

Sixth Semester B.Arch.

6S-A-1

Architectural Design VI

Objectives: The focus will be on site planning, contour negotiation and campus planning.

The design process to deal with following aspects

1. Site planning, road geometry, parking lots etc.
 2. Design guidelines for sloping site and Contour management.
 3. Modules, super-modules, clusters and their relationship.
 4. Various horizontal connecting elements.
-

Sessional Works: Design of schools, resorts, educational campuses and recreational spaces etc.

6S-A-2

Allied Design Studio VI

The course content will be developed by the individual colleges as per their choice of allied design scheme.

6S-A-3

Building Construction and Materials VI

Objectives: To familiarize the students with the advanced building technologies.

Unit I: Space Structures, Introduction, Definition, design and structural principles. Types of Space Structures, in different materials. Skeleton / Grid Structures - definition, design and structural principles. Various types / category / varieties - Single layer / Double layer - Constructional and design aspects about Flat Grids, Spatial Grids, Single and Double Curvature skeletons. Advantages, Disadvantages.

Unit II: Prestressing- Introduction to Prestressed Concrete. Need /Reasons and Principles of Prestressing. Different methods and systems of Prestressing such as Pre tensioning, Post tensioning, Chemical and Thermal. Their application Various types / methods of Post Tensioning such as Freyssinet, Magnel Blaton, Gifford-Udal, Lee-McCall, CCL etc. Examples, advantages, disadvantages.

Unit III: Precast Cement Concrete Construction / System: - Introduction, definition. Need / Reason for this system. A complete study (from foundation to roof) of various systems such as Fully Precast and Composite and various types / subsystems under them - their design and structural principles, constructional and joinery techniques/concepts and details with examples. Precautions, advantages, disadvantage over cast-in-situ construction.

Unit IV: Temporary Structures - Utility / Purpose - various functions. Introduction, design and structural principles, Materials, Construction and Joinery Techniques. Design, constructional aspects and detailing. Design and constructional drawing and details for problems on Small temporary Structures, by employing commonly used building materials.

References:

- Hayder, A. R. (2014). Strengthening Design of Reinforced Concrete with FRP. CRC Press.
 - Bureau of Indian Standards. (1993). Code of practice for ductile detailing of RC structures subjected to Seismic forces. IS:13920.
 - N Subramanian. Principles of Space structures. Publisher: Wheeler Publishing.
-

6S-A-4

Working Drawing II

Objectives: To strengthen the students' knowledge about preparing detailed working drawings for various building elements.

In continuation of previous semester, students shall be required to handle the projects of greater magnitude in this semester and they shall be trained to prepare working drawings of a class problem already completed in design class having Multi-storeyed R.C.C. framed structure. A set of working drawings shall contain the followings.

Unit I: Centerline plan, all floor plans, lintel and slab level plans.

Unit II: Sections, elevations and large- scaled details,

Unit III: Site development Plan showing landscaping roads .

Unit IV: Toilet details, Drainage Layout showing soil, waste and rain water drainage system. Sanitary. Fittings, traps, inspection chambers etc.

Unit V: Water supply layout indicating supply tapping point with meter, supply line to storage tanks and connections to different equipment in building.

Unit VI: Electrical layout showing meter board and power supply lines to different parts of building and different equipment.

Sessional Work: Plates on above topics.

References:

- National Building Code (NBC)

- Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). The professional practice of architectural working drawings. 4th Ed. Hoboken : John Wiley & Sons.

6S-A-5

Structural Design & Systems VI

Objectives: The course intends to develop understanding about the structural behavior of various types of steel structural systems, that are commonly employed in construction industries.

It also exposes the students to the methods that are used to design the steel structural system for specific condition and loadings.

Unit I: Overview of the Structural System in Architecture.

Study of concept & configuration in steel structure like geodesic dome, space frame, tensile structure and other Innovative structural forms.

With suitable examples from historical and contemporary architecture.

Unit II : Study of IS 800- 1984 – Design Considerations.

(Without Limit state method)

Steel Connections – Welded Joints

1. Types of Welds.
2. Concentric Sections.
3. Eccentric Sections.
4. Sections in Bending.
5. Sections in Torsion.

Unit III: Design of Tension Members

(Using standard sections)

Unit IV: Design of Compression members

(Using standard sections)

Unit V: Design of Built in Columns

(Excluding Design of Battens and Lacings)

Sessional work: Sketches/ Notes/ Tutorials & Presentations

Desirable: Site visits to develop better understanding of above.
To prepare relevant study models on above,
Laboratory exposure wherever possible.

