B. ARCH. SEMESTER – V  
NAR – 501, ARCHITECTURAL DESIGN - V

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT CREDITS</th>
<th>DURATION OF THEORY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LECTURE</td>
<td>TUTORIAL</td>
<td>PRACTICAL/STUDIO</td>
</tr>
<tr>
<td></td>
<td>CT</td>
<td>TA</td>
<td>TOTAL</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>7</td>
<td>100</td>
</tr>
</tbody>
</table>

OBJECTIVES
- Understanding basic structure forms in relation to space and materials.
- To understand the different structural systems and their mechanism/logic.
- To understand the constraints and possibilities of designing with the range of structural systems available.
- To employ and integrate these structure systems into the design ideology, especially in proposals requiring large spans

Module-1 Introduction
Acquainting with the various structural systems and their relation to form, materials and function.

Module-2 Types of structural systems
Through seminars, drawings and models, a study of different structural systems, their mechanism of load bearing, adaptability, efficiency and limitations.

- Trabeated: Brick and stone, columns and beams slabs, one way and two way, coffers.
- Arcuated: Corbelled, Radiating Arch, Vault and Dome, Squinch and Pendentives.
- Vector Structures: Trusses and space frames.
- Form Structures: Folded slabs, Shells, Hyperbola-paraboloid.
- Tensile: Tents, Cables, and Pneumatic vis-à-vis materials and plan shape/s

It should be noted that emphasis would be on the design parameters and graphical presentation of systems rather than their structural analysis.

Module-3 Design Proposal
Design of functional spaces that incorporate large span structures, repetitive modules, medium column free spans and multi-storied aspects that use the varied structural systems. For example factories, institutes, auditoriums, stadium, commercial malls and other campus designs etc.

Module-4 Integration of design of structural system
Development of the design proposal to the stage of integrating structure system necessary for the execution of the project and making relevant drawing for the same.

SUGGESTED STUDIO EXCERCISES
1. Literature study and Case Study of different structural systems as used in famous buildings of the world.
2. Presentation of the system with scaled models or actual structures in construction yard.
3. Design of buildings like Stadia, auditorium, Petrol Pump, Factories, Museums, Malls, and buildings using varied structural systems.
4. Study tours to relevant urban destinations for primary documentation.

REFERENCE BOOKS
OBJECTIVES

- To introduce and familiarize the students with constituents, manufacturing process/availability, properties/characteristics, defects, classifications and uses of building materials used in construction;
- To understand the use of these building materials in building works.
- To introduce and familiarize the students with the various metal/gypsum board partitions and false ceilings construction works.
- To understand the use of the metal doors/windows in existing and new construction.
- To familiarize the student with the building construction practices on site.

SECTION – A, BUILDING MATERIALS AND SCIENCES

Module-1 Gypsum Products
Introduction - Gypsum Board, Suspended Ceiling (Board & Tiles), Gypsum Plaster, Components and Accessories. Joining and Finishing.

Module-2 Metals (Ferrous)
Ferrous – Iron (Pig, Cast & Wrought), Mild Steel in various forms, Stainless steel and Alloys.

Module-3 Water Proofing Compounds
Waterproofing compounds in various forms

Module-4 Materials with special reference to interiors
Floor Coverings, Wall Finishes, Ceiling Finishes, Window Dressings, Fabrics / Upholstery, Hardware

LIST OF ASSIGNMENTS (Market Surveys, Seminars & Report)

1. To study the availability, constituents, properties, manufacturing processes, storage, transportation and applications of above mentioned materials.
2. To visit assembly workshops/shops etc. for better understanding and submit report.

WORKSHOP/CONSTRUCTION YARD PRACTICE & SITE EXPOSURE

Module-5 Workshop/Construction Yard Practice
Practicing in construction yard by making the examples of components covered under 'Building Construction Technology'.

Module-6 Site Exposure
Exposure to advanced building construction practices on site of various items of work from foundation to roof and finishes.

LIST OF ASSIGNMENTS

1. To study the various tools, equipments used in structural steel works, partitions and false ceiling works.
2. To construct examples of structural steel works, partitions and false ceiling works in construction yard.
3. To survey construction work on site and submit report.

SECTION – B, BUILDING CONSTRUCTION TECHNOLOGY

Module-1 Structural Steel Works
Typical metal joinery (mechanical (riveted & bolted), soldering and brazing and welding). Detailing of structural steel work – beam to column joint, beam to beam joint, Column Splice, Column Base, Roof Truss to column joint.
Module-2  Doors & Windows (Metals)
L and Z section mild steel, Pressed steel section.

Module-3  Shutters (Operational Mechanisms)
Rolling shutters, Collapsible shutters

Module-4  Partitions & False Ceilings (Gypsum Board)
Construction details of Metal Stud Partition (single layer).
Construction details of Suspended Ceilings

Module-5  Water Proofing Works
Basements and Exterior surfaces

Module-6  Temporary Constructions
Centering, Shuttering and scaffolding

CONSTRUCTION PLATES
1. To understand the application of structural steel works in buildings.
2. To understand the application of metal doors/windows in buildings.
3. To understand the application of metal shutters in buildings.
4. To understand application of metal stud & gypsum board partitions and false ceilings in buildings.
5. To understand the application of waterproofing works in buildings.
6. To understand the application of temporary construction in buildings.

