First Semester B.Arch.

1S-A-1

Basic Design & Visual Arts

Objective- Developing skills in manual presentation techniques, use of various media of presentation, Principles of 2-D & 3-D compositions, Principles of Design.

Theory of Basic Design- The study of this subject is aimed to understand the Visual & aesthetic qualities of Art and relating these to Architectural Design situation. This subject forms the direct input to Design as 'Basic Design' is the foundation of all Professional courses which deals directly or indirectly with Aesthetic.

Visual Art- Visual Art is aimed at providing knowledge and understanding of various visual arts and its importance. It further aims at developing the freehand drawing and rendering skills in different medium and using it as tool of expressing ideas visually.

Unit-I:
Brief historical review of development of fine arts (visual and performing arts.) and Interdependency of visual arts, architecture, painting and sculpture

Unit-II:
Introduction to basic elements of design–point, line, plane, form

Unit-III:
Principles of Design and its role in expression (architectural expression)
Introduction to principles of organization/composition
Repetition, Variety, Radiation, Rhythm, Gradation, Emphasis & Subordination, Proportion, Harmony, Balance

Unit-IV:
Study of Visual Properties of 2-Dimensional forms both geometrical and non-geometrical surfaces and visual textures, optical illusion etc.

Unit-V:
Free hand line sketching and drawing of natural and manmade. Study of shades and shadows,
Sketching of Historic or new built up structures of Architectural importance using different mediums.

Unit-VI:
Study of classification of colours with different hues, values, and shades. Colour wheel and colour composition, properties of colour.

Sessional Work- Plates, Sketches and models to understand basic design principles, elements and their expressive qualities
Creative Exercises of 2d to 3d composition
Exercise related to positive and negative spaces
Product Design.

1S-A-2

Construction Technology & Materials – I:

Objective: To develop understanding about construction principles. The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques. Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complex.

For first year the focus shall be on basic building materials and basic construction principles.

Unit I:
General Idea / Introduction to various elements of building from foundation to roof.
General idea about basic building materials such as stone, wood, concrete, steel etc.

Unit II:
Introduction to "Construction" as a subject and its relevance to architectural design.

1. Construction and the logic of stability as its basis.
2. Concept of load bearing: Support and Supported building elements
3. Concept of Span

Unit II:
Understanding the basic construction principles with respect to structural stability and its applications/ extensions /manifestations in terms structural systems and then building elements
Construction Principles- construction systems-building elements- building materials

Unit IV:
General conditions at site level such as site topography, climatic conditions and soil conditions and its implications on construction techniques, building materials, building elements, construction systems to be adopted**.**

Unit V:
Basic Structural systems such as load bearing and frame structure.

Sessional Work: Site visit reports, tutorials, notes, sketches and market surveys.

1S-A-3

Structural Design & Systems – I

Objectives: Emphasis will be more on structural concepts vis-à-vis stability of forms rather than intricate numerical calculations. While dealing with different structural concepts, their importance shall be related to architectural requirements by giving examples from history of architecture / contemporary architecture. Wherever application is mentioned examples from architecture typologies shall be referred to.

Unit I:
Basic Structural forces : Study of types of Coplanar & non- coplanar forces.

Unit II:
Co-Planer forces – resolution and resultants – Lami's Theorem – Application

Unit III:
Equilibrium of 2 D elements : Basic Principles, condition of equilibrium, free body diagram

Unit IV:
Equilibrium of 3 – D elements – understanding of basic principles of resolution and equilibrium of 3 D force system no mathematical calculation.

Unit V:
Types of Structural Supports and support reactions – Theoretical and practical – Study of reactions of simple support, hinge support, roller support and fixed support, study of types of beams and types of loads.

Unit VI:
Static Friction: Basic Principles: Application for elements on horizontal plane, inclined planes and ladders.

Unit VII:

Properties of plane sections
a) Centre of gravity
b) Moment of inertia (second moment of area) – section modulus, radius of gyration, polar moment of inertia.

Unit VIII: Application for
c) Perfect frames (Method of joints, Method of Sections and graphical methods.)
d) Simply supported beams – Analytical and graphical
e) Weight less cables / strings

Sessional work: Sketches, notes, tutorials, tests and presentations

1S-A-4

History of Art & Architecture –I

Objective: Study of evolution of various styles of art and architecture as a response to climate, culture and socio-political conditions by taking examples from river valley civilizations.
The emphasis will be on the development of the understanding of fundamental design principles (visual art principles) and resulting architectural expression; appropriate to place and people.
Aim: To understand architecture as an outcome of Physical factors like geography, climatology, location, Building Materials and available Technology and also the influence of Art, Culture and Society.

Unit I:
Introduction to Art, Culture, Society, Civilization and Architecture.

Unit II:
Earlier attempts of man for shelter during the prehistoric period.

Unit III:
Indian Art and Architecture.

Unit IV:
Western Art and Architecture.

Unit V:
Elements of Art & Principles of Design studied from historic examples.

Sessional work: Sketches, notes, tutorials, tests and presentations

1S-A-5

Architectural Graphics I

Objective: Ability to present in graphic form all elements of building design- study of shades and shadows, textures, tones, colours , geometrical form, perspectives and projections, free hand drawing and rendering in different media.
The understanding about representation of 3D objects in 2D by graphical way should first be developed from real world experiences and then technical aspects of solid geometry can be taught.

Unit -1 Free hand drawings:-
Simple exercise in object drawing, light and shade of simple, natural and geometric forms. Out door sketches of simple bldg. forms.

Unit – 2 Architectural symbols :-

Architectural representations of trees, hedges, foliage, human figure in different postures, vehicles, furniture etc. their integration to presentation drawings. Representation of building elements, openings, materials, accessories etc. terminology and abbreviation used in architectural presentation.

Unit – 3 Scale Drawing :-

Study of scales, their use in practice and construction of Plain and Diagonal scale. Architectural and stencil lettering in varying heights and thickness and dimensioning. Applications of scales to enlarge or to reduce the objects in drawing.

Sessional work: Sketches, notes, tutorials, tests and presentations

1S-A-6

Workshop Practice- I

Workshop Practice- I: (1S-A-6)

Objective:- Developing skills to understanding various tools, processes and material.

- Understanding various basic tools used for carpentry joinery and fabrication.
- Understanding workshop rules, safety norms and care in handling various manually operated and motorized tools.
- Basic understanding of wooden joints, evolution of joints, needs of joints, making simple wooden joinery parts.
- Understanding various building materials and their tools used for cutting, joining and extension. Handling materials like wood, marble, steel, MS, plywood, POP, Aluminum etc.
- Understanding nailing, screwing, riveting and their various conditions and types of applications.

Expression of forms- By handling various materials.

Sessional work: Model Making

1S-A-7

Computer Application(NG)

Objective: Developing skills in non-graphic applications of computer as required for architectural profession and office management.

Sessional work: Assignments

1S-AA-1

Elective a	presentation skills/ public speaking/ English I/ sketching and rendering

1S-AA-2

Elective b	Mathematics/ statistical methods/ Numerical ability/ scale and proportion

Second Semester

2S-A-1

Architectural Design I

Objectives: Development of space visualization
Application of materials to simple architectural forms.
Application of the knowledge gained in other subjects and basic design to design of buildings of single/ simple activity .

1) **Anthropometry :**
    a. Study of Human dimensions, concept of percentile in Indian standards, space required for various simple activities, circulation spaces.
2) **Form and Space :**
    a. Volumes, elements of volumes, enclosure of space, semi – enclosed spaces, defining space by elements, light as a factor of shape, Color, texture & form, view, visual relationship. Properties of forms and their impact on spatial experience.
3) **Elements of built form** :
    a) Basic Elements: Walls, Floors, windows, doors, staircase, facade, etc.
    b) Support Elements: Courtyards, balconies, canopy, patio, Sitouts, water bodies, pergola, etc.
    c) Relevance of all such elements on architectural expression and spatial quality

4) **Principles of Design :**
    a. Basic principles or spatial organization , symbiosis of form and function concept generation convergent & divergent thinking in design
5) **Furniture & Facilitation :**
    a. Need of furniture as an aid to enhance activities, study of various furniture in isolation & combination.

6) **Climate & design :**
    Orientation, climatic coordination and architectural elements, like chajjas,fins, fenestration etc,

Sessional work: Assignments on each head with presentation, lecture and site visits.
Design of simple single activity spaces like residence, school, canteen etc.
Small modules of short design projects based on the understanding developed about above mentioned topics.

2S-A-2

Construction Technology & Materials –II

Unit I: Study of basic building materials, such as brick, stone, cement, lime, concrete, Glass w.r.t classification, composition and general idea about their chemical, physical properties leading to structural strength and aesthetic qualities.

Emphasis should be on developing understanding about making choice of appropriate building materials in a given situation.

Unit II: Masonry: Basic principles/rules of masonry for its load bearing capacity and stability

1.Various types of Building materials used in masonry such as stone, brick, mud blocks, concrete blocks – size, shape, strength and aesthetic quality of each of them
2. Types of Stone masonry with dressed and undressed stones, Composite masonry
3. Types of Brick masonry used in load bearing walls such as Flemish, English bonds, cavity walls and use of piers in load bearing walls
4. Types of masonry used in partition walls

Unit III: Concept of span and its application in creating openings in masonry walls with lintels and arches. Structural difference in the behavior of lintel , arch and relieving arch.

Basic terminology and types of lintels and arches and materials used for them such as stone, brick , wood, steel.

Unit IV: Principles of wooden/ timber Joinery. Types of timber and wood used in structural wood work. Basic types of joints and its applications in various building elements such as timber doors, windows and timber roofs.

Timber paneled, partly paneled and partly glazed and fully glazed doors and windows with its fixtures and fastenings.

Sessional Work: Site visit reports, tutorials, notes, sketches and market surveys.
Plates of Small modules of design based on the construction principles of masonry, joinery etc.

2S-A-3

Structural Design & Systems- II

Unit I: Stability of Masonry Structural elements

Unit II :Simple stresses and strains : Concept and application – Definition of stress, strain, study of stresses & strains, Hook's law. Principle of superimposition & stresses in composite sections.

Unit III :Thermal stresses and strains : Simple and composite section, concept and application.

Unit VI :Elastic Constants: definitions , Poisson's ratio, Bulk Modulus, Modulus of elasticity, Modulus of rigidity.

Unit V: Shear Stresses: Shear stresses and its distribution in Rectangular, Circular, I & T section only. Concept and application

Unit VI :Bending stresses – circular bending: Concept and application (study of concept of Flinched beams no mathematical calculation.)

Unit VII :Torsional stresses: Torsion of solid and hollow circular shafts of same material. Concept and application

Sessional works: Sketches, notes, tutorials, tests and presentations

2S-A-4

History of Art & Architecture –II

Study of evolution of various styles of art and architecture as a response to climate, culture and socio-political conditions then by taking examples from Western architecture and architecture of the Indian sub continent.

Unit I: Progression of art and architecture of the River valley Civilizations.

Unit II: Study of visual art principles, scale and proportions, technological development emphasizing on architectural expression and its relevance on the society quoting examples from:

I. Greek period
II. Roman period
III. Christian architecture up to Renaissance Period.

Unit III: Role of culture and art on architecture in Indian context Study of visual art principle, monumental and human scale. Study of Impact of religious philosophy on the physical form.

I. Buddhist architecture
II. Jain architecture
III. Hindu Temple Architecture
IV. Islamic architecture

Sessional works: Sketches, notes, tutorials, tests and presentations

2S-A-5

Architectural Graphics II

Unit – I Orthographic Projections :-

Study of reference planes, projectors, orthographic projections of object/objects in different positions and method of drawing the same.
Angular Projections :- Isometric and Axanometric projection.

Unit – II Complex Projections :-

Section planes in different angles, drawing of true section and introduction of slicing method.
Development of solids/ solids with voids and drawing the same to scale.
Interpenetration of solids, solids and voids , development of surface and section at a junction.

Unit III: Architectural Drawing

Development of Drafting skills for architectural drawings.

Sessional work :- Plates, sketches, & tests.

Workshop Practice – II (2S-A-6)

Objective:- Developing understanding of various material and efficiency in technique.

- Finishing Surfaces: Understanding various surface finishing techniques and processes received by different material like wood, steel, aluminum, stone etc.
- Paints and Polish: Surface preparation, use of sand paper, application of putty, application of base coat, middle coat and final coat, understanding oil paints, decopaints, acrylic paints etc.
- Study of various application techniques like brush, pads, scalpel, spray paints, working on highlights for painting.
- Design and executing prototype of simple objects like pen stand, projector stand, lamp shades, paper tray, CD stand, knife holder, kitchen accessories and finishing of selected material.

Evaluation shall be done on following heads:

Simplicity, honesty of material, originality, workmanship, junction, structure.