References:

- Ramachandra .S Design of steel structures Vol. I, Standard publication, New Delhi, 1992.

- Vazirani V.N, and Ratwani M. M, Steel structures, Khanna Publications, New Delhi, 1995.
- Duggal S.K. (2017) Design of Steel Structures, Mcgraw Hill Education.
- L. S. Negi (2017) Design of Steel Structures, Mcgraw Hill Education.
- Steel Tables by Ramamrutham , S. New Delhi: Dhanpat Rai Publications Ltd.
- IS 800- 1984.

Theory of Architecture

Unit I: Introduction of Architectural Design: Definition of Architecture; Elements of Architecture backed by need and followed by fulfillment of need.

Unit II: Scope of Architectural Design: Architectural Design – An analysis – Integration of aesthetic and function.

Unit III: Architectural Space and Mass: Mass and space, Visual and emotional effects of geometric forms and their derivatives – Sphere, Cube, Pyramid, Cylinder, Cone, etc.

Unit IV: Aesthetic Components of Design: Proportion, scale, Balance, Rhythm, Symmetry, Hierarchy, Pattern, Axis with building examples.

Unit V: Application of Colour in Architecture: Effect of colour in architecture – Colour symbolism.

Unit VI: Organization of Forms and Spaces

- a) Spacial relationships: i) Space within space; ii) Interlocking Space; iii) Adjacent Space; iv) Space linked by common space.\
- b) Spacial organization – influencing factors and their types: i) Centralised; ii) Liner; iii) Radial; iv) Clustered; v) Grid.
- c) Articulation of Forms and Space types: i) Edges and Corners. li) Surface.

Unit VII: Character and Style in Building: Factors influencing the character and style in buildings, study of examples in contemporary architecture (including Modern and post Modern).

Unit VIII: Principles of Composition.

Unit IX: Harmony and specific qualities of design to include dominance, punctuating effect, dramatic effect, fluidity, climax, accentuation and contrast with building examples.

Unit V: Circulation

Study of circulation pattern and its relation to organization functional spaces and activities.

Building Services III

Objectives: This part of the building services deals with various systems and components of complex Electrical services, ventilation systems, Air Conditioning systems and brief study of Centralized Domestic Gas Piping system for large scale projects. The students shall be made aware of Architectural design consideration regarding space allocation and design of building elements to anchor these services so as to achieve balance of functional efficiency and building aesthetics. This shall also help student to establish a sound communication in terms of design with a wide range of consultants, fabricators, wanders and contractors.

Unit I: Electrical Systems, supply and distribution for group housing projects, urban complexes, high-rise building etc. brief load calculations and distribution systems for areas mentioned above.

Unit II: Importance, functions and design considerations for installation of bus bar. Details of bus bar chamber. locational aspects of Step up and step down transformers, electrical substation, stand by generators, automatic relays, invertors, etc.

Unit III: Natural and mechanical ventilation, Need of mechanical ventilation, Types of fans and Blowers for industrial ventilation. Effects of installation of fan in ventilation such as Exhaust and Plenum effect etc.

Unit IV: Principles of Psychometrics and heat transfer, Study of Air conditioning systems and their applicability as per Regional, Functional and Equipment variation.

Components of A.C. systems such as Chilling plants, Cooling towers, Air Handling units, V.R.V / V.R.F. and Air distribution systems, ducts and ducting layouts, etc. Calculation of A.C. loads, space requirement, integration of A.C. system at design stage, Water demand for A.C. in brief.

Unit V: A brief study of the Centralized Domestic Gas Piping system, Introduction-function, application, merits, and demerits. Design of various building elements and their location criteria to anchor the services such as walls, Floor and their features, ceiling, Shafts or ducts, tranches, chambers etc.

References:

- Bovay, H. E. (1981). Handbook of Mechanical & Electrical systems for Buildings. McGraw-Hill Higher Education.
- Sawhney, G. S. (2006). Fundamentals of Mechanical Engineering: Thermodynamics, Mechanics and Strength of Materials. New Delhi: Prentice Hall of India.