APPROACH
• The students would be familiarized with vernacular terminology as prevalent in this part of the country.
• The emphasis will be construction details as applicable to Indian conditions.
• Site visits and market surveys will be an integral part of sessional work.

REFERENCE BOOKS
5. Building Construction_Mitchell (Elementary and Advanced)
9. Mitchell’s Structure & Fabric-II
17. Engineering Material-Roy Chowdary
OBJECTIVES:
- To understand the analysis of intermediate structures and their use in field in greater depth.

Introduction, Limit state, characteristic strength and characteristic load. Design values, partial safety factors, factored loads, stress strain relationship for concrete & steel, yield stress

Module-2  Theory & design of singly reinforced, Doubly-reinforced, L & T beams (Limit State method)

Module-3  Theory and design of one way & two way slabs (Limit State method)

Module-4  Theory & design of RCC column for pure axial load, Lateral Ties. Direct and bending stress combined and RCC footing (Limit State method)

Module-5  Elements of pre-stressed concrete, Principles and system losses in pre-stress
Design of Pre-stressed beams.
Advantages of Pre-stressed beams

APPROACH
1. Lectures by Experts in the field of Design and analysis will be arranged to make the student’s exposure to practical aspects of design

REFERENCE BOOKS
4. Senol Utku , “Elementary Structural Analysis”.

B. ARCH. SEMESTER – V
NAR – 503, ARCHITECTURAL STRUCTURES - V

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT TOTAL</th>
<th>CREDITS</th>
<th>DURATION OF THEORY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LECTURE</td>
<td>TUTORIAL</td>
<td>PRACTICAL/STUDIO</td>
<td>SESSIONAL ASSESSMENT</td>
</tr>
<tr>
<td></td>
<td>CT</td>
<td>TA</td>
<td>TOTAL</td>
<td>THEORY</td>
</tr>
<tr>
<td>---------</td>
<td>-----</td>
<td>-----</td>
<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td>Lecture</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>15</td>
</tr>
</tbody>
</table>
B. ARCH. SEMESTER – V
NAR – 504, INTERIOR DESIGN

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT CREDITS</th>
<th>DURATION OF THEORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURE</td>
<td>TUTORIAL</td>
<td>PRACTICAL/STUDIO</td>
<td>SESSIONAL ASSESSMENT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CT</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>2</td>
<td>15</td>
</tr>
</tbody>
</table>

OBJECTIVES
- To initiate students into theory and practice of Interior Design.
- To familiarize students with modern materials and techniques useful for furniture and interior design.
- To appreciate early interventions in design of furniture

Module-1  Introduction to interior design
- Definitions related to interior design;
- Review of enclosing elements like walls, floors, ceilings, openings, staircases, furniture & design elements such as color, light, textures in interior spaces;
- Principles of interior design

Module-2  History of interior & furniture design
- Evolution from ancient to modern, post-modern ideologies to contemporary (Egyptian, Greek, Roman, Gothic, Baroque, Renaissance, Arts and Crafts Movement, Art Nouveau, De Stijl, Modernism, Post Modernism and Contemporary);
- Understanding role of materials and technology in their transformation and various theories associated in their evolution

Module-3  Study of materials, finishes & their applications in furniture & other interior elements
- An in-depth understanding of the characteristics and workability of various materials used in interiors.
- Their classification could be on basis of elements of usage (floor, ceilings, walls etc.) or materials based like wood, metal, plastics and their variants.

Module-4  Understanding innovation in furniture & interior design
- Like modern materials, modular furniture, interior landscaping, fittings & fixtures etc.

Module-5  Analysis & design of furniture
- Analyzing existing designs of selected furniture on basis of ergonomics, user type, economics, material, joinery and maintenance to ascertain their suitability.
- Design furniture for specific use complying to the aforementioned formulated design criteria.
- Build scaled models of the designed furniture for better understanding of working and materials

Module-6  Analysis & design of small interior spaces
- Analyse small selected interior spaces like study, bedroom, executive/architect office, retail outlet, conference, reception & waiting lobby including toilets and kitchens in detail, for varied aspects like function, ergonomics, materials and establishing detailed design criteria.
- Design of selected small interior spaces on specific sites/locations based on formulated design criteria using modern design methodologies.
- Develop design details of the afore-designed projects for their furniture and finishing.
- Making estimate and bill of quantities for the designed projects.

APPROACH
- Course should be covered through lectures and seminars by the students.
6. Attempts should be made for a thorough study of materials and techniques used in interiors and their applicability.
7. Scaled models of design exercises should be encouraged.
8. Regular studio work for total grasp of the subject is essential.
9. Report making for study of furniture and craft styles in India should be done

REFERENCE BOOKS
3. Massey, Anne. Interior design since 1900.
4. Litchfield, Fredrick. Illustrated History of Furniture from the earliest to the present time.
5. Fiell, Charlotte and Peter. 1000 chairs
B. ARCH. SEMESTER – V
NAR – 505, ESTIMATION & SPECIFICATIONS

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT</th>
<th>CREDITS</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LECTURE</td>
<td>TUTORIAL</td>
<td>PRACTICAL</td>
<td>SESSIONAL ASSESSMENT</td>
</tr>
<tr>
<td></td>
<td>CT</td>
<td>TA</td>
<td>TOTAL</td>
<td>THEORY</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>2</td>
<td>15</td>
<td>35</td>
</tr>
</tbody>
</table>

OBJECTIVES
- To initiate the students into theory and practice of estimation and quantity surveying.
- To develop the understanding of specification writing.

