

SECOND SEMESTER

AR 17B2.1C ARCHITECTURAL DESIGN – I

L/s: 9/Wk Int: 200 End Exam: 200 Total: 400 End Exam: 5 hrs Cr: 9

Course Overview:

This course is intended to provide framework for understanding design as a process.

Objectives of the Course:

Simple space organization starting with single activity to multifunctional spaces.

Spaces responding to human anthropometrics

Expected Outcome:

To understand principles of design. To develop the ability to translate abstract principles of design into architectural solutions for small problems.

Course Contents:

Unit - I

Anthropometrics: Basic -average measurements of human body in different postures-its proportion and graphic representation, application in the design of simple household and street furniture. Use of mannequins in defining spatial parameter of design.

Unit - II

Study of functional spaces and the issues like clearances, lighting and ventilation, furniture arrangements; Minimum and optimum areas for various functions; Detailed study of spaces such as living, dining, bedrooms, kitchen, toilet, etc.

Study of the human considerations like, privacy, convenience, comfort, etc.; Case study of a house and a critical appraisal of the spaces.

Unit - III

Introduction to design process. Pre- Design Studies: Preparation of design brief, the user requirement and their implications, Study of the site and the context;

Design Response: Development of concept, Graphic tools like circulation diagrams, Figure Ground studies, etc. Integration of form and function in the design of an enclosed object/space using the materials studied. e.g. Security cabin, grocery store, caravan, bus shelter, milk booth, traffic police kiosk, flower stall, ATM Center, etc.

Unit – IV

Listing of important local buildings and understanding the reasons for their importance.

Listing and Drawing silhouettes of favourite buildings or places.

Observing the built environment around and experiencing enclosures (field trips)

Local stories on architecture.

Introduction to basic development of forms: additive form, deductive form, rhythm, contrast, balance and symmetry.

Concepts of volume and scale, width to height ratio.

Study models to explore the design principles. Multiple sectional drawings of study models.

At least two major exercises and two minor design/time problems should be given. The final submission shall necessarily include a model for at least one of the two main problems.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

Reference books:

Chiara Joseph de and Others. Time Savers Standards of Building Types. McGraw – Hill, 1980.
Kirk, Paul Hayden and Sternberg, D. Eugene. Doctors Offices and Clinics, 2nd ed. Reinhold Pub., USA, 1960.
Neufert, Ernst. Ernst Neufert Architects Data, Granada Pub. Ltd., London, 1970.
Pevsner, Nikolaus. A History of Building Types. Thames and Hudson, London, 1976.
 Shah, S. Charanjit. Architects Hand Book Ready Reckoner. Galogotia Pub. Co., New Delhi, 1996.

AR 17B2.2C ARCHITECTURAL DRAWING AND GRAPHICS – II

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 5hrs Cr: 4

Course Overview:

The course is intended to develop the techniques of architectural drawing pertaining simple and complex solid geometrical forms of Building geometry Sciography and Documentation.

Objectives of the Course:

To impart the skills of three dimensional visualization and presentation.

Course Contents:**Unit – I**

Orthographic Projections (first angle projection): Principles of orthographic projection; projections of points, lines, planes –all combinations; Orthographic projection of solids; Orthographic projection of architectural built elements and built forms: (with increasing complexity)

Building Geometry: Study of points, lines, and planes leading to simple and complex solid geometrical forms; Representation of 3D elements in Plan and Elevations

Use of circle in mouldings and arch forms - Ovolo Covetta, Ogee, Lancet, Horse shoe, Moorish, Stilted and Rampant, Tudor, three

centered and drop. Exercises on Ionic volute, Entasis of column etc., working with models to facilitate visualization.

Unit –II**Sciography:**

Simple and composite forms, shadows on horizontal, vertical planes and on their own surfaces. Study of shade and shadows of simple geometrical solids of various forms and groups of forms.

Shade and shadow techniques leading to advanced practical examples: shades and shadows on buildings or parts of buildings. Relative changes in building shades and shadows with sun angle, time, building height. Introduction to sciography in perspective.

Unit-III**Architectural Documentation:**

Detailed measured drawing and documentation of any interesting historical or modern building – preparation of maps, plans, elevations, sections, views etc.

Reference books:

Thoms, E. French. Graphic Science and Design, New York: MC Graw Hill.
Nichols, T.B. and Keep, Norman. Geometry of Construction, 3rd ed. Cleaver – Hume Press Ltd., London, 1959.
Bhatt, N.D. and Panchal V.M. Engineering Drawing: Plane and Solid Geometry, 42nd ed. Charotar Pub., Anand, 2000.
Gill, P.S. T.B. of Geometrical Drawing, 3rd ed. Dewan Suhil Kumar Kataria, Ludhiana, 1986.
Shah, M.G., Kale, C.M. and Patki, S.Y. Building Drawing: with an integrated approach to built environment, 7th ed. Tata McGraw Hill Pub., Delhi, 2000.
Claude Batley: Design Development of Indian Architecture
Ernest Burden:-Architectural Dilineation

AR 17B2.3C BUILDING CONSTRUCTION – II

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 5hrs Cr: 4

Course Overview:

The course introduces to the methods and techniques of construction of doors and windows, stairs and partitions of a building using different materials.

Objectives of the Course:

To understand the elementary and simple construction methods like joinery details in wood, fixing of hardware.

Expected Skills / Knowledge Transferred:

To understand the techniques of constructing doors and windows, staircase and partitions using different materials

Unit – I

Carpentry and joinery: Terms defined; mitring, ploughing, grooving, rebating, veneering. Various forms of joints in wood work, such as lengthening joints, bearing joints, halving, dovetailing, housing, notching, tusk and tenon etc;

Unit – II

Doors: Definition of terms, types of doors: wooden, ledged, ledged and braced, paneled, flush door. Hinged, single and double shutters, sliding, folding, revolving, pivoted.

Unit – III

Windows: Casement, top and bottom hung, pivoted and sliding sash, UPVC doors and windows.

Hardware: fixtures, locks, hinges, fastenings for doors and windows.

Unit – IV

Steel: windows, rolling shutters and grills. Aluminium doors and windows.

Unit – V

Partition Walls: Various types of glazed and wooden partitions and paneling; Sound proof and light weight partitions; Brick partition, reinforced brick partition, brick nogged partition, lath and plaster partition, pre-cast concrete partition, glass block and glass create partition, common wooden partition, trussed partition.

Unit – VI

Staircases: Principles of staircase construction and its elements; Terms defined, Tread, riser, stringer, nosing, flight, landing, head room, handrail, balusters, newel post etc., types of stairs i.e., straight, doglegged, open well, geometrical, circular, spiral, bifurcated, wooden stairs, stone stairs, metal stairs and elementary knowledge of R.C.C. stairs. Details of various staircases in wood, stone, steel and RCC.

Unit – VII

Flooring & Flooring finishes: Various natural and manufactured materials: Types of Stone flooring: Granite, Marble, Kota, Shahbad (Limestone), Flagstone, Wooden Flooring, Ceramic and Vitrified Tiles. Concrete floors, Brick on edge, Indian patent floor, granolithic, terrazzo, pitch mastic, Magnesium Oxide, Chloride.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

Reference Books

Barry, R. The Construction of Buildings Vol. 2, 5th ed. East-West Press. New Delhi, 1999.

Bindra, S P. and Arora, S P. Building Construction: Planning Techniques and Methods of Construction, 19th ed. Dhanpat Rai Pub. New Delhi, 2000.

Hailey and Hancock, D.W. Brick Work and Associated Studies Vol. 2. MacMillan, London, 1979.

Moxley, R. Mitchell's Elementary Building Construction, Technical Press Ltd.

Rangwala, S.C. Building Construction, 22nd ed. Charotar Pub. House, Anand, 2004.

Sushil Kumar. T.B. of Building Construction, 19th ed. Standard Pub, Delhi, 2003.

AR 17B2.4C BUILDING MATERIALS – II

L/s: 2/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3hrs Cr: 2

Course Overview:

The course is intended to provide information on the properties, uses, installation and costs of building materials. The course highlights on Mechanical and physical properties of various materials. Influence of various factors on these properties. Causes of defects, their prevention and remedies. Testing of materials.

Objectives of the Course:

To provide knowledge on the various types of building materials used while highlighting the current innovations and trends.

Expected Skills / Knowledge Transferred:

Knowledge required for specifying appropriate materials for various spaces in buildings.

Course Contents:

Unit – I

Laminates and Veneers: Resin bonded ply wood, types of laminates, laminated wood, insulating boards and other

miscellaneous boards, veneers from different varieties of timber, their characteristics and uses MDF& HDF Boards.

Unit – II

Paints and Varnishes: Protective coating, paints, constituents of paints, their functions, water paints, distempers, and cement based paints, emulsion paints, selection of paints, and storage of paints.

Types varnishes (oil and spirit): characteristics and uses of varnishes. French polish, anti-corrosive paint, damp proofing finishes.

Unit – III

Glass and glass products: Composition and fabrication of glass, types of glass, wired glass, fiber glass, rock wool, laminated glass, glass-crete blocks, structural glass, their properties and uses in buildings.

Unit – IV

Plastics: Polymer types, thermo setting and thermo plastics, resins, common types of moldings, fabrication of plastics, polymerization and condensation, plastic coatings.

Composite materials, classification, properties and uses - linoleum, plastic coated paper, polythene sheets, reinforced plastic, plastic laminates and PVC.

Properties and architectural uses of plastics – structural plastics – Reinforced plastics and Decorative laminates-plastic coatings, Adhesives and sealants – Modifiers and

Primary plastic building products for walls, roof and partitions. Secondary building products for rooms, windows, roof lights, domes, gutters and handrails.

Unit – V

Floorings: Introduction, essential requirements of a floor, factors affecting selection of flooring material, Various natural as well as artificial flooring materials like brick, flag stone, tiled, cement

concrete, granolithic, terrazzo, marble, shahbad stones timber flooring, timber floor supported on RSJ, flag stone floor resting on RSJ,, vitrified tiles, ceramic tiles, , Mosaic, rubber, Linoleum, and PVC and PVA flooring

Unit – VI

Roof Coverings: Introduction, requirements of good roof, technical terms, classification, types of roof coverings for pitched roof. : Roofing tiles and roofing with cement products like A.C. sheet roofs, G.I. Sheets roofs, slates.

Unit – VII

Miscellaneous Materials and treatments: Properties and uses of Asbestos, cork, felt, mica, adhesive, Bakelite, china clay, fiber glass, leather, canvass, jute, rubber, Asphalt and Bitumen

Materials for Special Treatments: Fire resistant, waterproofing, and anti-termite treatment. Damp proofing: Hot applied and cold applied – Emulsified asphalt, Bentonite clay. Butyl rubber, silicones, Vinyls, Epoxy resins and metallic water proofing materials, their properties and uses. Water proofing: waterproofing membranes such as rag, asbestos, glass felt, plastic and synthetic rubber- vinyl, butyl rubber, neoprene, polyvinyl chilnide – prefabricated membranes sheet lead, asphalt their properties and uses.

Application: application of the above in basement floor, swimming pool, and terraces.

Thermal insulation: Heat transfer heat gain/ loss by materials - vapour barriers and rigid insulations, blanket, poured and reflective insulation – properties and uses of spun glass foamed glass, cork, vegetable fibers Gypsum, plaster of Paris, hydride gypsum properties and uses.

Acoustics insulation: porous, baffle and perforated materials such as Acoustic plastic, Acoustic tiles, wood, partition board, fiber board, cook, quilts and mats – their properties and uses – current developments.

Applications: Applications of the above insulations in seminar hall, theater and cold storage.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

Reference books:

Chowdary, K.P. Engineering Materials are used in India, 7th ed. Oxford and IBH Pub. Ltd., New Delhi, 1990.

Moxley, R. Mitchell's Elementary Building Construction, Technical Press Ltd.

Rangwala, S.C. Building Construction: Materials and types of Construction, 3rd ed. John Wiley and Sons, Inc., New York, 1963.

AR 17B2.5C STRUCTURAL MECHANICS –II

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3hrs Cr: 3

Course Overview:

Gives an in-depth understanding of the concepts associated with different Elements of Structures.

Objectives of the Course:

To provide knowledge of behavior beams, columns stress behavior due to applied forces.

Expected Skills / Knowledge Transferred: Basic principles of mechanics and behavior of elements of structures.

Unit-I

Theory of simple bending Introduction, pure bending & ordinary bending, Assumptions derivation of flexure formula section modulus Numericals on flexure equation.

Unit-II

Shear stresses in beams Introduction, derivation of shear stress formula, shear stress distribution for standard shapes like rectangle circle triangle I, T L, C Section Numericals.

Unit-III

Direct & bending Stresses Introduction, stress distribution of eccentrically loaded column, middle third rule, core or Kernal of Section, stress distribution for column with one axis eccentricity, two axis eccentricity, Numericals.

Unit IV

Deflection-I-Introduction of slope & deflection, slopes & deflections for cantilever beams with point load & udl's using double integration method & moment area methods

Unit V

Deflection-II- Introduction of Macaulay's method, slopes & deflections simply supported beams with point load & udl's double integration & Macaulay's methods

Unit-VI

Fixed beams Introduction Advantages and disadvantages of fixed beams over simply supported beams, SFD & BMD for fixed beams with combination of point loads & udl's (No formula derivations)

Unit-VII

Propped Cantilevers Introduction, Reaction of a prop, Cantilevers with Udl's, point loads, prop at end & at intermediate positions, slope & deflection

Unit-VIII

Welded joints: Introduction, Advantages and disadvantages of welded joints, types, strength of fillet weld, design of welded joint for plates and unsymmetrical sections for axial loading

Reference Books:

Khurmi. R.S. Engineering Mechanics, S. Chand and Co.Ltd., New Delhi, 1999.
Ramamrutham. S. Engineering Mechanics, 7th ed. Dhanpat Rai Pub. Co. Ltd., Delhi, 2004.
Timoshenko. S. and Young, D.H. Engineering Mechanics, McGraw-Hill International Editions

AR 17B2.6C HISTORY OF ARCHITECTURE - I

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr: 3

Course Overview:

History of Architecture to be studied as development of building forms in response to social, religious, aesthetic and environmental factors. The study should focus on the three dimensional forms, plan forms, façade organization, structural solution, construction methods and ornamentation. The study should focus on the general trends and not on specific examples of buildings

Objectives of the Course:

- To expose the students to a wide spectrum of architectural styles ranging from pre-historic to modern times.
- To explain to the students the evolution of architecture in relation to time with special emphasis on social, religious and environmental factors.
- To make the students understand the developments in the construction technology in different periods.

Expected Skills / Knowledge Transferred:

- 1) Acquire knowledge to identify the common characteristics among the monuments of a particular style.

- 2) Acquire graphic skills to present a building, analyze its elements and explain the composition.
- 3) Acquire knowledge on good practices of architecture in the past.

Course Contents:

Unit – I

Architectural development in the ancient civilizations in Indus valley, Egypt and Mesopotamia, Study of Pyramids, Temples, Mastabas, Ziggurats.

Unit – II

Architecture in the Classic Greek periods, different orders, optical correction and appreciation of perfection.

Unit – III

Architecture in Roman period; Grand scale, application of Greek orders; Construction of vaults; study of different typologies of buildings; development of roads and aqueducts;

Unit – IV

Architecture in the early Christian, Byzantine, Romanesque, Gothic periods in Europe and rest of the world excluding Asia.

Unit – V

Architecture in Renaissance and Baroque: revival in architecture, study of building typologies.

Unit-VI

The other architecture styles preceding the advent of Industrial revolution in Europe - Mannerist architecture, Jacobean architecture, Elizabethan architecture, Victorian architecture and Moorish architecture.

Reference books:

- Fletcher, Sir Banister.** A History of Architecture, 19th ed. CBS Pub., Delhi, 1992.
Yarwood, Doreen. A Chronology of Western Architecture. B.T. Batsford Ltd., London, 1987.
Schulz, Christian Norberg. Meaning in Western Architecture, 2nd ed. Rizzoli Intl. Pub., New York, 1981.
Copplstone, Trewin and Others. World Architecture: An Illustrated History, 11th ed. Hamlyn, London, 1979.
Bindoo. D.D, History of Architecture, Milind P Lakshana, Hyderabad – 2006.
 Wittkaner R Architectural Principles in the Age of Humanism, Chichester :Academy Editions 1998

AR 17B2.7C SURVEYING AND LEVELING

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3hrs Cr: 3

Course over view

To explain the different techniques and instruments used in survey of land tracts

Objectives of the Course:

To explain the techniques and instruments used in survey of land tracts.

Expected Skills / Knowledge Transferred:

Surveying skills and related theory.

Course Contents:

Unit – I

Introduction – Definitions – Basic Principles of Surveying; Classification of Survey; Uses of Survey - Scales and Symbols- Sources of errors in Survey – Linear Measurement: accurate and approximate methods, duties of Surveyor.

Unit – II

Chain Surveying – Introduction – Types of chains and tapes. Instruments for chaining and taping – ranging-cross staffs – offsets – obstacles in chain surveying – errors and corrections (standardization, temperature and pull) composition of Areas (Trapezoidal rule – Average ordinate-Simpson rule).

Unit – III

Compass Surveying: Introduction – Prismatic Compass and Surveyors Compass – Types of Bearings-Designation of bearings – Fore bearing and back bearing – Types of Traverse – Temporary adjustments of prismatic compass, local attraction, Corrections, precautions, errors.

Unit – IV

Plane Table Survey: Introduction – Types of Plane Tables and their Accessories – Setting up the plane table – traversing – Radiation Method – Intersection Method – Resection Method (two point problem). Three point problem

Unit – V

Leveling – Introduction –Definitions of terms used in leveling – Principle of leveling – Classifications temporary adjustments of dumpy level, RL's by height of Instrument and rise and fall method, Contouring and their characteristics, uses, – errors in leveling.

Unit – VI

Theodolite – Introduction – vernier Theodolite – uses of Theodolite - Temporary adjustments – Traversing.

Unit – VII

Automated Surveying – Introduction to use of Digital Surveying – Instruments such as distomat – total station, Electronic Theodolite, G.P.S.

Unit – VIII

Site Studies – Plot, site, land and regions, size and shape of site, Analysis of accessibility, Topography, Climate, land forms, Surface Drainage, Soil, Water, Vegetation, Ecology and Visual aspects.

Reference books:

Arora, K.R. Surveying Vol. I, 6th ed. Standard Book House, Delhi, 2000.

Lynch, Kevin. Site Planning. MIT Press, Massachusetts, 1962.

Punmia, B.C. Surveying Vol. 1, 13th ed. Laxmi Publications Pvt. Ltd., New Delhi, 1996.

GN 17B2.1A COMMUNICATION SKILLS

L/s: 2/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3hrs Cr: 2

Course Overview: To prepare students to acquire understanding and fluency in English for professional work

Objectives of the Course: To provide an adequate mastery of technical and communicative English Language training primarily, reading and writing skills, and also listening and speaking skills.

Expected Skills / Knowledge Transferred: To prepare students for participation in seminars, group discussions, paper presentation and general personal interaction at the professional level.

Unit I: Communication: Importance of Communication; Elements of good individual communication; organizing oneself; different types of communication; Barriers in the path of Communication

Unit II: Listening skills: Listening to conversation and speeches (Formal and Informal)

Reading: Techniques of reading, skimming, Scanning, SQ3R technique

Unit III: Creative Writing: Scope of creative writing; Writing skills
Signposting, Outlines, Rephrasing
Writing a report/ format of the report; Paragraph, Letter Writing,
Essay writing, Memo, Circular, Notice, Cover Letter, Resume,
Writing with a thesis, Summary, Précis, Product description –
Description of projects and features
Oral Report; Periodical Report; Progress Report; Field Report
Preparation of minutes; Video conference; Tele conference / Virtual
meeting

Unit IV: Speaking: How to converse with people, How to
communicate effectively; Language and grammar skills;
Pronunciation drills, Phonetics, vowels, Diphthongs, consonants,
Stress, Rhythm and intonation, Conversational skills
Features of effective speech - practice in speaking fluently –role
play – telephone skills – etiquette.
Short Extempore speeches – facing audience – paper presentation
– getting over nervousness – Interview techniques – preparing for
interviews – Mock Interview – Body Language.

Unit V: Impact of internet on communication; communication
through computers; voice mail; broadcast messages; e-mail auto
response; etc.

Reference books:

1. **Krishna Mohan & Meera Banerji:** Developing Communication Skills
Macmillan India
2. **C S Rayudu:** Principles of Public Relations, Himalaya Publishing
House
3. **K. Ashwathappa:** Organizational Behavior, Himalaya Publishing
House
4. **Daniel Colman:** Emotional Intelligence,

THIRD SEMESTER

AR17B3.1C ARCHITECTURAL DESIGN – II

L/s: 9/Wk Int: 200 End Exam: 200 Total: 400 End Exam: Viva-voce Cr: 9

Course Overview:

This course is intended to provide skills for designing a single use, small span and single-storey buildings.

Objectives of the Course:

To develop abilities in design in the context of user requirements.

Expected Skills / Knowledge Transferred: Use of standards, handling of space, and application of knowledge gained from other subjects in design.

Course Contents:

The design issues to be addressed:

- Various functions and their spatial implications.
- Formulations of concept.
- Anthropometry and furniture layout
- Horizontal circulation
- Interior volumes and space articulation through different materials.
- Integration of form and function.
- NBC and other relevant building codes as applicable.
- Relevant design considerations for barrier free design for the differently abled.

The list of suggested topics to be covered as design problems:

Balwadi, Kindergarten School, Primary Health Centre, Doctor's Clinic, small Cafeteria, Highway Restaurant, Village Post Office, Bank extension counter, Police Station, Architect's Office, Departmental Store, School Gymkhana and Youth Club etc.

Necessary theoretical inputs to be given highlighting the norms and design issues. The topics not covered as design problems will have to be covered by the Studio faculty members through lecture/slide show sessions and site visits.

