documentation.

### **REFERENCE BOOKS**

1. Ching, Francis D.K. Form Space & Order.
2. Rappoport, Amos. House Form & Culture.
3. Oliver, Paul. Shelter & Form.
4. Fathy, Hasan. Natural energy & vernacular architecture.
5. Housing projects by Geoffery Bawa, Charles Correa, B.V. Doshi among others.

## Construction Technology & Materials-II (150202)

### **Module 1 Doors (timber):**

Ledged braced and battened door  
Panel door  
Glazed door  
Flush door

### **Module 2 Windows (timber):**

Side and Top hung  
Pivoted  
Louvers  
Ventilators  
Fixed and openable fanlights.  
Composite window.

### **Module 3 Door (metal):**

Pressed steel  
'Z' section, with and without fanlight.  
Swing doors.

### **Module 4 Windows (metal):**

Pressed steel  
'Z' section,  
Top and side hung, fixed  
Pivoted  
Louvers  
Ventilators  
Fanlights  
Composite window.

### **Module 5 Opening accessories:**

Jamb casing  
Architrave  
Palmate  
Mouldings  
Skirting  
Door and window fixtures.  
Door cum window in timber and metal.

### **References:**

1. Don A. Watson, Construction Materials and Processes , McGraw Hill, 1972.
2. W.B. McKay, Building Construction Vol, 1 and 2, Longmans, UK, 1981.
3. S.C Rangwala Building Construction Charotar Publishing House, India, 2000
4. S.K.Sharma, A Text book of Building Construction , S.Chand & Co Ltd., New Delhi, 1998
5. American Institute of Timber Construction (AITC), Timber Construction Manual, Wiley Publishers, 2004
6. Francis D.K Ching Building Construction illustrated, John Willey & Sons, 2000
7. Wills H Wagner, Howard Bud, Modern Carpentry, Good Heart – Wilcox publishers, Portland, 2003
8. Barry, Construction of Buildings, Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005



## **Architectural Graphics-II (150203)**

### **OBJECTIVE**

To enable the students to have a better visualization/understanding of a three dimensional entity through Perspective Drawings

### **CONTENTS**

#### **UNIT I (Time-two weeks): Introduction to Perspective drawings**

- Introduction, Concept, Terminologies: Cone of Vision – Centre line of Vision – Horizon line – Distortion -Station Point – Visual rays - Picture plane – Ground line – Height line – Vanishing Points , Types of Perspective projection: One Point Perspective – Two Point Perspective – Three Point Perspective – Box Method – Centre line Method

#### **UNIT II (Time-two weeks): Setting up One Point Perspective Projection**

- Detailed Method: Obtain the required dimensions through orthographic projection - Location of Station Point and Centre line of Vision – Checking Station Point with Cone of Vision – Location of Picture Plane – Location of Vanishing Point – Location of Horizon line – Location of Ground line – Location of True Elevation on the Picture Plane – Location of Perspective lines through points on the True Elevation – Location of Visual rays to locate the various faces of the object in perspective view , Illustrative practice examples.

#### **UNIT III (Time-three weeks): Setting up Two Point Perspective Projection**

- Detailed Method: Obtain the required dimensions through orthographic projection - Location of Station Point and Centre line of Vision – Alignment of Centre line of Vision - Checking Station Point with Cone of Vision - Location of Picture Plane - Location of Vanishing Points – Location of Height line – Location of Horizon line and transferring Vanishing points on them –Location of Ground line – Location of height of object on Height line and top and bottom lines of sides in perspective view – Location of Visual rays to locate end points of side of the object in perspective view – Using Visual rays and Perspective lines for plotting the perspective view of the object, Illustrative practice examples

#### **UNIT IV (Time-two weeks): Setting up Three Point Perspective Projection**

- Detailed Method: Obtain the required dimensions through orthographic projection- Location of Station Point and Centre line of Vision – Preparing elevation at right angles to Centre line of vision (plan position) – Location Profile view of the plan position – Modify the plan position w.r.t Profile view – Location of Picture plane in both Plan & Profile view – Location of Vanishing points in both Plan & Profile view – Locating the Horizon line & Ground line – Extending the Ground plane to meet the Ground line – Extending the plan of Centre line of Vision – Locate V.P.1, V.P.2 & V.P.3 in perspective view – Locate line at 45° from intersection of Ground line & Ground plane for transferring points from the profile view to intersect the points from plan projections through Visual rays – Using Visual rays, Vertical & Horizontal projections and Perspective lines complete the perspective view of the object, Illustrative practice examples.

#### **UNIT V (Time-four weeks): Shadow projection in Perspective drawing**

- Introduction, Location of Sun w.r.t. the spectator, Terminologies: Vanishing Point Plan – Vanishing Point Actual – Plan of light rays – Method of obtaining true inclination of light ray with ground plane
- Detailed method of constructing shadows in Two point Perspective projection: Location of Sight line - Plan location of Vanishing points – Locating Sight lines for obtaining true angle of inclination of the light ray – Locating vanishing point for the actual light rays – Locating shadow of the object through intersection of light rays joining the vanishing point for the plans of light rays to light rays joining the vanishing point for actual light rays, Illustrative practice examples.

### **REFERENCE BOOKS**

“Rendering with Pen and Ink”, Robert W. Gill, Thames & Hudson Ltd., 1984.

“Creative Perspective”, Robert W. Gill, Thames & Hudson Ltd., 1975.

## Theory of Design (150204)

### OBJECTIVE

To develop greater perception of complex Architectural forms and buildings.

To develop the skill of making perspectives of complex buildings and Rendering them in different media.

To develop or upgrade an understanding about AutoCAD 3D, as an important tool for drafting, designing, analyzing and representation of the drawings in a desired manner.

### Module-1 Shades and Shadows

- Values in Shades and shadows.
- Constructing plan shadows (point, line and plane).
- Constructing shadows in elevations (point, line and plane).
- Short – cut methods for constructing shadows.
- Presentation techniques in Sociography.

### Module-2 Presentation

- Introduction to different textures and finishes in plan and elevation.
- Graphical representation of furniture, automobiles, human figure etc. in plans and elevation and 3-Dimension.

Preparation of presentation drawings of small buildings, through Plans, Elevation, Section, Site plan etc., using various rendering techniques and media, incorporating sociography for creating three dimensioned effect.

## Structures-II (150205)

### Module 1

- Strain energy,
- Bette's law,
- First theorem of Castigliano.
- Deflection of truss joint

### Module 2

- Shear force and bending moment diagram for simply supported beam, cantilever beam, overhang beam (subjected to point load, U.D.L and point load/U.D.L.)
- Point of contra flexure,
- Member subjected to couple.

### Module 3

- Principal stresses and strain,
- Mohr's circle.

### References:

1. R.K. Bansal, A Text Book on Strength of Materials – Laxmi Publications, New Delhi, 1994.
2. B.C. Punmia, SMTS-I, Strength of Materials – Laxmi Publications, New Delhi, 1994.
3. M.M. Ratwani & V.N. Vazirani, Analysis of Structures, Vol. 1, Khanna Publishers – Delhi, 1987.
4. Timoshenko, S.P. and D.H. Young, Elements of Strength of Materials, Fifth edition, East West Press, 1993.
5. A.R. Jain and B.K.Jain, Theory and analysis of structures, Vol. 1, Nemchand and Bros, Roorkee, 1987.
6. R.K. Rajput Strength of Materials , S.Chand & Company Ltd., New Delhi 1996..

## History of Architecture-I (150206)

### OBJECTIVE

To understand evolution and development of architectural and urban built environment in context to geophysical, social and technological factors.

### CONTENTS

#### Module I (Time-three weeks)

- Introduction to Indus Valley civilization. Study of architectural characteristics.
- Introduction to the Vedic village. Study of its building typology and construction.

#### Module II (Time-three weeks)

- Introduction to Buddhist settlement in India.
- Detailed studies of Architectural characteristics of various building types such as Stupas, Chaityas and Viharas through suitable examples from each geographical context to illustrate differences in Form, Construction methods and Ornamentation.

#### Module III (Time-five weeks)

- Study of evolution of Hindu architecture, Rock-cut and structural forms and comparison of Temple forms in various regions of India.
- Study of various styles of temples such as Dravidian, Indo-Aryan Orissan, Jain with respect to functional components, architectural Form, construction and ornamentation.

#### Module IV (Time-five weeks)

- Delhi or Imperial Style :Slave, Khilji, Tughlaq, Sayyed, Lodhi
- Provincial Style Bengal , Jaunpur, Deccan, Malwa, Bijapur
- Moghul Architecture in North India under : Humayun, Jehangir, Akbar, Shahjehan

### NOTE:

- Analysis of architectural style/building typology must include functional, constructional and Architectural, ornamental aspects.

### REFERENCE BOOKS

"Architecture in India", Marilia Albanese, Sandeep Prakashan, 2001.

"Hindu India", Henri Stierlin, Taschen, 1998.

"Ancient Indian Architecture", Sanjeev Maheshwari and Rajeev Garg, CBS Publishers & Distributors, 2001.

"The Hindu Temple", R. Champakalakshmi and Usha Kris, Roli Books, 2000.

"The Architecture of India: Buddhist and Hindu, Volume 2", Satish Grover, Vikas, 1980.