Module-1 Estimating

- Exercise in estimating (with different methods) of small buildings, estimating exercises for interior schemes, plumbing work and electrical installations etc.

Module-3 Specifications
- Definition, Importance and scope of the subject. Correct form of writing specifications avoiding ambiguity and conflicting statements. Form and sequence of clauses, study and uses of standard specification viz: drafted by C.P.W.D etc.

Module-4 Specifications – contd.
- Writing detailed specifications for various building materials e.g. bricks, sand, lime, timber, glass and paints etc.
- Writing detailed specifications for various building constructions works e.g. earthwork for foundations, concreting the trenches for foundations, superstructure in cement mortar, R.B. work, plastering and painting, lime punning, flooring, whitewashing, distempering and painting. Snowcem wash, stone masonry, mud phuska, terracing and others.

Module-5 Rate analysis
- Principles of analysis of rates, rates of labour and materials, exercises in rate analysis of different building works, e.g. earthwork for foundations, flooring, timber work etc.

Module-6 Rate analysis – contd.
- Introduction to P.W.D accounts procedure, measurement book, daily labour, muster roll, stores, stock, and issue of material from stock, indent form, imprest account, cash book, mode of payment.

LIST OF ASSIGNMENTS
1. To study the various types of estimates.
2. To prepare detailed estimate for a small building.
3. To study the importance and correct form of writing specifications.
4. To prepare detailed specifications for various items.
5. To study the principles of analysis of rates and prepare analysis of rates for various items of work.
6. To understand the Standard accounts procedure and record keeping.

APPROACH
- The course would be covered through lectures and tutorials.
- The students’ seminars will help realize the grasp on the subject matter.

REFERENCE BOOKS
2. Birdie, G. S. *Estimating and Costing*
12. Standard Schedule of Rates for Delhi, CPWD & UPPWD.
13. Standard Specifications, CPWD & UPPWD
14. I. S. 1200 Parts I to XXV – Method of Measurement of Building and Civil Engineering Works, Bureau of Indian Standards

B. ARCH. SEMESTER – V
NAR – 506, ARCHITECTURAL SERVICES – IV (AIR CONDITIONING SYSTEMS & LIFT SERVICES)

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT</th>
<th>CREDITS</th>
<th>DURATION</th>
</tr>
</thead>
</table>


OBJECTIVES
• To develop an understanding of the advanced building services such as Air conditioning and lifts and their application in the design proposals of buildings of slight complex nature such as multistoried.
• The thrust shall be on understanding the use and application of the services and not the calculation or numerical part.

SECTION – A, AIR CONDITIONING SYSTEMS
Module-1 Introduction Fundamentals of air conditioning System Design
Building Plans, Drawings, and Schematics
Module-2 Principles of Air-conditioning Refrigeration Cycle, Psychometric chart, Cooling load for air conditioning
Module-3 Unitary ac systems Comfort cooling systems & their working- Unitary air conditioning- window ac & split ac. Package ac system. Evaporative cooling systems
Module-4 Central ac systems central air conditioning their parts- A.H.U., cooling plant, cooling tower
Module-5 Air Distribution Systems Air Distribution Systems-fans, filters, fan coil units, ductwork, outlets, dampers
Module-6 Norms Norms for Air-conditioning prescribed in NBC

SUGGESTED EXCERCISES
• Site visits of buildings where different types of Air-conditioning systems have been installed, their working and the merits and demerits of the system.
• In an already designed project of a large covered area & multi-storeyed building installation of an air-conditioning system and the location of their parts and how they will be connected.

SECTION – B, LIFT SERVICES
Module-1 Introduction Fundamentals of lift services System Design
Building Plans, Drawings, and Schematics
Module-2 Principles of lift services Definitions regarding lifts such as average travel lift carrying capacity, rated load, rated speed, RTT etc.. Grouping of lifts and design standards of a lift lobby.
Module-3 Lift types Types of Lifts. Working of lifts with details of lift section describing Various parts of lifts.
Module-4 Escalators Fundamentals of escalators, Function and working of Escalators
Module-5 Escalator types Types of Escalators.
Module-6 Norms Installation requirements and the information to be provided by the architect for the installation of lifts & escalators.

SUGGESTED EXCERCISES
• Site visits of buildings where different types of lifts & escalators have been installed, their working and the merits and demerits of the system.
• In an already designed project of a large covered area & multi-strayed building installation of these systems and the location of their parts and how they will be connected.

APPROACH
• Specialized lectures from technical people in the field.
• Practical and site based exercises to make the data more comprehensive.

REFERENCE BOOKS
5. Understanding Buildings: A Multi-disciplinary Approach, E Reid, MIT
8. ASHRAE Publications

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT</th>
<th>CREDITS</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURE</td>
<td>TUTORIAL</td>
<td>PRACTICAL/</td>
<td>SESSIONAL ASSESSMENT</td>
<td>ESE</td>
</tr>
</tbody>
</table>

**B. ARCH. SEMESTER – V**
**NAR – 507. HISTORY OF ARCHITECTURE – IV**
OBJECTIVES

- Understanding of the period in terms of its location, climate as well as the socio-cultural, historical, economic and political influences of the time.
- Study of the building ‘types’ and the development of architectural form and character based on the developments in construction and technology exemplified through specific building examples that identify the works of the period.
- Understanding the intentions of the period and architects as a solution to the need or demands of the period.