Sessional work: Model Making of identified architectural projects

2S-AA-1

Elective a - presentation skills II/ public speaking II/ English II/ sketching and rendering II/ foreign languages

2S-AA-2

Elective b - fundamentals of painting/ fundamentals of sculpture/fundamentals of drawing techniques/ fundamentals of photography

Third Semester B.Arch.

3S-A-1

Architectural Design-II

The study of design shall continue with further progress and complexity in aesthetic qualities but with more emphasis on architectural and functional aspects like

a) Complexity in circulation- and pattern of horizontals as well as vertical movement.

b) Integration in terms of facilitation, planform, volume, concept and space organization.

c) Application of basic building materials to evolve a design with their aesthetic appeal, functional quality and elementary structural concepts to evolve specific form.

d) Climatic consideration for the design, orientation of building on site, simple concepts of sun shading devices, their application in elevations as functional / aesthetic solutions.

Sessional work : Exercise on one or few aspects at a time followed by at least two design problems arranged in sequence leading to more and more complexity.

Type of Design Problems:

a) Small Residence, Guesthouse, Block of Flats.

b) Primary School, Dispensary, Club.

c) Post office, Bank, Office etc.

3S-A-2

Construction Technology & Materials –III:

Objective:

Unit I:
Tiles, Steel, Aggregate, Reinforcement Bars.

Unit II:
Concept of vertical connector – Study of staircases – Types on the basis of geometry, materials and structural systems used for it.

Unit III:
Concept of spanning and its extension in formation of roofs and floors. Traditional methods of flooring such as timber floors, mud floors, jack arch floors. Types of timber roofs, trussed roofs in timber and steel, north light roofs, sky lighting.

Unit IV:
Principle of framed structure: R.C.C. as a building material and all R.C.C. elements, steel framed structures.

Sessional Work: Site visit reports, tutorials, notes, sketches and market surveys.

3S-A-3

Structural Design & Systems – III

Unit I:
Principal stresses and strain : Application of Mohr's Circle method and study of concepts by analytical method.

Unit II:
Direct and bending stresses: Concept and application

Unit III:
Stability of Retaining walls : Stresses at base and minimum base width (without surcharge).

Unit IV:
Stress strain curves for concrete and steel (MS and TS)

Unit V:
Column and struts: Eulers and Rankins theory – concept and application

Unit VI:
Hoop stress / longitudinal stress in cylinders and pipes.

Unit VII:
Simply supported beams – BM and SF Diagrams, Cantilever beams

Sessional work: Sketches, notes, tutorials, tests and presentations

3S-A-4

History of Art & Architecture –III

Objective: Study of social changes on architecture

Unit I: Islamic Architecture: 11th Century AD. Architectural forms conceived by Qutub Dynasties at Delhi.

Unit II: Development of regional styles noticed in various provinces such as Bengal, Jaunpur, Gujrat and Central India.

Unit III: Architecture under Mughals - Humayun, Akbar, and Shahjahan.

Unit IV: Contemporary Architecture (in West)

Unit V: Architecture in *Post* Independence era, city planning of Chandigarh, Delhi and study of its important administrative buildings.

Unit VI: Study of various schools of thoughts and philosophies of modern architects and its impact on contemporary architecture.

Unit VII: Industrial revolution in Europe and emergence of the Modern movement and its impact on contemporary Indian Architecture.

Contemporary Architecture in India. Study of works of Indian Architects, new developments like Navi Mumbai. **Sessional work:** Sketches, notes, tutorials, tests and presentations

3S-A-5

Architectural Graphics-III

Perspective :

Unit-I: Perception and registration of an object when viewed.

Unit-II: Introduction to picture planes, standpoint, eye level etc.

Unit-III: Types perspective views such as one point, two point, three point, worm's eye view, Bird's eye view, normal view, etc.

Unit-IV: Methods of drawing perspective views such as conventional method, measuring point method, shortcut and approximation in perspective drawing, simple problems based on geometrical solids

Unit-V: Measured Drawing: Measurement techniques of existing object (such as building, plot,etc.) and preparing measured drawing to suitable scale.

Unit-VI: Sciography: Introduction to Sciography, principle of conventional angle of light and its rays acting as a projectors to cast shadow of simple plane lamina e.g. square, circle, hexagon etc.

Sessional work: **Sketches, notes, tutorials, tests and presentations**

3S-A-6

Surveying & Levelling

Unit I: Introduction to surveying and leveling, types of surveying methods and application,

Unit II: Chain and compass survey, methods and instruments used, plotting and adjustment of closing error.

Unit III: Plane table survey, method and instruments used.

Unit IV: Levelling, methods of levelling -dumpy level and its uses.

Unit V: Contours, use of theodolite, contour survey. .

Unit VI: Planimeter and its use.

Practicals:
a) Chain and compass survey, traversing.
b) Plane table survey of cluster of buildings.
c) Levelling using dumpy level and water table.
d) Setting out site layout.
e) Contour survey, plotting contour maps.

Sessional work: Practical record book, plates and notes

3S-A-7

Climate and Architecture

Objective: This part of the subject provides a scope to apply the knowledge of basic Climatology gained earlier for designing in different climatic conditions, with emphasis on tropical climate.

Unit I:
Study of traditional / vernacular architecture in relation with the climate types, with emphasis on vernacular architecture in Indian Context.

Unit II:
Understanding climate data, its analysis and method of presentation.

Unit III:
Study of passive cooling techniques, techniques of solar radiation control and heat transfer and insulation.

Unit IV:
Study of effect of orientation, topography, vegetation, form, building materials and surfaces on the building design in response to the climate.

Unit V:
Approach to climate responsive built environment.
Sessional work: Notes, Plates, Case studies etc.

Sessional work: Notes, plates, practicals & case study.

3S-AA-1

Elective a - environmental studies/ rural architecture/ vernacular architecture/ environmental impacts

3S-AA-2

Elective b - history of Indian traditional art and crafts/art appreciation/ architectural documentation/critical appreciation

Fourth Semester

4S-A-1

Architectural Design III

This course will be in continuation with the previous semester i.e. Architectural Design II

Sessional work: Assignments on each head with presentation, lecture and site visits.
Design of simple single activity spaces like residence, school, canteen etc.
Small modules of short design projects based on the understanding developed about above mentioned topics.

4S-A-2

Construction Technology & Materials –IV

Unit I:
Metals: Aluminium, copper, steel, titanium etc.

Unit II:
Doors Windows – Steel, aluminium and sliding doors, sliding and folding doors, revolving doors, revolving shutters, collapsible gates.

Unit III:
Partitions – Aluminium, timber, steel.

Unit IV:
Temporary Structures and temporary supports – Timbering to trenches, formwork, centering, shoring and underpinning.

Sessional Work: Site visit reports, tutorials, notes, sketches and market surveys.
Plates of Small modules of design based on the construction principles.

4S-A-3

Structural Design & Systems- IV

Unit I: Concept of fixity – independent fixed beams with different loadings - BM and SF diagrams.

Unit II: Concept of continuity – three moment theorem - BM and SF diagrams.

Unit III: Method of Moment distribution for

a) For continuous beams
b) Single portal frames

BM. And SF. Diagrams.

Unit IV: Deflection of beams – simple supported and cantilever beams by using Macaulay's method.

Unit V: Determinate and indeterminate structures – degree of indeterminacy.

Unit VI: Study of Arches

a) Study of behaviour fixed arch and Two hinged arch.
b) Analysis of three hinge arches.

Unit VII: Study of IS 875 Part I, Part II and Part III

Unit VIII: Concept of load distribution for structural systems and overall stability like:

a) One way
b) Two way
c) Suspension Structures
d) Arch Action

Sessional works: Sketches, notes, tutorials, tests and presentations

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4S-A-4

Building Services–I

Objective: Aim of this subject is make the students aware of the importance, installation and working of essential services in buildings, and a way building services help in generating a cleaner and healthier built environment. The students should also be made familiar with I.S. codes related to services. The first part deals with the basic aspects of water supply, sewage disposal, refuse and storm water disposal in buildings.

Unit I: General idea of sources of water supply, qualitative & quantitative aspects, impurities, hard & soft water, standards for quality of water. Study of standards regarding water demand and consumption in different types of buildings, computing demands for domestic use, connection from municipal supply, domestic water supply systems, types, capacity-design-construction of suction & storage tanks.

Unit II: Down take supply, water supply pipes, and their sizes, jointing, fixing and laying. Various valves, fittings and fixtures like taps, showers etc. Domestic hot water supply system, water heaters.

Unit III: Principles of sanitation, water carriage systems, collection of waste matter in buildings. Various sanitary fittings and fixtures like water closets, urinals, wash hand basins, sinks, flushing cisterns, shower trays, bath tubs, bidets, drinking water fountains etc.

Unit IV: Various traps and their function, sewage collection and disposal system for individual buildings. Various types of sanitary pipes and their jointing, fixing and laying, manholes, inspection chambers, intercepting chambers.

Unit V: Self cleansing velocity, invert levels, drains on sloping sites, sewage disposal system in un-sewered localities- septic tank, soak pits, cesspools, aqua-privy, leeching pits for individual building of urban and rural areas.

Unit VI: Refuse disposal- Sources, types, collection, storage and transport, provisions for refuse disposal individual building level, refuse chutes. Storm water drainage- collection and disposal.

Sessional works: Sketches, notes, tutorials, tests and plates

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4S-A-5

Architectural Graphics IV

Sciography:

Unit-1: Study of visual effects of shades and shadows when cast by Sight rays on solids and planes.

Unit–2: A principle of conventional angle of light and its rays acting as a projector to cast a shadow on simple geometrical object including shadow cast partly on horizontal and vertical plans.

Unit-3: Study of combination of shades and shadows.

Unit-4: Complex problems on-buildings, building projections, louvers, chajjas, canopies etc. rendered in appropriate medium.

Unit-5: Study of shades and shadows cast by artificial light on solids and planes.

Perspective :

Unit-6: Perspective of interior of buildings rendered suitably.

Unit-7: Parallel and angular exterior perspective views of objects of buildings in different materials rendered with appropriate colours showing shades and shadows.

Unit-8: Bird's eye view showing a building or any object with surrounding landscape, buildings etc. rendered

Sessional works: Sketches, notes and plates

4S-A-6

Theory of Design-I

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

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

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

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

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

Sessional work: Notes, case studies and presentations

4S-A-7

Theory of Landscape Architecture

Objectives:
The scope of the subject is to make students aware of architecture beyond buildings, in the outdoor environment and spaces, and, the role and importance of landscaping and site planning in enhancing and improving the quality of building environs, functionally and aesthetically.

Unit I: Introduction to Landscape Architecture, definitions, importance, need and scope. Levels of landscape planning and design. Landscape architecture and ecology. Relationship between landscaping and environmental planning, regional planning, urban planning, urban design , architecture and interior design.

Unit II: Historical development of landscape architecture. Origins of gardens. Design Principles, salient features and elements of various gardens in history - like Egyptian, Persian, Spanish, Italian, French, English, American, Japanese, Moghul Indian etc.

Unit III: Modem garden development. Changed scenario for modern garden designs. Effect of industrialization on garden designs. Company towns, parks movement, green belts, urban parks, residential gardens, small gardens.

Unit IV: Different factors and components of a landscape. Social and economical factors. Psychological considerations of spaces and enclosures. Brief idea about man made components like walls, fences, entrances, gates, barriers, screens, planters, roads & pathways, street furniture, signage, services-electrical, water supply and drainage. Basic natural components - land, trees, water and climate.

Unit V: Land. Different aspects of land as a landscape element - soils, geology, topography, earth forms, levels, foundations, grading, drainage, paved and unpaved surfaces. The importance and use of the aspects as a landscape design element.

Unit VI: Plants. Different aspects of trees, shrubs, climbers, hedges, lawns as landscape elements. Basic horticultural idea about plants, plant selection, planting design and care of plants. Importance and use of the aspects as a landscape design element. .

Unit VII: Water. Various forms 'of water elements in a landscape - fountains, waterfalls, pools, cascades, channels irrigation etc. Importance and use of water as a landscape design element. Construction of various water elements.

Unit VIII : Climate. Macro and micro-climatic considerations in landscape architecture. Effect of climate on landscape and various components of landscape on the microclimate. Relationship between climate and landscape and architecture.

Reference Books:
Landscape Architecture By J.O.Symonds.McOraw Hill Publications.
Earthscape by J.O,Symonds,McGraw Hill Publications,
Architecture-A manual of site planning and design by J.O.Symonds, McgrawHill Publications,
Site Planning by Kevin Lynch,
Site Planning by R.Genebrooks, Prentice Hall.

Sessional Work: Notes, sketches, tests and seminars based on the above topics.

4S-A-8

Elective a - graphic softwares/ web design/ building simulations and modeling/

4S-A-9

Elective b - anthropometrics and ergonomics/ product design/ design of building elements

Fifth Semester B.Arch.