At least two major exercises and two minor design/time problems should be given. The final submission shall necessarily include a model for at least one of the two main problems.

Note: In end exam which is a viva-voce the students have to present the entire semester work for assessment.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

Reference books:

Chiara Joseph de and Others. Time Savers Standards of Building Types. McGraw – Hill, 1980.
Kirk, Paul Hayden and Sternberg, D. Eugene. Doctors Offices and Clinics, 2nd ed. Reinhold Pub., USA, 1960.
Neufert, Ernst. Ernst Neufert Architects Data, Granada Pub. Ltd., London, 1970.
Pevsner, Nikolaus. A History of Building Types. Thames and Hudson, London, 1976.
Shah, S. Charanjit. Architects Hand Book Ready Reckoner. Galogotia Pub. Co., New Delhi, 1996.

AR17B3.2C ARCHITECTURAL DRAWING & GRAPHICS – III

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 5hrs Cr: 3

Course Overview:

The course is intended to develop the techniques of architectural rendering, graphic skills required for effective presentations and documentation techniques.

Objectives of the Course:

To impart the skills of composition, rendering and documentation

Course Contents:

Geometrical Drawing: Solid Geometry: Multi-view projection of solids – cube, prism, pyramids, cones, cylinders etc. Sections of solids, true shape of solids.

Introduction to Pictorial Views:

Solid Geometry : Simple Projections – Projection of solids – Developments

Isometric & Axonometric

Isometric Views of Objects, building components such as Steps, Canopy etc. Diametric and Trimetric Views, Oblique View etc.

Axonometric view: Axonometric view of objects, interior view of rooms etc.

Unit –I

Perspective:

Characteristics of perspective drawings: perspectives of simple geometric solids and spaces and complex geometries. Advanced examples in one point or parallel perspective, two point or angular perspective, introduction to three point perspective.

Unit-II

Rendering techniques:

Introduction to surfaces and media, observation, recording and basic representation techniques in different media through drawing pencil, pen, brush, charcoal, crayons etc.

Introduction of rules of composition, color study, values, tones and general approach to rendering, Entourage, Treatment of sky, clouds, landscape elements, human figures, foreground and surroundings, shadow projections in renderings.

Unit-III

Graphic skills and Presentation Techniques:

Page layout and Composition grids; Illustration techniques; Portfolio design and formats; Digital techniques in graphics

Reference books:

David E. Carter, The Big Book of Design, David E. Carter Books
Joyce Rutter Kaye, **Design Basics**, Rockport.

Graphics Book, Rotovision

Ellen Lopton and Jennefer Cole Phillips, Graphic Design The New Basics, Princeton Architectural Press

Atkin, William W, Corbelletti, Raniero and Fiore, R. Vincent. Pencil Techniques in Modern Design, 4th ed. Reinhold Pub. Corporation, New York, 1962.

Bellings, Lance Bowen. Perspective-Space and design.

Burden, Ernest. Architectural Delineation: A photographic approach to presentation, 2nd ed. McGraw-Hill, Inc., New York, 1982.

Conli, Claudius. Drawings by Architects.

Hagarth, Paul. Drawing Architecture.

Pranchlay, H. Perspective

AR17B3.3C BUILDING CONSTRUCTION-III

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 5hrs Cr:4

Course Overview:

The course focuses on understanding the potentials as well as shortcomings of RCC as a building material.

Objectives of the Course:

To introduce and expose the students to various ways in which RCC is used in building construction. The course intends to impart the theory of reinforced concrete construction (in conjunction with the Theory of Structures which is a separate course), and practical knowledge through site visits to the construction sites.

Course Contents:

Unit I :

Introduction to RCC: Understanding the properties and characteristics of RCC. Its advantages and disadvantages. Cast-in-situ and pre-cast constructional methods in RCC.

Unit II :

Understanding the structural components of a typical RCC frame structure with reference to their location, junctions, load transfer and design.

Unit III:

Substructure: RCC foundations – isolated footing (rectangular and trapezoidal footings), pile foundation, combined footing, raft foundation.

Unit – IV

Superstructure: RCC columns – different shapes, different combinations and loading conditions (axial, bending, non

axial), slenderness factor. RCC beams - Single and doubly reinforced beams, T and L beams, continuous beams, lintels and brackets. RCC slabs – One way and two way slabs.

Unit - V

Miscellaneous: RCC staircases and ramp – Waist slab and folded plate staircases. RCC Balconies, chajjas, lintels, arches etc.

Unit VI:

Advanced concepts: Flat slab, coffered slab, diaphragms, retaining walls and water tanks.

Note: This is a studio subject and students should be made to prepare construction drawings as studio exercises along with the theoretical inputs.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

References:

Bindra and Arora. Building Construction: Planning Techniques and Methods of Construction, 19th ed. Dhanpat Rai Pub., New Delhi, 2000.
Foster, J. Stroud. Mitchell Building Construction: Elementary and Advanced, 17th ed. B.T. Batsford Ltd, London, 1963.
McKay, W.B. Building Construction Metric Vol. 1 – IV, 4th ed. Orient Longman, Mumbai, 2005.
Sushil Kumar. T.B. of Building Construction, 19th ed. Standard Pub. Distributors, Delhi, 2003.

AR17B3.4C STRUCTURAL MECHANICS –III

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3hrs Cr: 3

Objectives of the Course:

To impart sound knowledge of strength, behavior of various materials and techniques in the analysis of structures.

Expected Skills / Knowledge Transferred:

Ability to analyze the standard members in structures.

Course Contents:

Unit – I

Continuous beams: Shear Force and Bending Moment diagrams for continuous beams using theorem of three moments (excluding derivation and sinking of supports).

Unit – II

Moment Distribution Method: Introduction, carryover, relative stiffness, application of Moment Distribution Method to Continuous beams, single bay frame without sway (excluding sinking of supports)

Unit – III

Kani's method / Rotation Contribution Method: Introduction, rotational factors, application of Kani's method for beams and frames (single bay with out sinking of supports).

Unit – IV

Columns and Struts: Buckling and crushing failures, types of end conditions, Euler's theory of long columns for different end conditions and equivalent length derivations, Rankine's equation, Derivation and application of the basic formula.

Unit-V

wind pressure on chimneys ,Maximum & Minimum intensities of stress at bottom of chimneys Retaining walls subjected to earth pressure.

Unit – VI

Torsion of Shafts: Assumptions, Derivation of basic equation $T/J = G\theta/l = fs/R$, Power Transmitted by shafts, application of basic equation to shafts.

Unit – VII

Arches: Determination of horizontal thrust, bending moment and radial shear for three-hinged parabolic and segmental arches with supports at same level and different levels.

Reference books:

A.K.Jain and Punmia. Strength of Materials

Ramamrutham, S. Theory of Structures, 17th ed. Danpat Rai Pub. Co. Ltd., New Delhi, 2005.

Reddy, C.S. Basic Structural Analysis, 18th ed. Tata McGraw Hill Pub.Co.Ltd., New Delhi, 1991.

AR17B3.5C HISTORY OF ARCHITECTURE - II

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3hrs Cr: 3

Course Overview:

History of Architecture to be studied as development of building forms in response to social, religious, aesthetic and environmental factors. The study should focus on the three dimensional forms, plan forms, façade organization, structural solution, construction methods and ornamentation. The study should focus on the general trends and not on specific examples of buildings.

Objectives of the Course:

- To expose the students to a wide spectrum of architectural styles ranging from pre historic to pre independence period in India.
- To explain the students the evolution of architecture in relation to time with special emphasis to social, religious and environmental factors.
- To make the students understand the developments in the construction technology in different periods.

Expected Skills / Knowledge Transferred:

- 1) Acquire knowledge to identify the common characteristics among the monuments of a particular style.
- 2) Acquire graphic skills to present a building, analyze its elements and explain the composition.
- 3) Acquire knowledge on good practices of architecture in the past.

Course Contents:**Unit – I**

Development of Vedic Architecture, Development of architecture in India and rest of Asia in Buddhist Architecture

Unit – II

Evolution of Hindu temple form, early rock cut examples; Early Chalukyans.

Unit – III

Development of Hindu Architecture: Nagara style in Orissa, Kahjuraho, Gujarat etc.

Unit – IV

Development of Hindu Architecture: Dravidian style in Pallava, Chola, Pandya periods.

Unit – V

Development of Hindu Architecture under late Chalukyans, Development of Jain Architecture.

Unit-VI

Islamic Architecture in India: Early Saracenic School in India: Imperial school at Delhi

Unit-VII

Islamic Architecture in India: Provincial styles at Gujarat, Deccan, Bengal, Moghul Architecture in India.

Reference books:

Brown, Percy. Indian Architecture: Buddhist and Hindu Periods. D.B. Taraporevala Sons and Co., Mumbai, 2003.

Grover, Satish. The Architecture of India. Vikas Pub. House Pvt. Ltd., Ghaziabad, 1980.

Rowl, Benjamin. Art and Architecture of India.

Tadgell, Christopher. The History of Architecture in India: from the Dawn of Civilization to the End of the Raj. Om Book Service, New Delhi, 1990.

Vistara. The Architecture of India

AR17B3.6C BUILDING SERVICES – I

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3hrs Cr:3

Course Overview:

Understanding the significance, design and functioning of water and sewerage systems as essential components in building design and site planning.

Objectives of the Course:

To introduce and provide information on the principles and appurtenance of water supply and sanitation systems, and their integration with architectural design.

Expected skills and knowledge transferred: To enable students to design sanitary and water supply systems for buildings, and prepare water supply and drainage plans for building sites.

Course Contents:

Unit I:

Introduction to water supply: Traditional sources of water supply and sanitation. Different sources of water supply such as wells, reservoirs, etc. Conventional water treatment – sedimentation, coagulation, filtration and disinfection. Classification of water based on its usage. Water and its qualities; Impurities and treatment; Hardness of water – softening.

Demand of water for domestic, commercial, industrial and public utility purposes as per BIS standards. Per capita demand.

Unit – II

Elements of public / private water supply system, Storage and Distribution of Water - Different methods of water distribution; gravity and pressure distribution by storage tanks of individual buildings. Pumping and Distribution at city level, boosting water.

Unit – III

Domestic water supply system- water meter, sump, pump, centrifugal pump, check valves, foot valves and pressure test gauges, overhead tank; System of water supply: Continuous, intermittent, their advantages and disadvantages Service connections, types and sizes of pipes, Types of fittings like taps, bathtubs, showers, jets, cocks, valves, electrical fixtures, etc. Faucets for kitchens, bathrooms and toilets.

Unit – IV

Building service connections, cold and hot water distribution systems in buildings and their design, materials, joints, fittings and valves (gate, flap, ball, flush valves etc.). Direct and indirect systems, individual water supply, water supply for multistory buildings, Fire hydrants, Hot water supply systems, solar heating systems. Simple exercises on water supply, fire fighting and sanitary layout of residential and public buildings.

Unit – V

Sanitation - Introduction, purpose and importance Types of refuse, collection and disposal; Separate, combined and partially separate systems, advantages, disadvantages; Sanitary requirements of buildings, types of pipes, sanitary fittings

Inspection chamber: sizes and construction, manhole, traps used in the plumbing system; Septic tank, Dispersion trench and soak pits, house drainage & layout; Ventilation of house drainage: Anti siphonage and vent pipes, single stack and double stack system

Design of sewerage systems, Location of sewage systems, conventional wastewater treatment, activated sludge, trickling filters etc.; septic tank and its design, soil absorption system, alternatives, solid wastes collection and removal from buildings. On-site processing and disposal methods. Aerobic and Anaerobic decomposition, purifying capacity of water bodies.

Sewage treatment (outline of various processes)

Biochemical Oxygen Demand

Unit – VI

Drainage: Principles of drainage, surface drainage combined and separate system oGf drainage, shape and sizes of drains and sewers, storm water over flow chambers, methods of laying and construction of sewers

Design of drainage and vent pipes, system for low-rise and high-rise buildings, building drains, sewers, gullies, connection to public sewer, cross connections.

Unit VII

Types of fixtures and materials - wash basins, water closets, urinals, bidets, sinks etc. Conditions of flow in building drainage pipes, traps, vents and their material specifications. Over-head and under-ground reservoirs. Detailed study of Independent House and Apartment

Unit –VIII

Solid Waste Disposal: Properties of Solid Wastes: Physical and chemical composition of municipal solid wastes, waste generation rates. Management of Solid Wastes in India: Prevalent SWM practices and deficiencies: Storage of waste at source, segregation of wastes, primary collection of waste, transportation of waste, disposal of wastes. Disposal of Wastes: Sanitary landfilling, Composting, Incineration, Pyrolysis – advantages and limitations.

Unit – IX

Roads and Pavements – Different types, water bound macadam, tar bitumen, asphalt and Cement concrete roads, soil stabilization, types of paving-murram, brick, and stone paving. Drainage of roads, sub-drains, culverts, ditches and gutters.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

AR17B3.7CCLIMATOLOGY

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3hrs Cr:3

Course Overview:

Science (tools, data, standards, methods and principles) of building design and site planning as related to climate, particularly to tropical climates as found in India.

Objectives of the Course:

To equip the student with the basic understanding of climatic types in India, and the impact on requirements of building design and site planning; to introduce them to the basic science of building design and site planning for thermal comfort, daylighting and natural ventilation; familiarize them with the data, methods, principles, standards and tools for planning and designing for climatic comfort

Expected Skills / Knowledge Transferred:

The student should be able to 'predict' climatic conditions in a given building (simple residence) and undertake redesign for given parameters

Course Contents:

Note: The topics here to be dealt with keeping in mind Indian climatic conditions. NBC and BIS guidelines / standards have to be introduced at all relevant contexts.

Unit – I

Introduction to Building Climatology:

Climate and built form interaction. Global Climatic factors, elements of climate, graphic representation of climatic data, Mahoneys Tables, macro and micro climate; challenge of rapid, extreme environmental change

Unit – II

Tropical Climates:

Definition, classification of tropical climates, characteristics of different climatic zones, Design considerations for warm-humid, hot-dry, composite and upland climates.

Unit – III

Thermal Comfort:

Thermal comfort factors, Physiological aspects, Body heat balance, comfort range, comfort charts.

Unit – IV

Heat flow through Buildings:

Basic principles of heat transfer through buildings, performance of different materials, Periodic heat flow.

Unit – V

Sun and the Design process:

Solar geometry, Solar charts, Sun angles and shadow angles, orientation for sun, sun control, design of shading devices, building form and heat gain, basic principles of daylighting, sunlight and glare.

Unit – VI

Natural Ventilation:

Air movement around and through buildings, Orientation for wind, stack effect, Induced ventilation.

Unit – VII

Passive Cooling:

Passive methods of Cooling, traditional and contemporary; roof pond, desiccant cooling, evaporative Cooling, and earth sheltered buildings etc.
Site Planning (including landscaping) and building planning and design considering climate factors
Detailed appraisal/analysis of climatological performance of an

existing residence and or a workplace; followed by redesigning or the same to improve climatological performance.

Reference books:

Koenigsberger, O.H. and Others. Manual of Tropical Housing and Building. Orient Longman, Chennai, 2003.

Konya, Allan. Design for Hot Climates.

Kukreja, C.P. Tropical Architecture. Tata McGraw-Hill Pub. Co. Ltd., New Delhi, 1978.

Markus, T.A. and Morris. E.N. Buildings, Climate and Energy. Pitman Pub. Ltd., London, 1980.

Olgay and Olgay. Solar Control and Shading Devices.

GN17B2.2A VALUE EDUCATION

L/s: 2/Wk Int: 50 End Exam: Nil Total: 50 End Exam: Nil Cr:2

Course Overview: To provide guiding principles and tools for the development of the whole person, recognizing that the individual is comprised of Physical, Intellectual, Emotional and Spiritual dimensions.

Knowledge Transfer /Expected Skills:

- _ To help individuals think about and reflect on different values.
- _ To deepen understanding, motivation and responsibility with regard to making personal and social choices and the practical implications in relation to themselves and others, the community and the world at large
- _ To inspire individuals to choose their own personal, social, moral and spiritual values and be aware of practical methods for developing and deepening them.

Unit I

Value Education—Introduction – Definition of values – Why values? – Need for Inculcation of values – Object of Value Education – Sources of Values – Types of Values: i) Personal

values ii) Social values iii) Professional values iv) Moral and spiritual values) Behavioral (common) values

Unit II

Personal values – Definition of person – Self-confidence – Relative and absolute confidence, being self-determined, swatantrata (loosely equivalent to freedom).

Self-discipline – Self Assessment – Self-restraint –Self motivation – Determination – Ambition – Contentment
Self-respect and respect to others; expression of respect

Unit III

Social values – Units of Society - Individual, family, different groups – Community – Social consciousness – Equality and Brotherhood – Dialogue – Tolerance – Sharing – Honesty-Responsibility – Cooperation; Freedom – Repentance and Magnanimity.

Peer Pressure – Ragging - examples - making one's own choices

Unit IV

Professional values – Definition – Competence – Confidence – Devotion to duty –Efficiency – Accountability
– Respect for learning /learned – Willingness to learn-Open and balanced mind – Team spirit – Professional

Ethics – Willingness for Discussion; Difference between understanding and assuming

Time Management: Issues of planning, as well as concentration (and aligning with self-goals)

Expectations from yourself. Excellence and competition, coping with stress, Identifying one's interests as well as strengths.

Unit V

Behavioral values – Individual values and group values.
Anger: Investigation of reasons, watching one's own anger;

Understanding anger as: a sign of power or helplessness, distinction between response and reaction.

Right utilization of physical facilities. Determining one's needs, needs of the self and of the body, cycle of nature.

Relationship with teachers. Inside the class, and outside the class, interacting with teachers.

Unit VI

Complimentary nature of skills and values. Distinction between information & knowledge

Goals: Short term goals and long term goals; How to set goals; How to handle responsibilities which have to be fulfilled while working for goals.

Reference Books

1. **Ramancharla Pradeep Kumar.** Compiled Reading Material IIT Hyderabad
2. **Dr. S. Ignacimuthu S. J.,** Values for life, Better yourself Books, Bandra Mumbai-600 050 (1999).
3. Values (Collection of Essays)., Published by : Sri Ramakrishna Math., Chennai—4.,(1996)
4. **Prof. R.P.Dhokalia.,** Eternal Human Values NCRT –Campus Sri Aurobindo Marg., New Delhi
5. **Swami Vivekananda.,** Education. Sri Ramakrishna Math., Chennai-4(1957)
6. Holy Books of all religions

FOURTH SEMESTER

AR17B4.1C ARCHITECTURAL DESIGN- III

L/s: 9/Wk Int: 200 End Exam: 200 Total:400 End Exam: Viva-voce Cr: 9

Course Overview:

This course focuses on buildings for residential use.

Objectives of the Course:

To enhance the understanding of the complexities of architectural design for residential needs and develop creative design solutions for good living environments.

Course Contents:

The design issues to be addressed:

- Organization of functional activities in relation to user requirements and the site.
- Relating the system of horizontal and vertical circulation, open spaces, parking etc.
- Responding to socio-economic factors such as income levels, privacy, territoriality, interaction etc.
- Considering materials, structure and services in relation to the design proposal.
- Integration of plan forms and three dimensional compositions.
- Detailing for the physically handicapped and the elderly.
- NBC and other relevant building codes as applicable.
- Relevant design considerations for barrier free design for the differently abled.

The list of suggested topics to be covered as design

problems:

Large guest house, students hostel, small hotel, holiday resort, motel, row houses, block of flats and residential complexes at an small scale, housing for specific communities in urban and rural areas such as home for the aged, fishermen's housing etc.

Necessary theoretical inputs to be given highlighting the norms and design issues. The topics not covered as design problems will have to be covered by the Studio faculty members through lecture/slide show sessions and site visits.

At least two major exercises and two minor design/time problems should be given. The final submission shall necessarily include a model for at least one of the two main problems.

Note: In end exam which is a viva-voce the students are to present the entire semester work for assessment.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

Reference books:

Chiara Joseph de and Others. Time Savers Standards of Building Types. McGraw – Hill, 1990.
Neufert, Ernst. Ernst Neufert Architects Data, Granada Pub. Ltd., London, 2000.
Peloquin, Albert. Barrier-Free Residential Design. McGraw-Hill, Inc., New York, 1994.
Pevsner, Nikolaus. A History of Building Types. Thames and Hudson, London, 1976.
Shah, S. Charanjit. Architects Hand Book Ready Reckoner. Galogotia Pub., New Delhi, 1996.
Untermann, Richard and Snall, Robert. Site Planning for Cluster Housing.

AR17B4.2C BUILDING CONSTRUCTION-IV

L/s: 4/Wk Int:50 End Exam: 50 Total: 100 End Exam: 5 hrs Cr:4

Course Overview:

The course work deals with principles, methods and construction practices of structural steel work.

Objectives of the Course:

To introduce and expose students to various aspects involving use of steel for construction activity of buildings and structures.

Course Contents:

Unit - I

Structural Steel Work: General principles and terms defined, standard sections i.e. beams joints, angles, channels, tees, bolts, rivets and welding.

Unit – II

Steel Work Connections

Bolt Connections, Riveting and welding methods.

Unit – III

Steel Members

Columns and stanchions, stanchions or column bases, beam and girders, column and beam connections plate girders, lattice or warren girder.

Unit - IV

Steel Roof Trusses

Steel trusses, types for various spans, tubular steel roofs, monitor roof, north light roof truss, details of steel –roof trusses.

Unit – V

Lantern light, dome light, structural steel practice and drawings as per IS Code.

Unit – VI

Portal frame, Geodesic principles, cable net and tensile structures.

Note:A hands-on fabrication project to be taken up as part of the internal assignments. This is a studio subject and students should be made to prepare construction drawings as studio exercises along with the theoretical inputs. The studio work should be supplemented with appropriate site visits.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

Reference books:

Bindera and Arora. Building Construction: Planning Techniques and Methods of Construction, 19th ed. Dhanpat Rai Pub., New Delhi, 2000.