"Islamic Architecture in India", Satish Grover, Galgotia Publishing Company, 1996.

## Workshop Modelling & Site Exposure-II (150207)

The aim of the subject is to introduce to the students to the various tools used in painting and polishing, plumbing, metal work, electrical wiring etc. and get a reasonable skill in handling the materials and tools there off. The workshop should be directed to impart first hand experiences to students in construction of buildings like –

Preparing layouts for sites, marking for foundations, use of pipe level, spirit levels, plumb bob, etc. First-hand experience of plastering, casting concrete, etc. **Model making of design problems introduced into the class.**

**Painting and polishing:** Preparation of timber and metal surfaces, priming, painting by brush, spray, guns, polishing of timber surfaces, lamination to timber surfaces.

**Plumbing:** Introduction to various pipes and fittings, screwed joints, threads, bending and plumbers tools. Fixing of fixtures like traps, taps, wash basins, urinals, W.C., showers etc.

**Metal work:** Cutting, bending and jointing of (ferrous/non ferrous metals) sheets, flats, bars, wires etc.

**Electrical Wiring:** Basic electrical wiring systems like fitting of lights, geysers, one-way and two-way switches, regulators. MCB and electrical distribution system, earthing. Use of ammeters and voltmeters.

**Model making of design studio.** Making of models with detailing..

## **Architectural Design- III (150301)**

### **OBJECTIVE**

- To understand the role of climate and environment as a context in shaping building design.
- To comprehend the interpretation of prescribed environmental directions / norms for a given place in building forms.
- Recognizing the relevant materials & building techniques suitable for that region & explore their applicability in design.
- Learn building on sloping sites or with unique topography.

### **Module-1 Understanding climatic zones**

- Lecture on the varied climate zones especially in the Indian sub-continent including examples of environment responsive designs.
- Establishing design criteria for various climate types.

### **Module-2 Design of climate responsive buildings**

- Designing a multi-functional building in a typical climate zone utilizing the developed design criteria.

### **Module-3 Design on sloping site**

- Design exercise on sloping terrain with specific orientation & climatic conditions.

### **SUGGESTED STUDIO EXERCISES**

1. Studies of various climates; responses of vernacular / traditional in those conditions & establishing design criteria.
2. Design of multi-functional building like Motels, college, commercial complex, cultural complex, boarding school.
3. Design on sloping site with unique topography for structures like a simple guest house, tourist complex or museums.

### **REFERENCE BOOKS**

1. Krishan, Arvind Climate Responsive Architecture.
2. Brown, G.Z. Sun Wind & Light.
3. Olgyay, V. Design with Climate.
4. Yeang, Ken. Designing with Nature: The Ecological basis for Architecture Design.
5. Works of Architects like Hasan Fathy, B.V. Doshi, Charles Correa, Ken Yeang, among others to understand responses of varied designers to the existing environment

## Construction Technology & Materials-III (150302)

### Module I -Timber floor:

- Single
- Double
- Triple
- Various joints between joists, lengthening of wall plates, etc.
- Herring bone and solid strutting.

### Module II- Timber roofs:

- Lean and types
- Couple
- Close couple
- Collar.

### Module III- Timber trussed roofs:

- King post
- Queen post
- Built up roof truss.

### Module IV- Industrial roofing:

- North Light roof trusses in steel
- Monitor type steel trusses.

### Module V- Industrial roofing:

- Tubular trusses
- Built- in trusses in steel
- Industrial roofing in R.C.C.
- Industrial glazing in roofing.
- Industrial cladding in roofing

### References:

1. Don A. Watson, Construction Materials and Processes□, McGraw Hill, 1972.
2. W.B. McKay, Building Construction□ Vol, 1 and 2, Longmans, UK, 1981.
3. S.C Rangwala Building Construction□ Charotar Publishing House, India, 2000
4. S.K.Sharma, A Text book of Building Construction□, S.Chand & Co Ltd., New Delhi, 1998
5. American Institute of Timber Construction (AITC), Timber Construction Manual, Wiley Publishers, 2004
6. Francis D.K Ching Building Construction illustrated, John Willey & Sons, 2000
7. Wills H Wagner, Howard Bud, Modern Carpentry, Good Heart – Wilcox publishers, Portland, 2003
8. Barry, Construction of Buildings, Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005

## Climatology (150303)

### OBJECTIVES

- To acquaint students with the concept of climate as a significant determinant of built form.
- Familiarization with climate controlling devices.

### CONTENTS

#### Module I (Time-four weeks)

- Climatology: Role of climate with respect to shelter and importance of Building climatology,
- Tropics, climatic zones, macro and micro-climate, Elements of climate and climatology data needed for planning of buildings, change of seasons, distribution of global pressure belts & wind movements..
- Human Comfort: Human heat balance and thermal comfort, Thermal stress index, effective temperature and bio climatic analysis, Interrelationship of climatic elements and psychometric chart

#### Module II (Time-three weeks)

- Air Temperature: Factors that influence air-temperature – latitude, altitude, seasons, water, trees, areas etc.; thermal conductivity and heat exchange between building and environment, thermal properties of material.
- Solar Radiation, solar charts; Design and application of shading devices, sun machines and their uses; Opaque building elements and heat transfer through this elements, solar gain factor and sol-air temperature.
- Wind: study of diurnal and seasonal variations, heating and cooling, effect of topography: effect of wind on location of industrial areas, airports and other land-uses and road patterns, Air movement in and around buildings, wind eddies, size and position, effect of wind on design and siting of buildings.
- Precipitation: Water-vapour. Relative-humidity, condensation, rain, fog, snow and architectural responses.

#### Module III (Time-two weeks)

- Day-light: glare, amount of light, sky as a source of light and day-light factor, effect of size and shape of openings in different planes with and without obstructions.
- Orientation and Application of Climatic Principles: Siting of buildings with respect of sun, wind and view; Climatic design of indigenous shelters in response to different climatic zones in India; Use of landscape elements, evaporative cooling, ground cooling, cavity walls, topography; Ventilation of roof spaces and controlled ventilation.

### REFERENCE BOOKS

- "Manual of Tropical Housing and Building: Climate Design", O.H. Koenigsberger et.al. Madras: Orient Longman, 1984.  
"Environmental Design", Randall Thomas, Taylor & Francis; 3 rd edition, 2006.  
"Microclimatic Landscape Design", Robert D. Brown and Terry J. Gillespie, John Wiley & Sons, 1995.  
"Energy-efficient Buildings in India", Mili Majumdar, TERI Press,  
"Sustainable Building-Design Manual- Volume I&II", TERI Press,  
"Thermal control in passive solar buildings", S.C. Kaushik, G.N. Tiwari and J.K. Nayak, IBT Publishers & Distributors, 1988.

## Computer Application-I (150304)

Introduction and basic applications of operating software:

- Like Windows, and Word processing software:
- MS Office (word, excel, access,
- Power point etc. – formatting and putting formula in excel, data handling with access, etc.),
- PageMaker, Open Office etc.

Introduction to basic understanding of Architectural application software, such as Auto cad 2D and 3D modeling (creating shades and shadows, attaching materials and rendering

## Structures-III (150305)

### OBJECTIVE

To understand the principles of Structural Analysis, so that it forms the basis for Structural design.

### CONTENTS

#### Module I (Time-three weeks)

Bending Stress in Beams, Theory of simple bending, section modulus, design criterion, bending stresses in symmetrical and unsymmetrical sections, strength of sections.

Shear Stress In Beams and Torsion, Shear stress in beams and torsion in symmetrical and unsymmetrical sections,

#### Module II (Time-two weeks)

Fixed And Continuous Beams, Review of shear force and Bending Moment diagram for simply supported beam, Effect of continuity, its advantages and disadvantages.

Analysis of Continuous beams for two to four spans, conceptual idea about full and partial loading and fixed end moment using moment distribution method and Theorem of three moments.

#### Module III (Time-two weeks)

Trusses, Definition of Truss, Perfect Truss, Imperfect truss, Types of Trusses and Suitability, Analysis of simple Trusses by Analytical method.

Arches, Types and behaviour of arches with history. Introduction to three hinged arches.

Frames, Indeterminacy of frames with different end conditions, Analysis of frame by portal & cantilever method.

#### Module III (Time-one weeks)

Introduction of basic structural systems in architecture- Tensile structures, Compressive structures, Trusses, Shear structures, Bending structures

### NOTE

The time mentioned at the end of each of the above unit indicates the tentative time taken to complete each.

The marks for sessional works may be divided accordingly.

### REFERENCE BOOKS

“Strength of Materials”, B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, 2011.

“Theory of Structures SMTS - II: SI Units”, B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, 2011.

“Elements of Strength of Materials”, Stephen P. Timoshenko and Donovan H. Young, East West, 2003.

“Strength of Materials”, Ramamrutham S., Dhanpat Rai Publications, 2011. Relevant Design Codes and Design Aids

## History of Architecture-II (150306)

### OBJECTIVE

To understand evolution and development of architectural and urban built environment in context to geophysical, social and technological factors.

### CONTENTS

#### Module I (Time three weeks)

Introduction to examples of early shelter, Stone Age as an expression of man's physical and spiritual needs.  
Introduction to Egyptian civilization. Study of local context and architectural characteristics of public buildings such as mastabas, pyramids and temples to be explained with examples.

