

FOURTH YEAR B. ARCH 7TH SEMESTER

SUBJECT: ARCHITECTURAL DESIGN-VI

Subject Code: 01101401

Focus: To develop the ability of students to deal with and resolve complex issues into a valid expression of architectural character, contextuality and urban identity. Emphasis is to be laid on the architecture for the collective design of Settlement level Institution/Housing/Amenity.

Content:

- Architecture for the Public Domain is emphasized through detailed analysis & study of a town/ or parts.
- Design resolution for a project in the urban fabric selected within a given town, with the intention of developing individual designs for diverse projects within on overall conceptual development for the settlement.
- A comprehensive resolution of all aspects of the project- detailed design, control mechanisms, structure and materials, landscaping etc. must be stressed.

Note: Projects could be of the following nature - Urban infill, Slum Up-gradation, Conservation and Revitalization of core areas, new development etc.

SUBJECT: ADVANCED BUILDING MATERIALS AND CONSTRUCTION

Subject Code: 01101402

Focus: Understanding the building construction requirements of multi storeyed buildings and long span structure.

Content:

- **Roof:** Characteristics, Typologies and Material applicability.
- **Pre-stressed structure:** post-tension and pre-tension structure – concrete, steel etc.
- **Building finishes:** Types of Internal wall & External wall, Ceiling & Flooring Plastering, Pointing, Polishing & Varnishing, Textures surface etc.
- Construction for Service duct, Electrical duct, A.C. duct, lift well, ramp, swimming pools. (details of its components)

- Study of Building components such as Partition wall & Panelling, False Ceiling & False Floor, Under-deck insulation etc.
- Structural glazing, curtain walls, steel sockets & ball joint, steel ropes, external cladding of framed structures etc.
- Building behaviour during earthquake and its retrofitting analysis.
- Tensile, space frame, geodesic dome, free form shell structures.
- Long span structures – (RCC, Steel & others)

References:

1. 'Building construction illustrated', by Francis D.K Ching, Wiley (John Wiley & Sons, Inc.)
2. 'Earthquake Resistance Design of Structures' by B. L Gupta

SUBJECT: ADVANCED SERVICES

Subject Code: 01101403

Focus: To study advanced services in buildings and area level planning; and concerns related to each of their installation, management, maintenance and design.

Content:

- Study of the advanced building services related to complex building situations (high-rise complexes, hospitals, multiplex, stadiums, etc.) and area level planning such as:
 - HVAC, water supply, electrification, acoustics, lighting Fire detection, alarm and protection, computer Lan, UPS, smart communication & Monitoring.
 - Refuse collection, storage and disposal.
 - Domestic cooking gas (PNG) supply and services related to it.
 - Security systems and related services.
 - Networking and electronic communication
- Integrated energy management – renewable energy sources, distribution and energy recovery techniques – solar, wind etc.
- Concepts of building management systems & Building Information Modelling.

References:

1. 'Building Services Handbook' by Roger Greeno and Fred Hall; Routledge
2. 'Building Services, Technology and Design' by Roger Greeno; Longman
3. 'Building Services Design Management' by Jackie Portman; Wiley-Blackwell

4. 'Architectural Acoustics: Principles and Practice' by William J. Cavanaugh and Gregory C. Tocci; Wiley
5. 'Architectural Lighting', by M. David Egan and Victor W. Olgyay; McGraw-Hill Higher Education

SUBJECT: ADVANCED STRUCTURAL DESIGN AND SYSTEMS

Subject Code: 01101404

Focus: To study the design and execution techniques of complex building structures and advanced structural systems.