McKay J.K. Building Construction Metric Vol. 4, 4th ed. Orient Longman Pvt. Ltd., Mumbai, 2002.

Mitchell. Advanced Structures.

Rangwala, S.C. Engineering Materials: Material Science, 31st ed. Charotar Pub. House, Anand, 2004.

AR17B4.3C DESIGN OF STRUCTURES -I

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3hrs Cr:3

Course Overview:

This course focuses on structural design of different elements of building in RCC.

Objectives of the Course:

To develop the structural design skills in RCC elements

Course Contents:

Unit – I

Introduction to RCC design, Design Philosophies: Working stress and limit state method, singly reinforced beam, Analysis and Design using both working stress and limit state methods.

Unit – II

Situations where doubly reinforced beams are used, analysis and design of doubly reinforced beam using limit state method only.

Unit – III

T-beams: introduction, analysis and design of T-beam using Limit State method only. Design of shear reinforcement for all types of beams with and without cranking (Limit State method only)

Unit – IV

Slabs: Introduction, Design of One way and two way reinforced slabs (simply supported, Restrained, continuous) by limit state method only.

Unit-V

Design of axially loaded RCC columns and columns subjected to BM about one and two axis using limit state method only.

Unit-VI

Design of stair case (Dog-legged only) using working stress method.

Design of lintels and cantilever beams and slabs using limit state method only

Unit-VII

Design of RCC Isolated footings for columns (Square and Rectangle) - working stress method only.

Unit-VIII

Introduction, to prestressed concrete, Pretensioning & Post tensioning methods, Problems of beams.

Reference books:

A.K.Jain. Reinforced Concrete: Limit State Design, 5th ed. New Chand and Bros., Roorkee, 1999.

Ramamrutham. S. and Narayan, R. Design of RCC Structures, 12th ed. Dhanpat Rai Pub. Co. Pvt. Ltd., Delhi, 1998.

AR17B4.4C HISTORY OF ARCHITECTURE- III

L/s: 3/Wk Int: 50 EndExam:50 Total: 100 End Exam: 3hrs Cr:3

Course Overview:

History of Architecture to be studied as development of building forms in response to social, religious, aesthetic and environmental factors. The study should focus on the three dimensional forms, plan forms, façade organization, structural solution, construction methods and ornamentation. The study should focus on the general trends and theories and not on specific examples of buildings.

Objectives of the Course:

To expose the students to a wide spectrum of architectural styles and theory.

To explain the students how architecture evolved in relation to time with special emphasis to social, religious and environmental factors.

To make the students understand the developments in the construction technology in different periods.

Expected Skills / Knowledge Transferred:

Acquire knowledge to identify the common characteristics among the monuments of a particular style.

Acquire graphic skills to present a building, analyze its elements and explain the composition.

Acquire knowledge on good practices of architecture in the past.

Course Contents:

Unit – I

Influence of Industrial Revolution on building materials, Construction Technology, evolution of new building types and increasing user requirements.

Unit – II

Characteristic styles of modern architecture up to First World

War. Steel structures, Arts and crafts movement, Art Nouveau, Vienna School, Chicago School, Monumentalism, Expressionism and beginning of RCC. Theories of John Ruskin, William Morris, Henry Vandevelde, Otto Wagner, Peter Behrens and Louis Sullivan.

Unit – III

Contributions to Architecture and Theory made by pioneers- Le-Corbusier, Frank Lloyd Wright, Walter Gropius, Mies Van der Rohe in the periods between the Worlds Wars.

Unit – IV

Characteristics of modern architecture after the Second World War. Study of Alvar Aalto, Ero Saarinen, Richard Neutra, Louis I Kahn, Phillip Johnson, etc.

Unit – V

Design theories and contributions of Engineer- architects like Pier Luigi Nervi, Felix Candela, Buckminster Fuller, and Frei Otto.

Unit – VI

Pre-independence architecture in India: Development of secular architecture from the end of the 18th Century to the middle of the 20th Century.

Reference books:

Benevolo, Leonardo. History of Modern Architecture: the tradition of modern architecture Vol.1. Routledge and Kegan Paul, London, 1971.

Frampton Kenneth Modern Architecture: A Critical History London: Thames& Hudson, 1980

Benevolo, Leonardo. History of Modern Architecture: the modern movement Vol.2. Routledge and Kegan Paul, London, 1971.

Curtis, J.R. William. Modern Architecture since 1900. Prentice-Hall, Inc., New Jersey, 2002.

Giedion, Sigfried, Space, Time and Architecture: the growth of a new tradition, 4th ed. Harvard Universtiy Press, Cambridge, 1962.

Hilberseimer, L. Contemporary Architecture: Its roots and trends. Paul

theobald, Chicago, 1964.

Pevsner, Nicolaus Oersonem: Pioneers of Modern Design from William Morris to Walter Gropius-

Sharp, Dennis. Twentieth Century Architecture: A Visual History, Facts on File. New York, 1991

Norberg schul C., Principles of Modern Architecture, London Andreas papadakes, 2000.

AR17B4.5C BUILDING SERVICES – II

L/s: 3/Wk Int:50 End Exam: 50 Total: 100 EndExam:3 hrs Cr: 3

Course Overview:

The study to focus on understanding basic working, principles, terms and definitions, as well as practical aspects and solutions utilized in architecture.

Objectives of the Course:

Course Contents:

To impart knowledge and skills related to electrical services, illumination and mechanical service and their integration into Architectural design.

Unit – I

Fundamental principles of Electricity: Voltage, Amperage, wattage, generation, and transmission of power, distribution in cities, HT and LT consumers, Transformers and load calculations, Single and three phase connections, Indian Electricity rules, Types of Generators, UPS

Unit – II

Building Wiring System: Service wires, metering, light and power circuits. electrical safety devices, MCB, ELCB, distribution boards, wiring methods, ISI Codes and standard materials, Conductors, switch boards, electrical points in general building, pipe earthing, plate earthing.

Unit – III

Electric layouts: Electrical symbols, NBC, preparation of

layouts for residences, offices, Domestic appliances their location in buildings, Types of electric motors and pumps.

Principles of illumination – Visual tasks – Factors affecting visual tasks – Modern theory of light and colour – synthesis of light – Additive and subtractive synthesis of colour – Luminous flux – Candle– utilization factor – Solid angles - Depreciation factor – Laws of illumination, inverse square law, Lamber’s Cosine law, application of laws in lighting calculations using point by point method.

Light Flux Method: Calculation of number of lamps required for achieving a particular level of illumination.

Introduction to power and lighting circuits,

Unit – IV

Electrical load estimation.

Indian Electricity Rules- relevant codes of practice’, energy auditing

Building lighting system: artificial illumination, various types of lamps, advantages and disadvantages, method of lighting, direct, semi direct, indirect, concealed lighting, spot lighting, task lighting, decorative lighting, rope lights, neon lights, flood lighting, yard lighting, under water lighting.

Preparation of a lighting and electrical scheme

Unit – V

Lighting Design

Artificial light sources – Spectral energy distribution – Luminous efficiency – Colour temperature – Colour rendering. Design of modern lighting – Lighting for stores, offices, schools, hospitals and house lighting. Elementary idea of special features required and minimum level of illumination required for physically handicapped and elderly in building types. Lighting Calculation: NBC standards, nominal illumination levels in building interiors, lux, lumen, intensity, lighting schemes.

Unit – VI

Principles of air-conditioning: IAQ, comfort conditions, gas laws, refrigeration cycle, a/c equipment, compressor heat exchangers, condenser, evaporators,

Unit – VII

Types of Air-conditioning: single zone, multi zone, window air conditioners, split air conditioners, ductable air conditioners, package system and central air conditioning, all air systems and chilled water systems. a/c plant room, AHU's Building ducting, diffusers and grills, FC units.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

Reference books:

Electrical wiring and Contracting (Vol.1 to Vol.4), London The New era Publishing Company.

Dr. FrithAbnwos and others, Electrical Engineering hand Book

William. J. Guinnesss, Mechanical and electrical Equipment for Buildings, New York: Willey

Bovay. H.E., Handbook of Mechanical and Electrical Systems for Buildings New York: MC Graw Hill

AR17B4.6C LANDSCAPE DESIGN AND SITE PLANNING

L/s: 3/Wk Int:50 EndExam:50 Total:100 End Exam: 3 hrs Cr: 3

Course Overview:

This course introduces students to landscape design and site planning and relate it to design and planning of built environments. It provides an overview of development of landscape design, site studies, plant studies and application of the knowledge at various levels of design.

Objectives of the Course:

1. To develop a conceptual understanding of landscape design and site planning principles.
2. To develop skills in integrating landscape design with built environments.

Course Contents:

Unit – I

Introduction and History of Landscape Architecture. Introduction to landscape Architecture and Role of Landscape design in built environment.

A brief review of Landscape Design and garden design in history in various regions Persian, Spanish, Italian, French, Moghul, English, Japanese Garden styles.

Changing perception of mans relationship with nature in various phases of history and its influence on environment.

Evolution of concepts in landscape design after the industrial revolution leading to new theories in integrating built spaces to open spaces. Increasing awareness of ecological variables in landscape design.

Unit - II

Site Studies and Site Planning

Principles of site Planning and land use; review of definition applied in typical landscape development situations.

Site survey and appraisal – understanding different site characteristics –topography, vegetation, Hydrology, Access, Surroundings etc. documents, site characteristics and establishing relationship with design / Architecture Programme requirements.Provision of vehicular and pedestrian circulation; parking; street widths; turning radii; street intersections; steps and ramps.

Site planning considerations in relation to surface drainage, water systems, sewage disposal, outdoorelectrical systems.

Philosophical and design issues related to site development – sitting of buildings, spatial and contextual relationships of built and outdoor space and circulation, site and its relationship to surroundings. Importance of climate and social factors in development of site.

Process of design development. Identifying functional requirements of site. Development of site by mutual exploitation of forms and use of grading principles.

Unit -III

Plants and Design

Introduction to study of plants in relation to landscape design and architecture. An overview of use of plants in history.

Study of Plant material – Botanical Nomenclature anatomy and physiology of plant growth study of trees, shrubs, ground cover, indoor plants in Indian context.

Design with plants – Basic principles of designs. Plant selection criteria -The physical attribute of plants and relation to design. Appearance, functional and visual effects of plants in landscape design and built environment.

Selection and management of plant material in relation to built environment.

Unit -IV

Elements in Landscape Design

Use of landform, water and vegetation in landscape design.

Hard landscapes: design of paths, roadways streets, terraces etc and use of land form effectively.

Soft landscapes: design of lawns, shrubs, hedges, trees – in relation to buildings and other landscape elements.

Design concepts related to use of sculpture, outdoor lightings, Architectural feature, street furniture and grouping them into meaningful compositions for visual and functional effects.

Unit -V

Landscape Construction and Services

Study of landform its technical expression through grading plan, sections and earthwork computations.

Irrigation systems – sprinkler trickle irrigation, drip irrigation and laying irrigation networks.

Construction of structure in landscape circulation roads, parking, paths, level changes – walls, steps lamps, construction of screens, trellis, wall fences gales decks, pools etc.

Unit -VI

Contemporary concepts and concerns and design of open spaces – Urban landscape, Parks, Rural landscape etc.

Introduction to concepts of green architecture and micro climate planning. The role of landscape components in modifying micro climate with respect to temperature, humidity, precipitation and percolation.

Assignments

Simple exercises in using plants and landscape elements

Studio exercise emphasizing relationship between built form and outdoor areas and site planning issues.

Reference books:

Blake, Alan. Landscape Construction and Detailing. B.T. Batsford Ltd., London, 1996.

Colvin, Brenda. Land and Landscape.

Hacheat, Brian. Planting Design.

Harris, C.W. and Dines, T. Nicholas. T.S.S for Landscape Architecture. McGraw Hill, New York, 1995.

Laurie, Michael. An Introduction to Landscape, 2nd ed. Prentice Hall, New Jersey, 1986.

Lynch, Kevin. Site Planning. MIT Press, Massachusetts, 1962.

John I.Mutloch. Introduction to Landscape Design, 2nded.John Wiley & Sons, Inc, New york, 2001

Santapau. H. Common Trees. National Book Trust, New Delhi, 1981.
Trivedi, P. Pratibha. Beautiful Shrubs. Indian Council of Agricultural Research, New Delhi, 1990.

AR17B4.7C COMPUTER APPLICATIONS-I

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: Practical Cr:3

Course Overview:

To orient the student to create two and three-dimensional objects in space with special emphasis on presentation and visualization of interiors and exteriors of building using different rendering techniques using CAD.

Objectives of the Course: To explore computer modeling techniques using CAD

Expected Skills / Knowledge Transferred:

To learn basic skills of modeling, scripting (rendering) in CAD, and to exercise methods of interface within CAD.

Course Contents:

Unit - I

Starting Auto CAD: Introduction to the menu, starting drawings from scratch, Creating and using templates-starting drawings with setup wizards. Saving and closing a file.

Unit - II

Using co-ordinate system: The UCS, Working with Cartesian and polar co-ordinate systems, using displays with key shortcuts.

Unit – III

Setting up the drawing environment: Setting the paper size, Setting units, setting grid limits, drawing limits, Snap controls, Use of paper space and model space.

Unit - IV

Basic commands dealing with drawing properties: Layer control, change properties, line weight control, etc.

Unit - V

Inquiry methods: Using database information for objects, calculating distance and angle, areas etc.

Unit - VI

Dimensioning commands and Blocks: Dimensioning the objects in linear, angular fashions along with quick time dimensioning etc. Creating and working with blocks, creating symbols, use of blocks in creating a layout of a residential area- one exercise to be done as lab assignment.

Reference books:

Teyapoovan, T. Engineering Drawing with Auto CAD 2000. Vikas Pub. House Pvt. Ltd., New Delhi, 2000.

Parker, Daniel and Rice, Habert. Inside Auto CAD Daniel. 1987.

Georgeomura, Auto CAD Release 2000.

AutoCAD 2010 Textbook-AutoCAD 2010: A Problem-Solving Approach- Customizing AutoCAD 2010

Beginning AutoCAD 2007- By Bob McFarlane, Robert McFarlane

GN17B4.1A CULTURAL AND POLITICAL STUDIES

L/s: 2/Wk Int:50 Total: 50 End Exam:Nil Cr:2

Course Overview: Course aims to equip students with the skills needed to function in their professional careers in a well-rounded manner. It supplements and enriches core domain of technical and academic knowledge with awareness of broader issues and challenges faced in development.

Expected Skills / Knowledge Transferred:

A familiarity with contemporary issues in the global and national context covering political ideologies and scenarios, globalization, sectoral development in the country, transnational migration, social and cultural changes in society due to globalization. It helps students in technical courses to understand their location in the overall scheme and also their role and skills.

Unit I

Changing International Political Scenario: The Cold War and after – shift from unipolar to multipolar – growth of alternative centres of power – countries with political influence – changing economic and trade – Non- Aligned Movement, BRIC, European Union – Environmental issues in the context of politics. Major countries, their leaders and political ideologies. Current Indian political scenario in the last few decades – regionalism.

Unit II**Contemporary India**

Agrarian issues; industrial labour; urbanization; transnational migration; environment and development; caste as a system and ideology; relationship between caste and class; the middle classes and consumption; media depictions; gender identities; education and employment; inequalities in access to resources.

Unit III**Globalisation**

Globalisation as a process which links people, cities and countries - dimensions of interconnectedness- global village - basic concepts, processes and trends; global business organization; economic globalization; socio-cultural

globalization; global workforce; Anti-globalisation movement; Global inequalities; impacts of globalization; the major drivers of globalization and their linkages, evaluation of globalisation .

Unit IV**Cultural Psychology**

Definition of culture – its transmission Cultural psychology as a study of psychological and behavioral tendencies rooted in and embodied in culture. Sociocultural perspective in psychology: impact of circumstances surrounding individuals on their behaviours , cultural models, the four Is culture cycle, Whiting model,; Culture and Empathy across Cultures; Criticisms – Stereotyping

Unit V

Anthropology and Popular Culture: Theoretical foundations and approaches; founders of the discipline; methods of study Seminars to be arranged and various professionalsto supplement the inputs by the core teachers of the subject.

Note: A presentation at a public event: debate, skit etc. on appropriate topics to form part of internal assignment.

FIFTH SEMESTER

AR17B5.1C ARCHITECTURAL DESIGN – IV

L/s: 9/Wk Int: 200 End Exam: 200 Total: 400 End Exam: Viva-voce Cr: 9

Course Overview:

This course focuses on institutional design - facilities required and detailing design for institutions in urban context.

Objectives of the Course:

To enable the student to design institutions within the given conditions.

Expected Skills / Knowledge Transferred:

Detailing skills required for the design of institutions in urban contexts.

Course Contents:

The following issues relating to institutional design will be addressed to:

- Nature of contemporary institutions, correlation to urban structure.
- Development control and urban infrastructure affecting design.
- Various attitudes to building in urban context.
- Integration of function: movement, climate, acoustics, structure and services into the group of buildings.
- Landscaping and site planning
- Institutional character from abstract to detail.
- NBC and other relevant building codes as applicable.
- Relevant design considerations for barrier free design for the differently abled.

Necessary theoretical inputs to be given highlighting the norms and design issues. The topics not covered as design problems may be covered by the studio faculty members through lecture/slide shows. And site visits.

The topics to be covered as design problems may include:

- Institution of learning –colleges with its various departments such as medical, engineering. Law, business, music and dance colleges, vocational training institutions etc.
- Institutions of health such as hospitals, reformatories and rehabilitation institutes for the disabled.
- Institutions of research in various disciplines.
- Administrative and Legal institutions such as high courts, secretariat, development authorities, directorates etc.

At least two major exercise (one problem should be pertinent to the urban fabric) and two minor design/time problems should be given and the final submission shall necessarily include a model for at least one of the two main problems.

Note: For the end exam, which is a viva-voce, the students have to present the entire semester work for assessment.

Reference books:

Chiara Joseph de and Others. Time Savers Standards of Building Types. McGraw – Hill, 1990.

Hand Book of Planning and Design Data.

Kirk, Paul Hayden and Sternberg, D. Eugene. Doctors' Offices and Clinics, 2nd ed. Reinhold Pub., USA, 1960.

Konya, Allan. Libraries: A Briefing and Design Guide. The Architectural Press, London, 1986.

Neufert, Ernst. Ernst Neufert Architects Data. Granada Pub. Ltd., London, 2000.

Pevsner, Nikolaus. A History of Building Types. Thames and Hudson, London, 1976.

Rosenfield, Isadore. Hospital Architecture and Beyond. Van Nostrand Reinhold, New York, 1969.

Stone, G. Louis. Institutional Buildings Architecture of Controlled Environment.

Tergsone, W.R. Practical Laboratory Planning.

Wild, Friedemann, Libraries for Schools and Universities. Van Nostrand Reinhold, New York, 1972.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

AR17B5.2C BUILDING CONSTRUCTION - V

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 5 hrs Cr:4

Course Overview:

Course focuses on issues related to failures in buildings, decay and damage, approaches for maintenance, repairs and renovation of buildings.

Objectives of the Course:

To create awareness among the students regarding problems related to old buildings and renovations and methods to deal with them.

Course Contents:

Unit - I

Failures:

Introduction to building failures: causes of decay and damage in old buildings, issues of maintenance and repair. Preliminary inspection and general observation, decayed elements difference between decay and damage.

Unit - II

Timber:

Moisture content, treatment prior to installation, factors reducing strength of timber, approach to repair and to the timber roofing system.

Unit - III

Bricks:

Strength reducing factors in brick work, effect of ageing, weathering, temperature variation of brick-work, joints and cracks, construction defects, repair and maintenance.

Unit - IV

R.C. Concrete:

Mixing methods at site, structural design for repairs, causes of failure in concrete structures, pressure-grouting.

Unit - V

Methodical approach to Repairs:

Cracks over openings, sinking and sagging balconies, repairs to decayed floors and floor joints, example: Jack arch., madras roof terrace, foundation sinking, repairs to walls. Propping, **shoring**, strutting and under pinning.

Unit - VI

Unusual problems:

Repairs to large span rooms, water proofing the roof terraces, leakages from toilets, case studies and site visits.

Note: This is a studio subject and students should be made to document the problems in old buildings through inspections and propose remedial measures by preparing construction drawings as studio exercise with the theoretical inputs given through lectures.

Reference books:

Feilden, M. Bernard. Conservation of Historic Buildings. Butterworth Scientific, London, 1992.

McKay, W.B. Failures and Repair of Concrete Structures Vol. IV.
Raikar, R.N. Learning From Failures: Deficiencies in Design. Construction and Service, R and D Centre, New Bombay, 1987.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

AR17B5.3C DESIGN OF STRUCTURES -II

L/s: 3/Wk Int:50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:3

Course Overview:

Course focus is on Structural Design of elements of Industrial Building in Steel.

Objectives of the Course:

To develop the structural design skills of the student in steel.

Expected Skills / Knowledge Transferred: Develop capability to design Steel structures.

Course Contents:

Unit – I

Design of simple beams including check for shear and deflection for laterally supported and unsupported conditions, analysis of simple beam from strength and stiffness considerations.

Unit – II

Design of built up beams with flange plates only, Introduction to plate girders (No Design calculations)

Unit – III

Axially loaded tension members: introduction, net effective areas, analysis and design of tension members including rivet and welded connections, (L-Angle and T-section only)

Unit – IV

Columns: Analysis and design of axially loaded steel columns using single I-section, 2 channels placed back to back and toe to toe, 4-angles etc., including lacing system.

Unit-V

Design of slab base and gusseted base for axial loads (with out moments) for different columns.

Unit-VI

Design of grillage foundation for isolated columns only

Unit-VII

Purlins: Introduction, Dead load, live load and wind loads, design of angle purlin and I-section purlin.

Unit-VIII

Bracket Connections, Riveted & Welded Connections design of Joints.