5S-A-1

Architectural Design-IV

Objective-
The study of this subject will continue further with-greater emphasis on functional aspects involved in complex design situations. The main objective is to understand effect of climate, topography and services on the buildings, to understand relationship between form and function of buildings, The design process to deal with the following:

1. Effect of sun, rain and wind on buildings.
2. Functional organization of activities with respect to site, its topography and surroundings.
3. Development control rules, building byelaws and standard codes
4. Functioning of building services like drainage, water supply and electricity
5. Form to suit the purpose of building.

Session at work: Study of the above aspects in the form of book study, case study etc. followed by a relevant design problem. Minimum two major design problems and two short/time problems to be tackled in each-semester.

Type of design problems:
Design problems on sloping sites such as Duplex residence, Yatri niwas, Library etc.
College building, Hostel, Primary health center, Museum,
Club, Holiday resort, Memorial, Multistoried apartment, Office/Commercial complex.

Reference Books:
Time Saver Standards for Building Types by J.H. Calendar, Mc-Graw Hill Publications

Time Saver Standards Design data, by J.H, Calender, Mc. Graw-Hill Publications,
Neuferts Architects Data, By Rudolph Herg Crossby, Lockwood and Sons.
A.J. Metric Handbook.

5S-A-2

Construction Technology & Materials –V:

Unit No. I:
Cement, paints, various types of plasters, paints, varnishes and finishes.

Unit No. II:
Plasters and finishes.

Unit No. III:
Expansion Joints, Water-Proofing, earthquake resistant structures.

Unit No. IV:
False Ceiling, Suspended ceilings, roofs.

Unit No. V:
Foundations, footings and all advanced foundations.

Sessional Work: Site visit reports, tutorials, notes, sketches and market surveys.

5S-A-3

Structural Design & Systems – V

Unit I:
Structural properties of: a) Concrete b) Reinforced Concrete

Unit II:
Concepts in RCC Design: a) Elastic b) Ultimate Load c) Limit State

Unit III: Different Limit states, partial safety factors, permissible stresses

Unit IV: Design of Singly Reinforced RCC Sections

Unit V: Design of doubly reinforced sections

Unit VI: Design of 'T' and 'L' beam sections

Unit VII: Design of shear reinforcement in beams.

Unit VIII: Design of RCC Sections in Tension

Unit IX: Study of IS 456 – Section III – Design Considerations.
Note: It is expected Concrete as a building material shall be dealt in Materials in detail.

Sessional work: Sketches, notes, tutorials, tests and presentations

5S-A-4

Building Services –II

Objective: The second part of the subject continues with the services related to electricity. The students are required to design the service layouts so as to get a deeper insight into the working of the various services at a larger magnitude, with students getting information related to large campuses, complexes, high-rise buildings and special uses like swimming pools, fire fighting etc.

Unit I: Electrical services, various wiring systems, calculation and distribution of loads, electric fittings and appliances, detailed layout of electrical services in a residence.

Unit II: Schematic water distribution system from treatment plants to town, group housing etc. Computing demands for group housing schemes and high-rise building, design of storage and distribution system, Detailed layouts of water supply systems.

Unit III: Hot water supply in high-rise buildings, boilers, furnaces, solar water heaters, computing a special demands of water for swimming pools, air conditioning plants, fire fighting, street washing, fountains and gardens etc. and their systematic layouts.

Unit IV: Sewage collection and disposal for large campuses, complexes, high-rise buildings etc, Mechanical methods for removal of sewage from special areas like basements (shones ejector).

Unit V: Rain water harvesting.

Sessional work: Sketches, notes, tutorials, tests and presentations

5S-A-5

Architectural Graphics-V

Objective: The objective of this subject is to train the students for *the preparation of :*
1. Submission drawing as per the local building bye laws
2) Working drawings required for carrying out actual construction *work.* The graphics of the drawings will be with specific reference to the code of practice for Architectural and Structural drawings as laid down in B.I.S. No.962 of 1960. The course of this subject shall be completed in two semesters i.e. Semester-5 and Semester-6. The course to be completed shall be as follows:

Unit I: Study of building bye-laws, building regulations, requirements of parts of Buildings etc. as per the National Building Code.

Unit II: Understanding the concept of Ground coverage, Built-up area, FSI/ FAR etc:

Unit III: Preparations of submission drawings for a single storied residence with approximate 75 Sq.Mt. built-up area..

Unit IV: Preparation of working drawings for the same building. The set of drawings to be prepared shall include Foundation / centre line plan (considering Load Bearing as well as R.C.C. Frame structure type), Floor Plan, Lintel level plan, Terrace Plan showing roof drainage arrangement. Sections, All elevations, Details of stair, Doors and windows, Flooring pattern, Kitchen, Architectural features etc. (Set of min. 10 drawings of imperial size prepared to facilitate the execution of building)
Sessional Work: Plates on above topics.

5S-A-6

Theory of Design-II

Unit I: Organization of Forms and Spaces

a) Spacial relationships: i) Space Within Space ii) Interlocking Space iii) Adjacent Space iv) Space linked by common space
b) Spacial Organization- influencing factors and their types: i) Centralised ii) linear iii) Radial iv) Clusterd v) Grid
c) Articulation of Forms and Space types: i) Edges and Corners ii) Surface

Unit II: Character and Style in Building
Factors influencing the Character and Style in Buildings, study of examples in Contemporary Architecture (Including Modern and Post Modern)

Unit III: Principles of Composition:

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

Unit V: Circulation
Study of circulation pattern and its relation to organisation fuctional spaces and acitivities.

Sessional work: Case Studies, notes, plates and presentations

5S-A-7

Specifications

Objective: Art of writing specifications for materials and works is very important in which emphasis on the required qualities of materials and proper sequence of construction should be brought out.

Unit I: Introduction, importance of specifications building construction activity. Types of specifications and its applications,

Method of writing specifications (contents, correct order and sequence), use of Indian standard codes and specifications, PWD specifications.

Unit II: Specifications of basic building materials such as bricks, stones, aggregate, cement, steel, timber etc. Specifications of materials used in flooring and finishing such *as* ceramic tiles marble-mosaic tiles, paints and varnishes.
Specifications of materials used in roofing and roof covering such as tiles, A.C, G.I. and Aluminum sheets etc.

Unit III: Specifications for fixtures and fastenings; Study of proprietary materials along with manufacturer's specifications, trade names of such materials.

Unit IV: Specifications of works for a residential building of load bearing type or R.C.C. framed type.
Specification of construction of steel structure, ceilings and partitions, paneling insulation and Water proofing.

Unit V: Specifications for items of services such as drainage, wafer supply, electrical installation.

Unit VI: Specifications for demolition-work, temporary construction like sheds, exhibition stalls, gateways.

Reference Books:
Estimating & Costing by B. N. Dutta, B.S. Publishers.
Estimating and Costing by S.C. Rangawala, Charotar Publishing House..
Red Book of Public Works Department Government of Maharashtra.
Estimating and Costing in Civil Engineering by Chakravarti, Bhaktivedanta Book Trust.
IS – 1200

Sessional work: Notes and tests on above topics.

5S-AA-1

Elective a - building automation systems/advanced building materials/ specialized services/

5S-AA-2

Elective b - appropriate technology/ eco-friendly architecture/regional architecture/ sustainable development/

Sixth Semester

6S-A-1

Architectural Design V

Course work to be continued and completed in this semester as mentioned in Architectural Design-IV Syllabus.

6S-A-2

Construction Technology & Materials –VI

Unit I:
Cladding Materials

Unit II:
Bamboo, mud, ferro-cement, vault domes, flat slabs etc.

Unit III:
High rise construction

Unit IV:
Advanced R.C.C. Structures

Sessional Work: Site visit reports, tutorials, notes, sketches and market surveys.
Plates of Small modules of design based on the construction principles.

6S-A-3

Structural Design & Systems- VI

Unit I: Study of IS 1893 – Earthquake Resistant Structures

Unit II: Design of: a) One Way Slab b) Two Way Slab c) Continuous Slabs

Unit III: Design of RCC Sections in Compression – Columns: a) Short Columns b) Limitation of Long Columns c) Columns subjected to Uniaxial bending (using charts)

Unit IV: Design of Independent Column Footings

Unit V: Design of RCC Grid Structures – Simple Concept

Unit VI: RCC Building frames – Structural Behaviour

Unit VII: Design of RCC Sections for Retaining Wall a) Continuous b) Supported in one direction c)Supported in both directions

Unit VIII: Structural Behaviour of Large Span RCC Structural Systems like: a) Portal Frames b) Arches c) Open Web Sections d) Bow String Girders e) Shell Roofs – Cylindrical, Conical, Hyperbolic Paraboloid and others f) Space Structures g) Innovative Structural Forms

Sessional work: Sketches, notes, tutorials, tests and presentations

6S-A-4

Building Services -II

Unit I: Communication systems in buildings, Video conferencing, Computer networks and trenches and conduits to accommodate the systems. Security and Surveillance.

Unit II: Introduction to building automation systems, components and application of BAS, Architectural implications.

Unit III: Causes of fire in buildings, types of fire, spread of fire, production of smoke and poisonous gases. Fire safety and preventive measures.

Unit IV: Fire fighting regulations with reference to National Building code. Fire escape, stairways and escape routes, dry and wet risers, Water demand for fire fighting, storage tanks, fire hydrants etc.

Unit V: Study of Fire detection systems, smoke detectors, heat detectors, fire alarms etc. Fire extinguishing systems, Unit fire extinguishers, Chemical and foam extinguishers, Chemical and foam extinguishers.

Unit VI: Ventilation of buildings, Natural and mechanical ventilation, Need of mechanical ventilation, Exhaust fans, Axial flow fans, Blowers for industrial ventilation.

Sessional works: Sketches, notes, tutorials, tests and plates

6S-A-5

Architectural Graphics VI

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

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

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

Unit III: Site development Plan showing landscaping roads .

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

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

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

Sessional Work : Plates on above topics.

6S-A-6

Design of Human Settlements

Objectives: The study aims at introducing students to the development of planning thought from that of historic to present age. It also gives emphasis on stressing broad principles of settlement in such period. The study of this subject continues with emphasis on planning philosophies and the student to carry out the further studies in the specialized field of Urban Planning.

Unit I: Man's role in designing and developing the towns and cities from ancient times through Medieval, Renaissance and Industrial revolution to present day development.

Unit II : Town planning in India, Pre-historic, Vedic, Pre- British and British Planning in India, Planning after independence.

Unit III: Pioneers and their works, Planning concepts of Patric Geddes, Ebnezer Howard, Abereronmbie, Le-corbusier, C. A. Parry, Clarence Stein, Doxiadis, Kevin Lynch, F.L. Wright, Lewis Mumford, Rob Krier and Victor Gruen.

Unit IV : Present concept of planning at various levels, Planning as a team work, Role of Architects/ Planners in a team , Importance and methodologies of surveys in the planning process, Factors governing the location and growth of towns.

Unit V : Understanding the process of development plan making, general ideas of implementation of such plans and planning agencies, study of planning legislation and administration, town and

regional planning acts., M.R.T.P Act., Development control rules, zoning, density, height, FSI Structures, Role of local and planning authorities.

Unit VI : Introduction to the problem of urban and rural housing in India, Analysis of deman and supply, General study of Planning consideration of housing and area development and housing infrastructure such as utilities and servies.

Sessional works : Notes and Seminar of above topics, Critical appraisal of existing proposed housing schemes, planning exercise of residential community.

Reference books :
Fundamentals of Town Planning by G.K.Hiraskar, Danpatrai & Sons.
Town Planning by S.C.Rangwala and K.S.Rangwala
Town Planning by Abir Bandhopadhaya, Books and Allied (P) Ltd.,
Urban Pattern City Planning and Design by Gallion and Eisher.
Sessional work :- Sketchess, assignments & tests.

6S-A-7

Estimating and costing

Unit I: Purpose of Estimating, types of estimates

Unit II: Bill of quantities for single story structures - (a) Load bearing *(*b) R.C.C, frame.

Unit III: Study of IS-l200.

Unit IV: Estimation of quantities for R.C.C. structural members like footing, column, beam and slab.

Unit V: Estimation for electrification, water supply *&.* sanitation, (only for residential buildings)

Unit VI: Rate Analysis - general, factors affecting the rate of an Item, rate analysis for R.CC. work, brick work, plaster work, flooring painting, doors and windows
Unit VII: Brief specifications and schedule of rates.

Sessional work: - Plates, sketches, & tests.

6S-AA-1

Elective a - project management/ data management techniques/computer applications in estimating and costing/

6S-AA-2

Elective b - advanced spatial analysis/ environmental psychology/ man-environment relationship

Seventh Semester B.Arch.

7S-A-1

Architectural Design-VII

Objective- Study of this subject shall conclude with emphasis on urban development, design problems of increasing structural and design complexity will be set with full opportunity, coordination, collection and analysis of data. Emphasis will be on preparation of design programme, preparation of drawings and detailing.