Module-1 Introduction:
Introduction and understanding of ‘Islam’s’ philosophy and its consequent rituals and their interpretation in building type e.g. mosque, tomb, fort and their elements like domes, minarets, arch, squinch, landscape, motif, calligraphy, directionality, symmetry, geometry, material, court, water, patterns etc.

Module-2 The Sultanate Style:
The architecture of early Islamic dynasties that ruled from Delhi like the Slave, Khalji, Tughlaq, Sayyid, Lodhis and ShershahSuri regimes. The formation of ‘Indo-Islamic’ style that was the amalgamation of Islamic space and prevalent Hindu techniques of building and materials.

Module-3 Provincial Architecture:
Development of colloquial styles in various provinces of India like Punjab, Jaunpur, Gujrat, Bengal, Bijnipur, Bidar and Deccan.

Module-4 Cities and Citadels:
Morphology of fortified cities of Jaisalmer, fort/ palaces like Mandu, Chittorgarh, Orchha, Datia, Jodhpur etc. with an overview on architectural types like havelis, stepwells, gates, baradaris etc.

Module-5 Mughal Architecture:
The architecture of the Timurids in India- Babur, Hamayun, Akhbar, Jahangir and Shahjahan, which was the culmination of the Indo-Islamic paradigm. The proportions, structure systems, landscape, materials, scale and distinct features.

Module-6 The Later Moghuls:
The Oudh architecture, which was a blend of the Mughal style and the British features, in Lucknow and its environs. The manzils, baghs, kothis, imambaras, karbalas: their planning, materials and techniques.

Module-7 Colonial Architecture:
The British architecture of the colonial days in India- the capitol at Delhi and the residency at Lucknow emphasizing on their planning criteria and architectural features. Incorporation of local motifs and materials.

APPROACH:
1. Lectures to be specifically conducted with the visual aids and seminars presented by students.
2. Students will make written assignments and seminar presentations on architectural characteristics that identify the building types and the intentions of the period in response to context and time.
3. Free hand sketches and orthographic drawings could made by students in the tutorials on specific building examples to familiarize them with the architectural character that identify the works of the particular period.
4. Scaled, sectional models of historical buildings to be encouraged to understand the scale and proportion.

REFERENCE BOOKS
3. Rober Hillenbrand “ Islamic Art and Architecture” Tames and Hudson.
4. Rober Hillenbrand, “Islamic Form Function and Meaning”.
B. ARCH. SEMESTER – V  
NAR – 508, RESEARCH - IV

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT TOTAL</th>
<th>CREDITS</th>
<th>DURATION OF THEORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURE</td>
<td>TUTORIAL</td>
<td>PRACTICAL/</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SESSIONAL ASSESSMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ESE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STUDIO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT</td>
<td>TA</td>
<td>TOTAL</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>15</td>
<td>35</td>
</tr>
</tbody>
</table>

OBJECTIVES
- Understanding basic principles of any research with special reference to architectural research and applications.
- To understand the basic methodology of writing a technical paper.
- To be able to write a technical paper of about 2000 words.

Module-1  Introduction
Anatomy of a technical paper- parts of a technical paper; its chronology

Module-2  Technical Writing
- Intent of the paper
- Structuring the paper; formulating a synopsis
- Identifying sources- categorization into direct and indirect; sequencing them in order of significance.
- Referencing

Module-3  Writing a technical paper
Writing a paper of 2000 words in following stages:
- Synopsis with clear heads of Intent, Background, Aims and Objectives, Scope, Methodology.
- Structuring the body of the paper in detail
- Ascertaining Primary and Secondary Sources
- Utilizing the sources to reach to the desired objectives
- Editing the paper

LIST OF ASSIGNMENTS
1. Writing a paper of 2000 words. This should be broken down stage wise and a feedback be given at every stage.

REFERENCE BOOKS
3. Joseph Gibaldi, MLA handbook for Writers of Research Papers
OBJECTIVES

- To create awareness about natural disasters, factors that cause them, and to foster knowledge about strategies for disaster prevention and mitigation.
- To make the students understand the various pre & post disaster design and construction measures.

Module 1  Hazards & Disasters
Types of disasters: Man-made & natural, Characteristics of particular hazards and disasters: earthquakes, cyclones, floods, environmental accidents, and other disasters.

Module 2  Disaster Preparedness
Disaster Management Act, Guidelines, NDMA
Vulnerability Assessment & Warning systems for different disaster types

Module 3  Disaster Response
Programs and strategies for disaster reduction. Communications

Module 4  Disaster Mitigation
Pre disaster, emergency, transition, and recovery. Disaster management plan, Natural crisis management committee [NMC], State crisis management group [SCMG].Economics of mitigation

Module 5  Disaster Resistant Construction Techniques
General requirements, principles and measures for building design.
Special construction techniques for earthquakes, floods, cyclones, avalanche, etc.