Reference books:

Ram Chandra. Design of Steel Structures Vol. I, 10th ed. Standard Book House, Delhi, 1999.
Dayaratnam, P. Design of Steel Structures. Wheeler Pub., Allahabad, 1992.
Ramamrutham, S. and Narayanan, R. Design of Steel Structures, 4th ed. Dhanpat Rai and Sons, Delhi, 1995.

AR17B5.4C HISTORY OF ARCHITECTURE - IV

L/s: 3/Wk Int:50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:3

Course Overview:

The course is designed to study the contemporary developments in Architecture and its impact on built form, structure, construction methods etc.

Objectives of the Course:

To orient the students to various developments in the field of architecture for a greater understanding of trends in contemporary architecture.

Course Contents:**Unit – I**

Contemporary trends in architecture of India after Independence. Influence of Le Corbusier and. Louis.I.Khan.

Unit – II

Theory and works of Achyut Kanvinde, J.A. Stein, Habib Rehman etc.

Unit - III

Contributions made by Pioneers - Charles Correa and B.V. Doshi. Anant Raje, Raj Rewal

Unit – IV

Design Theories and works of contemporary architects - Uttam Jain, Hasmukh Patel, including Chandravarkar and Thacker, Jaisim, Anil Laul, Shirish Beri, Romi Khosla, Ranjit Sabiki, Shashi Bhooshan and Sanjay Mohe.

Unit – V

Familiarisation of architecture at Auroville and Laurie Baker's work in Kerala.

Unit – VI

Contemporary trends in the rest of the world architecture. Theory of Post Modernism.

Unit – VII

Design Theories and works of Charles Moore, Michael Graves, Richard Meyer, Aldo Rossi, Cesar Pelli, I.M. Pei, Yamasaki, Peter Eisenmann etc.

Unit – VIII

Design Theories and works of Hassan Fathy, Geoffery Bawa, Norman Foster, Renzo Piano, Richard Rogers, Frank Gehry, Zaha Hadid, Santiago Calatrava, Tadao Ando etc.

Reference Books:

Bahga, S.S: Post Independent Architecture.

Bhatt, Vikram and Scriver, Peter. Contemporary Indian Architecture After the Masters. Mapin Pub. Pvt. Ltd., Ahmedabad, 1990.

Curtis, J.R. William. Modern Architecture since 1900. Prentice-Hall, Inc., New Jersey, 2002.

Jencks, Charles.The Language of Post-Modern Architecture, 4th ed. Academy Editions, London, 1984.

Frampton, K Tad Ando- buildings, Projects Writings, New York Rizzoli, 1984.

AR17B5.5C COMPUTER APPLICATIONS – II

<i>L/s: 4/Wk</i>	<i>Int:50</i>	<i>End Exam: 50</i>	<i>Total: 100</i>	<i>End Exam: Practical</i>	<i>Cr:4</i>
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Course Overview:

This subject aims to further architectural design skills through advanced computer applications. The subject focus is in the area of computational media techniques and technologies and their impact on architectural design and production. This digital studio critically explores the impact of existing and emerging digital media and software, for advanced digital visualization, simulation and communication as well as associated theories

and methods on the conceptualization and development of architecture. Computational media is broadly defined across three categories: digital techniques for visualization; data collection and analysis, building information modeling (BIM) and introduction to physical model making using computer technologies.

Unit –I

Introduction to digital theory and this unit equips students with an understanding of the territory of computational design through its theoretical vocabulary and relevant histories. Making of Architectural vector diagrams to explore design and for digital communication using vector applications like coreldraw, illustrator etc.

Unit –II

3d modeling and different types of methods in 3 modeling like polygonal modeling , NURBS modeling ,subdivision surface modeling and building information modeling etc to design and test Architectural built environments virtually.

Unit –III

Scene setup involves arranging virtual objects, lights, cameras and other entities on a scene which will later be used to produce a still image or an animation. Image processing and video editing to create Architectural walkthroughs.
Digital solar studies

Unit –IV

Building information modeling; using 3 dimensional, real-time, dynamic building modeling software to increase productivity in building design and construction. The process produces the Building Information Model (also abbreviated BIM), which encompasses building geometry, spatial relationships, geographic information, and quantities and properties of building components.

Design and documentation using building information modeling application like Revit Architecture, ArchiCAD, Bentley Architecture etc

Unit –V

Introduction to Organic modeling and 3d printing to explore biomimetics and emergent concepts in the field of architecture and design by using advanced computational technologies

References:

Catalytic Formations: Architecture and Digital Design. Ali Rahim
BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors- Chuck Eastman
Building Information Modeling – Willem Kymmell

AR17B5.6C BUILDING ESTIMATING, COSTING AND SPECIFICATIONS

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

The course deals with various methods of quantity surveying, rate analysis of building and valuation and specifications for different materials used.

Objectives of the Course:

To provide the student adequate knowledge to write the specifications for a given item of work, to work out the unit cost of individual items based on their specifications and arrive at the overall cost of the project.

Expected Skills / Knowledge Transferred:

Techniques of estimating and costing and writing specification related to building construction in order to control/ monitor quality of work and project cost.

Course Contents:

Unit - I

Quantity Surveying: Introduction - Definitions and terms used, principles, units of measurements. Methods of preparing approximate/preliminary estimates (plinth area and cubic content method), basic differences and advantages.

Unit - II

Detailed estimate – data required, factors to be considered, methodology of preparation, abstract of estimate, contingencies, work-charged establishment, bill of quantities, different methods for estimating building works, Method of obtaining detailed quantities of building items (center line method, long wall and short wall method) PWD System to be followed.

Unit - III

Detailed estimation for load bearing structure in brick masonry and framed structure (ground floor only)

Unit - IV

Example and exercise in obtaining all items from excavation to finishes including arches, steps, polygonal, circular rooms, measurement of RCC work in slabs, columns, beams, staircase etc.

Unit - V

Preparing approximate estimates for services like water supply, plumbing, sanitation, electrical work, mechanical equipment and air conditioning. (for residential building).

Simple earth work calculations for road work – mid sectional area, mean area, prismatic formula methods (no transverse slope)

Unit - VI

Rate analysis: definition; method of preparation; quantity and labour estimate for unit work; Cost of materials and labour for various works, data sheet for different items of works, different methods of execution i.e. piece work, daily basis, lump sum, labour rates and percentage etc; task or outturn work; rate analysis for: earth work, concrete works, first class brick work, reinforced brick work, cement plastering, DPC with cement mortar/ concrete, finishing (cement paint, distemper, acrylic emulsion, enamel paint) to walls & ceiling.

Unit - VII

Specifications: Definition, purpose and importance of specifications, General or brief specifications, Detailed specifications, writing of specifications for the purpose of calling for tender types of specifications, general specifications for 1st, 2nd, 3rd and 4th class buildings

Specifications for items like earthwork excavations, foundation, CRS masonry, DPC, PCC, RCC, brickwork, doors and windows (wooden), steel and aluminum, mortars, plaster, different types of painting, flooring like terrazzo flooring and tiles, ceramic tiles, marble, granite, distemper, glazing, painting to joinery, varnishing, French polishing; Specification, writing to include materials, tests pre and post installation, modes of measurements.

Unit-VIII

Introduction to computer software for cost estimation; Introduction to cost accountancy and book keeping

Reference books:

Datta, B.N. Estimating and Costing in Civil Engineering: Theory and Practice, 23rd ed. UBS Pub. Distributors Ltd., New Delhi, 1993.

Bride, G.S. Estimating and Costing, 2nd ed. Dhanpat Rai and Sons, Delhi, 1982.

Rangwala, S.C. Valuation of real Properties, 6th ed. Charotar Pub. 6 House, Anand, 2003.

Standard Specification and rates, Government of Andhra Pradesh, Government Press, Hyderabad

Indian Standards Institution. National Building Code of India 1983. Indian Standards Institution, New Delhi, 1984.

Lerris, Jack. Engineering Construction Specification.

Macey, W. Frank. Specification in Detail, 5th ed. Technical Press Ltd, London, 1955.

Lewis, R. Jack. Building Construction Specifications. Prentice-Hall, Inc., New Jersey, 1975.

Govt. of Maharashtra. Standard Specifications, Government Press, Nagpur, 1972.

AR17B5.1E WORKSHOP - VERNACULAR ARCHITECTURE (Elective – I)

L/s: 3/Wk Int:50 End Exam: Nil Total: 50 End Exam: Nil Cr:3

Course Overview:

To expose the students to traditional architecture of various parts of the country.

Expected Skills / Knowledge Transferred:

Students will have knowledge of the planning aspects, materials used in construction, constructional details and settlement planning in various parts of the country.

Introduction to Vernacular Architecture

Approaches and concepts to the study of Vernacular architecture – A study of major typologies in various parts of the world.

Dravidian South

Planning aspects, materials of construction, Constructional details & Settlement Planning of

- Kerala – Nair houses (Tarawads), Kerala Muslim houses (Mappilah houses), Temples, Palaces and theaters – Thattchushastra.

- TamilNadu – Toda Huts, Chettinad Houses (Chettiars) & Palaces
- Karnataka – Gutthu houses (land owning community), Kodava ancestral home (Aynmane)
- Andhra Pradesh –Kaccha buildings
- Telangana – Gadhis and forts

Western Region

Planning aspects, Materials used, Constructional details, Climatic factors influencing the planning of

- Jat houses for farming caste, Bhungas(Circular Huts) and Havelis (Pukka houses) of Rajasthan
- Pol houses of Ahmedabad - Primitive forms, Symbolism, Colour, Folk art etc in the architecture of the
- Desert settlements and houses of Kutch & Gujarat state.
- Vernacular architecture of Goa.

Northern and Eastern India

- Kashmir – Typical Kutcha houses, mosque, Dhoongas (Boathouses), Ladakhi houses, bridges
- Himachal Pradesh – Kinnaur houses
- Uttar Pradesh – Domestic housing of Uttar Pradesh
- Bengal – Bangla (Rural house form), Aat Chala houses – change from Bangla to Bungalow, Kutcha & Pucca
- Architecture of Bengal. Nagaland – Naga houses & Naga village, Khasi houses

Studies to be taken up in groups in any one of the different regions indicated above. Field visits, documentations to be taken up and a Report to be prepared based on literature review and field visit. Reports should include factors influencing planning aspects, religious practices and beliefs, culture & climatic factors, materials of construction and constructional details. Field visits may be planned in the preceding vacation periods/clusters of holidays so as not to disturb class work.

Appropriate Materials

Study of Appropriate Materials based on Vernacular techniques of construction from different parts of the country. A study of BMTPC technologies, Auroville Earth Institute

Text Books

1. Traditional buildings of India, Ilay Cooper, Thames and Hudson Ltd., London

Reference Books

1. Architecture of the Indian desert, Kulbushan Jain & Meenakshi Jain, Aadi Centre, Ahmedabad

2. The Royal Palaces of India, George Michell, Thames and Hudson Ltd., London

3. Chettiar Heritage, S.Muthiah, Meenakshi Meyappan, Visalakshmi RAMASWAMY, Lokavani-Hallmark Press Pvt. Ltd., Chennai

4. Encyclopaedia of Vernacular architecture of the World, Cambridge University Press

5. Haveli – Wooden houses & mansions of Gujarat, V.S.Pramar, Mapin Publishing Pvt. Ltd., Ahmedabad

6. The Tradition of Indian architecture – Continuity & Controversy – Change since 1850, G.H.R.Tillotsum Oxford University Press, Delhi

7. VISTARA – The architecture of India, Carmen Kagal. Pub : The Festival of India, 1986.

8. House, Form & Culture, Amos Rappoport, Prentice Hall Inc, 1969.

AR17B5.2E WORKSHOP - UNIVERSAL DESIGN (Elective – I)

L/s: 3/Wk Int:50 End Exam: Nil Total: 50 End Exam:Nil Cr:3

Course Overview: The objective of this course is to acquaint the students of architecture regarding the various provisions and design issues for universal design

Knowledge Transfer /Expected Skills:

Multi sectoral collaborative approaches in design for persons

with disabilities and elderly persons / Inculcate skills required for designing for barrier free built environments for physically challenged persons. Techniques involved in making such provisions.

Syllabus to be covered by a 'learning by doing' approach and seminars by faculty and students. It should be project oriented with a hands on approach for eg: detailing for making a public space universally accessible etc.

Course Contents:

Unit – I

Introduction to Provisions of persons with Disabilities (Equal opportunities, Protection of Rights and Full Participation) Act, 1995, Type of disabilities - Orthopedic, Hearing, Visual Impairments, National Policy for provisions for elderly persons, Concept of equal opportunity, human rights, social justice and empowerment of physically challenged persons.

Unit-II

Introduction to similar efforts in other countries. Initiatives at global and International level for protection of rights of disabled and also elderly person. American disabilities Act 1990 etc.

Unit-III

Information on various types of national Institutes, agencies and professional bodies involved in disabled welfare, associated norms and standards thereof. The role of NGO's, professional and outreach.

Unit-IV

Principles of Universal Design; Design principles in Architecture for creating environments friendly for various types of physically

challenged persons. Barrier free concept Educational Institutions, Hospitals, Transportation terminals such as bus, railway stations and airports for barrier free spaces. Study of Standards as given in TSS, TCPO, CPWD, ADA etc., and others.

Unit-V

Provisions in public spaces and site planning – parks, play grounds, public transportation, parking lots, Details of sidewalks, road intersections, access to public toilets.

Unit-VI

Provisions in design of public buildings - Details in, ramps, guide rails, lifts, dimensions of wheel chairs, accessibility in public buildings, Signage, audio visual facilities etc. Design of Toilets and interiors spaces for use of physically challenged.

Exercises in design of user friendly spaces for physically challenged persons. Term paper on certain type of disability and requirements thereof for making environs barrier free or any other exercise appropriately framed by the subject faculty.

Reference books:

Micheal J. Bednar. “Barrier Free Environments”, Dowden, Hutchinson and Ross, Ives 1977.

Ministry of Urban Affairs and Employment. Central Public Works Department, India, “Guidelines and Space Standards for Barrier Free Environment for Disabled and Elderly Person, 1998.

Unnati. “Design Manual for a Barrier – Free Built Environment”, Handicap International, December, 2004

SIXTH SEMESTER

AR17B6.1C ARCHITECTURAL DESIGN –V

L/s: 9/Wk Int: 200 End Exam: 200 Total: 400 End Exam: Viva-voce Cr: 9

Course Overview:

Course aims at teaching the design of buildings for passive recreation and large span buildings for public uses.

Expected Skills / Knowledge Transferred:

Design vocabulary, enhancement and sensitization of student in design preparation and its relation to structural systems

Course Contents:

Design issues should address the following:

- Environmental and micro climate.
- User behavior and requirements.
- Utility and space enhancement.
- Form and function.
- Circulation: horizontal and vertical.
- Site Planning and Landscape detailing.
- Structural details such as beam framing, Building Services / HVAC etc.
- Design detailing considering the barrier free environment.
- Socio-economic profile of user group.
- Parking details and standards.
- NBC and other relevant building codes as applicable.
- Relevant design considerations for barrier free design for the differently abled.

Topics considered for design are:

Passive Recreation buildings such as:

- Infotainment center.
- Civic Centre

- Convention Centre.
- Cultural Centre.
- Community Centre.

Public Buildings - Large Span structures:

- Bus terminals.
- Multiplex.
- Auditorium Complex.
- Museum and Art Gallery.
- Kalyana Mandapam.

At least two major exercises and one minor design / time problem need to be covered. Design proposal along with a scale model / digital model must be submitted for the two main problems.

Sufficient theoretical inputs need to be given highlighting the norms and standards of design parameters.

Note: For the end exam, which is a viva-voce, the students have to present the entire semester work for assessment.

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

Reference books:

Chiara Joseph de and others. Time Savers Standards of Building Types. McGraw – Hill, 1980.

Dawes, John. Design and Planning for Swimming Pools. The Architectural Press, London, 1979.

Ruknitein, M. Harvey. Central City Malls.

AR17B6.2C WORKING DRAWINGS & DETAILS

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: Viva-voce Cr:4

Course Overview:

The focus of the course is to impart skills related to the preparation of drawings meant for construction work on the site and to improve the students' ability of detailing.

Objectives of the Course:

To impart training in the preparation of working drawings for buildings with specific reference to code of practice as per IS Code No. 962 of 1969 and incorporating specifications as complementary to the working drawings.

To sensitize the students in preparing finer design details required for buildings.

Expected Skills / Knowledge Transferred:

To prepare working drawings for a project and resolve complex aspects in the buildings with appropriate materials and design details.

Course Contents:

Unit - I

Preparation of working drawings: Suitable scales of drawings, methods of giving dimensions: on plans, sections, elevations and other standards.

Unit – II

Preparation of Plans Building marking plan, excavation plan, centerline plan, foundation plan, column centerlines drawings, floor plans, terrace floor plan.

Unit - III

Elevation and Sections

Detailed elevations, detailed sections – at least one through staircase and one through toilet, typical wall profile sections and elevations.

Unit - IV

Details

Layout for Sanitation: and detailed plans, Electrical layout: plans and details, details of staircases, toilets and kitchens.

UNIT – IV

Detailing for walls, floors, ceilings through detail drawings to large scale in the form of plans, sections, elevations. Surface Treatment; Cladding, texture treatment.

UNIT – V

Detailing of architectural elements such as staircase, balcony, verandah, shading devices vertical and horizontal components of the building.

UNIT – VI

Detailing of Doors, windows, storage shelves for frames, shutters, joinery of frame to shutter, shutter to panelling etc. and other fixing details.

UNIT – VII

Design details appropriate for creating Barrier Free Environment.

Note: Students shall prepare at least two working drawing sets, one for a small residence and one for a large building. (Load Bearing and R.C.C. framed structure with part/basement, ground floor and first floor with lift/elevator including interior detail drawings)

To give the learning in this subject a more practical orientation seminars by industry or trade related organisations or field/site visits should be organized. A weightage of 5% in the overall Internal Assessment in the subject should be reserved for students attending these seminars/site visits and maintaining the records/observations as required by the subject faculty.

Reference books:

Lerrs, Jack. Engineering Construction Specification.
Liebing, W. Ralph and Raul, Ford Mimi. Architectural Working Drawings, 2nd ed. John Wiley and Sons, New York, 1983.
Macey, W. Frank. Specification in Detail, 5th ed. Technical Press Ltd, London, 1955.
Shah, M.G., and Others. Building Drawing: with an integrated approach to build environment, 3rd ed. Tata McGraw Hill Pub., co. Ltd, New Delhi, 1996.
Standard Specification of Government of Andhra Pradesh State.
Lewis, R. Jack. Building Construction Specifications. Prentice-Hall, Inc., New Jersey, 1975.
Govt. of Maharashtra. Standard Specifications, Government Press, Nagpur, 1972.
Datta, B.N. Estimating and Costing in Civil Engineering: Theory and Practice, 23rd ed. UBS Pub. New Delhi, 1993.
Wakita, Osamu A. & Linde, Richard M. The professional practice of architectural detailing, 2nd ed. New York: Wiley, 1987.
Robert, C. Mc Hugh. Working Drawing Hand Book, New York: VNR, 1977.

AR17B6.3C ARCHITECTURAL ACOUSTICS

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:3

Course Overview:

Acoustics to be studied as a determinant of built form and understand the behavior of sound.

Objectives of the Course:

To equip the students with tools for application of acoustical design in architecture.

Expected Skills / Knowledge Transferred:

The knowledge of specific acoustic requirements of different spaces

Skills to deal with acoustic problems within buildings

Knowledge that enables to deal effectively with specialists and consultants in acoustics

Course Contents:

Unit – I

Need to study acoustics; pioneers and their works. Acoustics examples from the past: methods used for good acoustics.

Unit – II

Basic theory: Generation, propagation, transmission; reception of sound; Frequency, wavelength and velocity of sound; sound intensity; inverse-square law; decibel scale, decibel addition, small numerical examples in intensity of sound.

Unit – III

Human ear characteristics, Binomial hearing, Loudness perception, subjective effects, characteristics of speech, music and hearing and music,- distribution of energy in speech and music frequencies, intelligibility of speech, high fidelity reproduction of music. A-weighted sound levels.

Unit – IV

Room acoustics: Behavior of sound in enclosed spaces. resonance, reverberation, echo, reverberation time, simple exercise using Sabine's formula. Ray-diagrams, sound paths, effect of geometry and shapes, sound adsorption, sound absorption coefficients, Sound insulation, materials and resonant panels.

Unit – V

Acoustic design process and requirements of different types of buildings: Auditoriums, concert halls, cinema halls, Seminar rooms, lecture halls, class rooms and open offices. Exercises involving reverberation time and absorption co-efficient.

Case study of an auditorium with a report containing drawings and calculations of reverberation time etc. Detailed acoustic design for any one type of building.

Unit-VI

Sources and types of noise in and around buildings, characteristics and effect of noise impact on human beings/behavior, noise curves, transmission of noise, noise control for buildings - laws and legislation, regulations.

Legislations related to transportation, examples- airports, railway stations, railway tracks, MRTS etc.

Noise reduction: Sound isolation, transmission loss TL, TL for walls, sound leaks in doors, noise reduction between rooms, Construction details for noise reduction. Noise reduction and built form, Noise reduction through landscapes elements, land use planning for noise control.

Noise reduction from mechanical equipment, Rubber mounts, vibration isolation guidelines, characteristics of duct system, noise in AC ducts, vibration isolation of pumps and generators.

Unit-VII

Acoustics in Building Design and Construction

Design: Shape, volume, treatment for interior surface, basic principles in designing open air theatres, cinemas, broadcasting studios, concert halls, class rooms, lecture halls, theatres, auditorium.

Construction: Constructional detailing, relation to walls/partition, floor / ceiling/ opening/ windows/ doors.

Insulating fittings and gadgets machine mounting and installation of machinery.

Unit-VIII

Speech privacy, annoyance, background noise. Communication in open plans, electronic sound systems, loud speaker's layout.