Content:

- **Force system:**
 - Theory of Tension, Compression & Tensile member and its uses and distribution of loads in each of the members.
 - Shells and pin-joint trusses and uses of two hinge arches its classification.
- **Complex Structural systems:**
 - Basic principles of analysis and design, theoretical concepts and specifications for structural system like arches, vaults, domes, shells, folded plates, Cable structures, Membrane structures, Pneumatic structures, Space frames, pre - stressed concrete structure, air inflated structures, structures, circular and rectangular water tanks. Retaining walls, diaphragm and basement walls etc.
 - Selection criteria, Types, Uses, force systems of above type of structures. Eulier's principle, permissibility of retaining wall.
- **Steel Structures:**
 - Introduction of steel structure - terminologies and types, physical characteristics of steel; comparison of steel with cast iron and wrought iron.
 - Uses of steel - types of connections, types of steel, types of joints, comparison of bolted connection and welded connection.
 - Tension forces acting of Gusset plates and disadvantages on heavy loaded connection.
- **Tall buildings & long span Structures:**
 - Theory and principals for structural design of tall buildings & Long span structures.
 - Study of structural systems of different existing buildings.

- Aseismic structural configurations.
- Introduction to advanced intelligent structures.
- Matrix stiffness method and finite element method.
- **Failures of Structure:**
 - Types of failure in various structures
 - Causes of failures
 - Evaluation of damage
 - Non-destructive testing techniques.
 - Techniques to prevent collapse / failure in structure
 - Repair and rehabilitation of structures

References:

1. 'The Tectonics of Structural Systems: An Architectural Approach', by Yonca Hurol; Routledge
2. 'Structures and Architecture', by Paulo J. Da Souza Cruz (Editor), CRC Press
3. 'Beyond the Cube: The Architecture of Space Frames and Polyhedra', by J. Francois Gabriel (Editor), John Wiley & Sons
4. 'Form and Forces: Designing efficient, expressive structures', by Edward Allen and Waclaw Zalewski; John Wiley & Sons
5. 'Membrane Design and Structures in the World', by Kazuo Ishi

SUBJECT: THESIS ORIENTATION – I

Subject Code: 01101405

Focus: To understand the methodological approach to carry out a research-based programme in order to design an architectural project involving a set of complex issues.

Content:

- Nature and function of research, scientific research, meaning of research in the field of architectural design. Pure and applied research.
- Stages of research and design; design and research methodology
- Techniques of data collection
- Forms of research reporting, structure of a report
- Writing skills, presentation aids
- Use of primary and secondary references, bibliography, notations, cross reference etc.
- Nature of an undergraduate thesis, its structure and other requirements.

References:

1. 'A Conversation (Framing a Stage): A process of an architectural thesis project' by Damir Vukovljak; VDM Verlag Dr. Muller
2. 'Architectural Research' by James C. Snyder; Van Nostrand Reinhold Company
'Architectural Research Methods' by Linda N. Groat and David Wang; Wiley

SUBJECT: ELECTIVE-IART AND ARCHITECTURE

Subject Code: 01101430**Focus:** To explore the inter-relationship of art and architecture through the study of global art history.**Content:**

- Role of art in history of world architecture
- Symbiotic relationship of art and architecture
- Application of different art forms in architecture
- Works of different artists and architects that reflect the inter-relationship.

References:

1. 'Modern Architecture since 1900' by William J. R. Curtis; Phaidon Press
2. 'The 20th Century Artbook' by Susannah Lawson; Phaidon Press

VISUAL COMMUNICATION

Subject Code: 01101431**Focus:** To study the significance and role of visual communication in architecture.**Content:**

- Aspects of visual communication in architecture, built forms and environment
- Way finding in architecture and spaces between built environment.

References:

1. 'An Introduction to Visual communication: From Cave Art to Second Life' by Susan B. Barnes; Peter Long Publishing

2. 'Visual Communication: From Theory to Practice' by Lucienne Roberts, Jonathan Baldwin; AVA Publishing
3. 'Visual Communication: Images with Messages' by Paul Martin Lester; Wadsworth Publishing

ARCHITECTURAL JOURNALISM

Subject Code: 01101432

Focus: To study the techniques of writing on Architecture and allied subjects, with a journalist perspective.

Content:

- Analysis of recent historical and contemporary examples of written and journalistic criticism of architecture
- Study of selected writings by Indian and overseas critics
- Study of discursive techniques
- Study of major critical themes and thematic categories in architectural writing over the past three centuries.