REFERENCE BOOKS
1. Building Configuration and Seismic Design-Christopher Arnold.
### OBJECTIVES

- To understand the constraints of multiple housing units in an urban setting with respect to social norms, climate and client’s expectations.
- To understand design limitations due to authority guidelines and making drawing/ details necessary for final execution of a project.
- To integrate services and structure system in the housing design project.

### Module-1 Introduction

Acquainting with the various ways of designing a group housing in urban context i.e. low/medium rise- high density; high rise- high density etc.

### Module-2 Study and Analysis

Through literature studies and case studies analyze the constraints, typologies and interventions in housing throughout India and the rest of the world.

### Module-3 Design Proposal

Design of a housing project incorporating varied formats of grouping on an actual site with specific bye-laws and regulations.

### Module-4 Integration of Services and Structure

Development of the housing proposal to the stage integrating services, structure and other infrastructural facilities necessary for the final execution of the project and making relevant drawing for the same.

### Module-5 Working Drawing

Making complete set of working Drawings and Details for the residence or any other project designed by the students. The drawings to also incorporate electrical and plumbing details complete with schedule and all specifications. The Working Drawings and details to include:

1. Submission Drawing for the local authority
2. Site plan
3. Foundation layout with details of foundations.
5. First Floor Plan.
6. Terrace Plan
7. Sections
8. Elevations.
9. Doors and Windows
10. Doors and Windows details
11. Electrical Layout in at least one of the two Floors.
12. Plumbing Layout in at least one of the two Floors.
13. Toilet details complete with all fixtures and their specifications.
14. Kitchen details complete with all fixtures and their specifications
15. Flooring pattern on either of the two Floors.
16. Staircase Details including railings.
17. Details of Grills, Parapet or railings.
18. Typical wall section showing foundation, DPC, skirting, sill, lintel, slab and terracing details.

### SUGGESTED STUDIO EXCERCISES

1. Design of group Housing in varied formats with diverse by-laws and regulations.
2. Complete set of working drawings as suggested above for a medium sized project.
3. Submission Drawings for the regulating Authority.
REFERENCE BOOKS
OBJECTIVES
- To introduce and familiarize the students with constituents, manufacturing process/availability, properties/characteristics, defects, classifications and uses of building materials used in construction;
- To understand the use of these building materials in building works.
- To introduce and familiarize the students with the various temporary construction works required for RCC construction works.
- To understand the use of the metal/PVC doors/windows in existing and new construction.
- To familiarize the student with the building construction practices on site.

SECTION – A, BUILDING MATERIALS AND SCIENCES

Module-1 Plastics
Thermosetting Plastics-Polyster resin, Polyurethane, Synthetic resin.
Rubber.

Module-2 Metals (Non-Ferrous)
Non ferrous – copper & copper based alloys (brass & bronze), tin, cadmium, chromium, zinc, lead, nickel.

Module-3 Admixtures

Module-4 Construction Equipments

LIST OF ASSIGNMENTS (Market Surveys, Seminars & Report)
1. To study the availability, constituents, properties, manufacturing processes, storage, transportation and applications of above mentioned materials.
2. To visit kiln/factory etc. for better understanding and submit report.

WORKSHOP/CONSTRUCTION YARD PRACTICE & SITE EXPOSURE

Module-5 Workshop/Construction Yard Practice
Practicing in construction yard by making the examples of components covered under ‘Building Construction Technology’.

Module-6 Site Exposure
Exposure to advanced building construction practices on site of various items of work from foundation to roof and finishes.

LIST OF ASSIGNMENTS
1. To study the various tools, equipments used in RCC and temporary construction works.
2. To construct examples of RCC works in construction yard.
3. To survey construction work on site and submit report.

SECTION – B, BUILDING CONSTRUCTION TECHNOLOGY

Module-1 Doors & Windows (P. V. C.)
Door frame & shutters

Module-2 Steel works
Gate, Grill, Door shutters, Staircase Railings and Parapets.

Module-3 Doors, Windows & Partitions (Aluminium)

Module-4 R.C.C. (Formwork & Laying)

Module-5 R.C.C. (Formwork
Beams, Columns, Lintel, column grid and frame construction.
&Laying)

Module-6 R.C.C. (Formwork & Laying)

Slabs-simply supported & cantilevered. Staircases

CONSTRUCTION PLATES
1. To understand the application of PVC Doors/Windows.
2. To understand the application of steel works in buildings.
3. To understand the application of Aluminium Doors, Windows and partitions.
4. To understand the RCC foundation construction in buildings.
5. To understand the RCC beam column & lintel construction in buildings.
6. To understand the RCC slab & staircase construction in buildings.

APPROACH
- The students would be familiarized with vernacular terminology as prevalent in this part of the country.
- The emphasis will be construction details as applicable to Indian conditions.
- Site visits and market surveys will be an integral part of sessional work.