Reference books:

Poella, L. Lestie. Environmental Acoustics.

Moore, J.E. Design of Good Acoustics, The Architectural press, London, 1961.

Burris, Harlod. Acoustics for the Architect.

Lord, Peter and Templeton, Duncan. The Architecture of Sound: Designing Places of Assembly. Architectural Press Ltd., London, 1986.

Egan, David. Architectural Acoustics, MC Graw-Hill Book Company, New York, 1988

AR 17B6.4C BUILDING ECONOMICS AND SOCIOLOGY

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

To introduce the economics and sociological aspects in architecture.

Course Contents:

Unit – I

Brief introduction of general economics through an introductory survey of concepts in micro and macroeconomics as applicable to building industry as follows.

Micro Economics: The market, budget constraint, choice, demand and supply, uncertainties, equilibrium, technological constraints, profit maximization and cost minimization, monopoly and oligopoly, production welfare and public good.

Macro Economics: GNP, NNP, demand and supply, inflation, interest rate, employment, saving and investment, monetary and fiscal systems and policies.

Unit – II

General discussions on various economic issues such as public versus private participation, equity, labour intensive versus capital intensive projects.

Unit – III

General economics of the basic inputs into building construction- land, labour, capital and materials. Market Demand and Supply – Choice of Technique in production – Laws of returns governing production.

Urban land values, land utilization, factors involved in development of urban land. Cost and cost indices, preliminary for building. Concepts of life cycle costing with reference to buildings. Time value of money-present worth and inflation.

Unit – IV

Financing for projects, sources costs and utility in financing. Agencies and institutions directly and indirectly influencing economic aspects of project.

SOCIOLOGY:

Unit – V

Family as the basic unit of 'Society'. Differences in lifestyles due to regional background, religion, caste, income group, etc. and their implication in Architectural design of the housing units.

Sociological aspects in the history of the evolution of housing / shelter forms.

Unit – VI

Urban and Rural Society: Sociological problems of interaction, isolation, privacy, accessibility, conflict, alienation related to the planning and design of different buildings with the references to the people of different age group/population groups.

Unit – VII

Power structures in society – local self-government, administrative structures – structure of decision making processes related to building projects at various government and private organizations levels.

Reference books:

Amos Rappoport, House Form and Culture

Wallis, Wilson D and Willey, M.M, Text book of Sociology, 1st ed., Khel Sahitaya Kendra, New Delhi, 2001.

Charon, Joel M. The Meaning of Sociology, 6th ed., Prentice Hall, New Jersey, 1999.

Thio, Alex. Sociology: a brief introduction, 4th ed. Allyn and Bacon, Boston, 2000.

Schaefer, Richard T. Sociology: a brief introduction, 4th ed. McGraw Hill, Boston, 2002.

Bilton, Tony and Oth. Introductory Sociology, 3rd ed. Palgrave, New York, 1997.

Stone, P.A. Building Economy: Design Production and Organisation a synoptic view, 2nd ed., Pergamon Press, Oxford, 1976.

Koutsoyiannis, A. Modern Microeconomics, 2nd ed., ELBS with MacMillan Press, 1994.

Nobbs, Jack and Hopkins, Ian. Economics: a core text, 4th ed. McGraw-Hill, London, 1995.

Teck, HoonHian and Oth. Economics: theory and applications, McGraw-Hill, Taiwan, 1998.

Dewett, K.K. Modern Economic Theory, Shyam Lal Charitable trust, New Delhi, 2005.

AR 17B6.5C HUMAN SETTLEMENTS AND TOWN PLANNING

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

This course focuses on the review of origin of Human Settlements to the level of understanding the various Town Planning problems.

Objectives of the Course:

To make the student understand about various planning related issues.

Expected Skills / Knowledge Transferred:

Should be in a position to make a neighbourhood plan for 5000 people.

Course Contents:**Unit - I**

Historic Evaluation: Brief review of the origin of early human settlements, factors responsible. Development of various settlement forms. Types of settlements (urban and rural) classification of areas within the urban settlements in terms of types of land uses, densities, administrative division, building types etc. Land use and factors influencing it in urban and rural settlements.

Unit - II

Sociological aspects: Essential elements of society Rural and Urban Communities, Growth of Socio-cultural thought through the ages. Influence of religion and culture on domestic and civil architecture.

Unit - III

Urbanization: Facts, Theories. Socio-spatial problems of migrants, slums, high and low density housing; high rise living such as isolation, alienation, accessibility, conflicts etc as

related to planning and design of buildings in different areas of the city. Social Survey and social research.

Unit - IV

Transportation and communication: potential and limitations of roadways, railways, airways and waterways in the development of a settlement.

Unit - V

Principles of Ekistics: Brief introduction to the theory of "Ekistics". Introduction to the concepts of green belts, satellite towns, neighbourhood, roads in solving some of the problems in urban development. Indian context: Growth pattern of urban and rural settlements; problems and potentials.

TOWN PLANNING**Unit - VI**

A brief introduction to the implication of town forms in urban planning and development processes. National, regional, urban, rural, local etc. emphasizing the difference and relationships among them.

Unit - VII

A general and introductory study of inputs, objectives, preparation and outputs of Master plan for a city; land-use classification, features and relationships with transportation. Meaning and use or implication of O-D surveys, desire line diagrams trip generation, attraction, distribution and modal split.

Unit - VIII

Introduction to housing and community facilities; role of F.S.I, densities in housing.

Unit - IX

Basic methodology for planning of industrial areas and recreation areas.

Unit - X

Brief introduction to redevelopment schemes and urban renewal, problem of slum and shanty areas and a review of the concepts regarding solutions: clearance, rehabilitation and improvement.

At least one exercise related to the preparation of a layout for a residential neighbourhood of about 5000 populations.

Reference books:

- Bhagiratha Rao, E.L.** Land Acquisition Manual in Andhra Pradesh.
Buch, N. Mahesh. Planning the Indian city.
Chand, Mahesh & Puri, Vinay Kumar. Regional Planning in India. Allied Pub. Ltd., Bombay, 1990.
Doxiadis, C.L. Ekistics: Introduction to the science of Human Settlement.
Gallion, B. Arthur & Eisner, Simon. Urban Pattern: City Planning & Design, 5th ed. Van Nostrand Reinhold, New York, 1986.
Hyderabad Urban Development Authority. Hyderabad Urban Development Authority, HUDA, 1981.
Khosla, R.K. Urban and Rural Development in India.
Patterson, T. William. Land-use Planning Techniques of Implementation.
Rama Reddy, Padala & Srinivas Reddy, Padala. Commentaries on Land Reforms Laws in Andhra Pradesh.
Rame Gowda, K.S. Urban and Regional Planning. Univ. of Mysore, Mysore, 1972.
Rangwala, S.C. & Others. Town Planning, 18th ed. Charotar Pub. House, Anand, 2003.
Rappoport, Amos. House, Form and Culture.
Singh, Alok Kumar, & Others (ed). Strategies in Development Planning.

AR17B6.6C ENVIRONMENT RESPONSIVE DESIGN

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:3

Course Overview:

The course focuses on developing an understanding regarding environmental sustainability and environmentally responsible green buildings. It addresses the design concerns in architecture to develop resource-efficient buildings that have minimum adverse impact on the natural environment.

The emphasis is to gain an understanding regarding the existing concepts, ideas and processes in Architecture and built environment and also recognize rapidly emerging building solutions and technological initiatives that complement current practices in order to attain human health and environmental goals.

Objectives of the Course:

Develop skills to promote eco-friendly characteristics in the area of architecture and buildings and identify crucial technologies, facilities and applications that help in developing green buildings.

Course Contents:

Unit - I

Introduction to Macro Environment: Elements of climate, weather, Water cycle, Carbon cycle, Environmental quality, Deforestation, climatic change, Ozone depletion and implications.

Unit - II

Micro-environment: Natural environment Vis a vis built environment. Living environment Characteristics and components of Urban Ecosystem solar radiation, heat flow, air-movement, Land use, drainage and sanitation.

Unit - III

Concepts of green field development: Brown field development, environmental impact and ecological balance,

FAR, layouts, sustainable Site development, vegetation, landscape elements, alternative services and technologies, rain water harvesting, on site sewerage retention, treatment, recycle and reuse

Unit - IV

Building Resources: Passive energy system design, Building envelope, orientation and components of building fabric and Shading, High rise buildings, modular building Construction, curtain walls, Sourcing and recycling of building materials, alternative Calcareous, metallic and non-metallic, materials

Unit - V

Building Infrastructure: Active Energy Systems in buildings, Utilities and services, building automation. electro-mechanical systems, lifts and transportation, captive power plant and equipment, operation & maintenance

Unit - VI

Indoor air quality: fresh air requirements standards, Sick Building Syndrome, VOC and pollutants.

Unit - VII

Introduction to building rating systems: building auditing, points system, components, and weight age, agencies and institutions, GBC, TERI etc, green buildings in the contexts of Indian sub-continent,

Reference books:

Green Building Technologies - Godrej Centre CII a Madhapur, Hyderabad.

Greening Building – Green Congress, US.(web).

HSMI. Sustainable Building Technology – HUDCO, HSMI (Human Settlement Management Institution, New Delhi).

Koenigsberger, O.H. and Others. Manual of Tropical Housing and Building. Orient Longman, Chennai, 2003.

Odum, P. Eugene. Ecology and Environments, 2nd ed. Oxford and IBH Pub., New Delhi.

TERI, The Building Energy Audit – TERI (Tata Energy Research Institute).

HMDA Hyderabad- Green building guidelines

AR 17B6.1E THEORY OF DESIGN AND ARCHITECTURE (Elective – II)

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:3

Course Overview:

To provide the student of architecture a foundation in the conception of forms, spatial aspects, compositions and their analysis in buildings

Expected

To develop understanding of the philosophy, basic principles of space and mass, and architectural composition in the various periods studied in History courses in previous semesters

Unit I

Design process –Integration of aesthetics and function - Understanding of formative ideas, organization concepts

An understanding of design activity and how designers think; categories of design;

Design as problem solving and decision making, uncertainties in design process, multi- faceted nature of design; as a mixture of creativity and analysis, other design methods and processes

: Iterative design process, waterfall process, classic approach by analysis- synthesis, evaluation;

Empathy, integrative thinking, experimentalism, collaboration, intuitive thinking, types of reasoning

Position of design and its relation to science, art, technology

Unit II

Architectural Space and Mass: Definitions of architecture; Architecture as space, structure and enclosure; Spatial qualities imparted by shape, density etc. size, degree of enclosure; Materialization in terms of enclosing planes, articulation of planes, openings, elements of structure; spatial relationship, spatial organization, Primary forms, properties of form, transformation of forms - dimensional transformation, subtractive, additive forms, organization of additive forms - Articulation of forms- Interplay between physical elements and space

Understanding architecture as an expression of the primary design elements: point, line, plane, volume; Exploration of buildings in terms of basic principles of design and composition such as Unity, Proportion, scale, Harmony, Balance, Contrast, balance, rhythm, symmetry, hierarchy, axis with building examples; Accentuation, Restraint, Definition, Repose, Vitality, Strength, fluidity, etc. etc. - with the help of illustrations of buildings both historical as well as contemporary.

Expression of form and spatial organization in various periods and styles - Linear, Centralized, Radial, Clustered, Grid organization; Circulation: The building approach, the building entrance, Configuration of path, Path space relationship, Form of circulation space

Unit III

Design and use of technology - Use of different materials and technology for aesthetic and structural purposes.

Design to accommodate a programme: Fits between use/ user and design

Design and relation to context: site and cultural milieu

Style in architecture - basis for classification of styles - evolution of styles.

Unit IV

Use and need of ornament in architectural design- Different types of ornamentations in buildings

Historical perspective of the use of ornament in buildings.

Unit V

Values defining traditional and modern buildings; Metaphors in Design: Order, mystery; relation between parts and whole; Linkages between inside and outside; Architectural theory and architectural practice

Reference books:

1. "Form Space and Order" by Francis D K Ching
2. "Design Fundamentals in Architecture" by Parmar V S

AR17B6.2E ADVANCED CONSTRUCTION TECHNOLOGY & STRUCTURAL SYSTEMS (Elective – II)

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:3

Course overview:

The course supplements the previous courses on theory of construction and structures, and introduces the advanced developments in Building Construction and structures. . The students are expected to understand the systems of advanced construction and structural systems but not to solve numerical problems.

Objectives of course:

To introduce the students to the latest developments in construction, building materials and structures. Students should be able to grasp the construction techniques and structural forms available for adopting to architectural forms.

Expected Skills / Knowledge Transferred:

Gain knowledge about the recent developments and advanced

concepts in construction and structures and analyse and understand the nature of stresses that are developed in the major elements of advanced types of structures.

Course contents:

Unit I

Relation between structure and architecture; Geometry of form and structural function; Aesthetic theories of the expression of structural function in architectural form.

Construction and form; Structure and Form

Unit II

Equilibrium under simple tension or compression; Structural elements: Beams and slabs Arches and catenaries; vaults, domes and curved membranes; Trusses, Portal frames and space frames.

Advanced construction methods in RCC, pre-stressed concrete beams slabs frames, lift slab construction post tensioning, multi-storied building frames, circular slabs and beams. Uses of rapid-hardening cement, ready mix concrete [RMC], light weight concrete surface finishes of cement.

Pre-fabrication and Modular Construction:

A review of industrialised building: Basic principles, elements, assembly; Case studies.

Unit III

Folded plates like prismatic, V-type, trough type, pyramidal, prismatic and RCC folded plate and geometrical staircases, Shell structures, cyclonical shells, hyperbolic paraboloids,

Unit IV

Space frames: Folded plates, shells, cyclonical shells, Hyperbolic paraboloids, free forms.

Cable structures: Simply curved suspended roofs, membrane structures, cable structures, combination of cables and struts.

Structural Systems: single and double layer grids; braced domes, ribbed domes, plate type domes, Network domes, Lamella domes, Geodesic domes, Grid domes. Braced and folded structures.

Unit V

Curtain walls: types of curtain walls, components, structural solutions, construction and erection. glass wall system-glass; sheet metal wall systems sheet metal cladding.

Unit VI

Advanced Building Materials plastic, PVC, metals, synthetic boards, fire proof/ resistant boards/tiles, acoustic materials, glass, composite panels and their applications, non-load bearing gypsum blocks

Reference books:

James Ambrose, Building Construction Enclosure System 1990

Andrea deplazes (ED), Constructing Architecture: Materials processes structures-A hand Book Second Extended edition

Robert E Fischer, Engineering for Architecture 1989

R Barry, The construction of Buildings Volume 4 4th Edition

Schall, Rolf. Curtain Walls: Design Manual. Reinhold Pub., New York, 1962.

Sandela, Felix. Architecture and Structuralism. 1963.

Lane, Allen. Developments in Structural Form. Penguin Books Ltd, London, 1975.

Macdonald, J. Angus. Structure and Architecture, 2nd ed. Architectural Press, Oxford, 2003.

Michaels, Leonard. Contemporary Structures in Architecture. 1950.

Schall, Rolf. Curtain Walls: Design Manual. Reinhold Pub., New York, 1962.

Siegel, Curt. Structure and Form in Modern Architecture. Crosby Lockwood and Son Ltd., London, 1962.

Subramanian, N. Principles of Space structures. Wheeler and Co., Allahabad, 1983.

Zannos, Alexander. Form and Structure in Architecture: The role of statical function. Van Nostrand Reinhold Co., New York, 1987.

SEVENTH SEMESTER

AR17B7.1C ARCHITECTURAL DESIGN -VI

L/s: 9/Wk Int: 200 End Exam: 200 Total: 400 End Exam: Viva-voce Cr:10

Course Overview:

This Course deals with the design of large scale, multistorey, complex projects and aims to develop skills for a comprehensive design approach in the areas of Housing Design and Campus Design.

Objectives of the Course:

To develop skills for a comprehensive design in areas of housing and campus design for making a complete design portfolio.

Expected Skills / Knowledge Transferred: To develop skills for comprehensive understanding and dealing with Architecture of a group of buildings.

Course Contents:

I. Housing Design: Issues to be addressed for the design project pertaining to housing design:

- Density, mixed land use, ground coverage, development controls.
- Urban systems, services and their integration with the project.
- User requirements (derived from surveys)
- Issues in appropriate technology and costs.
- Issues of hierarchy, identity of space, public and private scales of space. Integration of community institutions etc.
- Detailing for the disabled and the elderly.

- Indian / local architectural responses to climate, culture, traditional values, building elements, symbols motifs and special character.
- NBC and other relevant building codes as applicable.
- Relevant design considerations for barrier free design for the differently abled.

Design exercise related to housing design for specific target groups.

II. Campus Design: Issues to be addressed for the design project pertaining to campus design:

- Issue in preparation of Master Plan for Institutions: academic, administrative, staff housing, student hostels etc.
- Environmental considerations.
- Phases of development.
- Scope for expansion for future developments
- Safe and comfortable vehicular and pedestrian movement.
- Issues of character and landscaping.
- NBC and other relevant building codes as applicable.
- Relevant design considerations for barrier free design for the differently abled.

Students would need to undertake one of the design subjects for the studio exercise. Students may be required to develop a brief, translate it into requirements and design.

One Major design exercise and one Time problem/minor design exercise should be given

The evaluation shall be through periodic internal reviews. The final submission will include a brief report of about 1000 words explaining the concept and design proposals for main portfolio.

It will also include a model.

Note: In end exam, which is a viva-voce, the students have to present the entire semester work for assessment.

Reference books:

Alexander, Christopher. Pattern language: Towns, Buildings, Construction. Oxford University Press, New York.
Richard. D. Dober. Campus Architecture: Building in the Groves of Academy. McGraw Hill, New York, 1996.
Chiara, De Joseph and Others. Timesavers standard for Housing and Residential development, 2nd ed. McGraw Hill, Inc, New York.
Newman, Oscar and Others. Defensible space: People and Design in the Violent City. Architectural Press, London, 1972.

AR17B7.2C ADVANCED SERVICES

L/s: 5/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:5

Course Overview:

Study of services and facilities used in special type of buildings. The emphasis is laid on operation of services, working of different equipment employed for carrying out building function in specific different building types

Objectives of the Course:

To develop understanding of special services, definitions and terms used, working of equipment, installation of facility, special provisions to be made in building design.

Expected Skills / Knowledge Transferred:

Principles and installations of specialized services in buildings and building complexes and NBC standards.

Course Contents:

Unit - I

Elevators and escalators –

Types of Elevators like traction, Hydraulic etc., Double-decker, sky lobby, lift lobby, lift interiors etc., Passenger, Capsule, Hospital bed lift; goods lift etc. Components; Working and operation of lifts, parts of lifts; industry standards

Planning for Elevators in a building: location in building, serving floors, grouping, size, capacity calculations. shape of passenger car, door arrangement etc., Provisions to be made in buildings for installation,

Service requirements: Quality of service, quantity of service, time, passenger handling capacity, space and physical requirements, machine room spaces and their typical layout

Escalators – Definition, Application. Location and arrangement in buildings. Space requirement, Introduction to working and design of escalator.

Escalators V/S Elevators, Conveyor belts - movement of passengers and goods

Unit - II

Electronic Systems in Buildings: Telephone and communication, networks in buildings EPABX, Security systems, Burglar alarms, video surveillance, access control, design of computer labs, access flooring, server rooms.

Unit - III

Fire Fighting Services: Behaviour of fire – ignition, igniter, Combustible contents, causes of fire, Mechanism of fire spread in building

and prevention – fire safety standards – concepts in fire protection

High temperature effect and combustibility: High temperature effects and combustibility of building

materials and structure – Fire resistance of buildings – Classification of buildings based on occupancy – fire fighting installation and requirements .Passive and active fire precautions – site planning and fire brigade access – Roof covering – control of fire spread.Portable firefighting equipment, Heat sensitive detectors – smoke detectors – Automatic water system.built in wet riser system, dry standpipe, sprinkler system, fire hydrant
Fire safety, fire & human behaviour – Means of escape, design and planning of escape halts and corridors to final exit. Psychological aspects – concept of panic – domestic, Multiple occupancy and Hospital fires.
NBC standards

Cooking gas distribution in buildings, piped gas supply, bottled gas supply.

Unit - IV

Swimming Pools: Pool and tank design, patio, finishes, Water circulation, cascades, channels, filtration and water treatment, Water quality and disinfection, balancing tank.

Unit - V

Hotel services: Specialty services required for hospitality industry, Laundry services, Kitchen services, Channeled Music, Internet,

Unit – VI

Environmental services: waste generation in Industrial buildings, various types of waste, solid, liquid, gas, treatment and disposal facilities, waste generation in hospital buildings, design provision for its disposal,

Unit - VII

Alternative energy sources for buildings: hot water solar energy system, applications of photo voltaic cells, biomass digesters, wind energy.

Reference books:

Faber, Oscar and Kell, J.R. Heating and Air-Conditioning of Building. Architectural Press, Surrey, 1945.

Prasad, Manohar. Refrigeration and air-conditioning, 5thEd. New Age Intl. Pub., New Delhi, 1996.

Tiwari, Satish. Water and Energy resources.

AR17B7.3C ENERGY CONSERVATION BUILDING CODE

L/s: 5/Wk Int: 50 End Exam: 50 Total: 100 EndExam: Practical Cr:5

Course Overview: This will give an overall understanding and importance of Energy Conservation in built environment and will also help students to design buildings which are ECBC compliant.

Objective of the Course: To enable students to design and evaluate code compliant buildings.

Expected Sills/Knowledge Transferred: Basic understanding of building energy codes, compliance methods, day lighting, and whole building energy simulations.

Course Contents:

Theoretical Sessions

Unit I

Building Physics and Energy in built environment: Physics of Heat – Heat and temperature, Types of Heat flow, Laws of thermodynamics, **thermal behaviour of buildings** – Solar control, ventilation, Steady State heat flow, Dynamic response of buildings, **Thermal Comfort** – Thermal balance and comfort, factors of Comfort, adjustment mechanisms, comfort indices, comfort zone, HVAC, **Thermal properties of materials** – Glass (SHGC, VLT, U value), walls, other building materials.