The process will deal with

1) Design orientation of advance and specialized buildings and environmental services, climate and acoustical system oriented buildings, their appropriate structural buildings and construction techniques.
2) Orientation on development control rules like, density, zoning, FSI etc. redevelopment and urban conservation techniques.
3) Study of urban environment, complex building forms, their design including positive and negative space relationship, Parking Provision, Precincts concept and pedestrian movement.

Sessional work : will include appropriate exercises on one or more of the above mentioned aspects followed by at least 3 design problems arranged in a sequence of complexity and as a problem solving approach.

Site visits audio, visual presentation and library reference is emphasized.

Design problem will be like :

a) Public buildings : Theatre, museum, auditorium, recreation, complexes, stadium, etc.
b) High rise apartment, offices, hospitals, laboratories, campuses etc.
c) Urban design level problems such as commercial complexes, group housing, area development etc.

7S-A-2

Construction Technology & Materials –VII:

Objective: Study of this subject is aimed at teaching the students the advanced and more complex aspects of construction. It also aims at making students aware of systems and techniques of construction used to cover the large spans.

Unit I: Introduction to space structures, possibilities in different materials, types of space structures and possibilities in different materials to cover large spans. General study of shell structures and folded plate structures in concrete, various types, constructional aspects, merits and demerits etc.

Unit II: **G**eneral study of Grid structures and Skeletal structures, space frames, domes etc. in steel, various types, constructional aspects, merits and demerits, etc.

Unit III: Pre-cast concrete, Design considerations and constraints, advantages over cast-in-situ construction, construction techniques and jointing details, applications. Modular coordination, RCC pre-fabricated proofing systems to cover large spans, with or without north light.

Unit IV: Study of pre stressed concrete, principals and methods of pre-stressing, system of pre-stressing, advantages and disadvantages and applications.

Unit V: Temporary structures, materials and techniques used, constructional aspects using timber and M.S Sections, design and detailing problems on small temporary structures**.**

Unit VI: General study of various external cladding materials and systems, curtain walling in various materials, construction details of glass curtain.

Reference books :

Advanced Building Construction by Mitchell, Allied Publishers.
Construction Buildings by R.Barry, Orient Longman.
Space structures by N. Subramaniam, Wheeler.
A.J.Handbook of Building Structures by A. Hodgkinson.
Pre-stressed Concrete Structures by P.Dayaratnan.
Building Construction illustrated by Francis D.K.Ching, Van Nostrand.
Concrete Technology by M.S.Shetty, S.Chand and Co.
Eriction of Pre-fabricated Reinforced Concrete Structures by Y.Bessar & V.Proskurnin.
Structures by Daniel L.Segodak,Prentice – Hall, Inc.
Structural Concepts and Systems for architects and Engineers by T.Y.Lin and Stotesbury.

Sessional work : Notes, plates, assignments (Problems) and test.

7S-A-3

Building Services-IV

Unit I: Principles of Psychometrics and heat transfer, Study of Air conditioning systems and their applicability, Unit A.Cs, Central A.Cs, Split A.Cs.

Unit II: Components of A.C. systems such as chilling plants, cooling towers, air handling units, etc. Calculation of A.C. loads and Air distribution systems, ducts and ducting layouts, space requirement, integration of A.C. system in design, Water demand for A.C.

Unit III: Electric supply and distribution for group housing projects, urban complexes, high-rise building etc. Study of load calculations and distribution systems for larger areas as mentioned above.

Unit IV: Importance and functions of bus bar, set up, step up and step down transformers, electrical substation, lightning conductors, stand by generators, automatic relays, invertors, circuit breakers etc.

Unit V: Electromechanical means of vertical transportation in buildings, requirements, occupant load, study of elevators, various components of elevators, standard space requirements, various types of elevators, various components of elevators, standard space requirements, various types of elevators and architectural implications.

Unit VI: Escalators and Trav-o-lators, its components arrangements and functioning, space requirements, construction detailing.

Sessional work: Sketches, notes, tutorials, tests and presentations.

7S-A-4

Structural Design & Systems – VII

Unit I: Study of IS 800 – Design Considerations.

Unit II: Steel Connections – Welded Joints

a) Types of Welds
b) Concentric Sections
c) Eccentric Sections
d) Sections in Bending
e) Sections in Torsion

Unit III: Design of Tension Members

Unit IV: Design of Compression members – Struts / Independent

Unit V: Design of Built in Columns

Unit VI: Design of Sections in Bending

Unit VII: Sections Subjected to Biaxial Bending (design of purlin)

Unit VIII: Structural behaviour of Types of Large Span Steel Structures like:

a) Arches
b) Open Web Sections
c) Bow String Girders
d) Suspension Structures
e) Geodesic Dome
f) Space Structures

Sessional work: Sketches, plates, notes, tutorials and tests

7S-A-5

Research Skills & Project Introduction

Objective: Perspective on research framework and methods in architectural planning and design which can be quantitative, qualitative as well as techniques in visual, special and contextual evaluation.

Unit I: Identification of the investigation to be done in research, methodology in sequence to achieve to acquire desired results.

Unit II: Assessment of data to be used in formation of the total thesis profile.

Unit III: Data collection methods like reference books, internet resource, monographs, microfilms, tables and charts and statistical data.

Unit IV: Concluding part of research comprising of the data used in the case study for final presentation in presentable format through similar case studies.

Sessional work: Sketches, notes, tutorials, tests and presentations

7S-A-6

Acoustics and Illumination

Objectives: Study of this subject will make students realize the importance of acoustics in interior spaces and necessity of manipulating acoustical environment in buildings. And also to impart knowledge of basic illumination design & illumination system for the indoor spaces.

Acoustics

Unit I: Frequency range of audible sounds. Propagation of sound, sound reflection, diffusion, diffraction. Sound Isolation, Mass law, Transmission loss, STC rating, TL for single and double walls sound leaks and flanking.

Unit II: Acoustical Material and interior finishes, Sound absorbing materials & their properties. Constructional and planning measures for good acoustical design of building in general, Acoustical treatment of Auditorium / Lecture Halls / Conference hall.

Illumination

Unit III: Light radiation, its units, Laws of illumination, inverse square law and cosine law. Artificial light calculation by Lumen Method. Light sources, various types of Lamps and their characteristics.

Unit IV: Types of lighting systems, task lighting, accent lighting, general lighting, lighting for mood etc. Luminaries, their types , properties and uses.

Reference Books:
Acoustics In Building Design by K.A. Siraskar.
Architectural Acoustics by David Egan.
Auditorium Acoustics and Architectural Design by M. Barron.

Sessional Work : Notes & problems based on acoustical design theory, tutorials, Sketches.
Survey of various sound insulating materials for interior elements.
Survey of various lighting fixtures.

7S-AA-1

Elective a - Architectural education/ design process/ interior design/ landscape design/advanced spatial analysis II

7S-AA-2

Elective b - urban planning/ conservation/urban design/ urban aesthetics/infrastructure planning

Eighth & Ninth Semester B.Arch.

8S-A-1 & 9S-A-1

Practical Training

Details of Practical Training:

(1) The Practical Training of six months duration (under a Registered Architect only) envisages the following varied experience in order to ensure exposure of a student to various tasks.
   a) Office experience in respect of preparation of working drawing, detailing drawings of perspective, preparation of architectural models, study of filing systems of documents, drawings, ammonia prints and preparation of tender document.
   b) Site experience, in respect of supervision of the construction activity, Observation, layout on site, study of the staking methods of various building, materials, taking the measurement and recording.

(2) Student will have to maintain a weekly record of their engagement for the period of training. This will be recorded in an authorized log-book to be counter-signed by architect at the end of each month.

(3) At the end of the training period, student will have to procure a certificate of training and satisfactory performance from the concerned office in the prescribed form.

(4) Certificate of satisfactory completion of training same shall be submitted to the principal of the College, immediately after training, through Head of Architecture Department along with the report and drawings made during the training period and appear for Viva-voce at a prescribed date by the university.

Tenth Semester

10S-A-1

Project

Every student shall select a subject for Research project of an Architectural interest,
Experimental work, dissertation or a combination. The nature of the problem shall be based on the synthesis of their total experience and knowledge gained from the allied subjects. Emphasis, shall be laid on the approach to the design solution rather than the end-result. The subject of the project shall be approved by the Department at the commencement of the term.

The students shall have to give at least one seminar on their subject.

On the prescribed data students have to submit to department a bound report of the project, containing identification of the problem scope of the work, data collection, case studies, analytical studies, and its application to the final design solution. On the date prescribed by the Nagpur University, final and finished drawings with models etc. shall be submitted in the department, for the Final Viva-Voce.

10S-A-2

Construction Technology & Materials –VIII

Unit 1 : General study of Construction techniques to cover large spans using short length timber and laminated timber material, lamella roofing, portal frames, solid beams and web beams.

Unit 2 : General study of suspension structures, membrane structures and pneumatic structures, types, materials used, merits – demerits and examples.

Unit 3 : High rise buildings, foundations structural systems and architectural design considerations.

Unit 4 : Study of causes of defects in buildings such as cracks, seepage, deflection etc. and their remedies. General idea of non destructive tests such as Rebound test, Penetration test etc. Rehabilitation methods, Grouting, Guniting, Jacketing etc. General Study of special chemicals used in construction and repairing work.

Unit 5 : Earthquakes and its effects on buildings, earthquake zones in India, Architectural design considerations and construction detailing for earthquake resistance.

Unit 6 : Design and detailing of additions and alterations in existing buildings put to new use Process of modification and precautions to be taken.

Reference Books :
Structure in Architecture by M.Salvadorri.
Advances in Tall Buildings by L.S.Beedle
Construction Technology 1-4 Vol. Bu R.Chudley, British Library Cataloguing.
Explanatory Handbook on Codes for Earthquake Engineering, IS-1893-1975 & is
4326 -1976, Bureau of Indian Standards.
National Building Code.

Sessional Work: Site visit reports, tutorials, notes, sketches and market surveys.
Plates of Small modules of design based on the construction principles.

10S-A-3

Professional Practice

Objective: The study of this subject is to enable the student to acquaint with the various responsibilities of an architect and understand the technicality of the profession.

Unit I :
Nature of profession, difference between trade, business and profession, taking instructions from the client, its interpretation, design process and its stages.
Role of professional society, Professional code of conduct, Ethical ways of getting architectural commission, Importance of conduct of architectural competitions, architectural copy right.

Unit II :
Responsibilities and Liabilities of an architect towards the client. Scale and basis of fees. Professional charges of various jobs. Stages of Architectural design and the specific task in each of such stage.

Unit III :
Architects Office, Organisation and Administration., Office set up,
Correspondence, filing, preparation of drawing, standardization and documentation

Professional partnership, various options, advantages. Partnership deal, responsibilities and liabilities of partners. Provisions of Professional Tax, Service Tax, Income Tax rulels.

Unit IV:
Tender, types of tender, tender document, tender notice, procedure for opening and selection of tender, analysis bids, comparative statement, report to owner, work order.

Unit V :
Contract, type of contract, contract document, Detailed knowledge of various condition of contract as published by Indian Institute of Architects with special reference to responsibilities and liabilities of architect, contractor and the client.

Unit VI :
Architects Act 1972 , its effects on profession and education. General information and introduction to various acts and laws such as land acquisition Act, urban land ceiling Act. Building bye-laws, Sale deed procedure, owner ship documents.

Reference Books :
Professional Practice by Roshan Namavati
COA Handbook of Professional Documents.

Sessional Work : Notes, Tutorials & Report writing on above topics.

10S-AA-1

Elective a - industrial architecture/ long span structures/ high rise buildings/ housing/ campus planning

SCHEME OF EXAMINATION - B.Arch

FIRST YEAR B.ARCH.