#### Module -II (Time three weeks)

- Introduction to Mesopotamian civilization. Study of urban context and architecture of Public buildings such as Ziggurat of Ur city and Palace of Khorsabad.
- Introduction to Greek civilization. Architectural characteristics of typical civic spaces such as Agora, Acropolis, theatres.
- Systems of proportioning, Greek orders, optical corrections etc. through illustrative examples such as Parthenon etc.

#### Module -III (Time two weeks)

- Study of Roman town with respect to location, Architectural characteristics of typical civic spaces such as Forum, theatres etc.
- Detailed studies of monuments/temples of Roman period with reference to materials, construction systems, Roman orders through illustrative examples.

### NOTE

In each period given below, the architectural characteristics and minimum one example may be highlighted.  
The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.  
Analysis of architectural style/building typology must include functional, constructional/structural and ornamental aspects.

### REFERENCE BOOKS

- "The World of Architecture", Paul Holberton, Chancellor Press, 1997.
- "A History of Architecture", Sir Banister Fletcher, CBS Publisher, 1999.
- "A History of Architecture", Spiro Kostof, Oxford University Press, 1995.
- "Encyclopedia of World Architecture", James Ferguson.
- "A Global History of Architecture", Mark M. Jarzombek, Vikramaditya Prakash and Francis D. K. Ching, John Wiley & Sons; 2nd Edition, 2011.

## Architectural Documentation (150307)

### OBJECTIVE

Understanding basic principles of any research with special reference to architectural research and applications.

#### Module-1 Introduction

Aspects of Analysis of an Architectural project

#### Module-2 Technical Writing

Critical Appreciation of a Project: Analysing on the basis of site, Built Form and Space, Spatial Organization, Materials and Techniques, Elements and Special Characteristics, Activity Pattern.

#### Module-3 Book Reviews

Review of Book with presentation of the précis.

### REFERENCE BOOKS

1. Raman Meenakshi and Sharma Sangeeta, "Technical Communications – Principles and Practices", Oxford University Press, New Delhi.
2. Fundamentals of Design



## **Architectural Design-IV (150401)**

### **OBJECTIVE**

This subject aims at developing in students the skill to design building and small settlements with consideration to natural and manmade parameters. The assignments shall be Design of independent bungalows, farmhouses, combined units, duplex type and their cluster or grouping etc. along with relevant Building codes.

The design shall be handled with study of natural environmental factors, their impact and consideration by human settlements of a town or a part of a city, especially housing along with the study of Open spaces, activities in them. Emphasis on aspects like – climatic considerations and relationship with life style, consideration of design detailing in kitchens, toilets etc.

Two time problems (as class tests) are to be conducted in class other than regular design problems.

### **Note:**

Sessional will be in the form of drawings and models along with project report for the design dealt. The evaluation shall be done in intermediate reviews consisting of internal and external experts. There should be regular site visits / case studies of buildings, so as to document them with the help of photographs, slides, etc.

### **References:**

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
4. Ernst Neuferts Architects Data, Blackwell 2002
5. Ramsey et al, Architectural Graphic Standards, Wiley 2000
6. Richard P. Dober, Campus Planning
7. Kanvinde, Campus Planning in India
8. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967
9. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995

## **Construction Technology & Materials-IV (150402)**

### **OBJECTIVE**

To inculcate awareness of the constructional aspects of structural steel and its application in various building components of an industrial building.

### **CONTENTS**

#### **Module I (Time-three week)**

- Introduction to structural steel section, grillage foundation and framed construction. Detail studies such as characteristics of structural steel sections, methods of jointing and its application as structural members in different parts of building.

#### **Module II (Time-three week)**

- Types of industrialized doors and windows, sliding, revolving, collapsible, rolling shutters, steel, aluminum and composite sections. Detailed drawings and construction details of various types of Doors and Windows in steel and Aluminum.
- Detailed drawings and construction details of Steel stairs such as Straight flight and Spiral.
- Introduction to the concept of Mezzanine floor.
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#### **Module III (Time-six week)**

- Introduction to Structural steel trusses. Detailed drawings and construction details of North light truss, tubular truss, lattice girder along with roof coverings, valleys, gutters etc

#### **Module IV (Time-four week)**

- Introduction to false ceiling. Detailed drawings and construction details of the same.
- Introduction to various materials, products and hardware for false ceiling, paneling and partitions.

### **Note:**

Site Visits to ongoing related construction projects.

### **REFERENCE BOOKS**

- "The Construction of Buildings", Vol. 3 4/e PB, R Barry, Wiley, 2001.
- "Building Construction Metric" Vol. 4, W.B.Mckay, Orient Longman Private Limited, Mumbai, 2006.
- "Building Construction Illustrated", Francis D.K. Ching, John Wiley & Sons, 2011.
- "Construction Technology" Vol. 2-3-4 Roy Chudley, Roger Greeno, Prentice Hall (UK), 2005.
- "Architectural Graphic Standards", Charles George Ramsey, Harold Reeve Sleeper, Bruce Bassler John Wiley & Sons, 2008.
- "Interior Design", Ahmed A Kasu, Om Books, 2005.
- "Time Saver Standards for Interior Design and Space Planning", Joseph De Chiara, Julius Panero & Martin Zelnik, McGraw-Hill, 1991.

## Surveying & Levellinging ( 150403)

### Module I Introduction of surveying:

- Aspects of surveying for the Architect.
- Formulae used in measurement of land with geometrical and abstract configurations to work out Areas, volumes and other quantities.

### Module II Chain survey:

- Instrument used.
- Selection of survey station.
- Chain line, Offset, oblique offset, tie line, check lines, ranging.
- Field book plotting.

### Module III Levelling:

- Various parts of dumpy level.
- Temporary adjustment.
- Interrelationship of bubble tube axis.
- Line of collimation and vertical axis.
- Levelling staff, technical term used in levelling.
- Fly levelling (study of reciprocal levelling).
- Introduction of contouring.

### Module IV Plain table surveying:

- Introduction.
- Equipment required.
- Working with plain table.
- Errors in plain table.
- Advantage and disadvantage.

### Module IV Construction surveying:

- Introduction.
- Equipment for setting out.
- Horizontal and vertical control.
- Setting out a pipe line.
- Setting out a building and structure (complete layout).
- Staking out a highway

### References:

1. Kevin Lynch - Site planning - MIT Press, Cambridge, MA - 1967.
2. B.C.Punmia - Surveying Vol.I - Standard Book House, New Delhi - 1983.
3. Edward. T. O. Site Analysis – Architectural Media, 1983.
4. P.B.Shahani - Text of surveying Vol.I, Oxford and IBH Publishing Co – 1980
5. Joseph De.Chiarra and Lee Coppleman - Planning Design Criteria - Van Nostrand Reinhold Co.,
6. Storm Steven, Site engineering for landscape Architects, John wiley & Sons Inc, 2004.
7. Development Control Rules – CMDA.

## Computer Application-II (150404)

### Introduction to basic understanding of other software like

- Architectural Desktop
- Corel draw
- photoshop
- Revit
- Sketchup
- Archicad etc.

### Advanced professional application of software in

- Rendering techniques
- Walkthrough,  
Animations like Maya, 3D studiomax, etc.

## Structures-IV (150405)

### OBJECTIVE

To understand the basic properties of RCC as a building material and principles of design of RCC structures.

### CONTENTS

#### Module I (Time-two weeks)

- Introduction:- Materials, basic properties of concrete and steel, Reinforcement, standard loading, characteristics strength, permissible stresses in Concrete and steel as per Indian Standard, Design Philosophies- Working Method, Ultimate Load, Method and Limit state Method.

#### Module UNIT II(Time-seven weeks)

- Limit State Design Method: Safety and serviceability requirements, limit states, characteristics material strength and loads and Partial safety factors.
- Design of Beams: Design of singly and doubly reinforced beams including L & T beams for flexure shear, bond and torsion.
- Design of Compression members: Design of short and slender columns.
- Design of RCC one way & two way slab.

#### Module III (Time- five weeks)

- Proportioning of footings: - Square, Rectangular, Circular, Trapezoidal and combined.

#### Module - IV (Time- two weeks)

- Introduction to pre-stressed concrete.

### NOTE

The time mentioned at the end of each of the above unit indicates the tentative time taken to complete each. The marks for sessional works may be divided accordingly.

### REFERENCE BOOKS

- "R.C.C. Designs (Reinforced Concrete Structures)", Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi; Tenth edition, 2006.
- "Reinforced Concrete, 6 th Edition", S.K.Mallick and A.P.Gupta, Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi, 1996.
- "Limit State Design of Concrete Structures", Dr. Ramchandra and Virendra Gehlot, Scientific Publishers, 2007.
- "Comprehensive RCC Design", Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi; Tenth edition, 2006.

## History of Architecture-III (150406)

### OBJECTIVE

To understand the role of geo-physical, societal, political and technological factors in the evolution of Architectural and to develop a holistic approach to Architecture as an integral component of the built environment.

### CONTENTS

#### Module I (Time- four weeks)

- Study of Early Christian Architecture- evaluation of church architecture.
- Study of development of Church plans during the early Christian period with respect to architectural character.
- Study of Byzantine churches with respect to architectural forms, structural systems, techniques of construction etc- Hagia Sophia.
- Study of evolution of Romanesque architecture with respect to changes in church plans, Elevation features, techniques of construction and structural systems-Pisa cathedral complex.
- Study of architectural characteristics of Romanesque churches in Italy, France and Germany.