Unit II

International Practices - Energy Efficiency Requirements in Building Codes, Energy Efficiency Policies for New Buildings, General status in regions in Europe, North America, Japan, New Zealand, Australia, China, Energy Codes in Singapore, Malaysia, Duabi and Middle east, ASHRAE 90.1, ASHRAE 90.2 IECC, Title 24.

Unit III

ECBC Scope, Compliance and approach: Energy efficiency performance levels, building systems, precedence, building classifications, energy performance index, compliance approaches and requirements, approved analytical tools, administrative requirements, compliance documents, Benchmarking and Star Labelling.

Unit IV

ECBC Building Envelope: Mandatory requirements – Fenestration, opaque construction, daylighting, building

envelope sealing, **Prescriptive requirements** –roof, opaque external walls, vertical fenestration, skylights, **Building Envelope trade –off method**, standard building EPF calculation.

Unit V

Comfort Systems and Controls: Mandatory requirements – ventilation, minimum space conditioning equipment efficiencies, controls, additional controls for ECBC + and super ECBC, additional controls for super ECBC buildings, piping and duct work, system balancing, condensers, **Service water heating** –solar water heating, heating equipment efficiency, other water heating systems, piping insulation, heat traps, swimming pools, **Prescriptive requirements** – pumps, cooling towers, economisers, variable flow hydronic systems, boilers, energy recovery, **total system efficiency** – alternate compliance approach, low energy comfort systems.

Unit VI

ECBC Lighting and Controls: Mandatory requirements – lighting controls –automatic lighting shut off, space control, control in daylight areas, centralised controls for ECBC + and super ECBC buildings, Exterior lighting controls, additional controls, exit signs, **Prescriptive requirements** – interior lighting power, building area method, space function method, Installed interior lighting power, Exterior lighting power.

Unit VII

ECBC Electrical and renewable systems: Mandatory Requirements – Transformers, energy efficient motors, Diesel generators sets, check metering and monitoring, power factor

correction, power distribution systems, uninterruptible power supply, renewable energy systems.

Unit VIII

Daylighting – Daylighting simulation, manual daylighting compliance method.

Unit IX

Whole building performance method and Energy Simulation- General Scope, compliance, annual energy use, trade-off limited to building permit, documentation requirements, Mandatory requirements, **Simulation requirements** – energy simulation program, climate data, compliance calculations, **calculating energy consumption of proposed design and standard design** –energy simulation model, HVAC systems, compliance thresholds for ECBC Compliant, ECBC + and super ECBC Buildings, maximum allowed EPI ratios, Schedules.

Practical Sessions

Unit X

How simulation software works, geometry of buildings, material and construction, openings and shading, lighting and controls.

Recommended software for whole building: Design Builder/Open studio/Synergy.

Unit XI Heating and cooling design, Unitary HVAC Systems, Central HVAC System, simulation parameters natural ventilation.

Unit XII Building energy code compliance, project: small office, large office, single family residence.

Unit XIII Daylight Simulation: Recommended Software: DIVA for RHINO/DAI LUX EVO 6/Open Studio.

References:

1. Steven V Szokolay. Introduction to Architectural Science: The Basics of Sustainable Design. Architectural Press, Second Edition, 2010.
2. Vishal Garg, Jyothirmay Mathur, Surekha Tatali, Aviruch Bhatia. Building Energy Simulation: A workbook using Design Builder. CRC Press. 2017.
3. Energy Conservation Building Code 2017. Bureau of Energy Efficiency. New Delhi. 2017
4. American Society of Heating, Refrigerating and air conditioning Engineers, Inc. Standards (ANSI/ASHRAE) 90.1 –Energy Standards for Buildings except Low-rise residential buildings.2016.
5. American Society of Heating, Refrigerating and air conditioning Engineers, Inc. Standards (ANSI/ASHRAE) 90.2 –Energy Standards for Low-rise residential buildings. 2016.
6. Jens Lausts. Energy Efficiency Requirements in Building Codes, Energy Efficiency Policies for New Buildings. International Energy Agency (IEA) Information paper. March 2008.

AR17B7.1URBAN DESIGN (ELECTIVE – III)

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

The course focuses on creating awareness in students in the subject 'Urban Design' as a specialization in the area of architecture and urban planning.

Objectives of the Course:

To give an overview of urban design as an interface between the fields of architecture and urban planning.

To impart the knowledge about various developments in the field of urban design.

Course Contents:

Unit - I

Discussion on Architecture, Urban design, Town Planning Interface. Urban Morphology and Elements of Urban Design. Nature of urban design projects in public and private developments.

Unit - II

Classical cities, medieval towns, neoclassic cities, and industrial towns. Characteristics of towns built by Hindu and Muslim rulers in India. Colonial inheritance, growth of post towns, civil lines, cantonments, railway and resort towns and Design in New Delhi.

Unit - III

Modern movements in city design such as 'city- beautiful' and 'Garden city' movements, utopian model Towns in the west. Changing structure of cities: sectors, blocks, streets, squares, buildings and open spaces.

Unit – IV

Role of planning agencies such as development authorities, Urban Arts Commission in the design of cities. Influence of city development policies namely Master plans, zoning regulations, on Urban Design. Built-form and space requirement in residential, commercial industrial and recreational land uses, activities. Patterns of subdivision and land-development.

Unit – V

Elements of urban spaces: squares and streets. Use of landscape in urban design, such as tree avenues, street fencing, side walks etc.

Lighting and illumination of cities, methods of lighting, signage and elements of utility services in the city.

Unit – VI

Urban conservation and its role in urban design. Past and present trends in urban conservation. Role of architectural control in urban conservation and city character and style.

Reference books:

Bacon, N. Edmund. Design of Cities. Penguin Books, New York, 1976.

Benevolo , Leonard. History of the City.

Krier, Rob. Urban Space, 3rd ed. Academy Editions, London, 1984.

Moughtin, Cliff and Others. Urban Design: Ornament and Decoration. Butterworth-Heinemann, London, 1995.

Moughtin, Cliff. Urban Design Street and Square.

Mumford, Lewis. City in History: Its origin transformation and its prospects.

Sprelregen, Paul. Urban Design: The Architecture of Towns and Cities.

Lynch, Kwin, the Image of the city Cambridge mass: MIT press, 1965

AR17B7.2E HOUSING (Elective – III)

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

The course introduces the basic concepts and issues related to urban and rural housing.

Objectives of the Course:

To give an understanding and appreciation of housing in terms of issues, problems and directions.

Course Contents:

Unit – I

Evolution of Housing:

Brief review of the historical development of housing in various contexts.

Unit – II

Housing situation in India

Housing need and Demand: Housing and Habitat policy and perspective at the national level. Problems and Issues in urban & Rural Housing, Housing Agencies and their role in housing development.

Unit – III

Housing Standards

Issues involved in formulating housing standards for rural and urban areas, desirable and minimum standards. Residential Densities

Unit – IV

Housing Strategies

Review of different forms of housing globally – particularly with reference to the third world countries.

Brief acquaintance with some strategies such as sites and services upgrading existing shelter, stimulating private – sector production, developing building materials and alternative technologies, improving architectural design., protecting inner-city renters, land sharing, resettlement etc.

Unit – V

Housing Layouts and Design

Traditional pattern of housing design, Row Housing, Cluster Housing Apartment housing, low rise versus high rise housing, Incremental housing, neighborhood unit. Case studies of housing Projects

Unit – VI

Housing Process

Managing and financing of housing projects. People's participation, Technology Transfer, development control rules and environmental aspects

Reference books:

Alexander, Christopher. Pattern language: Towns, Buildings, Construction. Oxford University Press, New York.

Chiara, De Joseph and Others. Timesavers standard for Housing and Residential development, 2nd ed. McGraw Hill, Inc, New York.

Desai, A.R. and Pillai, Devadas. Slums and Urbanization, Popular Prakashan Pvt. Ltd.

HUDCO. Housing for the Low Income. HUDCO.

Poulose, K. Thomas. Reading Material on Housing. Institute of Town Planners, New Delhi.

Cedric Prgh (1990) Housing and Urbanisation, Sage Publication New Delhi

AR17B7.3E BUILDING CONSTRUCTION MANAGEMENT (Elective – III)

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

To introduce the importance of construction management in the field of architecture.

Course Contents:

Unit – I

Introduction

Construction in India; its role in development, importance of Management in Construction, role of Construction Manager, Construction team, responsibilities and authorities of Construction Manager Organization.

Unit - II

Management Techniques:

Planning for Construction Projects: Principles, objectives, advantages of planning, stages of planning.

Scheduling: Definition, advantages

Methods of Scheduling: Bar chart, Milestone chart, Controlling, Life cycle curves. Job layout, work break down structure

Project Management through Networks

Introduction, objectives, advantages, terms and definitions, types of networks, rules for drawing a network, Fulker son's Rate of numbering the events.

Introduction to PERT, CPM, difference between PERT and CPM, finding critical path.

Unit – III

Introduction to construction equipments, performance, characteristics and usage of equipment used in large scale projects.

Human Resource management: manpower estimation at various stages, recruitment, training, under and over manning.

Materials Management: Materials of construction, classification codification, ABC analysis, estimation of materials procurement, inventory / stock control, purchase procedure, stores management.

Quality control in Construction: Importance of quality, elements of quality, organization for quality control, quality assurance techniques.

Unit – IV

Labour Legislations pertaining to construction industry, payment of wages act, migration Act, Factories Act, Contract Labour Act, Labour Welfare Fund Act, Workmen's Compensation Act.

Construction Safety Management: Importance of safety causes of accidents, safety measures, safety benefits to employees, employees and customers.

Unit – V

Economics of Project Management: Economic analysis of projects, economic studies, sensitivity analysis. Cost estimating principles, parameter estimation, detailed estimates, cost concepts, classification of costs, elements of costs, and cost analysis for control.

Unit – VI

Budgetary Control Systems: Types of budgets, new approaches for budgeting, responsibility of accounting, profit centre approach.

Financial Management: Meaning and scope, financial statement analysis, ratio analysis, funds flow analysis.

Working Capital Management: Meaning, policy for working capital, estimating working capital needs. Capital investment decision, long term financing working of financial institutions in India and abroad, self-financing, financing mechanisms.

Value engineering: Definition, value engineering job plan, life cycle casting, value engineering applications.

Unit – VII

Introduction to Linear programming, Transportation problem, Sensitive analysis.

Reference books:

Gupta, B.L. and Gupta, Amit. Construction Management, Machinery and Accounts, 3rd ed. Standard Pub, 2005.

Loraine, R.K. Construction Management in Developing Countries. Thomas Telford, London, 1993.

Srinath, L.S. PERT and CPM Principles and Applications, 3rd ed. Affiliated East-West Press, New Delhi, 2003.

Singh, Harpal. Construction Management and Accounts 14th ed. Tata McGraw-Hill Pub., New Delhi, 1981.

Gould, E. Frederick and Joyce, E. Nancy. Construction Project Management. Prentice Hall, New Jersey, 2000.

Shrivastava, U.K. Construction Planning and Management, 3rd ed. Galgotia Pub., New Delhi, 2004.

AR17B7.4EINTERIOR DESIGN(Elective – III)

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

The course provides a frame work of the discipline by addressing to the theoretical, social, historical, technological, professional aspects of Interior Design.

Course Contents:

Unit - I

The profession of Interior Design; Role of an Interior Designer- past and present; Scope of services; Interior Design Process. Interior Design and Concepts: Elements and Principles of design- an overview and their applications in interior designing.

Unit - II

Interior Space planning and human dimensions. Focuses on physical, psychological Behavioural and human factors, study of Proxemics, Behavioural settings.

Unit - III

Introduction to the fundamentals of Interior Design such as Lighting, Furniture, Space, Materials, Furnishings, Art etc.

Unit – IV

Colours in interiors – Colour Theory, Effect of light on colour, various colour schemes like analogues, complementary, triadic etc. Colour symbolism. Psychology of colour, Industrial colour codes. International standards.

Unit – V

Introduction to Furniture and Accessories: An overview of historical perspective of furniture and styles, accent pieces and accessories from Egyptian period to the present. Basic Furniture vocabulary. Styles of Interiors – Italian, English, French, Japanese styles etc.

Unit – VI

Interior lighting – direct and indirect lighting, location and light grid systems, types of luminaries, quality of lighting. Ambient, task and accent lighting. Exposure to eminent interior designers' works- Indian and international

Unit – VII

Business perspectives of Interior design – an overview of practice of interior design in India.

Reference books:

Archi World. Interior Best Collection: Residence, Commerce, Office, Restaurant Asia I-IV. Archi World Co., Korea, 2003.
Friedmann, Arnold and Others. Interior Design: An Int. to Architectural Interiors. Elsevier, New York, 1979.
Miller, E. William. Basic Drafting for Interior Designers. Van Nostrand Reinhold, New York, 1981.
Kurtich, John and Eakin, Garret. Interior Architecture, Van Nostrand Reinhold, New York, 1993.
Rao, M. Pratap. Interior Design: Principles and Practice, 3rd ed. Standard Pub., 2004.

AR17B7.5E LANDSCAPE ARCHITECTURE (Elective – III)

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Contents:

Unit - I

Study of landform its technical expression through grading plan, section, profiles layout plans and earthwork computations.

Principles of soil mechanics and landscape drainage and their application to surface and subsurface drainage of small scale projects.

Unit –II

Basic principles of outdoor lighting, types of fixtures and their use in varying situations.

Introduction to irrigation systems – sprinkler trickle irrigation, drip irrigation and laying irrigation networks.

Unit -III

Factors related to construction; of structures and systems.

Materials and techniques of landscape construction with emphasis on appropriateness for intended use.

Construction of structure in landscape

Circulation roads, parking, paths; Level changes – walls, steps, ramps; Construction of Garden, landscape feature Such as screens, trellis, wall fences gates decks; fountains and pool construction.

Unit -IV

Planting and establishment of woody plants, installing time, covers and herbaceous plants.

Planting principles – Bed preparation, mounding, application of fertilizers, roll preparation, pruning and maintenance.

Reference books:

Landphair, C. Harlow. Landscape Architecture Construction, 2nd ed. Elsevier, New York, 1988.

Motloch, L. John. Int. to Landscape Design, 2nd ed. John Wiley and Sons, Inc., New York, 2001.

Moorhead, Steven (Ed.). Landscape Architecture. Rockport Pub, Massachusetts, 1997.

Pregill, Philip and Volkman, Nancy. **Landscapes in History: Design and Planning in the western Tradition.** Van Nostrand Reinhold, New York, 1993

GN17B7.1A PERSONALITY DEVELOPMENT

L/s: 3/Wk Int: 50 End Exam: Nil Total: 50 End Exam: Nil Cr:3

Course Overview:

The purpose of this course is to build confidence and inculcate various soft skills and to help Students to identify and achieve their personal potential.

OBJECTIVE:

To help the students achieve effectiveness in their professional activities, harness skills and develop qualities suited for the profession.

Course Content:

Unit I

Personality: Nature of personality; Theories of personality- Type, Trait, Social Learning. Determinants of personality, Personality traits.

Unit II

Attitude Building
Importance of attitude, factors that determine our attitude, types of attitude, building positive attitude, developing optimism and discipline.

Unit III

Group and Team Work
Group and Team dynamics, Group Structuring- Leadership, role, Tasks, effective team work
Exercises to understand the nature of a team, team building, members and achieving a given task. Panel discussions.
Public speaking: Planning a speech, using presentations, speech outline, research for public speaking, language and

style, analyzing audience, types of speeches, preparing for impromptu speech.

Unit IV

Stress Management Importance, Causes, Stress relief mechanisms

Unit V:

Class room activities planned to ensure full student participation. The group and individual activities are planned to develop the skills and talents of the students which they will need in various occasions in their careers.

Time management; Critical Thinking; Lateral Thinking (Situational); Leadership Qualities; Motivation
Business situation; Business plan presentation
Vocabulary games; Presentation Skills
Event Management
Goal Setting; Analytical Thinking; Problem Solving;
Emotional Quotient; Assertiveness; Stress Management

Reference books:

1. **Krishna Mohan & Meera Banerji.** Developing Communication Skills, Macmillan India
2. **C S Rayudu.** Principles of Public Relations, Himalaya Publishing House
3. **K. Ashwathappa,** Organizational Behavior, Himalaya Publishing House
4. **Daniel Colman.** Emotional Intelligence

OPEN ELECTIVE -1

Open Electives will be announced by the Department/s before start of the Semester. If a student wishes to take any online course as Open Elective due permissions must be taken as prescribed.

EIGHTH SEMESTER

AR17B8.1C DESIGN STUDIO AR17B8.1.1C ARCHITECTURAL DESIGN - VI (DESIGN STUDIO)

L/s: 11/Wk Int: 200 End Exam: 200 Total: 400 End Exam: Viva-voce Cr:11

Course Overview:

The course deals with the design of large, multi-storeyed complex projects.

Objectives of the Course:

To develop skills for a comprehensive design in urban context (Ex; Housing project, Shopping Malls etc.) for making a complete design portfolio.

Expected Skills / Knowledge Transferred:

To develop skills for comprehensive understanding and dealing with Architecture of a group of buildings interconnected with elements of urban design.

Course Contents:

Urban Design: issues to be addressed:

- Issues of urban structure, urban space and form.
- Issues of conservation.
- Issues in zoning, land use, density, development control.
- Issues of building in context, urban infill
- Integration of diverse functional needs, access systems, parking, services etc.
- NBC and other relevant building codes as applicable.
- Relevant design considerations for barrier free design for the differently abled.

Design portfolio shall include (at least one example each) using

1. 'Hi-tech' materials / construction.
2. Conservation related materials / construction.

Students would need to undertake all of the above design subjects for the studio exercise.

The evaluation shall be through periodic internal reviews. The final submission will include a brief report of about 1000 words explaining the concepts and design proposals along with the main portfolio. It will also include a model.

Note: In end exam, which is a viva-voce, the students have to present the entire semester work for assessment.

Reference books:

Alexander, Christopher. Pattern language: Towns, Buildings, Construction. Oxford University Press, New York.

Lynch, Kevin. Image of the City

Newman, Oscar and Others. Defensible space: People and Design in the Violent City. Architectural Press, London, 1972.

Watson, Donald & Others (Ed.) Time Saver Standards for Urban Design. McGraw Hill, New York, 2003.

AR17B8.1.2C BUILDING CONSTRUCTION MANAGEMENT (DESIGN STUDIO)

L/s: 11/Wk Int: 200 End Exam: 200 Total: 400 End Exam: Viva-voce Cr:11

Course Overview:

Major studio work, focusing on construction management of large scale projects for effective and efficient implementations.

Objectives of the Course:

To equip students of Construction Management specialization with various techniques of project implementation.

Expected Skills / Knowledge Transferred: The skills related to construction management of large building projects.

Course Contents:

Preparation of working drawings in detail for large building project (building more than 5000 sq. mtrs.) covering the following aspects Implementation scheduling –Resource planning-time, labour, material, equipment and personnel requirements, estimation-scheduling, control and procurement. Preparation of network charts and flow charts with control mechanism in place, including quality and cost control – sticking to budgetary estimates and foreseeing any disturbances in scheduling, devise resilience and adaptive measures.

Report of Construction Management: Preparation of Project report on any live, ongoing or completed-large scale project.

Reference books:

Gupta, B.L. and Gupta, Amit. Construction Management, Machinery and Accounts, 3rd ed. Standard Pub, 2005.
Loraine, R.K. Construction Management in Developing Countries. Thomas Telford, London, 1993.
Srinath, L.S. PERT and CPM Principles and Applications, 3rd ed. Affiliated East-West Press, New Delhi, 2003.
Singh, Harpal. Construction Management and Accounts 14th ed. Tata McGraw-Hill Pub., New Delhi, 1981.
Gould, E. Frederick and Joyce, E. Nancy. Construction Project Management. Prentice Hall, New Jersey, 2000.
Shrivastava, U.K. Construction Planning and Management, 3rd ed. Galgotia Pub., New Delhi, 2004.
Chitkara, K.K. Construction Project Management: Planning, Scheduling and Controlling. Tata McGraw-Hill Pub., New Delhi, 1999.
Sharma, S.C. Construction Equipment and its Management, 4th ed. Khanna Pub., New Delhi, 2004.

AR17B8.1.3C LANDSCAPE ARCHITECTURE (DESIGN STUDIO)

Course Overview:

This course will focus on design and development of small to medium scale projects and aims to develop skills for design of comprehensive landscape proposal for simple residential landscape, community level open spaces and campus design.

Objectives of the Course:

To expose students to issues concerned with landscape design and site planning.

To expose students to wide range of design alternatives and preparation comprehensive designs for landscape projects.

Expected Skills / Knowledge Transferred:

Basic skills in design and orientation in landscape design are prerequisites for the students. The student is expected to obtain skills in development of concepts based on perceptual evaluation of site and propose design alternatives. Solutions to small and medium scale landscape design projects

Course Contents:

- Emphasis on form and spatial relationships leading to open space order and frame work.
- Concerns for Social, Psychological considerations of the individual and large groups of people, their interaction and resultant forms of environment.
- Issues related to functional requirement and design strategies.
- Microclimate and environmental consideration.
- Issues related to health, welfare, safety and enjoyment.
- Issues related to zoning, density and develop controls.
- Issues related to services and site development.
- Issues related to visual and aesthetic and contextual consideration.

Students would need to undertake one small and one medium scale designs in site planning.

The exercises taken up shall deal the issues comprehensively from general understanding to providing complete landscape design solutions. The exercise can be split into different stages such as Data collection, Case studies, Synthesis and Design development.

Reference books:

Southerland, Designing the new landscape.

Hacket, Brian. Planting Design.

Laurie, Michael. An Introduction to Landscape, 2nd ed. Prentice Hall, New Jersey, 1986.