Semester -1

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	1S-A-1	Basic Design & Visual Art	DC	AR	2	0	4	0	6	2	0	4	0	6	Sessional	_	200	200	100
2	1S-A-2	Construction Technology & Materials - I	DC	AR	2	0	2	0	4	2	0	2	0	4	Sessional	_	150	150	75
3	1S-A-3	Structural Design & Systems - I	ES	AR	1	1	0	0	2	1	1	0	0	2	Sessional	_	100	100	50
4	1S-A-4	History of Art & Architecture -I	DC	AR	2	1	0	0	3	2	1	0	0	3	Sessional	_	100	100	50
5	1S-A-5	Architectural Graphics I	DC	AR	3	0	0	2	5	3	0	0	2	5	Sessional	_	150	150	75
6	1S-A-6	Workshop Practice- I	DC	AR	0	0	0	2	2	0	0	0	2	2	Sessional	_	50	50	25
7	1S-A-7	Computer Application(NG)	DC	AR	0	0	1	1	2	0	0	1	1	2	Sessional	_	50	50	25
8	1S-AA-1	Elective a	HM	AR	1	2	0	0	3	1	2	0	0	3	Sessional	_	100	100	50
9	1S-AA-2	Elective b	BS	AR	1	2	0	0	3	1	2	0	0	3	Sessional	_	100	100	50
TOTAL					**12**	**6**	**7**	**5**	**30**	**12**	**6**	**7**	**5**	**30**			**1000**	**1000**	**500**

Total Paper-0, sessionals- 9 (Passing heads- 9)

Elective a - Presentation Skills/Public Speaking/Sketching & Rendering/Communication Skills-I

Elective b - Mathematics/Mathematical Applications/Statistical Methods/Numerical Abilities/Scale & Proportion

Semester 2

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	2S-A-1	Architectural Design I	DC	AR	2	0	0	4	6	2	0	0	4	6	Sessional Viva - Voce		100 50	100 50	75
2	2S-A-2	Construction Technology & Materials -II	DC	AR	2	0	2	0	4	2	0	2	0	4	Sessional Paper	 3	50 100	50 100	25 40
3	2S-A-3	Structural Design & Systems- II	ES	AR	2	1	0	0	3	2	1	0	0	3	Sessional Paper	 3	30 70	100	40
4	2S-A-4	History of Art & Architecture -II	DC	AR	2	1	0	0	3	2	1	0	0	3	Sessional Paper	 3	30 70	100	40
5	2S-A-5	Architectural Graphics II	DC	AR	2	0	0	2	4	2	0	0	2	4	Sessional Paper	 3	50 100	50 100	25 50
6	2S-A-6	Workshop Practice - II	DC	AR	0	0	1	1	2	0	0	1	1	2	Sessional		50	50	25
7	2S-A-7	Climatology	DC	AR	1	1	0	0	2	1	1	0	0	2	Sessional Paper	 3	30 70	100	40
8	2S-AA-1	Elective a	HM	AR	1	2	0	0	3	1	2	0	0	3	Sessional		100	100	50
9	2S-AA-2	Elective b	BS	AR	1	2	0	0	3	1	2	0	0	3	Sessional		100	100	50
TOTAL					**13**	**7**	**3**	**7**	**30**	**13**	**7**	**3**	**7**	**30**			**1000**	**1000**	**460**

Total Paper-5, sessionals- 6, viva-voce- 1 (Passing heads- 12)

Note : Sessional marks in studio subject shall be awarded by viva jointly conducted by external & internal examiner appointed by University.

Elective a - Presentation Skills-II/Public Speaking-II/Sketching & Rendering-II/Foreign Languages/Communication Skills-II

Elective b - Fundamentals of Painting/Fundamentals of Sculpture/Fundamentals of Drawing Techniques

Fundamentals of Photography/Visual Arts

SCHEME OF EXAMINATION

SECOND YEAR B.ARCH.

Semester 3

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	3S-A-1	Architectural Design II	DC	AR	2	0	0	5	7	2	0	0	5	7	Sessional Viva-Voce		100 100	100 100	100
2	3S-A-2	Construction Technology & Materials III	DC	AR	2	0	2	0	4	2	0	2	0	4	Sessional Paper	3	100 100	100 100	50 40
3	3S-A-3	Structural Design & Systems-III	E&T	**CE**	2	1	0	0	3	2	1	0	0	3	Sessional Paper	3	30 70	100	40
4	3S-A-4	History of Art & Architecture III	DC	AR	2	1	0	0	3	2	1	0	0	3	Sessional Paper	3	30 70	100	40
5	3S-A-5	Architectural Graphics -III	DC	AR	1	0	2	0	3	1	0	2	0	3	Sessional		50	50	25
6	3S-A-6	Surveying and Levelling	DC	AR	1	0	0	1	2	1	0	0	1	2	Sessional		50	50	25
7	3S-A-7	Climate & Architecture	DC	AR	1	0	1	0	2	1	0	1	0	2	Sessional Paper	3	30 70	100	40
8	3S-AA-1	Elective a	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
9	3S-AA-2	Elective b	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
TOTAL					**13**	**2**	**9**	**6**	**30**	**13**	**2**	**9**	**6**	**30**			**1000**	**1000**	**460**

Total Paper-5, sessionals- 6, viva-voce- 1 (Passing heads- 11)

Elective a - Environmental Studies/Rural Architecture/Vernacular Architecture/Environmental Impacts/

Elective b - History of Indian Traditional Art & Crafts/Art Appreciation/Architectural Documentation/Critical Appreciation

Semester 4

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	4S-A-1	Architectural Design III	DC	AR	2	0	0	5	7	2	0	0	5	7	Sessional Viva-voce		150 50	200	100
2	4S-A-2	Construction Technology & Materials IV	DC	AR	2	0	3	0	5	2	0	3	0	5	Sessional Paper	 3	100 100	100 100	50 40
3	4S-A-3	Structural Design & Systems-IV	ES	AR	2	1	0	0	3	2	1	0	0	3	Sessional Paper	 3	30 70	100	40
4	4S-A-4	Building services-1	DC	AR	1	1	0	0	2	1	1	0	0	2	Sessional Paper	 3	30 70	100	40
5	4S-A-5	Architectural Graphics IV	DC	AR	1	0	2	0	3	1	0	2	0	3	Sessional		50	50	25
6	4S-A-6	Theory of Architecture-I	DC	AR	1	0	0	1	2	1	0	0	1	2	Sessional Paper	 3	30 70	100	40
7	4S-A-7	Theory of Landscape Architecture	DC	AR	1	0	1	0	2	1	0	1	0	2	Sessional		50	50	25
8	4S-AA-1	Elective a	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
9	4S-AA-2	Elective b	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
TOTAL					**12**	**2**	**10**	**6**	**30**	**12**	**2**	**10**	**6**	**30**			**1000**	**1000**	**460**

Total Paper-4, sessionals- 7 , viva voce-1 (Passing heads- 12)

Elective a - Graphic Softwares/Web Design/Building Simulation & Modelling/Computer Applications-I

Elective b - Anthropometrics & Ergonomics/Product Design/Design of Building Elements/Photography

SCHEME OF EXAMINATION

THIRD YEAR B.ARCH.

Semester 5

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	5S-A-1	Architectural Design IV	DC	AR	2	0	0	5	7	2	0	0	5	7	Sessional Viva-voce		100 100	100 100	100
2	5S-A-2	Construction Technology & Materials V	DC	AR	2	0	4	0	6	2	0	4	0	6	Sessional Paper	 3	100 100	100 100	50 40
3	5S-A-3	Structural Design & Systems-V	ES	AR	2	1	0	0	3	2	1	0	0	3	Sessional Paper	 3	30 70	100	40
4	5S-A-4	Building Services II	DC	AR	1	1	0	0	2	1	1	0	0	2	Sessional Paper	 3	30 70	100	40
5	5S-A-5	Architectural Graphics V (Working Drawing)	DC	AR	1	0	1	0	2	1	0	1	0	2	Sessional Viva-voce		50 50	100	50
6	5S-A-6	Theory of Architecture -II	DC	AR	1	0	0	1	2	1	0	0	1	2	Sessional		50	50	25
7	5S-A-7	Specification	DC	AR	1	0	1	0	2	1	0	1	0	2	Sessional		50	50	25
8	5S-AA-1	Elective a	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
9	5S-AA-2	Elective b	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
TOTAL					**12**	**2**	**10**	**6**	**30**	**12**	**2**	**10**	**6**	**30**			**1000**	**1000**	**470**

Total Paper-4, sessionals- 7 , viva voce-1 (Passing heads- 12)

Elective a - Building Automation Systems/Advanced Building Materials/Specialised Services/Computer Applications-II

Elective b - Appropriate Technology/Eco Friendly Architecture/Regional Architecture/Sustainable Development/Green Architecture

Landscape Design Studio

Semester -6

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	6S-A-1	Architectural Design V	DC	AR	2	0	0	5	7	2	0	0	5	7	Sessional Viva-voce		150 50	 200	100
2	6S-A-2	Construction Technology & Materials VI	DC	AR	2	0	4	0	6	2	0	4	0	6	Sessional Paper	 3	50 100	50 100	25 40
3	6S-A-3	Structural Design & Systems-VI	ES	AR	2	1	0	0	3	2	1	0	0	3	Sessional Paper	 3	30 70	100	40
4	6S-A-4	Building services -III	DC	AR	1	1	0	0	2	1	1	0	0	2	Sessional Paper	 3	30 70	100	40
5	6S-A-5	Architectural Graphics VI (working Drawing)	DC	AR	1	0	1	0	2	1	0	1	0	2	Sessional Viva-voce		50 50	50 50	50
6	6S-A-6	Design of Human Settlement	DC	AR	1	0	0	1	2	1	0	0	1	2	Sessional Paper	 3	30 70	100	40
7	6S-A-7	Estimate & Costing	DC	AR	1	0	1	0	2	1	0	1	0	2	Sessional		50	50	25
8	6S-AA-1	Elective a	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
9	6S-AA-2	Elective b	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
TOTAL					**12**	**2**	**10**	**6**	**30**	**12**	**2**	**10**	**6**	**30**			**1000**	**1000**	**460**

Total Paper-4, sessionals- 6 , viva voce-2 (Passing heads- 12)

Elective a - Project Management/Data Management Techniques/Computer Aplications in Estimating & Costing/ Architect's Office & Site Practices

Elective b - Advanced Spatial Analysis/Environmental Psychology/Man-Environment Relationship/ Architectural Appreciation

SCHEME OF EXAMINATION

FOURTH YEAR B.ARCH.

Semester - 7

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	7S-A-1	Architectural Design VI	DC	AR	2	0	0	10	12	2	0	0	10	12	Sessional Viva-voce		150 50	150 50	100
2	7S-A-2	Construction Technology & Materials VII	DC	AR	1	0	2	0	3	1	0	2	0	3	Sessional Paper	 3	100 100	100 100	50 40
3	7S-A-3	Building Services-IV	DC	AR	1	1	0	0	2	1	1	0	0	2	Sessional Paper	 3	30 70	100	40
4	7S-A-4	Structural Design & Systems-VII	ES	AR	1	1	0	0	2	1	1	0	0	2	Sessional Paper	 3	30 70	100	40
5	7S-A-5	Research Skills & Project Introduction	DC	AR	1	0	2	0	3	1	0	2	0	3	Sessional Viva-voce		50 50	50 50	50
6	7S-A-6	Acoustics and Illumination	DC	AR	1	0	0	1	2	1	0	0	1	2	Sessional Paper	 3	30 70	100	40
7	7S-AA-1	Elective a	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
8	7S-AA-2	Elective b	DE	AR	1	0	2	0	3	1	0	2	0	3	Sessional		100	100	50
TOTAL					**9**	**2**	**8**	**11**	**30**	**9**	**2**	**8**	**11**	**30**			**1000**	**1000**	**460**

Total Paper-4, sessionals- 5 , viva voce-2 (Passing heads- 11)

Elective a

- Architectural Education/Design Process/Interior Design/Landscape Design/Advanced Spatial Analysis/

Elective b

- Urban Planning/Conservation/Urban Aesthetics/Infrastructure Planning/Valuation

Semester - 8

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	8S-A-1	Practical Training Presentation-I	DC	AR	-	-	-	-	-	-	-	-	-	12	Sessional		200	200	100
TOTAL									**-**					**12**			**200**	**200**	**100**

Total Paper-0, sessionals- 1,(Passing heads- 1)

SCHEME OF EXAMINATION

FIFTH YEAR B.ARCH.

Semester - 9

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	9S-A-1	Practical Training Presentation-II	DC	AR	-	-	-	-	-	-	-	-	-	12	Sessional		200	200	100
															Viva-Voce		300	300	150
TOTAL														**12**			**500**	**500**	**250**

Total Paper-0, sessionals- 0, viva voce-1(Passing heads- 1)

Semester - 10

Sr. No.	Sub. Code	Sub. Name	Category	Board	Load Per Week					Credits					Paper/ Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
					L	T	D	S/P	Total	L	T	D	S/P	Total					
1	10S-A-1	Project	DC	AR	2	0	0	16	18	2	0	0	16	18	Sessional		350	350	300
															Viva-voce		250	250	
2	10S-A-2	Construction Technology & Materials VIII	DC	AR	1	0	3	0	4	1	0	3	0	4	Sessional		100	100	50
															Paper	3	100	100	40
3	10S-A-3	Professional Practice	DC	AR	2	0	2	0	4	2	0	2	0	4	Sessional		30	100	40
															Paper	3	70		
4	10S-AA-1	Elective a	DE	AR	2	0	2	0	4	2	0	2	0	4	Sessional		100	100	50
TOTAL					**7**	**0**	**7**	**16**	**30**	**7**	**0**	**7**	**16**	**30**			**1000**	**1000**	**480**

Total Paper-2, sessionals- 3, viva voce-1 (Passing heads- 6)

Elective a - industrial architecture/ long span structures/ high rise buildgs./ housing/ campus planning/urban design/High Tech. Architecture

First Semester B.Arch.