- Abnwo, F. and Others. Electrical Engineering Handbook.
- Fred Hall & Roger Greeno. Building Services Handbook

6S-A-8

Landscape Architecture I

Objectives: To introduce students to the discipline of landscape architecture and its relevance to architecture. To understand the role and importance of landscaping and site planning in enhancing and improving the quality of building environs, functionally and aesthetically.

UNIT I: Introduction

Meanings / Definitions and concepts. Need and Scope, Experience of landscape. Relation with allied fields, Biosphere and Ecology.

UNIT II: Early Civilisations: Babylon, Persian, Mogul, Medieval Europe, Chinese and Japanese.

UNIT III: Western Civilisation, Post Industrial revolution, Park movement.

UNIT IV: Elements of designed landscape- Natural and Manmade elements. Different factors and components of a landscape. Social and economical factors. Psychological considerations of spaces and enclosures. Brief idea about manmade components like walls, fences, entrances, gates, barriers, screens, planters, roads & pathways, street furniture, signage, services-electrical, water supply and drainage.

UNIT V: Basic natural components - Land, Trees, Water and Climate. These elements should become invariable component throughout the study of history of Landscape.

Sessional work: Could be in the form of a write-up, abstracts in 2d /3d, Notes, seminars, etc..

References:

- Appleton. (1996). *The Experience of Landscape*. Wiley.
- Geoffrey, and Jellico, S. (1987). *The Landscape of Man*. Thames and Hudson.
- Holl, G. P. (2006). Questions of Perception Phenomenon logy of Architecture. Richmond : William Stout Publishers
- Laurie. (1986). *An Introduction to Landscape Architecture*. Elsevier.
- Reid, G. (2002). *Landscape Graphics*. New York : Watson-Guptill.
- Simonds, J. O. (2006). *Landscape Architecture: A Manual of Land Planning and Design*.

6S-A-9

Elective VI

Campus Planning/ Interior Design/ Architectural Appreciation/ Green Architecture/ Biophilic Architecture/ Institutional Project 6

Note: Following are the suggestive contents; institutes have freedom to formulate the content as per their school of thought

Campus Planning

Key Words: Flexibility, Efficiency, Synergistic relationship, physical bridging, sustainability, Communication system, Microclimate, Pedestrian friendly, Context.

Objectives:

- To study Adaptable built environment
- To understand the Circulation system
- To study Architectural Element with reference to campus
- To understand Land use distribution and give proper Site guidelines.

Sub Topics :

1. Concept of campus.
 2. Ways and theories of campus planning.
 3. Consideration for context and planning.
-

Sessional Work:

Project, Assignment, Site visit

References:

- Campus Architecture: Building in the Groves of Academe, Richard P Dober.
 - Educating by Design: Creating Campus Learning Environments That Work, C. Carney Strange and Dr James H. Bannin.
 - Campus Landscape, Richard P Dober.
 - University Planning and Architecture: The Search for Perfection, Isabelle Taylor and Jonathan Coulson, and Paul Roberts.
-

Interior Design

Key Words: Aesthetics, typologies and function, historical context, themes and concepts, psychological effects, human comfort, innovations and design ideas.

Objectives:

- To develop Creative ability and sense of usability of spaces.
- To enhance the skill of Furniture detailing, lighting calculation, fixtures study.
- To understand the influence of regional art and craft, Material study, service elements, incidental elements.
- To understand the relationship between space and elements, changing trends and lifestyle.

Sub Topics :

1. Introduction to interior design.
 2. History of interior architecture design.
 3. Elements of interior architecture- Enclosing elements.
 4. Elements of interior architecture- Lighting accessories and interior landscaping.
 5. Elements of interior architecture- Space planning and furniture design.
-

Sessional Work:

Project, Assignment, Site visit

References:

- Ching, F. D. K. (1987). Interior Design Illustrated. New York : V.N.R. Publications.
 - Doshi, S. (Ed.) (1982). The Impulse to adorn - Studies in traditional Indian Architecture. Marg Publications.
 - Kathryn, B. H. and Marcus, G. H. (1993). Landmarks of twentieth Century Design. Abbey Ville Press.
 - Penner, J. and Zelnik, M. (1979). Human Dimension and Interior space: A Source Book of Design Reference Standards. New York : Whitney Library of Design.
 - Slesin, S. and Ceiff, S. (1990). Indian Style. New York : Clarkson N. Potter.
 - Dorothy, S-D., Kness, D. M., Logan, K. C. and Laura, S. (1983). Introduction to Interior Design. Michigan : Macmillan Publishing.
-

Architectural Appreciation

Key Words: Human creativity, connoisseur of creation, aesthetic sensibility, cultural context, Historical Background, evolution, Isms, Visual Awareness and perception.