#### Module II (Time- four weeks)

- Detailed studies of Gothic Cathedral of Medieval European towns with reference to Architectural characteristics and their comparison to Romanesque period- Notre Dame.
- Comparison of Architectural characteristics of Gothic churches in France and England.

#### Module III (Time-four weeks)

- Introduction to the basis of Renaissance Movement and its effect on the built environment.
- Study of the works of Architects of Early Renaissance and High Renaissance.
- Study of Cathedral- St. Peter and St. Paul.

#### Module IV (Time-four weeks)

- Introduction to the basis of Baroque or Rococo Movement and its effect on the built environment.
- Detailed studies of Baroque Architecture such as its Development, Characteristics of Baroque Architecture-Piazza of St. Peter.
- Study of works Architects of Baroque period such as Bernini and Borromini.

### NOTE

Analysis of architectural style/building typology must include functional, constructional /structural and ornamental aspects.

### REFERENCE BOOKS

- "The World of Architecture", Paul Holberton, Chancellor Press, 1997.
- "Baroque India", Jose Pereira, Aryan Books International, New Delhi, 1990.
- "Renaissance Architecture", Jose Pereira,
- "A History of Architecture", Sir Banister Fletcher, CBS Publisher, 1999.
- "A History of Architecture", Spiro Kostof, Oxford University Press, 1995.
- "Encyclopedia of World Architecture", James Ferguson

## **Low Cost Building ( 150407)**

### **OBJECTIVE**

To make the students aware of the use of conventional and non-conventional resources for low cost construction.

### **CONTENTS**

#### **Module I (Time-five weeks)**

- An introduction to the subject to understand the various building techniques adopted in different climatic zones of the country, which resulting in varied vernacular expressions.
- Use of cost effective technologies through the use of local materials, up gradation of traditional technologies, prefabrication etc.

#### **Module II (Time-five weeks)**

- Need for low cost construction, both in the rural and the urban sectors.
- Innovations of building techniques for low cost construction.
- Analysis of space norms for low cost buildings.

#### **Module III (Time-six weeks)**

- Study of usages pattern of low cost buildings by the habitants.
- Comparative analysis of building materials and costing.
- Works of Laurie Baker, Hassan Fathy and other prominent architects.

### **NOTE**

The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

### **REFERENCE BOOKS**

- "Building Systems for Low Income Housing", Ashok Kumar Jain; Management Publishing House, 1992  
"Low Cost Housing in Developing Countries", Guru Charan Mathur; For Centre for Science & Technology of the Non-Aligned and Other Developing Countries, Oxford & IBH Publishing Company, 1993

## **Architectural Design (150501)**

The subject aims at developing creativity for designing imaginative built forms with application of principles and theory of architectural design and philosophies of contemporary architects. The attempt is towards developing one's own language and philosophy of architecture to guide towards exploring alternative building forms for different activities which help in understanding the relationship of structure and possibilities in building forms. Design problems shall include problems of simple and complex nature i.e. Religious buildings, residential complexes, gathering places, clubs, cafés, community halls, museums, art galleries, pavilions, sport complexes, hospitals, polyclinics, factories.

Emphasis shall be given more on three-dimensional studies to develop an understanding for man and space relationship and also relevant building byelaws.

There should be variety of problems in the studio work with changing focus for each problem from theory to construction techniques (local) and site layouts, including organization and detailing of open spaces with an aim to learn working with practical limitations.

Two time problems (as class tests) are to be conducted in class other than regular design problems.

### **Note:**

Sessional will be in the form of drawings and models along with Technical report for the design dealt. The evaluation shall be done in intermediate reviews consisting of internal and external experts. There should be regular site visits to buildings, dealt in studio problems, so as to document them with the help of photographs, slides, etc.

### **References:**

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
4. Ernst Neuferts Architects Data, Blackwell 2002
5. Ramsey et al, Architectural Graphic Standards, Wiley 2000
6. Richard P. Dober, Campus Planning
7. Kanvinde, Campus Planning in India
8. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967
9. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995

## **Construction Technology & Materials-V (150402)**

### **OBJECTIVE**

To make the students learn about all the aspects of advanced building construction techniques.

### **CONTENTS**

#### **Module I (Time- six weeks)**

- Introduction to new structural forms and methods of their execution such as form work required for execution of shell structures, Pneumatic Structure, geodesic domes, space steel frames etc.
- Introduction to types of special slabs like Filler slab, waffle, coffer and flat slabs.
- Introduction to shell & folded plate.

#### **Module II (Time-six weeks)**

- Design and Details of roof gardens.
- Detailing of Curtain walls, triple glazing windows.
- Introduction to high tech building materials like structural glazing, vitreous tiles, artificial veneers, aluminum composite panels etc.
- Advanced building finishes.

#### **Module III (Time-four weeks)**

- Introduction to cost effective and environmentally friendly building materials such as Stabilized mud blocks, Hollow concrete blocks, Aerated concrete blocks, Fly ash bricks, eco boards, husk boards etc.
- Prestressed Concrete Structures: Introduction, method of pre – stressing, losses of prestress designing of rectangular beams.
- Introduction of Prefabrication- Advantages and disadvantages of on-site and off-site prefabrication; Prefabrication in Indian construction industry.
- Emerging trends in building materials and recent advances in concrete technology.

### **NOTE**

Site Visits to ongoing construction project/s and modern buildings.

Market survey of building materials and visits to building materials industries.

### **REFERENCE BOOKS**

- “Steel Structure and Architecture”, Arne Petter Eggen, Bjørn Normann Sandaker, Whitney Library of Design, 1995.
- “Structural Analysis and Design of Tall buildings”,Bungale S. Taranath, CRC Press, Florida, 2012.
- “Handbook of Designing and Installation of services in Building complex”, Highrise Buildings, V.K.Jain, Khanna Tech., 1990.
- “Building Structures”, James Ambrose, Patrick Tripeny, John Wiley & Sons, 2011.
- “Handbook of Building Construction” Vol-1&2, MM Goyal, Thomson Press, 2006.



## **Working Drawing-I (150503)**

### **OBJECTIVE**

The aim of this subject is to train the students to enable them to make the detailed and accurate drawings so as to be executed in construction on site.

### **Module I**

Introduction to various building components and precise purpose of set of working drawings. Study of each drawing with reference to specification & schedules of various building materials.

### **Module II**

Preparations of check list as guide for list of working drawings. Study of building byelaws for various construction details. Method of representing various contents & specific information in working drawings.

### **Module III**

Preparation of municipal drawings and importance of working drawing as a legal document and tender document.

### **Module IV**

One set of working drawing of any load bearing structure along with large-scale details of any specifically designed situations.

### **List of drawings:**

- Excavation plan
- Center line plan
- Footing layout plan, footing detail
- Beam (ground beam and plinth beam), beam detail
- Sill level plan, schedule of openings
- Lintel level plan
- Slab level ,slab beam detail Frame detail

Note: Sessional shall be in the form of full set of working drawing and design details of given building. The sessional marks will be based upon the portfolio submitted and internal viva

## **Building Services-I (150504)**

### **OBJECTIVE**

To familiarize the students with fundamentals of water supply and drainage in building services & their integration with architectural design.

### **CONTENTS**

#### **Module I (Time-four weeks): Water Supply**

- Detailed studies such as Sources and Treatment of water
- Water demand & calculations, Storage & conveyance of water at municipal level
- Water supply systems and various fittings,
- Hot and Cold water supply layouts
- Water supply design of a residence: Connection with water mains, design of Underground & Overhead water tanks, pump capacity, calculations for diameter of pipe
- Introduction to water supply in a multistoried building.

#### **Module II (Time-fourweeks): Wastewater**

- Definition of Refuse, garbage, rubbish, sullage, sub soil water, storm water, night soil, sewage- sanitary, domestic & industrial, sewer, sewerage & waste water
- Various drainage & sanitary fixtures & fittings, traps - role of water seal, sizes, materials and their space requirements, Water efficient and waterless fixtures
- Types of pipes and drains in different materials and their usage, diameter of pipes, slope standards
- Inspection and Intercepting chambers, manholes etc.
- Sewage and Effluent treatment- Innovative and cost effective sanitation concepts e.g. EcoSAN
- Sewage systems for a small project, Wastewater recycling methods e.g. DEWATS etc.
- Introduction to STP's & ETP's, Design calculations of septic tank & soak pit
- Storm water design calculations for roof top & for surface drains, Rainwater Harvesting & Groundwater Recharge
- Exercise: Design a layout for a residence for water supply, drainage, sewage and storm water Zero discharge concepts

#### **Module III (Time-four week): Solid Waste management:**

- Waste production in India and Global,
- Waste management techniques

### **NOTE**

The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

### **REFERENCE BOOKS**

- "Water Supply Engineering", Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, 2003.  
"Design & Practical Handbook on Plumbing", Cr Mohan and Vivekanand, Standard Publishers Distributors, 2014.  
"Wastewater Engineering", Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, 1998.  
"Environmental Education and Solid Waste Management", A. Nag and K. Vizayakumar, New Age International, 2005.  
"Water and Wastewater Calculations Manual", Shun Dar Lin and C. C. Lee, McGraw-Hill Professional; 2 nd edition, 2007.  
"Advances in Water Supply Management: Proceedings of the CCWI '03 Conference, London, 15- 17 September 2003",Cedo Maksimovic, David Butler and Fayaz Ali Memon, 2003

## **Structures- V (150505)**

### **OBJECTIVE**

To understand the principles of design of Steel structures, IS:800-2007

### **CONTENTS**

#### **Module I (Time-three weeks)**

•Design of connections in steel Structures :- Bolted and welded connections, assumptions, different types of joints, design of various types of welded connections subjected to direct loads and moments.