REFERENCE BOOKS
5. Building Construction_Mitchell (Elementary and Advanced)
9. Mitchell’s Structure & Fabric-II
10. Concrete: Microstructure, Properties and Materials P. Kumar Mehta
11. Properties of Concrete A. M. Neville
20. Engineering Material-Roy Chowdary
25. Testing of Concrete in Structures J H Bungey and S. G. Millard
B. ARCH. SEMESTER – VI
NAR – 603, ARCHITECTURAL STRUCTURES - VI

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT TOTAL</th>
<th>CREDITS</th>
<th>DURATION OF THEORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURE</td>
<td>TUTORIAL</td>
<td>PRACTICAL/STUDIO</td>
<td>SESSIONAL ASSESSMENT</td>
<td>ESE</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>15</td>
<td>35</td>
</tr>
</tbody>
</table>

OBJECTIVES
- To understand the reinforcement cement concrete design of structural elements

Module-1 Design of continuous beams & Portal frames
Module-2 Theory of Design of Cantilever retaining walls
Module-3 Theory of Domes, shells and Folded Plates
  - Various types of Shell Geometry
  - Various types of Folded Plates.
Module-4 Design of Stairs. Effective span of Stairs. Distribution of loading on stairs, simples cases of design of stairs.
Module-5 Study of Industrial building, High rise building and shear wall

APPROACH
1. Lectures by experts in the field of design and analysis will be arranged to make the student do independent design of structural elements.

REFERENCE BOOKS
4. Senol Utku, “Elementary Structural Analysis”.
# B. ARCH. SEMESTER – VI
## NAR – 604, LANDSCAPE DESIGN

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT CREDITS</th>
<th>DURATION OF THEORY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lecture</td>
<td>Tutorial</td>
<td>Practical/ Studio</td>
</tr>
<tr>
<td></td>
<td>CT</td>
<td>TA</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>2</td>
<td>15</td>
</tr>
</tbody>
</table>

## OBJECTIVES
- To make students aware of plant-scape around them
- To encourage hand drawing & drafting in landscape presentation drawings
- To familiarize students in preparation of simple landscape proposals.

### Module 1
**Introduction to Landscape Architecture**
- Role and scope of Landscape Architecture; Understanding its relationship with Earth, water, fire, air, ether/space.
- Factors affecting Landscape: Climatic / Natural conditions- (soil, water, landforms, vegetation, temperature, humidity, rainfall), Scale, Material, Cost, Time.
- Elements of Landscape Design:
  - Natural elements (Landform, water, plantscape, microclimate)
  - Design elements: (man-made water bodies, landscape furniture, lighting, hardscape and softscape)
- Principles of Landscape Design:
  - Unity, Symmetry, Balance, Hierarchy, Repetition, Sequence with suitable examples

### Module 2
**Landscape Graphics**
Techniques on making handmade landscape drawings: trees of varied textures, landforms, buildings, paving, foliage patterns, tone contrast, & balance, rock & water and other landscape features. Conventional symbols in landscape presentations.

### Module 3
**Concise Theory And Evolution Of Landscape Architecture**
Evolution of landscape from pre-history to present day (history of landscape through civilizations).
Major Garden styles: Hindu, Buddhist, Mughal, Japanese, Italian, Renaissance, their Design and Philosophy in brief

### Module 4
**Planting Design**
Classification of Plants (Trees, shrubs, groundcovers, flowering plants) Selection criteria of plants on the basis of visual, functional, micro climate and ecological aspects.

### Module 5
**Landscape Design**
Inventory, Site analysis and Site planning
Conceptual design, design development and proposals
Landscape constructional details paving, curbs, retaining wall, fountain, decks, terrace gardens etc.

## APPROACH
1. Emphasis would be in drawing in studios
2. Site-visits to botanical gardens, existing parks & urban spaces
3. Suggested design exercises of traffic islands; small residences, campuses etc.

## REFERENCE BOOKS
1. Geoffry & Susan Jellicoe: landscape of Man: shaping the environment from pre-history to the present day.
2. Brian Hackett: planting design
4. Ian McHarg: Design with nature
5. Simonds: landscape architecture
6. Jay Appatlon: Experience of Landscape
7. Paul Bannet: The language of Landscape
8. SimondSwaffield: Theory in Landscape Architecture
OBJECTIVES

- To study the development controls as applicable to building design.
- To acquaint the students to compulsory building bye-laws and permits.
- To understand design limitations due to authority guidelines.
- To develop the understanding of making drawing/ details necessary for final execution of a project.

Module-1  Introduction to Building Bye Laws
Introduction to Building Bye Laws and regulation, their need and relevance, general definitions such as building height, building line, FAR, Ground Coverage, set back line. Role of various statutory bodies governing building works like development authorities, municipal corporations etc. Introduction to Master Plan and understanding various land uses like institutional, residential etc. and related terminology

Module-2  Development Authority
Familiarizing with Building Bye-laws through NBC & Local Development Authority, Housing board, etc. Interpretation of the Bye Laws applicable to residence in plotted developments, Group Housings, Commercial Buildings, Educational Buildings and other Public Institutions.

Module-3  Other Authorities
Various other statutory controlling authorities e.g. Water, Electricity, Fire, Airport, Archaeology, etc

Module-4  Codes
Introduction to various building codes in professional practice emphasizing the importance of codes and regulations to protect public health, safety and welfare and to ensure compliance with the local authority Easement Act, Apartment Act, etc.

Module-5  Acts

LIST OF ASSIGNMENTS
1. To prepare detailed Local Development Authority drawing for a small two storied residence.
2. To study the importance and correct form of Building Bye-laws.

APPROACH

- The course would be covered through lectures and tutorials.
- The students’ seminars will help realize the grasp on the subject matter.