Lynch, Kevin. Site Planning. MIT Press, Massachusetts, 1962.

Jellico, Man and Landscape.

AR17B8.1.4C INTERIOR DESIGN (DESIGN STUDIO)

L/s: 11/Wk Int: 200 End Exam: 200 Total: 400 End Exam: Viva-voce Cr:11

Objectives of the Course:

To enable the students to demonstrate design ideologies in the field of interior design

Course Contents:

Interior requires that students have a full understanding of the interior design field and have mastery of the design process, presentations, project administration and business skills.

Two interior schemes of different functional types: Residential / commercial at different scales will form the major design assignments.

Focus is on Portfolio creation by producing a complete and correct set of working drawings, from plans through details and specifications and sample boards

Portfolio preparation

The student will create a portfolio that clearly expresses his/her ability to design by using detailed drawing, rendering and Model Making. Usage photography and graphic design in preparing a professional portfolio is also encouraged.

Reference books:

Archi World. Interior Best Collection: Residence, Commerce, Office, Restaurant Asia I-IV. Archi World Co., Korea, 2003.

Friedmann, Arnold and Others. Interior Design: An Int. to Architectural Interiors. Elsevier, New York, 1979.

Miller, E. William. Basic Drafting for Interior Designers. Van Nostrand Reinhold, New York, 1981.

Kurtich, John and Eakin, Garret. Interior Architecture, Van Nostrand Reinhold, New York, 1993.

Rao, M. Pratap. Interior Design: Principles and Practice, 3rd ed. Standard Pub., 2004.

AR17B8.2C PRE-THESIS SEMINAR

L/s: 4/Wk Int: 100 End Exam: 0 Total: 100 End Exam: NIL Cr:4

Course Overview:

The course provides students with a framework to understand some emerging concepts in architecture and projects of design complexity and equip the student with adequate architectural design research methods for the realization of thesis concept. During the course of study, the subject of the thesis is developed and the project articulated.

Objectives of the Course: To impart knowledge to students, on the tools and methods needed to handle a design project of reasonable complexity individually,

Expected Skills / Knowledge Transferred: The skills required to collect, assimilate and synthesis data relevant to handle a design thesis project independently.

Course Contents:

UNIT - I

Introduction to architectural thesis Project: Difference between design thesis and design studio, selection of topics for architectural design thesis, design thesis topics based on building typologies, preparation of synopsis, Methodology of design thesis

UNIT - II

Emerging concepts in architecture due changes in social, economic, technological variables. Review of design projects related to real world instances and relevant to community at large. Review of projects of design complexity, involving themes, sub themes and architectural expression.

UNIT - III

Research in architecture: Tools and Methods required to handle a design project. Scientific methods of research with special emphasis on architectural research methods. Architectural enquiry visual, observations, questionnaire formats of enquiry, Literature Review and case studies. Data analysis techniques interpretation of data.

Unit IV

Thesis report writing and presentation:

- Formats for presentation of data, case studies and analysis.
- Formats for presentation of thesis design- media appropriate in the architectural profession such as two dimensional drawing, physical models, three dimensional

computer models.

- Report Writing: Techniques in report writing, presentation of contextual information relevant to interpretation of the data collected and design; reporting the design development from concept to design solution, explain the relation of the design to existing knowledge on the topic in the form of coherently written thesis report.

The inputs to the students on various design thesis topics would be in the form of Expert /Guest Lectures

Each student in consultation with the faculty shall choose a thesis topic, collect necessary data, review literature on the chosen topic and present a written paper and seminar at the end of the semester.

Reference books:

Mukhi, H.R. Technical Report Writing: Specially prepared for Technical and Competitive Examinations, New Delhi: Satya Prakashan, 2000.

Barrass, Robert. Writing At Work \b a guide to better writing in administration, business and management, London: Routledge, 2003.

Seely, John. The Oxford guide to effective writing and speaking, 2nd ed., Oxford ; New York : Oxford University Press, 2005.

Jo Ray McCuen, Anthony Winkler. Readings for writers, 9th ed., Fort Worth : Harcourt Brace College Publishers, 1998.

Treece, Malra. Effective reports, 2nd ed., Boston: Allyn and Bacon, 1985.

**AR17B8.1E ARCHITECTURAL ILLUMINATION
(Elective IV)**

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Objectives of the Course:

The course is intended to give an in depth understanding of the scientific and design aspects of lighting in Architecture

Course Contents:

Unit – I

Light and vision, basic units, photometry and measurement, quality and quantity of light of different sources of light. Daylight, incandescent lamps, halogen lamps, electric gas discharge lamps, fluorescent lamps, high discharge lamps. A market survey of lamps with cost and technical specifications.

Unit – II

Design of lighting; lumen method, point by point method, design tools, design documentation, simple numerical.

Unit – III

Specific lighting design requirement of different buildings such as homes, offices, industrial, hospital, art galleries, museums and exhibitions, case study of at least one type of the building by each student.

Unit – IV

Outdoor lighting: road lighting, high-mast lighting, tunnel lighting, landscape lighting, decorative lighting, facade lighting, spot lighting.

Unit – V

Lighting as determinant of form for architecture with graphic examples.

Unit – VI

Daylighting, advantages of daylighting; design tools in daylighting. Case studies and various examples, behaviour of daylighting in an interior spaces. Potentials of daylighting as an energy resource.

Unit – VII

Integration of daylighting with artificial lighting; lighting controls, intelligent building systems for lighting.

Unit – VIII

Conservation of energy in lighting use of daylight, optical fiber lighting, LED in lighting and the emerging trends in lighting.

Reference books:

Moore, Fuller. Concepts and practice of Architectural Day Lighting. Van Nostrand Reinhold co., New York, 1985.

Valia, Anil. Designing with light: A Lighting H.B. International Lighting Academy, Mumbai, 2002, Architectural Physics: Lighting.

Hopkinson R.G, Her Majesty stationery office, London.

David Egan. M, concepts in Architectural lighting Mc Graw Hill Book company, New York, 1983

AR17B8.2E ARCHITECTURAL JOURNALISM (Elective IV)

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

The Course prepares ground for the students to gain an understanding into the fundamental issues in architectural Photography and develop the skill to create Articles/presentation capturing the essence through the photographs.

Course Contents:

Unit – I

Analysis of historical and contemporary examples of writings on architecture, including selected writings by Indian and overseas critics;

Discursive techniques; analysis of major critical themes, thematic categories in architectural writing from the past.

Works of Indian and international writers and critics to be presented and discussed. Seminars on Indian architectural writers, journalists and critics
Awards for Architectural Journalism

Unit - II

Development of writing skills: Usage of language and Vocabulary and grammar- introduction to methodology of writing essays, news writing, precis writing, writing in architectural blogs; listening comprehension, analyze talks and information gathered and to edit gathered information to build an article.

Collecting clippings from articles, blogs and books.

Unit -III

INTRODUCTION TO PHOTOGRAPHY

Visual awareness – visual survey - General introduction to the art of photography; ; concept of color; concepts of lighting, distance, visual angle,

frames; media;

PHOTOGRAPHIC TECHNIQUES

Types of camera, properties and priorities;

Exposure, Aperture, Speed; EDFAT methods in using the camera

Unit - IV

Photo Journalism in perspective - Brief History - Photographs as social Documentaries - Birth of modern Photojournalism; Equipment required for Photo Journalism; Public relations News Papers and Magazine Design elements: Page Layouts - color scheme - Font - Blurb - Pictures - Ads etc- Other magazines

Documenting of Places - Rural- Urban.

Unit – V

People journalism and law-legal boundaries-libel and invasions of privacy – ethics-the photo journalist on scene

Unit - VI

Production of contemporary architectural journalism; Building pictures - Instant, Report - Editing - Editorial thinking – the picture Editor - Editing practices, creating drama - Photo editing -Documentary-evolution of the word document-methods and techniques.

Assignments should include an article based on ability to originate, plan, research, present and produce a piece of architectural journalism, integrating photography .

Reference books:

Kopelow, Gerry. How to photograph buildings and interiors, 3rd ed. New York: Princeton Architectural Press, 2002.

De Mare, Eric Samuel. Architectural photography, London: Batsford, 1975.

Busch, Akiko. The photography of architecture: twelve views, New York: Van Nostrand Reinhold Co., 1987.

Mehta, Ashvin. Happenings: \b a journal of luminous moments, Vapi, Gujarat: Hindustan Inks, 2003.

Mohd, Al Asad. Architectural Criticism and Journalism

Sommer, Robert. Tom Wolfe on Modern Architecture

AR17B8.3E STRUCTURES PROJECT (Elective– V)

L/s: 4/Wk

Int: 50

End Exam: 50

Total: 100

End Exam: Viva

Cr:4

Course Overview:

To understand the structural design concept and detailing for buildings up to G + 3 Floors

Objectives of the Course:

To provide knowledge and capability in structural concepts and design of framed RCC and steel structures

Course Contents:

Students have to design any structure, either in RCC or steel, which has been designed by them in the previous semesters. The project should be at least G + 3 Floors. It may be either RCC framed structure or steel structure and should include all basic structural elements.

Reference Books:

S. Ramamrutham, Design of RCC Structures, Delhi, Dhanpati Rai Publishing

Dayaratnam, Design of RCC Structures, Allahabad, Wheelers Publishers

Ramachandra, Design of Steel Structures Vols. 1 and 2, Standard Publications, New Delhi

Vazirani and Raywani, Design of Steel Structures, Khanna Publishers, New Delhi

AR17B8.4E WORKSHOP –TALL BUILDINGS (Elective - V)

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

To impart knowledge about the design approach to multi-storeyed buildings and the special service requirements of tall buildings; and to create awareness about the systems, equipment and materials commonly employed in high rise buildings.

Objectives of the Course:

Understanding the special systems required in mechanical, electrical and Fire safety services.

The ability to design vertical transportation systems, HVAC systems and Fire protection systems in line with the various standards, building codes and safety requirements.

Course Contents:

Unit I

Design and Structure

Design approaches to Tall buildings; Studying some famous examples as case studies; structural concepts of tall structures.

Vertical Transportation

Introduction to passenger elevator codes – Express & Local Elevators, Sky lobbies etc., - Study of elevator equipments, control systems and spatial requirements – Escalators and Capsule elevators – Stairways & Ramps

Fire Protection

Designing for fire safety – NBC – Fire alarm systems – Smoke detectors – Firefighting support systems – Fire rating of materials - Fire escape stairs & Safety regulations – Lightning protection.

Thermal Control Systems

Calculation of Heating and Cooling loads – Selection of suitable HVAC system – Special equipments and systems for heating and cooling – Spatial requirements for HVAC plants – Design of duct layouts etc.,

Water Supply and Sewage Disposal

Basic planning for water supply – Calculation of capacity for sumps and water tanks –Skip stage pumping etc., - Rainwater harvesting methods – Sanitation arrangements in high rise structures – Service floors – Ducts and vertical shafts – Waste treatment etc.,

Electrical Systems

Planning transformer & generator rooms, Preparation of electrical layouts for tall buildings – Spatial requirements of electrical rooms and ducts – Intelligent systems for electrical and illumination.

Text Books

1. Stein Reynolds Mc Guinness – *Mechanical and Electrical equipment for buildings – vol 1 & 2* – John Wiley & sons

Reference Books

1. Francisco AsensioCerver – *The architecture of Skyscrapers* – Hearst Book International - New York, 1997
2. Bennetts Ian & others – *Tall building structural systems*
3. Proceedings of the council for tall buildings – vol 1 & 2

**AR17B8.5E FURNITURE AND PRODUCT DESIGN
(Elective -VI)**

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: Viva Cr:4

Course Overview:

The course provides a framework in understanding the Theoretical, historical functional and human issues of the subject.

Objectives of the Course:

To impart a comprehensive understanding of the general theory and practice of the subject.
To inculcate in student a natural curiosity in allied discipline of design

Course Contents:

Unit – I

Understanding of the functional and formal issues in design – study and evaluation of popular dictums such as “Form follows function”, form and function are one”, “Less is more”, “God is in details” etc.
Evaluation of visual design for functional objects.
Gestalt theory of design: Law of closure, law of proximity, law of continuity etc.

Unit – II

Evolution of furniture through ages till present day

Unit – III

Human factors engineering and Ergonomic considerations; Principles of Universal Design and their application in furniture and product design.

Unit – IV

An introduction of various manufacturing processes most frequently adopted in furniture and product design such as, Injection Moulding; investment casting, sheet metal work, die-casting, blow-moulding , vaccum – forming etc.

Unit – V

Signage and Graphics – Environmental graphics: signage categories and materials.

Unit – VI

A detailed study involving the design aspects of any on of the following: Lifestyle accessories, Luminaire design, a piece of furniture, Point of Purchase design, Signage.

References:

- HéctorRoqueta.** Product design, London: teNeues, 2002.
Morley, John. The history of furniture: twenty-five centuries of style and design in the Western tradition, Boston: Little, Brown and Company, 1999.
Aronson, Joseph. The Encyclopedia of Furniture, 6th printing, New York: Crown Pub. 1944.
Saville, Laurel. Design secrets: furniture, Gloucester, Mass. : Rockport Publishers, 2006.
Datschefski, Edwin. The total beauty of sustainable products, Hove: Rotovision, 2001.
Papane, Victor J. The green imperative: natural design for the real world, New York: Thames and Hudson, 1995.

**AR17B8.6E ARCHITECTURAL DOCUMENTATION
(Elective -VI)**

Course Overview:

To train the students in conducting detailed building measurements including the application of surveying techniques.

Objectives of the Course:

To impart skills of planning a detailed measured drawing of an existing building/cluster of buildings (historical /contemporary/rural) and also to understand the background of the building design, construction, design concept.

1. Measurement of a modern building using plane table/TS
2. Village or neighbourhood study, preparing settlement plans, socio economic studies and conservation studies etc.
3. Documentation of any Historical/Heritage Building / Architectural landmark

Any one of the above to be taken up as groupwork during the Semester. The study should include a detailed understanding of the reasons for constructing the building, design concept, source of finance, building material and technology, socio-economic-cultural factors affecting the design and also the environmental factors impacting it. Wherever relevant and possible an interview with the architect of the building is to be undertaken.

The final submission to include a written report of at least 10000 explaining all aspects studied, Site plans, Building Floor Plans, Elevations and Sections.

AR17B8.7EBUILDING INFORMATION MODELING (Elective -VI)

Aim: The course shall impart theoretical and practical knowledge on BIM for building and infrastructure design, for preconstruction (- Estimating, Building analysis and optimization), for construction management (clash detection, constructability, trade coordination and scheduling), for IPD Integrated project delivery, and facility management.

1. Introduction

- History; building design process with purely drafting & modelling software and its limitations and disadvantages
- Difference between a purely drafting & modelling software and BIM software.

2. Basics of producing building design using BIM software.

- Introduction to Parametric 3D modelling and exploration of its advantages (Shall include Architectural, Structural, Electrical, Mechanical and all specialist consultant's elements) using any of the popular BIM software, preferably Revit 2018, Autodesk – the most popular software.
- Project Elements Planning – Creation of Project Tree. Hierarchical Identity creation of the project elements and intelligent internationally recognisable naming system.
- Building design – Creation of Digital Model of a building and its geo-physical location; creation of elemental details.
- Creation of Elements' families.

- Import of elements of all related trades. Format of digital model (IFC; acceptable formats and its advantages)
- Preparation of Project Documentation and Rendering
- Preparation of Schedules and BOQ (quantity take-off).
- Solar Studies – Daylighting simulation

3. BIM Information Sharing

- Concept of Central Model ownership of the digital model and interoperability.
- Location of the Central Model
- Access to model for the projects various stakeholders – The Client, Architect, Project Managers, Contractor, Structural Engineer, Electrical Engineer, Mechanical Engineer, all specialist consultants and Vendors in some cases.
- Other ways of exchange of information, in case of non-availability of common platform like the internet.

4. BIM as Project Design and Management Tool

- Introduction to 4D and 5D.
- Project Estimate and Scheduling; Linking of software like MS Project, Primavera, MS Excel to BIM. Exchange and Analysis of information
- Preconstruction study; project optimization
- BIM as tool to integrate Sustainability issues to building design and construction process; linking of various sustainability related applications, output and Analysis.
- Construction process and Constructibility

5. BIM Execution Plan

- Formats being used in different parts of the world to prepare a BIM execution plan.
- Need to prepare a project specific BIM Execution plan.
- LOD (Level of Development) for project specific requirement – production of Design Drawings, production of Working Drawings, coordination of various trades plus Clash Detection, production Shop Drawings, as-built drawings and compilation of information for Facility Managements (COBIE etc.).

References:

- Revit 2018 Suite _ Complete Reference Series, Mc Graw Hill Publication
- Mastering Revit Architecture - Demchak, Dzambazova&Krygiel
- BIM Handbook / Eastman, Teicholz, Sacks, Liston / Wiley
- Optional: BIM and Construction Management: Proven Tools, Methods, and Workflows / Hardin / Sybex — A BIM reference with a focus on construction management
- BIM – WillernKymmell

OPEN ELECTIVE - II

Open Electives will be announced by the Department/s before start of the Semester. If a student wishes to take any online course as Open Elective due permissions must be taken as prescribed.

NINTH SEMESTER

AR17B9.1C DESIGN THESIS

L/s: 23/Wk Int: 300 End Exam: 300 Total: 600 End Exam: Viva-voce Cr: 23

Course Overview:

Thesis should reflect the knowledge gained from all the courses undertaken by the student in all the previous semesters.

Objectives of the Course:

To develop assimilation, synthesis and application of research in Architecture

Expected Skills / Knowledge Transferred:

Student should be in a position to comprehend the design philosophy, theories, data analysis and application in a chosen area of study.

Course Contents:

Each student is expected to prepare a design thesis based on the preliminary work undertaken in the Pre Thesis Seminar, under an approved guide/adviser by the department.

The design Thesis shall comprise of Architectural Design proposals,

Thesis should reflect the knowledge gained from the course learnt in the previous semesters

The particulars of schedule, content, presentation, format etc., is to be decided by the department, from time to time and shall be strictly followed.

At the end of the semester, each student is expected to submit all original drawings prepared as per the department's specifications.

Three copies of the report in the specified format along with a model submitted to the department, after obtaining the approval of the respective guides / advisers.

The department shall schedule the final viva-voce, at its convenience, only after the receipt of the thesis submission by a student. The performance sheet submitted by the advisor and the thesis committee should be the basis for allowing the student to appear for the final viva-voce.

For End exam, viva-voce is to be conducted by a jury comprising of an external examiner, one internal examiner and head of the department or his nominee.

Reference books:

Mukhi, H.R. Technical Report Writing: Specially prepared for Technical and Competitive Examinations, New Delhi: Satya Prakashan, 2000.

Barrass, Robert. Writing At Work: A guide to better writing in administration, business and management, London: Routledge, 2003.

Seely, John. The Oxford guide to effective writing and speaking, 2nd ed., Oxford ; New York : Oxford University Press, 2005.

Jo Ray McCuen, Anthony Winkler. Readings for writers, 9th ed., Fort Worth : Harcourt Brace College Publishers, 1998.

Treece, Malra. Effective reports, 2nd ed., Boston: Allyn and Bacon, 1985.

AR17B9.2C PROFESSIONAL PRACTICE & BUILDING CODES

L/s: 4/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:4

Course Overview:

The course provides overview and specific conditions of COA regulations, Architects Act 1972 in Architectural practice.

Objectives of the Course:

To impart awareness and technicalities of code of conduct, and the significance of Architects Act 1972 in Professional Practice.

Expected Skills / Knowledge Transferred: Legal, Technical and Financial aspects of Architectural practices and management

skills for professional practice.

To develop understanding of the duties and liabilities of an architect along with knowledge of bye-laws that relate to the building and the environment in the Indian context.

Course Contents:

Unit - I

Professional Role of an Architect: Role and responsibility of architect in society; architectural profession as compared to others professions; difference between profession and business;.

Architects approach to works; ways of getting works; types of works, works partly executed by other architect; various precautions to be taken before taking up the work; conditions of engagement between the architect and client; commencement of work.

Architect's Act 1972, registration of architect, COA, IIA and other organizations related to architectural profession. Professional Practice Regulations 1989 and Minimum Architectural Education Regulations under the Architect's Act. IIA Code professional conduct;

Unit - II

Architectural Services Rendered: Architect's duties; drawings to be prepared; Architects relation with other parties connected with works such as client, contractor, sub-contractors, consultants, municipal and public authorities.

Architectural services - conditions of agreement - scope of work, comprehensive architectural services and architectural competitions, remuneration, professional fees and charges as per IIA norms.

Architectural Competitions & Legislations

Regulations governing the conduct of competitions, open & closed competitions, appointment & duties of Assessors, instructions to participants, award of premium.

Units and mode of measurements - clerk of work and his duties;

Inspection of work during construction; certification of contractor's bills; bill of quantities; defects liability; Schedule of rates, tenders; public, limited and negotiated tender documents and allied formalities.

Unit – III

Tender and Contract: Calling for Tenders, tender documents, open & closed tenders, labour & demolition tenders, conditions of tender, submission, scrutiny, recommendations & award of contract.

Contracts; types of contracts such as item rate, lumpsum, cost plus percentage etc.

General principles of Indian Contract Act; Building contracts, conditions and forms of contract, study of standard contract of the Indian Institute of Architects. Articles of Agreement. Administration of contract.

Arbitration: Principle of Arbitration, Indian Arbitration act 1940, Powers and duties of arbitrators, revoking authority; umpire, award cost fixed fee, cost with penalty, labour day work, piece work daily

Easements: definition; various types of easements; Dominant, and servient owners; essential conditions for enjoyment of easement; Fire insurance's definition, cover note; insurance for new work and additions; insurable value of property, claim for damage due to fire. Insurance of completed and occupied building

Unit - IV

Preliminary knowledge of transfer of property Act; registration, stamp duty under registration and Govt. Power. Income tax, wealth, land acquisition Acts; general information about land acquisition procedures.