1S-A-1

Architectural Design I

Objectives: The primary objective shall be to develop in students the understanding and relevance of human scale and space formation, elements of built form and its role in spatial realms.

1. Anthropometry:
   a. Study of Human dimensions, concept of percentile in Indian standards, space required for various simple activities, circulation spaces.
2. Form and Space:
   a. Volumes, elements of volumes, enclosure of space, semi-enclosed spaces, defining space by elements, light and shade as contributing factors, color, texture & form, view, visual relationship. Properties of forms and their impact on spatial experience.
3. Elements of built form:
   a. Basic Elements: Walls, Floors, windows, doors, staircase, façade, etc.
   b. Ancillary Elements: Courtyards, balconies, canopy, patio, sitouts, water bodies, pergola, etc.
   c. Relevance of all such elements on architectural expression and spatial quality.

Small modules of short design projects based on developing the understanding of above mentioned topics.

References

- Ching Francis D. K., Form Space and Order.
- Ching Francis D. K., A Visual Dictionary of Architecture.
- Pierre Von Meiss -Elements of Architecture from form to place.
- Yatin Pandya- Elements of Space Making

1S-A-2

Allied Design Studio I

Objectives: Developing skills in manual presentation techniques, use of various media of presentation, Principles of 2-D & 3-D compositions, Principles of Design.

Visual Art: Visual Art is aimed at providing knowledge and understanding of various visual arts and its importance. It further aims at developing freehand drawing and rendering skills in different medium and using it as tool of expressing ideas visually.

Unit I: Introduction to basic elements of visual arts – point, line and plane. Study of Visual properties of 2-Dimentional forms both geometrical and non-geometrical surface and visual texture and optical illusion.

Introduction to principles of organization/composition- Repetition, Variety, Radiation, Rhythm, Gradation, Emphasis & Subordination, Proportion, Harmony, Balance.

Unit II: Free hand line sketching and drawing of natural and manmade objects. Study of shades and shadows. Sketching of structures with architectural importance using different medium.

Unit III: Study of classification of colours with different hues, values, and shades. Colour wheel and colour composition, properties of colour.

Sessional Work – Plates, Sketches and models to understand basic principles of visual composition.
Creative Exercises of 2d to 3d composition.

1S-A-3

Building Construction and Materials I

Objectives: To develop understanding of building materials and its application in construction of various building elements. The subject also aims at introducing students with design ability for a certain building element integrating with architectural space and demand of time and place.

Unit I: Introduction to construction as a subject and its relevance to Architectural Design.

Construction and the Logic of stability as its basis, construction principles with respect to structural stability. Support and supported elements, concept of span and span - loading co-relation.

Building elements, types and subtypes, basic understanding of elements from foundation to roof vis-à-vis its purpose, function, utility and necessity.

Unit II: Building materials, Categories – Natural, Processed, Manufactured and Designed. Availability, Composition, General know-how with respect to physical, chemical and structural properties; utility and criteria for selection in design and construction of various elements of building. (Market survey and study of catalogues)

Manufacturing of clay bricks, **Bricks** made from other materials and blocks.

Building **Stones**, its quarrying process, preservations, dressing and artificial stone(s).

Manufacturing of **Lime, Cement** - its setting time; importance and need for curing.

Aggregate Coursed and fine, sources, grading and selection criteria, various uses and mix.

Concrete types (based on materials), Preparation and mix – criteria, its various uses, Manufacturing of **Glass,** various types, forms, applications.

Unit III: Basic Structural Systems, Load Bearing, Frame Structure and Composite structure, load transmission, suitability, merits, demerits etc. Introduction and understanding of various Subsystem such as Horizontal, Vertical and Foundation, Sub systems with respect to stability, utility and its application in building design and construction.

Unit IV: Masonry, definition and types; purpose / function their role in building design and construction. Standard terminology used for masonry work

A complete study of principles and rules of Brick Masonry (up to 2 brick thick) and Piers.

A complete study of principles and rules of Stone Masonry and Pillars.

Composite masonry and masonry out of various walling blocks.

References

- 'Building Construction' by Mackay W. B., Vol. 1 – 4
- 'Building Construction' by Barry, Vol. 1 – 5
- 'Construction Technology' by Chudley, Vol. 1 – 6
- 'Building construction Illustrated' by Ching Francis D. K.
- 'Engineering Materials' by Chaudhary

1S-A-4

Architectural Graphics I

Objectives: To introduce students to architectural drawing techniques with due emphasis to scale, annotations, labeling and dimensioning.

To enable students to express simple three dimensional objects and building components through technical drawings, using various graphic projection systems such as orthographic, Isometric and Axonometric projections.

Unit I: Introduction to graphic language and its components

Line types: meaning and application
Architectural Lettering and dimensions in techniques
Architectural annotations and conventions including representation of various building materials and building components
Graphic scales and their application

Unit II: Plane and Solid geometry

Introduction to graphical construction of various plane geometrical shapes.
Introduction to various projection systems used in Architectural drawing; such as Orthographic, Isometric and Axonometric projections to draw and represent various three dimensional geometrical objects/forms.

Unit III: Scale Drawing

Scale drawing (plan/s section/s and elevation/s) of a simple G+1 building of sufficient size (drawings of which has to be provided) to demonstrate use of various metric scales, conventions and standard annotations especially indicating the vertical circulation & toilet details in section.

Sessional work: Sketches, notes, tutorials, tests and presentations.

References

- Ching Francis D.K.: Architectural Graphics
- Gill Robert: Rendering with pen and ink
- H. Joseph and Morris: Practical plane and solid geometry

1S-A-5

Structural Design & Systems I

Objectives: This course provides students with a basic knowledge of structural systems used in buildings. Emphasis will be on structural concepts vis-à-vis stability of forms rather than intricate numerical calculations while dealing with different structural concepts. The subject intends to familiarize students to concepts of basic structural mechanics.

Unit I: Overview of the Structural System in Architecture.

Study of types of loads and types of beams.
Load bearing structure, RCC frame structure, Steel trusses in residential & industrial buildings,
With suitable examples from historical and contemporary architecture.

Unit II: Introduction to Structural Mechanics

Introduction of forces, composition, resolution, moments and couples,
Resultant of forces, Concurrent and non-concurrent co-planar force systems,
Principle of moments, Varignon's theorem.

Unit III: Principle of equilibrium. (2D Elements)

Basic principles and conditions of equilibrium, study of Lami's theorem and Free Body Diagrams.
Study of structural support reactions:- Study of reactions of simple support, hinged support, roller support and fixed support.

Unit IV: Geometric Properties of plane sections
Centre of gravity
Moment of inertia (second moment of area) – section modulus, radius of gyration, polar moment of inertia.

Unit V: Analysis of Trusses
Perfect frames (Method of joints)

Sessional work: Sketches/ Notes/ Tutorials &Presentations
Desirable: Site visits to develop better understanding of above.
Laboratory exposure wherever possible.

References:

- Khurmi, R. S.(2006). A Textbook Of Engineering Mechanics (SI Units). New Delhi: S.Chand And Co Ltd.
- Reddy, K. Vijaya Kumar; Kumar J. Suresh.(2011). Singers Engineering Mechanics Statics And Dynamics
(SI Units). Hydrabad:B.S Publications.
- Ramamrutham , S. : Narayanan, R.(2008). Engineering Mechanics. New Delhi: Dhanpat Rai Publications Ltd
- Shah, H.J. ;Junnarkar, S.B.(2012). Mechanics of Structures. Anand:Charotar Publishing House Pvt. Ltd.
- Singer, FerndinandL.(1975). Engineering Mechanics Statics & Dynamics. New Delhi :Harpercollins Publishers.
- Ching, Francis D.K.; Onouye, Barry S. Building Structures Illustrated: Patterns, Systems And Design. New Jercey: John Wiley And Sons.
- K. G. Rajashekarappa, S.S. Bhavikatti (1994), Engineering mechanics, New age international publication, Mumbai.

1S-A-6

History of Civilization

Objectives: To provide an introduction to the architecture of early civilisations as an expression of art and culture of that place.

To understand and interpret basic needs and lifestyle as determining factors for growths of early settlements.

Unit I: Prehistoric Architecture- Evolution of architecture. A study of primitive people, shelters, settlements.

Examples: Menhirs, Dolmens, Trilithons, Stone circles, Stone hedge, Cave dwellings. Catal Huyuk

Unit II: Nile Valley Civilization: The impact of the context, culture and society on art and architecture of the Egyptian Civilization. Evolution of tombs, valley of Kings, necropolis.

Unit III: Indus Valley Civilisation: The impact of the context, culture and society on art and architecture during Early Indus settlements in Mehrgarh, Harrapa, Mohenjo Daro, Dholavira.

Unit IV: Euphrates & Tigris river valley Civilisation: The impact of the context, culture and society on art and architecture of Asayrian, Sumerian, Mesopotamian and Babylonian period.

Unit V: Yellow River Civilisation: The impact of the context, culture and society on art sculpture and Architecture during Prehistoric, Xia Dynasty, Shang Dynasty and Zhou Dynasty

Unit VI: Vedic Architecture and Settlements: Rise of cities, Mahajanapadas, introduction to scripture

Exercises: Design of exercises to understand, analyze, interpret, synthesize the study of historical structures to develop understanding of architecture

Test: one at midterm and one at end of term to be conducted at institute level.

The questions should be framed with least emphasis on factual reproduction.

References

- History of World Civilisations by J.E. Swain.
- A Short History of the World – H. G. Wells

1S-A-7

Computer Application I

Objectives: This subject is to empower students with computer software useful for architects to enhance the skills of presentation, drafting and coordination of design and other subjects. To learn presentation software for enhancement of architectural drawings, sketches and convey ideas through presentations.

Unit I: M.S. office – Basics of M.S. office software, M.S word, PPT presentation or equivalent software and Excel

Unit II: Photoshop etc. to enhance presentation skills with help of software.

1S-A-8

Workshop I

Objectives: To develop skills to understand various tools, processes and material.

- Understanding various basic tools used for carpentry joinery and fabrication.
- Understanding workshop rules, safety norms and care in handling various manually operated and motorized tools.

- Basic understanding of wooden joints, evolution of joints, needs of joints, making simple wooden joinery parts.
- Understanding various building materials and their tools used for cutting, joining and extension. Handling materials like wood, marble, steel, MS, plywood, POP, Aluminum etc.
- Understanding nailing, screwing, riveting and their various conditions and types of applications.

Expression of forms – By handling various materials.

Sessional work: Model Making.

Evaluation shall be done on following heads:

Simplicity, honesty of material, concept, translation of concept, detailing, workmanship and expression

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1S-A-9

Elective I

Appreciation of Art and Architecture/ Numerical Ability/ Presentation Skills/ Sketching and Rendering/ Public Speaking/ Institutional Project 1

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

Appreciation of Art and Architecture

Key Words: Types of Arts, identification, appreciation, Visual perception, Art and Design, Modern, Contemporary Architecture.

Objectives: The objective of the course is to understand and appreciate art and architecture in terms of its form, content and context through the study of works of art over history in order to develop sensitivity towards aesthetics and techniques developed over the period which plays a important role in architecture.

- To introduce the vocabulary of Art, Architecture and the principles.
- To inform students about the various art forms through the ages within the cultural contexts.
- To study Modern Art and the new directions that evolved in the 19th and 20th centuries.
- To inform the production of art in the Indian context through history and the contemporary manifestations.

Sub topics :

1. Evolution of art and architecture.
2. Introduction to Art Appreciation. The ways of seeing Art.
3. Art and Design- Historical perspective.
4. Expression in Art and Design
5. Indian Art -Pre and post- Independence, Contemporary Indian Art.
6. Indian Art and Architecture- pre and post – Independence, Contemporary Indian Art and Architecture.
7. Role and impact of art and architecture. (History, Expression and relation).

Sessional Work:

Plates, Assignments, workshops, Visits

References:

- The Making of Indian Art – Tapathi Thakurta,
- Kala Swadhane- M.H.Krishnaiah,
- Contemporary Indian Sculptures- Dr. Shivji Panikar
- Cantanese, A. J. and Snyder,
- J. C. (1988). Introduction to Architecture. Ching, F. D. K.,
- Jarzombek, Heidegger,
- M. (1993). The origin of the work of Art-Basic writings. Vitruvius,
- Translation: Morris, H. M. (1960)

Numerical Ability

Key Words: Mathematics and architecture, Nature and mathematics, Geometry

Objectives:

- The objective of this course is to inculcate the interesting application of mathematics in architecture without using the complex mathematical operations and formulae.
- The focus is to make the students understand the mathematics that exhibit in nature.
- The students are introducing to Fibonacci series, Fractals, Tessellation and its application in architecture.
- Further students are introduce to the repeated geometric patterns like squares and circles which may overlapped or interlaced to form intricate complex Islamic Jalis in one of the Exercise.
- The Theories of Golden sections and fractals formed the basis for understanding the fundamentals of basic geometry as found in nature. In later stage, Students

are made to work upon evolving patterns that fallows certain rules through exercises of tessellations.