#### **Module II (Time-four weeks)**

•Design of Tension Members: Selection of sections, IS specifications, design of axially loaded tension members, design of members for axial tension & bending, end connections, IS code provisions for Lug angles and tension splices.

#### **Module III (Time-two weeks)**

•Design of Compression Members: Theory of buckling, design of column cross sections (single & built up sections); design of angle struts, eccentrically loaded columns. IS code provisions for column splices, lacing & battens.

#### **Module IV (Time-two weeks)**

•Design of Beams: Lateral stability, design of single & built up beams, plated beams and curtailment of flange plates.  
•Design of Roof Trusses: Types of trusses, roofs & side coverage, types of loading and load combinations, design of members & connections.

#### **Module V (Time-two weeks)**

•Case studies of modern steel structures.

### **NOTE**

The time mentioned at the end of each of the above unit indicates the tentative time taken to complete each. The marks for sessional works may be divided accordingly.

### **REFERENCE OF BOOKS:**

Bureau of Indian Standards, IS:800-2007, New Delhi, 2007.

"Design of Steel Structures", Anand S. Arya and J.L. Ajmani, Nem Chand, 2011.

"Design of Steel Structure Volume 2", D. Ramachandra and Virendra Gehlot, Scientific Publishers, 2013.

"Design of Steel Structures", P. Dayaratnam, S. Chand Publishing; Reprint Edition, 2007.

"Design of Steel Structure", Dr. B. C. Punmia, Ashok Kumar Jain and A. K. Jain, Laxmi Publications, 2006.

"Design and Analysis of Steel Structures", V.N. Vazirani, Khanna Publishers, Delhi, 2012.

## **Modern & Contemporary Architecture (150506)**

### **OBJECTIVE**

To understand the impact of industrial revolution and modern architectural works on architectural practice.

### **Module I Introduction of Modern Architecture**

- Effect of industrialization and development of modern architecture.
- Review of the development of Architecture on global level related to all influencing factors regarding evolution of styles. Movement of Modernism including various Architectural and aesthetical philosophies and concepts.

### **Module II Determinants of Physical forms:**

- Understanding the determinants of physical form viz: Space, Structure, Organization, Symbolism, Order, Datum, Axis, Surface, Mass, Void, Scale, Proportion, Harmony, Contrast, Rhythm, Balance, Accentuation etc. based on the comparison between the past development and modern movement.

### **Module III Works of Architects:**

- Study of Modern Architecture based on works and concepts of exemplary Indian and Non-Indian modern architects in 20th and 21st century like Louis Sullivan, F. L. Wright, Louis Kahn, Le Corbusier, Philip Johnson, Charles Correa, Michael Graves, etc.
- Study of environmental design and technology with reference to trend setting works of contemporary architects, designers. Ecologists, engineers etc.

### **Module IV Design Parameters of Modern Architecture**

- Communication and Interpretations of Modern and Contemporary Architecture based on study of literature and existing buildings to understand design parameters principles process, methods, and programme-formulation for design.

### **Module V Trends of Modern Architecture:**

- Relationship of modern architecture with social-cultural developments.
- Relationship of modern architecture with modern Arts.
- Introduction to Non-conventional architectural trends – bio mimicry, intelligent buildings, nano architecture, deconstruction etc. Futuristic trends –utopian architecture.

### **References:**

1. Kenneth Frampton , Modern Architecture: A Critical History , Thames & Hudson, London, 1994
2. Manfredo Tafuri., Modern Architecture, Harry N. Abrams Inc.
3. Leonardo Benevolo, History of Modern Architecture, 2 Vols.,Routledge & Keganpaul, London, 1971
4. Miki Desai et. al., Architecture and independence, Oxford University Press, 2000
5. Thomas Metcalf, An imperial Vision, Faber & Faber/ Electa, 1980.
6. Christian Norburg Schulz., Meaning in Western Architecture, Studio Vista
7. William J. Curtis – Modern Architecture since 1900.

## **Site Planning & Development (150507)**

### **OBJECTIVE**

To develop an understanding of the importance of site conditions for the creation of good architectural solutions and focus on the site as a fundamental component of building design. To examine the interrelationship of intended site use with the environment and also topography, vegetation and landscape, climate, geography, as well as theoretical aspects of site development. To emphasize the synthesis of programmatic and environmental requirements into a coherent concept for building placement and site improvements

### **Module 1**

Introduction to Site analysis, Importance of site analysis ; interrelationship between nature and human interventions , thematic traditions in site design, history of site design as a source for precedent analysis

### **Module 2**

On site and off site factors; Analysis of natural, cultural and aesthetic factors; topography, hydrology, soils, landforms, vegetation, climate, microclimate.; influence of water bodies

### **Module 3**

Site Zoning. Organization of vehicular and pedestrian circulation; parking ; street widths; turning radii ; street intersections ;steps and ramps. Site planning considerations in relation to water systems, sewage disposal, outdoor electrical systems.

### **References:**

1. Richard P. Dober, Campus Planning
2. Kanvinde, Campus Planning in India
3. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967

## **Architectural Design (150601)**

This program gives special emphasis on role of technology in architecture. The design projects to be dealt in the studio should respond to the importance of structure, services and acoustical treatments.

Exercises related to public buildings i.e. commercial centre, hospital, auditorium, cinema, sports complex & educational buildings on sloping/flat sites. Study and incorporation of building byelaws should be complete in this Semester.

Simultaneously, stress should be given on the interior treatment of small and large spaces. Freedom in design is to be given with preliminary introduction of importance and role of byelaws in building design. Minimum one time problem is to be attempted in class, in addition to the major design problems.

### **Note:**

Sessional will be in the form of drawings and models along with Technical report for the design dealt. The evaluation shall be done in intermediate reviews consisting of internal and external experts. There should be regular site visits to buildings, dealt in studio problems, so as to document them with the help of photographs, slides, videocassettes etc.

### **References:**

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
4. Ernst Neuferts Architects Data, Blackwell 2002
5. Ramsey et al, Architectural Graphic Standards, Wiley 2000
6. Richard P. Dober, Campus Planning
7. Kanvinde, Campus Planning in India
8. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967
9. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995

## Interior Design (150602)

### OBJECTIVE

To understand and appreciate the complexities and constraints in the design and execution of architectural interiors.

### CONTENTS

#### Module I (Time-three weeks)

- Introduction
- Understanding the role of interior design in total design process.
- Procedure of Interior design.
- Impact of the interior space on human psychology and behavior

#### Module II (Time-four weeks)

- Applications of colour, form and texture in interiors.
- Various material applications in interiors: walls, floors, ceilings and others
- Principles of aesthetic composition in interiors
- Meaning of spatial organizations, perceptual needs, psychological Needs, convenience, maintenance, durability and image in interior design.
- Use of artificial and natural lighting in interiors.

#### Module IV (Time-four weeks)

- Interior design in terms of retail, hospitality, residential and commercial.
- Interior Design problem with details with focus on corporate interiors

### NOTE

Appraisal for above mentioned issues through various library case studies or live projects.

### REFERENCE BOOKS

- “Interior Design”, Ahmed Kasu, Om Books, 2005
- “Time Saver Standards for Interior design and space planning”, De Chiara, Panero&Zelnik, McGraw-Hill, 1991
- “Interior Architecture” John Kurtich & Garret Eakin, Wiley, 1st Edition, 1995
- “Interior Spaces”, Hans DiterSchaal, Wiley, 1995
- “International Interiors”, Lucy Bullivant, Laurence King Publishing, 1993

## Working Drawing-II (150603)

The students shall bring one of their previous semester's major projects for preparation of working drawing.  
Site Visits to ongoing related construction projects.

**Note:** Sessional shall be in the form of full set of working drawing and design details of given building. The sessional marks will be based upon the portfolio submitted and internal viva

## **Building Services -II (150604)**

### **OBJECTIVE**

To familiarize the students with fundamentals of mechanical, electrical and acoustic services & their integration with architectural design.

### **Module I (Time- four weeks): Mechanical services**

- The fundamental principles of Psychometrics and heat transfer.
- Methods of Air conditioning, Fittings, fixtures, accessories and equipment used in various types of air-conditioning along with their construction details and basic load calculations.
- A.C. duct design and layout with constructional details. (Including calculations.).
- Lifts and movable walkways, escalators including study of their operation, function, layouts and design details

### **Module II (Time- four weeks): Electrical services**

- Thermal, Mechanical & Electrical energy and its generation
- Electrical distribution systems and safety devices
- Types of wiring systems, advantages and disadvantages, safety and precautions,
- Internal wiring, loads, demand, tariffs and rules
- Types of electrical equipments used in a building such as motors, fuses, switchboards etc.
- Introduction to Indian Electricity rules related to buildings.
- Introduction to wiring system in a multistoried building. Detailed studies of the electrical Fittings such as MCB's, ELCB's, fuse units, control panels etc.
- Standard symbols for various fixtures as per National Building Code 2005
- Exercise: Preparing an electrical layout with all necessary details for a small building/residence.