References:

1. 'Architecture and the Journalism of Ideas' by Bender
2. 'Architectural criticism and Journalism' by Mohammad al-Asad and Majd Musa

THEATRE/FILM SET DESIGN

Subject Code: 01101433

Focus: To understand the role of a 'Set' in films and theatres and to study the fundamentals of theme based set design.

Content:

For Theatre/Lecture/Drama/Dance/Other performances

- History of set and backdrop design for performance
- Theme Based Design Strategies and Technology Applications.
- Creating a make believe environment and to establish intimacy between the performers and the audience in relation to the theatre and cinema halls.

- Technical aspects like sound, light and colour scheme.

For Film Set Design

- Film set designs with response to camera positioning and movement.
- Indoor and outdoor shooting
- Film sets as a creation of virtual environment appropriate for the scenery and shots.
- Support structure for film set erection for indoor and outdoor shooting.
- Role of Architects in cinematography.

References:

1. 'Stage Design: A Practical Guide' by Gary Thorne
2. 'Theatre Design: Behind the scenes with the Top Set, Lighting and Costume Designers by Babak A. Ebrahimian

MARKETING SKILLS

Subject Code: 01101434

Focus: To learn the skills of marketing and its application in the architectural profession.

Content:

- Core concepts of marketing
- Significance of marketing in the architectural profession
- Modes of marketing: Visual, audio, audio-visual, literary and verbal
- Basic skills of marketing required in the Architectural profession

References:

1. 'Key Marketing Skills' by Peter Cheverton; Kogan Page
2. 'Develop your Marketing Skills: Understand contemporary Marketing; Apply Theoris and Principles; Use Research to Make Informed Decision' by Neil Richardson, Ruth Gosnay; Kogan Page
3. 'Architect and Entrepreneur: A Field guide to Buidling, Branding, and Marketing your Startup Design Business' by Eric W. Reinholdt; Createspace Independent Publishing Platform.

Subject Code: 01101435

Focus: To introduce fundamental aspects of Infrastructure Planning and Management with respect to buildings.

Content:

- Need and significance of infrastructure as related to design of buildings:
 - **Water Supply** for large scale settlement; including Rainwater harvesting.
 - Supply systems, layout, intake units, and storage.
 - Water purification & disinfection with spatial requirement for the same.
 - **Waste & Waste water** handling.
 - Types of wastes: storm water, garbage, sullage, sewage, Industrial wastes.
 - Different types of drains and sewer, sewer appurtenances.
 - Handling by septic tank and alternative methods.
 - Sewage treatment works, treatment units and their spatial requirements.
 - Sewage disposal by different method.
 - **Roads** - types, alignment, width and carriage width of roads, shoulders, curves, super-elevation, curbs etc. (Geometric Design).
 - **Parking spaces**, rules & general requirements.
 - **Fire fighting** -requirement for fire fighting, fire hydrants, their location & specifications.
 - **Lighting** -arrangement of street lighting, density, spacing height etc., Location of transformer substation & their spatial requirements.
 - **Telecommunication**-various modes of telecommunication, relevance with planning, and precautions to be taken while planning including spatial requirements.
- Design, planning and application of management systems for infrastructure development.

References:

1. 'Infrastructure Planning Handbook: Planning, Engineering and Economics' by Alvin S. Goodman and Makarand Hastak; McGraw Hill Professional

2. 'Infrastructure Management: Integrating Design, construction, Maintenance, Rehabilitation and Renovation' by W. Ronald Hudson, Waheed Uddin and Ralph C. Haas; McGraw-Hill Professional Publishing

SUBJECT: ELECTIVE-II

DISASTER MANAGEMENT

Subject Code: 01101440

Focus: To learn aspects and techniques of disaster management.

Content:

- Study of building designs to resist earthquake, fire, flood, cyclone, avalanche and other natural disasters
- Post disaster problem resolutions.

References:

1. 'Introduction to Disaster Management' by Modh Satish; Macmilan Publishers India
2. 'The Role of Architects in Disaster Response and Recovery' by Rachel Minnery, Public Interest Design, p. 131-142; AIA
3. 'Capacity Building for Disaster Management' by Dr. Aradhana Salpekar and Dr. Tanmoy Rudra; Jnanada Prakashan

EXPERT SYSTEMS AND ADVANCED COMPUTING

Subject Code: 01101441

Focus: Developing software skills for enhancing Architectural Graphic Representation and Rendering techniques.