Sub Topics:

1. Mathematics of architectural aesthetics.
2. Using mathematic as tool for designing.
3. Analyzing the mathematical concept related to architecture.

Sessional Work: Assignments, Plates, Workshops

References :

- The Divine Proportion: a Study in Mathematical Beauty,by H. E. Huntley
- The Golden Ratio and Fibonacci Numbers, R. A. Dunlap
- Geometry of Design, Kimberly Elam
- Fibonacci and Lucas Numbers and the Golden Section, Steven Vajda
- A mathematical history of the golden number, Roger Herz-Fischler
- The Golden Ratio: The Facts and the Myths, Francis D. Hauser

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Presentation Skills

Key Words: Presentation ,Communication, Presentation Techniques, public speaking, Group Discussions.

Objectives: The main objective of this course is to develop the skill of students by Introducing fundamental techniques of Visual representation and to equip them with basic principles of representation which will enhance the quality of graphical language for architecture. This subject will also improve the skill of delivering and engaging crowd.

- To improve on convincing skills of students.
- To enhance the Visualization Skills of students.
- To Improve Advertisement Skills.
- Introduction to public speaking.
- Visual Aids in public speaking.
- The psychology of audience.

Sub Topics:

1. Introduction to Presentation skills and public speaking(methods, use & application, delivering presentation).
2. Presentation Techniques.(Manual skills and digital presentation techniques)
3. Mediums of Presentation (Verbal, Illustrative, Digital,3Dimensional).
4. Software.

Sessional Work:
Assignments , Workshops ,Focused Group Discussions, Plates

References :

- Adrian, D. and Christopher J. (2000). Language in Use,
- Dinsmore, G. A. (1968). Analytical Graphics,
- Edward, J. F. and Lee, J. (2000).

Sketching and Rendering

Key Words: Visual thinking , representation, Geometric Drawings, Rendering techniques.

Objectives:
- Students to equip with fundamental techniques of sketching and rendering.
- To develop a medium for thinking and explorations.

Sub Topics:
1. Learning Sketching, Drawing
2. visual thinking, Design principles and representation techniques.
3. Understanding the complexity of forms.
4. Geometric Drawings and Projections.

Sessional Work:
Assignments , Workshops, Plates

References :

- Robert Gill, Rendering with pen and Ink,
- Thomas & Hudson Publishers, 1993

Public Speaking

Key Words: Speaker, Audience, topic, Skills.

Objectives:
- To develop the skills to address crowd.
- Visual aids in public speaking.
- The psychology of audience.

Sub Topics:
1. Introduction to public speaking
2. Visual aids in public speaking.
3. The psychology of audience.

Sessional Work:
Workshops, Focused Group Discussions.

Institutional Project 1

Institutional project aims at encouraging institutions to explore different areas.

Institution would have freedom to explore into multidisciplinary activities which would explore into other creative disciplines and inter-disciplinary activities.

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

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

Second Semester B.Arch.

2S-A-1

Architectural Design II

Objectives: The objective is to develop understanding of various concepts of design evolution, understand human interface with various furniture, objects, leading to design of simple built spaces.

1. Principles of Design:

Basic principles of spatial organization, symbiosis of form and function, concept generation, convergent & divergent thinking in design.

2. Furniture & Facilitation:

Need of furniture as an aid to enhance activities, study of various furniture in isolation and in combination.

3. Climate & Design:

Orientation, climatic coordination and architectural elements like chajjas, fins, fenestration etc.

Sessional Work:
Assignments on each unit with presentation, lecture and site visits.
Design of simple familiar activity spaces like residence, school, canteen etc.
Small modules of short design projects based on above mentioned topics.

References:

- Ching Francis D. K., Form Space and Order.
- Peter Streens, Patterns in Nature.
- John R. Mather -Climatology: Fundamentals and Application.

2S-A-2

Allied Design Studio II

Objectives: Developing skills in manual presentation techniques, use of various media of presentation, Principles of 2-D & 3-D compositions, Principles of Design.

Theory of Basic Design: To understand the visual & aesthetic qualities of design and relating these to Architectural Design situations.

Unit I: Brief historical review of development of Design and its interdependency.

Unit II: Introduction to basic elements of design. Study of shapes and its composition, study of volumes, effects of colour and texture on composition.

Unit III: Analysis of simple objects of daily use, in terms of material, interface, graphics, colour, texture, functionality etc.

Sessional Work – Plates, Sketches and models to understand basic principles Design and Analysis of Product.

2S-A-3

Building Construction and Materials II

Objectives:

1. To understand the basic building elements, their function and behavior under various conditions with specific reference to timber construction.
2. To help students to develop a clear understanding of basic principles of construction and materials suitable for load bearing construction & Concept of span.

Unit I: TIMBER Seasoning, its necessity and various methods, (Market survey to learn various types available, their sizing and costing and application in construction of building elements and furniture).

Types of timber joinery - principles and design considerations, their application in construction of various elements, items of building construction and in design of furniture.

Unit II: A) Wooden Doors - Design criteria and principles. types and Standard Terminologies. Design and detailed drawing work for Single leaf fully paneled doors, Single leaf partly paneled partly glazed doors, Double leaf fully paneled doors; with important joinery details.

B) Wooden Windows - Design criteria and principles. Types and Standard Terminologies. Design and detailed drawing work for Fully Glazed windows with mullion(s) and with Transom. Sash Windows, Centrally pivoted window, Top Hung Window, Louvered Window, with adequate number of important joinery details

Study of various fixtures, fittings, fastenings for doors and windows.

Unit III: Concept of Span and its application in providing / making openings in Masonry walls. Lintels its definition, purpose, basic Terminology, load considerations. Lintel Types such as stones, bricks, wood, steel, R.C.C., Rein. brick with their design criteria and considerations.

Arches: Definition, purpose / function. Standard Terminologies. Load considerations. .Comprehensive study of classification and types of arches. Centering for arches.

Unit IV: Foundation, Basic design considerations. Simple foundations for load bearing walls in stone and brick masonry. Timbering to trenches for various types of soil.

References:

- 'Building Construction' by Mackay W. B., Vol. 1 – 4
- 'Building Construction' by Barry, Vol. 1 – 5
- 'Construction Technology' by Chudley, Vol. 1 – 6
- 'Building construction Illustrated' by Ching Francis D. K.
- 'Elementary Building Construction' by Michell

2S-A-4

Architectural Graphics II

Objectives:

To enable the students to understand and express Composite three-Dimensional objects and buildings formed by additive and interpenetrated solids using various graphical projection systems including sections.

To enable the students to understand the technique of graphical documentation of a built structure / environment through measured drawing/s.

Unit I: Solid Geometry

Understanding and drawing of composite and complex three dimensional objects formed by additions and/or interpenetration of various objects in various planes.

Orthographic projections of true shapes of sectional planes.

Linking of complex three dimensional forms to complex building forms / Building elements through Sectional Planes and Interpenetration of objects.

Unit II: Surface Development of Solids

Surface Development of various simple and complex three dimensional objects.

Unit III: Measured Drawing (Sessional Work)

Measured drawing (Plan/Section/s&Elevation/s), drawn to appropriate scale, of a simple two storied building including a stairway and toilet. Inclusion of basic Area statement to be done.

Sessional work: Plates, sketches, models & tests.

References

- Ching Francis D.K.: Architectural Graphics.
- Kelsey W. E.: Geometrical & Building Drawing.
- H. Joseph and Morris: Practical plane and solid geometry.

Structural Design & Systems II

Objectives: To make students familiar with the basic theorems and mechanical properties of engineering materials, elastic constants, different types of stresses and strains. It also delivers the basic principles of structural mechanics & how Bending moments and Shear force diagrams are used to analyze simple structural behavior.

Unit I : Overview of the Structural System in Architecture.
Study of Types of Slabs (One way& Two way, Grid Slab),
Study of suspension structure,
With suitable examples from historical and contemporary architecture.

Unit II: Mechanical properties of building materials
Simple stresses and strains : Concept and application – Definition and study of stresses & strains, Hooke's law. Principle of superimposition.

Unit III: **Thermal stresses and strains**
Concept and application. (For simple sections only)

Unit IV: **Elastic Constants:**
Definitions , Poisson's ratio, Bulk Modulus, Modulus of elasticity, Modulus of rigidity.

Unit V: **BM and SF Diagrams**
Simply supported & Cantilever beams (Subjected to Point load & UDL)

Sessional work: Sketches/ Notes/ Tutorials & Presentations

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

References :

- Ramamrutham, S. : Narayanan, R.(2008). Strength Of Material . New Delhi: Dhanpat Rai Publications Ltd.
- Rajput, R.K.(2012). Strength Of Material (Mechanics And Solids) S.I. Units. New Delhi: S. Chand And Co Ltd.
- Khurmi, R. S.(2006). A Textbook of Strength of Material (SI Units). New Delhi: S.Chand And Co Ltd
- Bansal, R. K.(2011). A Textbook of Strength of Materials (SI Units). New Delhi: Laxmi Publications (P) .
- Shah, H.J. ;Junnarkar, S.B.(2016). Mechanics of Structures Vol. I (Strength of Materials).:Charotar Publishing House Pvt. Ltd.

History of Architecture I

Objectives: To develop the appropriate skills of interpreting the increasing complex structure in a society based on the socio-political, cultural factors and the resultant settlement pattern and architecture.

To analyze and synthesize architecture of an era based on climate and available building materials construction techniques, climate etc. and spatial configurations derived from it.

UNIT I: Early Greek Architecture- Minoan and Mycenaean, The impact of the context, culture and society on art and architecture during Hellenic and Hellenistic period- Greek Temples, Orders, and public spaces.

UNIT II: Roman Architectural style. The impact of the context, culture and society on art, architecture and construction techniques developed during Roman period.

Forum, Temples, Basillicas, Comitiums, Curia, Arches, Thermae, stadia, circus.

UNIT III: Byzantine and Early Christian Architecture: Fall of Rome. The impact of the context, culture and society on art, architecture and construction techniques developed during this period.

UNIT IV: Gothic, Romanesque and Renaissance: The impact of the context, culture and society on art, architecture during Gothic, Romanesque and Renaissance period through comparative study.

UNIT V: Industrial Revolution The Social, economic and political changes effected, new requirements of the society, new materials and technological developments.

School of thoughts – works of Louis Sullivan, Early Industrial buildings, Contributions of Bauhaus, De Stijl movement, Italian Futurism, Art Noueavau movement and Arts and Crafts Movement to Modern Architecture.

Eg: Wain Wright Building, St Louis, Guaranty Building, Buffalo, Crystal Palace, London. Bauhaus school at Dessau, Schroder house by Rietveld, Casa Mila, Casa Batlo, Sagrada Familia, Tassel House, Brussels, Paris Metro Station entrance, Red house, Kent.

Exercises: Design of exercises to understand, analyze, interpret, synthesize the study of historical structures to develop understanding of architecture

Test: One at midterm and one at end of term to be conducted at institute level.

The questions asked in such tests should promote the above mentioned 5 heads of critical thinking and discourage only factual reproduction.

The questions should be framed with least emphasis on factual reproduction.

References

- History of Architecture by Sir Bannister Fletcher.
- History of Architecture by Spiro Kostof.

2S-A-7

Computer Application II

Unit I: Sketch up or equivalent software – Basics of sketch up or equivalent software to strengthen the visualization of third dimension and vice versa. Commands for basic solids, 3d composition and interpenetration of solids. Commands for creating various building elements

Unit II: Sketch up or equivalent software – Advanced commands of sketch up for massing, 3d models of buildings, topography, shadow formation study etc.

2S-A-8

Workshop II

Objective: Developing understanding of various material and efficiency in technique.

- Finishing Surfaces: Understanding various surface finishing techniques and processes received by different material like wood, steel, aluminum, stone etc.
- Paints and Polish: Surface preparation, use of sand paper, application of putty, application of base coat, middle coat and final coat, understanding oil paints, deco-paints, acrylic paints etc.
- Study of various application techniques like brush, pads, scalpel, spray paints, working on highlights for painting.
- Design and executing prototype of simple objects like pen stand, projected stand, lamp shades, paper tray, CD stand, knife holder, kitchen accessories and finishing of selected material.

Evaluation shall be done on following heads:
Simplicity, honesty of material, concept, translation of concept, detailing, workmanship and expression.

Sessional Work: Model Making of identified architectural projects.

Elective II

Art in Architecture/ Graphic Designing/ Fundamentals of Painting/ Fundamentals of Sculpture/ Architectural Photography/ Institutional Project 2

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

Art in Architecture

Key Words: Visual perception, Art and Design, space, Theories, Architecture.

Objectives:
- Broad overview of Art and Design.
- Enabling students to understand visual awareness.
- Understanding of Design as a Multidimensional creative Art.