### **Module III (Time-five weeks): Acoustics**

- Introduction to general principles of sound such as Reverberation, Absorption, Reflection, etc..
- Introduction to Building acoustics with reference to various building types such as studios, auditoriums etc.
- Detailed studies of various types of Acoustical materials and their application.

### **REFERENCE BOOKS**

- IS 732: 1989 - Code of Practice for Electrical Wiring Installations.
- "Electrical Design & Drawing: with estimation and costing", Surjit Singh, Dhanpat Rai & Co (p) Ltd., 2007.
- "Lighting Design Handbook", Lee Watson, McGraw-Hill Inc., USA, 1990.
- "Architectural Lighting Design", Gary R. Steffy, Van Nostrand Reinhold, 1990.
- "Fundamentals of Acoustics", Lawrence E. Kinsler, Austin R. Frey, Alan B. Coppens and James V. Sanders, John Wiley & Sons; 4th Edition, 2000.
- "Acoustics in the Built Environment: Advice for the Design Team", Peter Mapp, Peter Sacre, David Saunders and Duncan Templeton, Architectural Press, 1993.
- Elevators, Escalators, Moving Walkways – Manufactures catalogues



## **Advanced Structural Systems & Technology (150605)**

### **Module I**

- Design of combined footings (rectangular).

### **Module II**

- Design of flat slab.

### **Module III**

- Design of column (Biaxial bending) (By using S.P.16).

### **Module IV**

- Design of beam curved in plan.

### **Module V**

- Detailing of Earthquake Resistance construction Introduction Cyclic behaviour of concrete and reinforcement Significance of ductility Ductility of beam Design for ductility Detailing for ductility

### **Note:**

1. I.S. code 456 and S.P. 16 shall be permitted in examination.
2. Computer aided design of structure (with SAP or other relevant software) could be taught in tutorial classes.
3. Computer aided practical classes could be taken up.
4. Sessionals work shall include assignments/tests on the above topics.
5. In theory examination there will be a separate question from each unit with choice within the unit/question. All units/questions will be compulsory.

### **References:**

1. B.C. Punmia, Reinforced Concrete Structures, Vol. 1 & 2, - Laxmi Publications, Delhi, 1994.
2. IS 456:2000, Indian Standard, Plain and Reinforced Concrete – Code of Practice, Bureau of Indian Standards.
3. SP – 16, Design Aids for Reinforced Concrete to IS 456
4. National Building Code of India, 1983
5. IS 1905, Code of Practice for Structural Safety of Buildings
6. P.Dayaratnam , Design of Reinforced Concrete Structures, Oxford and IBH Publishing CO., 1983.
7. N.C.Sinha and S.K.Roy, Fundamentals of Reinforced Concrete, S.Chand and Co., New Delhi, 1983.
8. Ashok K.Jain Reinforced Concrete (Limit State Design) - Nemchand, Bros Roorkee 1983.
9. Krishna Raj, Prestressed Concrete Structures

## Estimation Costing & Specification Writing (150606)

### OBJECTIVE

To familiarize the student with the commonly used methods of preparing estimates of Architectural Projects.

### CONTENTS

#### Module I (Time-four weeks)

- Introduction to different types of specification and their uses.
- Writing specification for civil works of the design project done during the previous Semester starting with excavation, earth work, foundations, damp proof course, brick masonry work, concreting, flooring, plastering, painting, doors and windows, painting, varnishes, sanitary fixtures, electric fixtures etc.
- Importance of specification as part of contract documents.

#### Module II (Time-nine weeks)

- Introduction to cost estimation and definitions of related to estimate.
- Introduction to the types of Preliminary Estimates and their preparation.
- Introduction to the types of Detail Estimates, methods of details of measurement and their application, item of work , measurement of typical elements, viz., arches, steps, and polygonal rooms.
- Introduction to Bill of Quantities of Materials for RCC work in slab, beam, column, stair cases etc.
- Detailed studies to preparation of estimated cost/bill of quantities use of schedule of rates, analysis of rates and break up of material required.
- Illustrative examples for the same.

#### Module III (Time-three weeks)

- Introduction to Standard rates and their derivation from given rates.
- Case studies/practical expertise in preparing detailed estimates of quantities of materials and analysis of rates of materials and labor for a small residential building.

### NOTE

- The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.
- Scope of the subject will be limited to preparing detailed estimate and costing of two storied residential building in masonry and reinforced cement concrete.

### REFERENCE BOOKS

- “Estimating and Costing in Civil Engineering”, B.N.Dutta, UBS Publishers & Distributors Ltd., 2006.
- “Text Book of Estimating and Costing (Civil Engineering)”, G.S.Birdie, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2015.
- “Cost Planning of Buildings”, Douglas J. Ferry, Peter S. Brandon and Jonathan D. Ferry, Wiley- Blackwell; 7 th editions, 1999.
- “Building Construction Estimating”, Stephen D. Schuette and Roger W. Liska, McGraw-Hill College, 1994.

## Energy Efficient Architecture (150607)

### OBJECTIVE

To familiarize the students with role of energy in built environment and for the efficient use of energy in design process.

### Module I (Time-three weeks)

- Types, availability and reserves of conventional and non-conventional energy sources.
- Energy Conservation, Indian Energy Conservation Act 2001 Features, Energy Star Rating of buildings and Equipments, Bureau of Energy Efficiency.

### Module II (Time-six weeks)

- Energy Conservation Building Code (ECBC).
- Energy Building Code, Guidelines: Thermal Insulation, Heating, Ventilation and Air .
- Conditioning System, Building Lighting Design: Lighting levels, light efficient options, CFL,
- LEDs, Fixtures, Day lighting timers, Building Energy Management.

### Module III(Time-seven weeks)

- Introduction to Building rating systems in India. Detailed study on LEED and GRIHA (Green Rating for Integrated Habitat Assessment).
- Case study national and international examples.

### REFERENCE BOOKS

- “Renewable Energy Sources and Their Environmental Impact”, Shahid A. Abbasi, Naseema Abbasi; PHI Learning Pvt. Ltd., 2004
- “Energy efficient buildings: architecture, engineering and environment”, Dean Hawkes, Wayne Forster; W.W. Norton & Company, 2002
- Indian Energy Conservation Act 2001, Gol
- Energy Conservation Building Code Manual, Gol
- “GRIHA Manuals”, The Energy and Resources Institute (TERI), 2011
- “Energy-efficient Buildings in India”; The Energy and Resources Institute (TERI), 2001

## **Architectural Design (150701)**

In the design studio stress shall be given on building design with use of modern technology. Multistoreyed building with use of lifts, escalators, air conditioning etc. Stress is also to be given on detailing of the services, parking and fire fighting.

Problem should be of different nature in terms of scale, site potentials and constraints. E.g. Factories, Film Studios, Computer Centres, Hotel, Multi-storeyed offices, Apartments. Commercial Centres etc.

Two time problems, in addition to regular studio assignment shall be given.

### **Note:**

Submission of the Sessional will be in the form of drawings and models along with Technical report for the design dealt. The evaluation shall be done in intermediate reviews consisting of internal and external experts. There should be regular site visits to buildings, dealt in studio problems, so as to document them with the help of photographs, slides, videocassettes etc.

### **References:**

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
4. Ernst Neuferts Architects Data, Blackwell 2002
5. Ramsey et al, Architectural Graphic Standards, Wiley 2000
6. Richard P. Dober, Campus Planning
7. Kanvinde, Campus Planning in India
8. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967
9. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995

## **Introduction to Thesis Project & Dissertation. (150702)**

### **OBJECTIVE**

To make the students equip in and Data Collection, Analysis and Research of Architecture and Planning, Urban and Rural development and Socio-Economic conditions.

### **CONTENTS**

#### **Module – I (Time-sixteen weeks)**

##### **Scope for Design/ Research Dissertation:**

- Topics / projects related to architecture and Planning
- Rural and Urban redevelopment projects
- Landscape projects

##### **Contents of report**

- Introduction
- Literature study and case study
- Analysis and Inferences
- Conclusion

### **NOTE**

- Design dissertation on a topic (project) shall be approved by the department separately for each student in the end of previous semester. Projects may be based on ongoing, proposed development or new investigation in the related area.
  - Students are also required to submit their thesis topics after the Viva-voce.
  - Students are required to stay for a week for discussion on thesis topics and guide (External / Internal)
- Students are required to proceed for Case studies and Data collection of their respective approved Thesis topic in consultation with their Thesis Coordinators. This work has to be completed by the students in the summer break at the end of this semester

## **Elective (S2) 1-Urban Design (150703)**

### **OBJECTIVE**

To understand the principles and applications of urban design.