REFERENCE BOOKS
2. Development Authority Bye-laws
3. Master Plan
4. Model – Bye-laws by TCPO
5. Various IS Codes
B. ARCH. SEMESTER – VI
NAR – 606, ARCHITECTURAL SERVICES – V (FIRE PROTECTION & ELECTRONIC SECURITY AND SURVEILLANCE SYSTEMS)

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT TOTAL</th>
<th>CREDITS</th>
<th>DURATION OF THEORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURE</td>
<td>TUTORIAL</td>
<td>PRACTICAL/STUDIO</td>
<td>SESSIONAL ASSESSMENT</td>
<td>ESE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CT TA TOTAL</td>
<td>THEORY VIVA TOTAL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15 35 50</td>
<td>50 0 50 100</td>
</tr>
</tbody>
</table>

OBJECTIVES
- To develop an understanding of the advanced building services such as Fire Protection and Security and their application in the design proposals of buildings of slight complex nature such as multistoried.
- The thrust shall be on understanding the use and application of the services and not the calculation or numerical part

SECTION – A, FIRE PROTECTION
Module-1 Introduction
- Risk, Threat & Vulnerability Assessment
- Survey Techniques
- Building Plans, Drawings, and Schematics
- Fundamentals of fire protection System Design- fire triangle/tetrahedron, classes of fire
- Causes and Spread of Fire

Module-2 Detection
- Fire Detection Equipments- heat & smoke sensors
- Alarm Systems

Module-3 Fire fighting techniques
- First stage firefighting equipment, Ladders, snorkel ladder
- Fire fighting pump and water storage, Hose and hose fittings, Dry and wet risers, Automatic sprinklers
- Fire extinguishers - Portable fire extinguisher, and other fire fighting equipments

Module-4 Materials
- Combustibility of materials and fire resistance

Module-5 Egress
- Means of escape, fire escape, fire doors, water curtains etc.

Module-6 Codes
- Code of Safety prescribed in NBC

SUGGESTED EXCERCISES
- Site visits of buildings where different types of Fire protection equipments have been installed, their working and the merits and demerits of the system.
- In an already designed project of a large covered area & multi-strayed building installation of these systems and the location of their parts and how they will be connected.

SECTION – A, ELECTRONIC SECURITY AND SURVEILLANCE SYSTEMS
Module-1 Introduction
- Risk, Threat & Vulnerability Assessment
- Security Survey Techniques
- Building Plans, Drawings, and Schematics
- Fundamentals of electronic security and surveillance System Design

Module-2 Perimeter Protection, Intrusion Detection & Alarm Systems
- Perimeter Protection Barriers, Barriers, Doors, Gates, Turnstiles, and Fences
- Intrusion Detection Sensors and Systems - Outdoor & Indoor
- Alarm Systems

Module-3 Access Control-I
- Guard Tour Systems
- Introduction to Access Control Systems, Locks, & Emergency Exits
- Visitor Management Systems

Module-4 Access Control-II
- Identification Systems – PIN, card, wireless systems, Biometric Systems
- Readers and Controllers
- Contraband Material Detection – HHMD, DFMD, X-Ray, Gamma Ray, Drugs & Explosives Detection

Module-5 Surveillance System
- CCTV. Components of Basic Systems
- Environmental Considerations, Choosing the Right Housing
Module-6 Recording systems

Understanding CCTV cameras
Choosing the right camera and lens, Pan, tilt & zoom mechanisms
Features of DVRs
Cables & Communications (including fibre optics)

Video Recording, Drawbacks, Digital Video Recording, Features, Functionalities, Digital Vs Analog Recording, Digital Video Management System – Introduction, Features, Advancements & Differences from Earlier Video Techniques
Understanding compression and storage
Preserving Evidence for Forensic Purposes

APPROACH
- Specialized lectures from technical people in the field.
- Practical and site based exercises to make the data more comprehensive.

REFERENCE BOOKS
5. CCTV (Newnes) by Vlado Damjanovski (1999)
9. Building Automation Online by McGowan; McGowan, John J.
10. CCTV by Damjanovski, Vlado; Edition: 3 Publisher: Butterworth- Heinemann
OBJECTIVES

- Understanding of the period in terms of its location, climate as well as the social cultural, historical, economic and political influences of the time.
- Study of the different building and the development of architectural form and character based on the developments in construction and technology exemplified through specific building examples that identify the works of the period.
- Understanding the intentions of the period and architects as a solution to the need or demands of the period.

Module-1 Picturesque and Neo-classical architecture:

Purity and structural honesty of antiquity preferred over ornamentation and exaggeration of Baroque. Representation of ancient Roman monuments in imaginary compositions. Archeological purism and importance of pictorial values in historical settings. Recreation of antique Roman simplicity and splendor for modern living. Study of important palaces and public buildings in Britain and France.

Module-2 Enlightenment and beginnings of Modern:

Belief in creation of ‘new’ and ‘ideal’ world through return to fundamentals, ‘true’ and ‘original’ values. Romanticizing elementary geometrical forms with undecorated surfaces. Iron and glass construction for openness and lightness: Art Nouveau. Repetitive, Orthogonal, skeletal systems for horizontal and vertical expansion. Latter attempts to dissociate references to past styles.

Module-3 Modern Architecture:


International style: Oversimplification of the modern Movement into functional, steel and glass, cubes. Monotonous functionalist abstractions and Modernism as a style. Disenchantment of modern cities and fall of modern Movement.