Accidents during progress of work and after completion, damage to persons and properties affected; Workmen's Compensation Act with regards to the affected persons and properties.

Consumer Protection Act and related acts on architects

Unit - V

Types of Architectural firms: Architects' Offices Proprietorship firms & Partnership firms combined concerns; Comparison between partnership and Proprietorship firms. Staff structure; filing of records; correspondence and drawings; maintenance of accounts; presentations in meetings, recording minutes of meeting. A small report to be prepared by each student after visiting an architect's office.

Role of consultants and Co-ordination between different consultants on a big project.

Unit VI

Valuation – purpose of valuation, types of valuation- terms: market value, book value, capital cost, capitalized cost, – salvage/scrap value- various methods of estimating the depreciation of building properties,- sinking fund- land valuation- mortgage and lease- Annuity- definition; problems to calculate the value of the property by different methods. Fixation of rent- out going- gross and net income – year's purchase- capital cost-standard rent- market rent -economical Rent.

Unit VII

Building Codes (National Building Code, and Local Codes): Study of building byelaws to enable to design and prepare drawings for submission to concerned bodies and an understanding of the administrative processes for obtaining building permission. General Land-use, building classifications and permissible uses; Norms for exterior and interior open spaces, Setbacks and margins, norms for building projections in open spaces, considerations in FAR, guidelines for open green areas. Requirements for various parts of buildings, building height regulations, multi-storey regulations

Requirements of parking spaces and vehicular movements, Nature of building codes in special regions like heritage zones, air funnels, environmentally sensitive zones, disaster prone regions, coastal zones, hilly areas, etc.

Norms for Fire Protection for various building classifications, norms for fire-exit ways and building materials, concept of fire zoning, doorways, stairways, passages and corridors, fire escapes etc.

Reference books:

- Banerjee, D.N.** Principles and Practice of Valuation, 5th ed. Eastern Law House, Calcutta, 1998.
Dalton, J. Patrick. Land Law, 4th ed. Pitman Pub., London, 1996.
Indian Institute of Architects. H.B. Professional Practice. The Architects Pub. Bombay.
Indian Standards Institution. National Building Code of India 1983. Indian Standards Institution, New Delhi, 1984.
Namavati, H. Roshan. Professional Practice, 8th ed. Lakshani Book Depot, Bombay, 2001.
Namavati, H. Roshan. Theory and Practice of Valuation, 2nd ed. Lakshani Book Depot, Bombay, 1991.
M.Dedbhkth Architectural practice in India by Prof.M.Deobhkta
V.SApte: Architectural Practice Procedures
Hyderabad Municipal Bye laws.
Indian Standards Institution. National Building Code of India 1983. Indian Standards Institution, New Delhi, 1984.
Scott, G. James. Architectural Building Codes, New York: Vanstrand Reinhold.

AR17B9.1E DISASTER RESISTANT ARCHITECTURE (ELECTIVE – VII)

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:3

Course Overview:

This course introduces and explains disaster resistant methods of construction

Objectives of the Course:

To develop understanding about the nature of disasters and their effects on built environment.

To develop understanding about the ways of building that would resist disasters.

Course Contents:

Unit - I

Building safety from Natural Hazards:

Earthquake, Fire safety in buildings, Cyclone effects: High winds, storm surge and safety aspects in buildings, related to Cyclones, Floods, Landslides.

Elementary Seismology:

Occurrence of earthquake in the world, plate tectonics, faults, earthquake hazard maps of India and the states.

Causes of earthquake, seismic waves; magnitude, intensity, epicenter and energy release, characteristics of strong earthquake ground motions. Seismological Instruments: Seismograph, Accelerograph, Seismoscope / Multi SAR.

Unit - II

Introduction to Theory of Vibrations:

Single degree undamped and damped systems, resonance, response to earthquakes, elastic response, concepts of response spectrum. Flexibility of long and short period structures.

Unit - III

Site Planning, Building Forms and Architectural Design Concepts for Earthquake Resistance:

Historical experiences, Site Selection, Site Development.

Building forms: - Horizontal and vertical eccentricities, mass and stiffness distribution, soft storey etc.; Seismic effects related to building configuration. Plan and vertical irregularities, redundancy and setbacks, Special Aspects:- Torsion, appendages, staircases, adjacency, pounding; Contemporary international approaches.

Unit – IV

Performances of Ground and Buildings in Past Earthquakes:

Earthquake Effects:- On ground, soil rupture, liquefaction, landslides; Behavior of various types of buildings, structures, power plants, switch yards, equipments, lifelines and collapse patterns; Behavior of Non Structural Elements like services, fixtures, mountings. Social and Economic Consequences of earthquakes, Lab simulations of models.

Seismic Design Principles:

Concept of seismic design, stiffness, strength, period, ductility, damping, hysteric energy dissipation, center of mass, center of rigidity, torsion, design eccentricities; Ductility based design: Design of energy absorbing devices, Seismic base isolation and seismic active control.

Unit – V

Structural Detailing:

Innovations and Selection of appropriate materials; IS Code provisions for the buildings:-IS:1893-2002, IS:4326-1993; Horizontal and Vertical seismic coefficients, valuation of base shear, distribution of shear forces in multi-storey building; Seismic

Detailing Provisions: Masonry and Wooden Buildings (IS: 4326, IS: 13828), Adobe houses (IS: 13827); Seismic Designs and Detailing of RC and Steel Buildings: IS: 1893 – 2002; IS: 13920 – 1993; IS: 456 – 2000; IS: 800 – 2004; Special reinforcing and connection details in structural drawings.

Unit – VI

Earthquake Resistance Construction Details:

Various Types and Construction details of: Foundations, soil stabilization, retaining walls, plinth fill, flooring, walls, openings, roofs, terraces, parapets, boundary walls, underground and overhead tanks, staircases and isolation of structures; Local practices: traditional regional responses.

Unit – VII

Construction Quality Control:

Sequences of Construction: Good supervision practices, Critical check points and certification at certain stages, reporting, maintenance of records, testing.

Vulnerability Assessments and Seismic Strengthening of Buildings:

Seismic vulnerability evaluation of existing buildings; Weakness in existing buildings, aging, weathering development of cracks; Concepts in repair, restoration and seismic strengthening, materials and equipments for restoration of masonry and concrete structures. Methodologies for seismic retrofitting.

Reference books:

Abbott, L. Patidc. Natural disasters.

Arhold, Christopher and others. Building configuration and Seismic Design. **Disasters and Development -**

National Geographic. Restless Earth: Disaster of nature.

Singh, P.P. and Sharma, Sandhir. Modern dictionary of natural disasters.

AR17B9.2E INTELLIGENT BUILDINGS (ELECTIVE – VII)

L/s: 3/Wk Int: 50 End Exam: 50 Total: 100 End Exam: 3 hrs Cr:3

Course Overview: To provide an elementary understanding of Intelligent Buildings and the applications therein

Expected Outcome: To make the student familiar with the various applications of IT in building services and their advantages and risks

The inputs shall be provided in the form of lectures, field visits and seminars by various service providers. Reports and documentations to be prepared for various aspects of IT applications in buildings.

Unit I

Definitions of Intelligent Building and different areas of emphasis in various countries; Organisations associated with intelligent buildings; Advantages of Intelligent Buildings; Relation between intelligent buildings and energy efficiency and sustainability

Intelligent buildings as: the achievement of productive and cost-effective environment through optimization of four basic elements: structure, systems, services and management, and the interrelationship between them. As an environment which maximizes the effectiveness of the building's occupants while enabling efficient management of resources with minimum life-time costs of hardware and facilities,

Relation between traditional Building Automation Systems (BAS) and BloT (Building Internet of Things) BloT technologies and applications

Major recent shifts in building designs, operations and use. Challenges of space optimization, energy efficiency and connectivity vs. increasing occupant expectations of modern and

flexible space design, improved comfort, productivity, and pervasive connectivity.

Integrated communications infrastructure that supports wired and wireless networks and applications. Person-to-person, person-to-machine and machine-to-machine communications within the building and with the outside world using a state of the art intelligent, flexible, wired and wireless platform. Use of wired LAN, Wi-Fi, in-building wireless, audio/visual, sensors, lighting, cloud connections and building management applications.

Applications and Integration of information technology (IT) into design and construction in HVAC, lighting and metering, Hot water system, Alarms and security

Risks in generational skills gaps, increasing capital expenses, project delays and rising operational and maintenance costs.

New Operational procedures: system interoperability, remote monitoring, centralized command & control, building system analytics, unified user interfaces and other big data tools for making data driven decisions and operational efficiency. Reliability and security of these and failure due to skills gaps, mismanagement or malicious intent. Cyber security implications for Building Automation Systems

TENTH SEMESTER

AR17B10.1C PRACTICAL TRAINING

L/s: 30/Wk Int: 150 End Exam: 150 Total: 300 End Exam: Viva -Voce Cr:30

Course Overview:

Internship with training in an architect's office for a period of not less than 20 weeks excluding the examination/viva-voce etc. .

Objectives of the Course:

To provide experience in Architectural Practice.

Expected Skills / Knowledge Transferred: The skills required for an architect to grow into a complete professional.

Course Contents:

Every student must work in an Architect's Office as a full-time trainee for a period of 20 calendar weeks (excluding Viva-voce) from the date of commencement of training. The Chief Architect in the firm should be registered with the Council of Architecture and have a minimum of five years of practical/professional experience after her/his graduation. The student should involve herself/himself in various aspects of work in an office like working drawings, presentation drawings, quantity and cost estimation, site supervision, municipal drawings, etc.

Note: Detailed instructions which may be given by the University regarding the training, the frequency of reporting to the department, etc. are to be followed strictly.

After completion of training, every student will have to submit a detailed report with a set of drawings on at least four projects on which she/he has worked during the practical training period.

Evaluation:

- The Internal Assessment shall be evaluated at the end/towards the end of the training period and shall be conducted by the faculty deputed by the department in the institute.
- The Internal Assessment shall be of 100 marks. Each college can decide on the mode of evaluation of the work, either by deputing a faculty member of the College to visit the architect's office or by assessing the work at the Institute, just preceding the External Assessment. The monthly reports, Log book maintained, and reports from the Architect will be considered for Valuation. Each College will follow a uniform policy for all students in the College.
- The detailed report and drawings prepared during practical Training by students will be evaluated at a viva-voce by a jury consisting of one External member, one Internal member (Practical Training Co-ordinator or his nominee and Head of the Department or his nominee).

The Department shall arrange for the conduct of the viva-voce examination after submission of the report the department will arrange.

Students who are interested in training abroad are permitted to do so. The Chief Architect should be licensed/registered with the local appropriate authority and should have been in practice for a minimum of five years. The faculty members may satisfy themselves about the architect's by checking the website but the primary onus of the selection depends on the student. The student and Parent/Guardian must sign an undertaking to be wholly responsible for the expenses, safety and accommodation of the student beforehand.

Additional Information to Colleges and students for Practical training:

- A counseling session should be arranged for the students before they start applying to architects offices for internship positions. Apart from faculty members, practicing architects should also be invited to orient the students and guide the students on formats and etiquette of applications, remuneration, work and discipline expectations etc.
- Before giving final permission training abroad the college should conduct a background check of the architect (by seeing the website, listed projects etc.)
- To ensure that students are aware of the options available to them, the College should put up a list of all firms who are willing /interested in taking trainees.
- An Open Day may be organized at The College with a display of students' works and invite architects to view the works and select students for training.
- The College should compulsorily check the portfolios/profiles of the students before submission to the architects' offices.
- The work done at the office may also include a small component of research related to an on-going project. The student may take up a study to give specific inputs, or relate to a new material or product etc. However such work should not engage the student for more than 2 (two) weeks.
- The student should submit a 1000 word report on the projects that they have worked on which should include salient features such as design methodology, special construction features etc.
- The letter from the College to the architect at the time of the student joining should contain the starting and ending dates of training. The HoD/ Practical Training Co-ordinator should inform the architect directly by email or letter the dates when the student is expected to report at the college.
- The students may be permitted to change the office of training after only once, with prior permission from the College and

strictly only where there are compelling reasons. Such cases may be dealt with on a case by case basis based on the merits of the situation.

JAWAHARLAL NEHRU ARCHITECTURE & FINE ARTS UNIVERSITY
BACHELOR OF ARCHITECTURE: COURSE STRUCTURE

S.No.	Course Code	Course Title	Pre-req	Periods per Week				Credits	Marks			End	Remarks*
				L	S/F	P/I/O	Total		Int.	Ext.	Total	W/S/J/P	
FIRST SEMESTER													
1	AR17B1.1C	Basic Design	Nil	1	8	–	9	9	200	200	400	S	Open
2	AR17B1.2C	Architectural Drawing and Graphics-I	Nil	1	3	–	4	4	50	50	100	S	Open
3	AR17B1.3C	Building Construction - I	Nil	1	3	–	4	4	50	50	100	S	–
4	AR17B1.4C	Building Materials - I	Nil	2	–	–	2	2	50	50	100	W	–
5	AR17B1.5C	Structural Mechanics - I	Nil	2	–	1	3	3	50	50	100	W	–
6	AR17B1.6C	Introduction to Art and Architecture	Nil	2	–	–	2	2	50	50	100	W	Open
7	AR17B1.7C	Workshop - Carpentry & Model making	Nil	–	–	4	4	4	50	–	50	–	–
8	GN17B1.2A	Environmental Studies	Nil	2	–	–	2	2	50	50	100	W	–
		Total		11	14	5	30	30	550	500	1050		
SECOND SEMESTER													
1	AR17B2.1C	Architectural Design -I	AR17B1.1C	1	8	–	9	9	200	200	400	S	–
2	AR17B2.2C	Architectural Drawing and Graphics - II	AR17B1.2C	1	3	–	4	4	50	50	100	S	Open
3	AR17B2.3C	Building Construction - II	AR17B1.3C	1	3	–	4	4	50	50	100	S	–
4	AR17B2.4C	Building Materials - II	AR17B1.4C	2	–	–	2	2	50	50	100	W	–
5	AR17B2.5C	Structural Mechanics - II	AR17B1.5C	2	–	1	3	3	50	50	100	W	–
6	AR17B2.6C	History of Architecture -I	Nil	3	–	–	3	3	50	50	100	W	Open
7	AR17B2.7C	Surveying and Leveling	Nil	2	–	1	3	3	50	50	100	W	Open
8	GN17B2.1A	Communication Skills	Nil	1	–	1	2	2	50	50	100	W	Open
		Total		13	14	3	30	30	550	550	1100		
THIRD SEMESTER													
1	AR17B3.1C	Architectural Design -II	AR17B2.1C	1	8	–	9	9	200	200	400	J	–
2	AR17B3.2C	Architectural Drawing and Graphics - III	AR17B2.2C	–	3	–	3	3	50	50	100	S	Open
3	AR17B3.3C	Building Construction - III	AR17B2.3C	1	3	–	4	4	50	50	100	S	–
4	AR17B3.4C	Structural Mechanics - III	AR17B2.5C	2	–	1	3	3	50	50	100	W	–
5	AR17B3.5C	History of Architecture - II	Nil	3	–	–	3	3	50	50	100	W	Open
6	AR17B3.6C	Building Services - I	Nil	3	–	–	3	3	50	50	100	W	–
7	AR17B3.7C	Climatology	Nil	2	–	1	3	3	50	50	100	W	–
8	GN17B2.2A	Value Education	Nil	2	–	–	2	2	50	0	50	-	–
		Total		14	14	2	30	30	550	500	1050		

FOURTH SEMESTER

1	AR17B4.1C	Architectural Design -III	AR17B3.1C	1	8	-	9	9	200	200	400	J	-
2	AR17B4.2C	Building Construction - IV	AR17B3.3C	1	3	-	4	4	50	50	100	S	-
3	AR17B4.3C	Design of Structures - I	AR17B3.4C	2		1	3	3	50	50	100	W	-
4	AR17B4.4C	History of Architecture - III	AR17B3.5C	3	-	-	3	3	50	50	100	W	Open
5	AR17B4.5C	Building Services - II	AR17B3.6C	3	-	-	3	3	50	50	100	W	-
6	AR17B4.6C	Landscape Design and Site Planning	Nil	2	-	1	3	3	50	50	100	W	Open
7	AR17B4.7C	Computer Applications - I	Nil	-	-	3	3	3	50	50	100	P	-
8	GN17B4.1A	Cultural and Political Studies	Nil	2	-	-	2	2	50	0	50	-	Open
Total				14	11	5	30	30	550	500	1050		

FIFTH SEMESTER

1	AR17B5.1C	Architectural Design -IV	AR17B4.1C	1	8	-	9	9	200	200	400	J	-
2	AR17B5.2C	Building Construction -V	AR17B4.2C	1	3	-	4	4	50	50	100	S	-
3	AR17B5.3C	Design of Structures - II	AR17B4.3C	2	-	1	3	3	50	50	100	W	-
4	AR17B5.4C	History of Architecture - IV	AR17B4.4C	3	-	-	3	3	50	50	100	W	Open
5	AR17B5.5C	Computer Applications -II	AR17B4.7C	-	-	4	4	4	50	50	100	P	-
6	AR17B5.6C	Building Estimating, Costing and Specifications	Nil	2	-	2	4	4	50	50	100	W	-
7	AR17B5.xE	ELECTIVE - I	Nil	1	2	-	3	3	50	0	50	-	Open
	AR17B5.1E	Workshop - Vernacular Architecture											
	AR17B5.2E	Workshop - Universal Design											
Total				10	13	7	30	30	500	450	950		

SIXTH SEMESTER

1	AR17B6.1C	Architectural Design -V	AR17B5.1C	1	8	-	9	9	200	200	400	J	-
2	AR17B6.2C	Working Drawing and Details	AR17B3.2C& AR17B4.2C	1	3	-	4	4	50	50	100	J	-
3	AR17B6.3C	Architectural Acoustics	Nil	3	-	-	3	3	50	50	100	W	-
4	AR17B6.4C	Building Economics and Sociology	Nil	4	-	-	4	4	50	50	100	W	-
5	AR17B6.5C	Human Settlements & Town Planning	Nil	4	-	-	4	4	50	50	100	W	Open
6	AR17B6.6C	Environment Responsive Design	AR17B3.7C	3			3	3	50	50	100	W	
7	AR17B6.xE	ELECTIVE -2		3	-	-	3	3	50	50	100	W	Open
	AR17B6.1E	Theory of Design and Architecture	AR17B5.4C										
	AR17B6.2E	Advanced Construction Technology & Structural	AR17B5.2C										
Total				19	11	0	30	30	500	500	1000		

SEVENTH SEMESTER

1	AR17B7.1C	Architectural Design -VI	AR17B6.1C	1	9	-	10	10	200	200	400	J	-
2	AR17B7.2C	Advanced Services	AR17B4.5C	3	2	-	5	5	50	50	100	W	-
3	AR17B7.3C	Energy Conservation Building Code	AR17B6.6C	3	-	2	5	5	50	50	100	P	
4	AR17B7.xE	ELECTIVE -3	Nil	4	-	-	4	4	50	50	100	W	
	AR17B7.1E	Urban Design											
	AR17B7.2E	Housing											
	AR17B7.3E	Building Construction Management											
	AR17B7.4E	Interior Design											
AR17B7.5E	Landscape Architecture												
5	Open Elective - 1						*	*					
6	GN17B7.1A	Personality Development		2		1	3	3	50	-	50	-	
Total				13	11	3	30	30	400	350	750		

EIGHTH SEMESTER

1	AR17B8.1C	Design Studio	AR17B7.1C	1	10	-	11	11	200	200	400	J	-
	AR17B8.1.1C	Architectural Design - VI (Design Studio)											
	AR17B8.1.2C	Building Construction Management (Design Studio)											
	AR17B8.1.3C	Landscape Architecture (Design Studio)											
AR17B8.1.4C	Interior Design (Design Studio)												
2	AR17B8.2C	Pre-Thesis Seminar	AR17B7.1C	-	2	2	4	4	100	0	100	-	-
3	AR17B8.xE	ELECTIVE - 4		2	2	-	4	4	50	50	100	W	
	AR17B8.1E	Architectural Illumination	AR17B4.5C										
	AR17B8.2E	Architectural Journalism	GN17B2.1A										
4	AR17B8.xE	ELECTIVE - 5		2	2	-	4	4	50	50	100	J	
	AR17B8.3E	Structures Project	AR17B5.3C										
	AR17B8.4E	Workshop - Tall Buildings	AR17B7.2C									W	
5	AR17B8.xE	ELECTIVE -6		2	2	-	4	4	50	50	100	J	
	AR17B8.5E	Furniture and Product Design	AR17B7.4E						100	-	100	J	
	AR17B8.6E	Architectural Documentation	Nil						50	50	100	P	
	AR17B8.7E	Building Information Modeling	AR17B5.5C										
6	Open Elective -2						*	*					
Total				7	18	2	30	30	450	350	800		

Note: * indicates credits for Open Electives. It is assumed as 3 credits for the purpose of the Course Structure and will depend upon the Course opted.

NINTH SEMESTER

1	AR17B9.1C	Design Thesis	AR17B8.1C	2	21	-	23	23	300	300	600	J	-
2	AR17B9.2C	Professional Practice & Building Codes	Nil	4	-	-	4	4	50	50	100	W	-
3	AR17B9.xE	ELECTIVE - 7		3	-	-	3	3	50	50	100		-
	AR17B9.1E	Disaster Resistant Architecture	Nil									W	
	AR17B9.2E	Intelligent Buildings	AR17B5.5C									W	
Total				9	21	0	30	30	400	400	800		

TENTH SEMESTER

1	AR17B10.1C	Practical Training	AR17B8.1C	-	-	30	30	30	150	150	300	J	-
Total						30	30	30	150	150	300		

Note: * indicates credits for Open Electives. It is assumed as 3 credits for the purpose of the Course Structure and will depend upon the Course opted.