### **CONTENTS**

#### **Module I (Four Weeks)**

- Introduction to Urban Design, its Principles and Techniques, Scope of Urban Design. Emergent concepts in urban design, Role of UAC.
- History & Heritage of Urban Design.
- Urban Design vocabulary, Elements of Urban Design.
- Concept of Urban Redevelopment, Urban Renewal and Urban Regeneration.

#### **Module II (three Weeks)**

- Importance of context in Urban design (Context analysis, regional study and project understanding).Impact of Factors such as economy, politics, religion and regional on urban design.
- Gentrification and social Imbalance.
- Concepts to be kept in mind (Gender issue, elderly People and Child) while designing.
- Study of Futuristic city and new urbanism.

#### **Module III (Four Weeks)**

- Concept of Neighborhood planning. Study of existing urban developments.
- Urban design exercises.

### **REFERENCE BOOKS**

- “Urban Design: Green Dimensions”, J. C. Moughtin & Peter Shirley, Architectural Press, First Edition, 1996
- “A New Theory of Urban Design (Center for Environmental Structure Series, Vol 6)”, Christopher Alexander, Hajo Neis, Artemis Anninou & Ingrid King, Oxford University Press, 1987
- “The Urban Design Handbook: Techniques and Working Methods” ,Ray Gindroz, Urban Design Associates,2003
- “Urban Design: Street and Square, J. C. Moughtin, Architectural Press ,Third Edition”, 2003
- “ Urban Spaces, No. 4”, John Dixon, Visual reference publication, 2006

## **Elective (S2) 2-Housing (150704)**

### **OBJECTIVE**

To equip students to deal with housing, along with the related issues of existing Housing stock and its future requirement.

### **CONTENTS**

#### **Module I (Time-three Weeks)**

- Introduction to housing & human settlements, Housing policies and programs, settlements in the development of human civilization, role of Housing in social and economic development of the nation.
- Housing in five year plans & Social Housing plans.
- National housing Policy

#### **Module II (Time- four weeks)**

- Major elements of housing policy: land, finance, material, technology & legislation. Development concepts and human settlement planning.
- Slum area development.

#### **Module II (Time- three weeks)**

- Mass housing programs. Housing design and standards. Rural Housing.
- Housing design & standards, units of housing design form and structure of housing as shaped by socio economic and physical parameters, housing systems & sub systems. Partial and integrated environment quality; post occupancy evaluation, housing Satisfaction, housing demand and policy analysis.

### **NOTE**

The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

### **REFERENCE BOOKS**

- Bennett L. Hecht (1990), "Developing Affordable Housing: A Practical Guide for Nonprofit Organizations" (Wiley Nonprofit Law, Finance and Management Series)
- Thomas Sowell (2009), "The Housing Boom and Bust"
- Sam Davis (1995), "The Architecture of Affordable Housing"
- Barbara Miller Lane (2009), "Housing and Dwelling: Perspectives on Modern Domestic Architecture"
- Barbara Miller Lane (2006), "Housing and Dwelling: Perspectives on Modern Domestic Architecture"
- Affordable Housing and Public Policy : Strategies for Metropolitan Chicago (Assembly Book); Lawrence B. Joseph (Editor)

## **Elective (T1) 1-Architecture Journalism (150705)**

### **OBJECTIVE**

To equip students to deal with housing, along with the related issues of existing Housing stock and its future requirement. This course covers topics on in the photography in relation to Architecture & Journalism. The objective of the course is to make students aware about importance of visually analyzing the architecture and its interpretation through journalism.

### **CONTENTS**

#### **Module I (Three Weeks)**

- General introduction to the art of photography; concept of color; concepts of lighting, distance, visual angle, Frames; media;

#### **Module II (three Weeks)**

- Types of camera, properties and priorities; Exposure, Aperture, Speed; Photographic films, Film processing color, black and white, printing techniques, developing.

#### **Module III (four Weeks)**

- Analysis of recent historical and contemporary examples of written and journalistic criticism of architecture, including selected writings by Indian and overseas critics; discursive techniques, analysis of major critical themes, thematic categories in architectural writing over the past three centuries.
- Works of Indian and international writers and critics will be presented and discussed. Seminars on Indian architectural writers, journalists and critics.
- Exercise on integrating photography in architectural journalism.

### **REFERENCE BOOKS**

- “Professional Secrets of Advertising Photography”, Paul Markow; Amherst Media, 1998
- Encyclopedia of practical photography, Eastman Kodak Company; Amphoto, 1979
- “The New 35mm Photographer’s Handbook: Everything You Need to Get the Most Out of Your
- Camera”, Julian Calder, John Garrett; Three Rivers Press, 1999
- Digital Photography for Dummies, Julie Adair King; John Wiley & Sons, 2012



## **Elective (T1) 2-Intelligent Buildings (150706)**

### **Module I- Introduction**

- Introduction & Origins of the Intelligent Buildings Concept.
- Definition and characteristics of Intelligent Buildings with brief history and contemporary concept.
- Automated buildings,
- Responsive buildings.

### **Module II- Facility Management**

- Study of Concepts of Management of facilities,
- Importance and study of planning and operational techniques for facility management.
- various models of Building Intelligence.

### **Module III- Services**

- Demands on building and services,
- Control systems,
- Study of development of Computer Integrated Building from single function systems to integrated solutions.
- Use of building intelligence in energy management.

### **Module IV- Key Issues for Intelligent Buildings**

- Multiple activity settings,
- Generic analysis of space utilization.
- Models for shared space use.
- The development of briefing process including design activity and building elements, life cycles, Coordination between life cycle, building technologies.
- Study of issues related to site, shell, skin, services and technology.

### **Module V- Intelligent design and construction**

- Effective Space utilisation,
- Expectations of user, effectivecommunication of architectural concepts to user, Locating people and information,
- Introduction to building efficiency with respect to life cycle costs.

### **REFERENCE BOOKS**

- Building Automation Systems – A Practical Guide to selection and implementation – Author :Maurice Eyke
- National Building Code of India 1983 (SP 7:1983 Part IV) – Published by Bureau of Indian Standards
- IS 2189 – Selection, Installation and Maintenance of Automatic fire Detection and Alarm System – Code of Practice (3rd Revision) – Published by Bureau of Indian Standards.
- The Principles and Practice of Closed Circuit Television – Author: Mike Constant and Peter Turnbull
- Rules of Automatic Sprinkler Installation – 2nd Edition – Published by Tariff Advisory Committee.
- Fire Suppression Detection System – Author : John L. Bryan
- Design and Application of Security/Fire Alarm system – Author: John E. Traister.

## **Elective (T2) 1-Landscape Design (150707)**

### **OBJECTIVE**

This course is aimed at providing a comprehensive knowledge regarding ecological aspects and environmental concerns in landscape design besides the advanced knowledge of basic elements of landscape design.

### **CONTENTS**

#### **Module I (Time-two weeks)**

- Introduction to the elements of landscape such as Earth form, Water and Vegetation and their effect in relation to the built environment. Plant types, characteristics, structure and color of foliage.

#### **Module II (Time-four weeks)**

- History, nature and scope Purpose of designed open space.
- Exposure to historical landscape (English, French, Italian, Chinese, Japanese, Mughal, Ancient India) and their relevance in their time, context and social needs.
- Introduction to ecology and its importance to Landscape designers.

#### **Module III (Time-three weeks)**

- Site analysis and site structure unity.
- Advanced knowledge of basic elements of Landscape Design and their effects in context to the environmental concerns
- Basic knowledge of contour/mapping and various methods of documentation of physical features, topography and landscape elements.

#### **Module IV (Time-three weeks)**

- Case studies of varied urban situations with typical different landscape characters in Chandigarh,
- Delhi region to analyze and assess their present landscape status by applying knowledge and techniques acquired as above.
- Landscape design proposal based on above mentioned analysis as a studio exercise.

### **NOTE**

The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

### **REFERENCE BOOKS**

- “Time-saver standards for landscape architecture: design and construction data”, Nicholas T. Dines, Kyle D. Brown; McGraw-Hill, 1998
- “Landscape design: a practical approach”, Leroy G. Hannebaum; Reston Pub. Co., 1981
- “Landscape design: an international survey”, Ken Fieldhouse; Overlook Press, 1993 Landscape Detailing, Micheal Littlewood; Routledge, 2001
- “Planting Design”, Theodore D. Walker; John Wiley & Sons, 1991
- “Landscape Architecture Construction”, Harlow C. Landphair, Fred Klatt; Prentice Hall PTR, 1999
- “Landscape As Inspiration”, Hans Dieter Schaal; Academy Editions, 1994
- “Introduction to Landscape Design”, John L. Motloch; John Wiley & Sons, 2000
- “Landscape Architecture: A Manual of Site Planning and Design”, John Ormsbee Simonds; McGraw Hill Professional, 1998
- “Trees of Chandigarh”, Chhatar Singh, Rajnish Wattas, Harjit Singh Dhillon; B.R. Publishing Corporation, 1998

## **Elective (T2) 1-Conservation of Architectural Heritage & Management (150708)**

### **OBJECTIVE**

To equip students to deal with Architecture conservation, along with the related design issues of existing Architecture, old Monuments, and natural and urban heritage areas.

### **CONTENTS**

#### **Module I (Time-four weeks)**

- Interactive session of History of heritage Buildings and cities.
- Introduction to conservation of Historic Buildings.
- Concepts and approach's to conservation in India and other countries.