Objectives:

To enhance the Development of vocabulary.

To help in generation of creativity.

To provide knowledge about Cultural understanding.

Sub Topics :

1. Concept of Architectural appreciation & criticism.
 2. Parameters for Architectural appreciation & criticism in architecture.
 3. Criticism & appreciation of architecture through examples based on Theories.
-

Sessional Work:

Studio, Lab, Workshop, Practical, Assignments.

References:

- Cantanese, A. J. and Snyder, J. C. (1988). Introduction to Architecture. New York : McGraw hill Books Co.

- Ching, F. D. K., Jarzombek, M. and Prakash, V. (2010). A Global History of Architecture. 2nd Ed. John Wiley & Sons.
- Fred, S. K. (2009). Art through the ages a Global History. 3rd Ed. Clark Baxter.
- Heidegger, M. (1993). The origin of the work of Art-Basic writings. Harper Collins.
- Heskett, J. (2002). Design-A very short introduction. Oxford University Press.
- Rapoport, A. (1969). House Form and Culture. New Jersey : Prentice Hall.
- Salingaros, N. (2009). A Theory of Architecture. Umbau-Verlag.
- Vitruvius, Translation: Morris, H. M. (1960). The Ten Books on Architecture.

Green Architecture

Key Words: Efficiency, Biomimicry, sustainable Habitat, Awareness, Natural resources conservation.

Objectives:

- To understand Eco friendly system.
- To Study the performance of building.
- To study Passive techniques renewable energy system.
- To study the adaptive reuse.
- To study the rainwater harvesting and grey water use.

Sub Topics:

1. Bioclimatic design concept.
2. Passive and active heating techniques.
3. passive and active cooling techniques.
4. Reduce, reuse and recycle concept.
5. Innovative green technologies and case studies.
6. International Rating System (IGBC, Teri, GRIHA, ECBC, IECC).

Sessional Work:

Assignments, Workshops, Studios

References:

- Arvind Krishnan & Others – Climate Responsive Architecture, Tata Mcgraw –Hill New Delhi 2001.
- Ralph M .Lebens – Passive Solar Architecture in Europe – 2, Architecture Press, London 1983. Sandra Mendler, William Odell.
- The Guide Book Of Sustainable Design, John Wiley & Sons, 2000.
- Lawson. B, Building Materials, Energy And The Environment; Towards Ecologically Sustainable Development Raia, Act, 1996.

Biophilic Architecture

Objectives: This elective is to understand the ways and means to connect occupant to the natural environment through the use of direct nature, indirect nature, and space and place conditions.

Introduction and role of Biophilic Design as relation between the human biological science and nature factors influencing biophilic design decisions.

Patterns of Biophilic Design under native in the space; Natural Analogies; and Nature of the space. Case study of patterns of biophilic design and analysis of biological responses.

Note:

1. The concerned teacher may prepare a detailed syllabus based on above key points while referring to books given or any additional, references.
2. Use of teaching methods to make subject interesting and absorbing is expected.
3. Knowledge application shall be the part of sessional work.

Reference Books:

1. The Experience of Nature
A psychological Perspective
Author - Terrapin Bright Green LLC.
2. Patterns of Biophilic Design
Author - Terrapin Bright Green LLC.
3. Building for life.
 - Designing and understanding the nature by design
 - Human - Nature connection
Author - Stephen R. Kellert
4. The theory science and Practice of Bringing.
Buildings to life.
Author - Stephen R. Kellert
Martin L

Institutional Project 6

Institutional project aims at encouraging institutions to explore different areas.

Institution would have freedom to explore into multidisciplinary activities which would explore into other creative discipline and multidisciplinary activities.

This would help student of architecture to have insight into different spectrums of people, place, culture, society, technology etc.

Institution has entire freedom to detail out the assignments to be conducted under this elective.