Module-4 Post Modern Architecture:

Post Modern Architecture as a revision of Modern architecture and resistance to functional containers of 60’s. Objective, representational and emphasis on content. Pluralistic and differing trends.

Module-5 Post Modern – Historicism:

Rooted to place and history. Regards of expression: ornaments, symbolism and context with irony and humour, exemplified through the works of James Stirling, Michael Graves, Charles Moore, Arata Isozaki.

Module-6 Neo- Modern:

Disregard historical imaginary to recapture ideas for modern architecture of 20’s. Hi-tech metal abstractions of Richard Rogers, Normal Foster, showing structure and equipment as implied ornament. References of Russian Constructivists. The early works of New York Five including later works of Richard Mier as complicated, exaggerated and sophisticated revival of the modern grid and Corbusier’s geometry. Synthesis of Hi-Tech and Historicism in the works Aldo Rossi, Mario Botta, Cesar Pelli.

Module-7 Deconstructive:

Narrative and representational. Sources in Russian Constructivism. Non perfection in the works of Frank Gehry, Peter Eisenman, Bernard Tschumi, Daniel Libeskind, questioning traditional purity of form, geometry and structure.
REFERENCE BOOKS
1. Kenneth Frampton, “Modern Architecture; A Critical History” by, Tames and Hudson
5. Leland M Roth; Understanding Architecture: Its elements, history and meaning; CraftsmanHouse; 1994
6. Pier Luigi Nervi, General Editor - History of World Architecture - Series, Harry N.Abrams,
8. S.Lloyd and H.W.Muller, History of World Architecture - Series, Faber and Faber Ltd.,
11. Webb and Schaeffer; Western Civilisation Volume I; VNR: NY: 1962
15. Marvin Trastctenber, “ Architecture from Prehistory to Post modernism”
### OBJECTIVES
- Understanding basic principles of any research with special reference to architectural research and applications.
- To write a technical paper of about 5000 words with original input.

#### Module-1 Introduction
Learning the formulation of research question or hypothesis

#### Module-2 Writing a technical paper
Writing a paper of 5000 words in following stages:
- Formulation of an original research issue by ascertaining the gaps in research
- Synopsis with clear heads of Intent, Background, Aims and Objectives, Scope, Methodology.
- Structuring the body of the paper in detail
- Ascertaining Primary and Secondary Sources
- Referencing in Harvard Style
- Utilizing the sources to reach to the desired objectives
- Editing the paper

#### LIST OF ASSIGNMENTS
1. Writing a paper of 5000 words. This should be broken down stage wise and a feedback be given at every stage.

#### REFERENCE BOOKS
OBJECTIVE
- To provide the students a strong knowledge base of original ideas written by the architects themselves and familiarize them with the original thought processes that was instrumental in the change.

Module-1 Pre-modern
Ornament and Crime by Adolf Loos
Seven Lamps of Architecture by John Ruskin

Module-2 Modern
Towards a New Architecture by Le Corbusier
In the cause of Architecture by Frank Lloyd Wright

Module-3 Post Modern
Complexity and Contradiction in Architecture by Robert Venturi
The Architecture of a City by Aldo Rossi
Thinking Architecture by Peter Zumthor

APPROACH
Allocate books amongst students and discuss it holistically and sequentially in class. The teacher can prepare a summary as a presentation to summarize the book.

REFERENCE BOOKS
1. Pattern language-Christopher Alexander
2. The language of post Modern architecture –Charles Jencks
4. Kenneth Frampton, “Modern Architecture; A Critical History” by, Thames and Hudson
5. Colin Davies, “Thinking about Architecture and Introduction to Architectural Theory”
7. Le Corbusier, “Towards a New Architecture”
10. Aldo Rossi, “ The Architecture of City”

### B. ARCH. SEMESTER – VI
NAR – 609, THEORY OF ARCHITECTURE

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>EVALUATION SCHEME</th>
<th>SUBJECT CREDITS</th>
<th>DURATION OF THEORY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LECTURE</td>
<td>TUTORIAL</td>
<td>PRACTICAL/STUDIO</td>
</tr>
<tr>
<td>Periods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Periods</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

### OBJECTIVE
To provide the students a strong knowledge base of original ideas written by the architects themselves and familiarize them with the original thought processes that was instrumental in the change.

Module-1 Pre-modern
- Ornament and Crime by Adolf Loos
- Seven Lamps of Architecture by John Ruskin

Module-2 Modern
- Towards a New Architecture by Le Corbusier
- In the cause of Architecture by Frank Lloyd Wright

Module-3 Post Modern
- Complexity and Contradiction in Architecture by Robert Venturi
- The Architecture of a City by Aldo Rossi
- Thinking Architecture by Peter Zumthor

### APPROACH
Allocate books amongst students and discuss it holistically and sequentially in class. The teacher can prepare a summary as a presentation to summarize the book.

### REFERENCE BOOKS
1. Pattern language-Christopher Alexander
2. The language of post Modern architecture –Charles Jencks
4. Kenneth Frampton, “Modern Architecture; A Critical History” by, Thames and Hudson
5. Colin Davies, “Thinking about Architecture and Introduction to Architectural Theory”
7. Le Corbusier, “Towards a New Architecture”
10. Aldo Rossi, “ The Architecture of City”