#### **Module II (Time-three weeks)**

- Institutional Aspects of Conservation
- Conservation related Charters
- World Heritage legislation and Sites
- Conservation Acts & Legislation
- Archaeological Acts

#### **Module III (Time-five weeks)**

- Conservation Area practice, adaptive reuse, up gradation programs in old areas, infill design.
- Conservation of traditional water systems.
- Upgrading infrastructure, financing and implementation framework for redevelopment and revitalization projects.

### **REFERENCE BOOKS**

- Architecture in Conservation: Managing Development at Historic Sites (Heritage: Care- Preservation-Management) –James Strike
- Protection, Conservation and Preservation of Indian Monuments- Shanti Lal Nagar
- Architectural and urban conservation- Santosh Ghosh, Ranajit Gupta, Sumita Gupta
- History of Architectural Conservation- Jukka Jokilehto

## **Architectural Design Thesis (150801)**

### **OBJECTIVE**

All the four years of learning architectural design and allied subjects culminate in design thesis project to motivate a student in investigative attitude individual methodology. Thus to train in handling projects independently

Evaluation will be based on major project as per details below:

### **Stage I (Synopsis)**

Introduction, Validity, Aims & Objective, Methodology, Site Conditions and tentative space requirement

### **Stage II**

Synopsis, Case Studies, Data Analysis, Library study and Framing of the requirements, Design philosophy.

### **Stage III**

Concept, Pre-Final design proposal and Block Model. Detailed working drawings showing any two of the following services: Air-conditioning, Landscape, Structure, Interior detailing, Water supply & Sanitation or any other detail. Hard Bound report.

### **Stage IV**

Final design proposal along with model/views, to be evaluated by external examiner.

### **Teaching & Evaluation system**

- The thesis studio will be conducted under the overall coordination of the thesis coordinator. In addition, one members of the Visiting/Expert Faculty would also be associated throughout the duration of the studio. Each student will be assigned a Thesis Guide (amongst the faculty), who will supervise the progress of the student's work on a regular basis.
  - Approval of the thesis project will be done by the team comprising of the head of the department, the thesis coordinator and the respective thesis guide.
- Each student should have minimum one internal guide

## Professional practice, ethics & Tendering Process (150802)

### OBJECTIVE

Introduction to the professional, vocational and legal aspects of architectural practice and profession.

### CONTENTS

#### Module I (Time-two weeks)

- Architectural professional association, its role and responsibilities.
- Introduction of Architects Act 1972. Council of Architecture – its role and responsibilities.

#### Module II (Time-two weeks)

- Code of professional conduct.
- Condition of engagement and scale of professional fees.
- Copyright Act as applicable to architectural work.
- Architectural competitions.

#### Module III (Time-Five weeks)

- Contract –Types, Preparation of contract documents general conditions of contract, interim certificates defect liability period, retention amount and virtual completion.
- Duties and liabilities of architects, contractors.
- Articles of agreement, execution of work payment and Arbitration.
- Tenders – types and the process of calling, security and selection system.
- Pre- Tender qualifications and registration of contracts.
- Office organizations and management, Role of design staff and supporting managerial staff; Personal management.

#### Module IV (Time-two weeks)

- Human Values: Morals, Values and Ethics, Integrity, Work Ethics, Service Learning, Civic Virtue, Respect For Others, Living Peacefully, Caring, Sharing, Honesty, Courage, Valuing Time, Co-Operation, Commitment, Self Confidence, Spirituality.

#### Module V (Time-three weeks)

- Introduction to Valuation.
- Role of Valuers
- Types , methods and importance of valuation

### NOTE

The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

### References:

- “Ethic in Engineering”, Mark Martin and Roland Schinzinger, Mccgrew hill, 1999
- “Architects Handbook, A Ready Reckoner”, CharanjitS.Shah, 2000
- “Town Planning”, Rangwala, 2001
- “Handbook on Professional Practice”. The Indian Institute of Architects.
- “Professional Practice”, Roshan Namavati, 2004
- “Estimation, Costing and Valuation (Professional Practice)”, Rangwala, 2002
- “Directory of Architects, List of Architects and Professional documents – Council of Architecture Architects Handbook”, A Ready Reckoner – Charanjit S.Shah

## **Elctive (T3) 1-Disaster Management (150803)**

### **OBJECTIVE**

To let the students understand the type of in natural disasters and its effects on structural and non- structural elements. To understand the mechanism involved in the management of disasters.

### **CONTENTS**

#### **Module I (Time-four Weeks)**

- Introduction to Natural Disasters.
- Introduction to disaster management, Rules and Notification.
- Natural Disasters: Earthquakes, Floods, River Erosion, Cyclones Tsunami Landslides & Avalanches Forest Fires

#### **Module II (Time-three Weeks)**

##### **Disaster preparedness and response and rehabilitation**

- Preparedness and Mitigation measures for various Disasters
- Preparation of Disaster Management Plans
- School Awareness & Safety Programme.
- Issues in Environmental Health, Water & Sanitation.
- Earthquake Mitigation, Floods, Fire, Landslides and other natural calamities

#### **Module III (Time-five weeks)**

##### **Post Disaster Relief & Logistics Management**

- Emergency Support Functions and their coordination mechanism.
- Resource & Material Management.
- Management of Relief Camp.
- Information systems & decision making tools.

#### **Module IV (Time-four weeks)**

##### **Roles and responsibilities of different agencies**

- Voluntary Agencies & Community Participation at various stages of disaster management.
- Integration of Rural Development Programmes with disaster reduction and mitigation activities.
- Role of Remote Sensing, Science & Technology.
- Rehabilitation Programmes

### **REFERENCE BOOKS**

- "Disaster Management in the Hills", Dr. Satendra, Concept Publishing Company, 2003.  
"Disaster Management", Harsh K. Gupta, Universities Press, 2003.  
"Natural Hazards and Disaster Management: Vulnerability and Mitigation", R. B. Singh, Rawat; Reprint edition, 2006.  
"Proceedings of the National Conference on Disaster & Technology, 1998, Manipal, India", Nirmita Mehrotra, 1998.  
"Disaster Risk Reduction in South Asia", Sahni, Pardeep, Ariyabandu and Madhavi Malalgoda, PHI Learning, 2003.

## **Elctive (T3) 2-Construction Management (150804)**

### **OBJECTIVE**

To let the students understand the onsite problems related to building construction and causes of delay in construction, as well as to inculcate the skills as a team manager.

### **CONTENTS**

#### **Module I (Time-four weeks)**

- Aim, objectives and functions of Construction Management.
- Construction stages, Construction team
- Role of an architect in construction management.
- Management techniques and tools.

#### **Module II (Time-six weeks)**

- Bar charts and limitations of bar charts.
- Program Evaluation and Review Techniques (PERT)
- Critical Path Method (CPM) for project management
- Development and analysis of CPM net work
- Cost time analysis in network planning
- Scientific methods of construction management

#### **Module III (Time-six weeks)**

- Project management for repetitive types of buildings. Line of balance method – its working knowledge with exercises.
- Resources scheduling methods through Bar charts, CPM and Line of Balance method.
- Inspection and quality control.
- Safety in Construction.

### **NOTE**

The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

### **REFERENCE BOOKS**

Construction Planning and Management – U.K.Shrivastava  
Total Construction Project Management – George J Ritz

## **Professional Training (150901)**

The aim of practical training is to expose the students to the world of Professional Practice and get training under the guidance of an Architect, registered with Council of Architecture, India, who is actively engaged in Architectural Practice. In case the student opts to go abroad he/ she will work under the guidance of the professional who is registered with the Council/ any other organization controlling the profession of Architecture in the respective country. It will give the students experience of dealing with live projects of various nature and also the site experience to see how the projects get built on the site. The students will also be able to learn about the Office Management, Project Management, Contract Management, Human Resource Management, new construction materials and new techniques of construction, advance building services, landscape and environmental designing etc.

Students can proceed for Phase-II (Professional Training) only after acquiring pass grades in all eight semesters (Phase-I). They need to take admission to both Ninth and Tenth Semester and then proceed for the training.

The students will have to undergo practical training for a period of two semesters (one year) so as to qualify for obtaining the final B. Arch degree. No student will be allowed to change training offices more than twice during entire training period. The student has to appear for the viva voce examination as per schedule announced by the Institute at the end of the training period. There would be no examination at the end of Ninth Semester. So there is no need to fill examination form for Ninth Semester.

The examination form of Tenth Semester should be filled as per the schedule of the institute.

### **The students are advised to do the following during their training:**

- Filling of log sheet and obtaining office certificate – the students shall fill the Log sheets as record of everyday work and shall submit the same duly authorized by the Trainer, along with a certificate and confidential report from the Trainer. In the confidential report (the format of which will be provided by the Department) the trainer shall also allot the TA marks, based on the work of the student. If the student changes the office during training, TA marks should be obtained from all the Trainers and averaging of the marks will be made during finalization of TA marks. The log book has to be presented during the final Viva Voce examination.
- The student shall collect copies of all the works done during training, duly authorized by their Trainers, for the final viva voce examination. These works may include working details, quantity survey, and any special work done during the training period.
- The students should also acquaint themselves with site supervision and practices – including checking site measurements, preparation of bills, site instructions, checking of executed works etc.