Content:

- Networking
- Web-design
- 3D modelling
- Rendering through software
- Walk-through

References:

1. Blender 3D Architecture, Buildings, and Scenery: Create photorealistic 3D architectural visualizations of buildings, interiors, and environmental scenery by Allan Brito

2. Virtual Architecture: Modeling and Creation of Real-Time 3D Interactive Worlds by Mohd Fairuz Shiratuddin, Kevin Kitchens, Desmond Fletcher
3. The SketchUp Workflow for Architecture: Modeling Buildings, Visualizing Design, and Creating Construction Documents with SketchUp Pro and Layout by Michael Brightman

MODULAR COORDINATION

Subject Code: 01101442

Focus: To study the significance of modular coordination in contemporary design and construction and its application in building industry.

Content:

- Meaning of Modular coordination
- History of Modular coordination
- Attitudes towards the Modular concept
- Contributing influences & trends
- Potential of Modular Design
- Implications of Modular Planning and Construction
- Modular structures
- Prefab structures

References:

1. 'Modular Structures in Design and Architecture' by Asterios Agkathidis; BIS Publishers
2. 'Prefab Architecture: A Guide to Modular Design and Construction' by Ryan E. Smith and James Timberlake; Wiley
3. 'Modern Modular: The Prefab Houses of Resolution' by Joseph Tanney, Robert Luntz and Allison Arieff; Princeton Architectural Press

BUILDING SYSTEM INTEGRATION

Subject Code: 01101443

Focus: To study the significance of building systems in architecture.

Content:

- Study of system and sub-systems in buildings.
- Analysis of sub-systems.
- Building systems in different building typologies, optimizations and sub-system.

References:

1. 'Building System Integration Handbook' by Richard D. Rush (Editor); Butterworth – Heinemann
2. 'Building System Integration: For enhanced environmental integration' by Shahin Vassigh and Jason Chandler; J. Ross publishing

INTELLIGENT BUILDINGS

Subject Code: 01101444**Focus:** Understanding types of Building Control Systems and to provide knowledge on the underlying concepts of intelligent buildings.**Contents:**

- Study of the control systems for various building services, types of controllers, preparation of necessary drawings for installing control systems;
- Integrated building management system; remote monitoring and management,
- Home automation, developments in service control systems.

References:

1. 'Intelligent Buildings: An introduction' by Derek Clements-Croome
2. 'Intelligent Buildings: Design, Management and Operation' by Prof. Derek Clements-Croome

PROJECT CONTRACT SYSTEM

Subject Code: 01101445**Focus:** To study in detail various project contract systems and their management.**Contents:**

- Types of contract systems and their suitability for diverse kinds of projects
- Merits/demerits of different systems
- Management of contracts

References:

1. 'Contractual and Commercial Aspects of Project Management: For projects in India' by L.T.K Ambasta; L.T.K Ambasta
2. 'Contracts and Arbitration for Managers' by Anurag K. Agrawal; SAGE Publications

FOURTH YEAR B. ARCH 8TH SEMESTER

SUBJECT: OFFICE TRAINING

Subject Code: 01101451

Focus: To make students aware of and to inculcate a sense of appreciation in all the operations that take place- right from the preliminary sketch design to the completion of the project.

Content:

- The students must complete a minimum of sixteen weeks of training in a registered architectural practice firm. They are required to participate in each activity of the organization for a minimum period of one week.
- Maintaining a weekly report file and recording their activities during training period in detail.
- The student is also expected to do case study of one project that he is associated with, during his training period. This study should include a complete documentation and analysis of the architectural / structural and constructional aspects of the project. Details which are deemed confidential by the firm should not be included in the study report, which must be submitted along with the Weekly Report File.
- A student is expected to work on preparation of Municipal drawings, basic knowledge about documentation, tender work, marking of layout on site, sanitary fittings, office administration etc.