Sub Topics:
1. Art and Design- A historical perspective.
2. Expression of Art and Design.
3. Relations in Art, Design and Architecture.
4. Introduction to theories.

Sessional Work:

Plates, Assignments , workshops.

References :

- Cantanese, A. J. and Snyder,
- J. C. (1988). Introduction to Architecture. Ching, F. D. K.,
- Jarzombek, Heidegger,
- M. (1993). The origin of the work of Art-Basic writings. Vitruvius,
- Translation: Morris, H. M. (1960)

Graphic Designing

Key Words: Graphics, visual communication, composition

Objectives: To enhance the graphic design abilities among the students.

Sub Topics:
1. Introduction to history of Graphic Design
2. Visual perception theory
3. Principle of Compositions – Colour Theory – Type Design and Typography (Layouts / Format / Calligraphy).
4. Environmental Graphics (Signage / Logo / enhancing the built environment).

5. Lateral thinking for exploration of designing Ideas.

Sessional Work: Assignments, Plates, Workshop

References:

- Webb, Frank, “The Artist guide to Composition”, David & Charles, U.K., 1994**.**
- Ching Francis, “Drawing a Creative Process”, Van Nostrand Reinhold, New York, 1990.
- Alan Swann, “Graphic Design School”, Harper Collins, 1991.

Fundamentals of Painting

Key Words: Visual arts , expression, creativity

Objectives:

- Develop the technical skills and the ability to organize the visual elements necessary to communicate concepts and experiences across various media.
- To translate concepts into visual composition.

Sub Topics:

1. Introduction to basic elements of painting.
2. Various use of colors.
3. Exploring different ways of paintings on different medium.
4. Exploring colors, light, transparency and composition.

Sessional Work: Assignments, Workshop, Plates

References :

- Painting Fundamentals: Fine Art Lesson by V. Hadady
- Fundamentals of Drawing and Painting by Richard Taylor

Fundamentals of Sculpture

Key Words: visual arts , expression, creativity

Objectives: To Develop the Visual skills by examining a sculpture's formal and sensory qualities (i.e. line, color, form, texture, etc.) and analyzing how the elements (i.e. scale, balance, rhythm, proportion, etc.) are organized.

Sub Topics:

1. History of Art
2. Aesthetics
3. Drawing from full life
4. Modelling from Life (Study of Human Head in Clay)
5. Sculptural Design (Modeling & Carving)

Sessional Work: Assignments, Studios, Workshop

References:
- Imagination and the Imaginary Hardcover, Kathleen Lennon.
- Dynamics of Architectural Form.
- Experiencing Architecture 2e, Rasmussen.

Architectural Photography

Key Words: Color, lighting, visual angle, frames

Objectives: Develop the skills of visual Composition, People & nature, Lighting & color and Understand the mechanics of imaging.

Sub Topics:
1. Introduction to photography
2. Photographic techniques.
3. Post processing photo.

Sessional Work: Assignments, Studios, Workshop

References :

- Fundamentals of Photography: The Essential Handbook for Both Digital and Film Cameras.
- Architectural Photography: Composition, Capture, and Digital Image Processing, Adrian Schulz.
- Balthazar Korab: Architect of Photography, John Comazz.
- Architectural Photography the Digital Way, Gerry Kopelow.

Institutional Project 2

Institutional project aims at encouraging institutions to explore different areas.

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

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

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

Third Semester B.Arch.

3S-A-1

Architectural Design III

This semester shall continue with further complexity in aesthetic qualities with increased emphasis on context and functionality.

Objectives:

- The focus at this stage will be on detailing of various architectural elements in the context of functions, construction techniques, characteristics of material and its implications on architectural form.
- Introduction to organizational, spatial strategies, circulation within and around the built form.
- Conceptual and Contextual exploration with respect to climate, culture, etc.

Sessional Work: Built and un-built spaces for multiple activities.

References:

- C.M. Deasy -Design for Human Affairs.
- Anthony Sealey, Introduction to Climatology.

3S-A-2

Allied Design Studio III

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

3S-A-3

Building Construction and Materials III

Objectives: To strengthen student's knowledge about reinforced cement concrete and its applications in buildings. To equip students about the methods of designing various structural members using reinforced cement concrete.

Unit I: Introduction to building materials:
Mild Steel and Reinforcement Bar, Stainless Steel, Aluminum, Copper, Titanium, w.r.t to composition, general know-how with respect to physical, chemical and structural properties their utilities and criteria for selection.

Unit II: Concept of vertical connector- Stairs, Design principles / considerations, proportions. Types on basis of Geometry, material and structural systems used. Stairs in Timber, Mild Steel and Stone. Railing types for stairs etc.

Unit III: Concept of spanning and its application in formation of Floors. Traditional Methods of Flooring such as Timber Floors, Jack Arch Floors, Composite Floors.

Unit IV: Principles of Framed Structures - Reinforced Cement Concrete, Complete Drawing work with typical details of R.C.C. Footings, Columns, Lintels, Chajjas, Beams, Canopies, Slabs, Cantilever Beams and Slabs, Fins etc.

Unit V: Study of form work, shuttering, for above components of R.C.C.

References

- Murthy, V. N. S. Soil Mechanics & Foundation Engineering. Sai Kripa Technical Consultants.
- Punmia, B. C. (2005). Soil Mechanics and Foundation Engineering. Delhi: Laxmi publications.
- Punmia, B. C. (2006). R C C Designs. Delhi: Laxmi Publications.
- Punmia, B. C. (2007). Limit State Design of Reinforced Concrete. Delhi: Laxmi Publications
- Barry, R. (1999). The Construction of Buildings Vol.II. 5th Ed. New Delhi: East-West Press.
- McKay, W. B. (2005). Building Construction Metric Vol.1–IV, 4th Ed. Mumbai: Orient Longman.

3S-A-4

Architectural Graphics III

Objectives: To enable the students to communicate an architectural idea / proposal in a legible and effective manner through perspective projections, use of shades and shadows, and various architectural presentation and rendering techniques.

Perspective:

Unit I: Introduction to picture planes, standpoint, eye level etc. Types of perspective views such as one point, two point, three point, worm’s eye view, Bird's eye view, normal view, etc.

Unit II: Methods of drawing perspective views such as conventional method, measuring point method, shortcut and approximation in perspective drawing, problems based on simple architectural built forms in different materials rendered with appropriate colours.

Unit III: Bird's eye view showing a building or any object with surrounding landscape, buildings etc.

Unit IV: Perspective of interior of buildings suitably rendered.

Sciography:

Unit V: Introduction to sciography, principle of conventional angle of light and its rays acting as projectors to cast shadow of simple plane lamina e.g. square, circle, hexagon etc.

Unit VI: Digital 3d modeling to understand light and its rays acting as a projector to cast shadow on simple building forms; also shadow cast partly on horizontal and vertical planes.

References:

- Holmes John M. : Applied Perspective.
- Themes and Hudson: Perspective for Architects.
- Shankar Mulik: Perspective and Sciography.

3S-A-5

Structural Design & Systems III

Objectives: The course would enable students to understand various principles of strength of materials like various kinds of simple, shear & bending stresses in beams & arches. It gives a fair understanding of behavior of different types of arches in architecture.

Unit I: Overview of the Structural System in Architecture.
To Study the behavior of fixed, two hinged & three hinged arches.
Stability of Structural elements of Dam structure & Retaining wall,
The concept of Flinched beam.
With suitable examples from historical and contemporary architecture.

Unit II:
a) Shear Stresses:
Concept and application of Shear stresses and its distribution in Rectangular, Circular, Triangular, I, L & T section
(Numerical on I& T section only)

b) Bending stresses: Circular bending:
Concept and application.

Unit III: **Direct and bending stresses:**
Concept and application.

Unit IV: Column and Struts:
Euler's and Rankine's theory – concept and application.

Unit V: Analysis of Three hinged Circular Arches
Determination of Normal thrust , horizontal thrust, radial shear force & Bending moment .

Sessional work: Sketches/ Notes/ Tutorials &Presentations

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

References:

- Bansal, R. K.(2011). A Textbook Of Strength Of Materials Si Units. New Delhi: Laxmi Publications (P) Ltd.
- Rajput, R.K.(2012). Strength Of Material (Mechanics And Solids) S.I. Units. New Delhi: S.Chand And Co Ltd
- Subramanian, R. (2010). Strength Of Materials. New Delhi: Oxford University Press.
- Reddy, K. Vijaya Kumar; Kumar J. Suresh.(2011). Singers Engineering Mechanics Statics And Dynamics (SI Units). Hydrabad: B.S Publications.
- Ramamrutham , S. : Narayanan, R.(2008). Engineering Mechanics. New Delhi:Dhanpat Rai Publications Ltd
- Shah, H.J. ;Junnarkar, S.B.(2012). Mechanics of Structures. Anand: Charotar Publishing House Pvt. Ltd.
- Khurmi, R. S.(2006). A Textbook of Strength of Material (SI Units). New Delhi: S.Chand And Co Ltd.

3S-A-6

History of Architecture II

Objectives: To provide an understanding of religious typologies in India based on individual philosophies, material and construction techniques.

Interpretation of Spatial Configurations, form or art and the proportioning systems derived from religious symbolism in each belief system.

Unit I: Buddhist Architecture: Rise of Buddhism and role of Emperor Ashok, Spread of Buddhism to South East Asia. Buddhist building typologies, Chaiyas, Viharas, Stupas, Stambha etc. Influence of Silk road on transmission of Buddhism and Architectural language and it's transformation.

Unit II: Jain Architecture: Understanding Importance of material and construction technique in Jain temple architecture.

Unit III: North Indian temple architecture: Classification of North Indian Temples. Examples from Orrisa, Khajuraho, Gujarat and Rajasthan.

Unit IV: Hemadpanthi **Temples Architecture of Central India**. Amruteshwar Temple, Ratangad, Tulja Bhawani Temple, Tuljapur, Trimbakeshwar Temple, Nashik, Bhuleshwar temple, Pune , Bhimashankar Temple, Pune.

Unit V: South Indian temple architecture: Classification of South Indian Temples under various dynasties; Pallava, Chalukyan, Chola, Chera, Vijaynagar and Pandya

Unit VI: Indo-Islamic Architecture during Qutub, Khilji, Tughlaq, Sayyid, and Lodi sultanates.

Exercises: Design of exercises to understand, analyze, interpret, synthesize the historical studies to develop understanding of architecture

The course should culminate in a term paper, documentation or design interpretation and transformation.

References:

- Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D. B. Taraporevala Sons and Co.
- Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.
- Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.

3S-A-7

Computer Application III

Objectives: To learn drafting skills and design testing methods with the help of computer software

Unit I: Auto CAD and equivalent software –drafting commands on Auto CAD, Appropriate graphical representation with the software as per requirements of architectural drawings.

Unit II: Introduction to simulation and simulation software as a tool to test the response of designed building in given situation. Introduction to Simulation softwares used for building services, climate, acoustics and illumination, construction, structures etc.

3S-A-8

Climatology

Objectives: Understanding fundamentals of climatology and its relation to human thermal comfort, and buildings.

Unit I: Introduction to climatology, climate and weather, importance of climatology in architecture, global climatic factors.

Unit II: Elements of climate such as temperature, wind, humidity, precipitation, solar radiation and various instruments, graphical representations to record climatic data.

Unit III: Scales of climate, global climatic zones, micro-climate.

Unit IV: Climate analysis tools, Mahoney tables ET/CET nomograms, bio-climatic charts, temperature isopleths, horizon and celestial coordinate system, solar geometry, shading device calculations, heliodon solaroscope.

Unit V: Thermal comfort factors, thermal comfort indices, heat exchange process of buildings, building heat gain calculations.

Unit VI: Natural ventilation in and around the building, ventilation systems.

Sessional works: Sketches, tutorials, use of climatology lab instruments, tests and experimentations

References:

- Climate responsive architecture, *Arvind Krishnam.*
- Manual of tropical housing and building, *O H Koenigsbereger.*
- Solar data book*, Roorkee.*

Elective III

Scale and Proportion/ Anthropometrics and Ergonomics/ Rural Architecture/ Traditional Arts and Crafts/ Biomimicry/ Institutional Project 3

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

Scale and Proportion

Key Words: Harmonious relation, Ability to perceive, order, Hierarchy,

Objectives: To improve on certain qualities like Judgment, visual understanding, perfection, proportioning system, Compositional Skill.

Sub Topics:

1. Elements of Design Scale and proportion.
2. Understanding dimensional relationship.
3. Proportioning system.
4. Scale.
5. Importance of different scale(Visual scale, Hierarchical scale, Distorted scale).
6. Vitruvius Theory.

Sessional Work: Assignment, Studios

References :

- Nikos A Salingaros, (2010) twelve lectures on Architecture.
- Building Structures Illustrated: Patterns, Systems, and Design 2nd Edition, Francis D. K. Ching.

Anthropometrics and Ergonomics

Key Words: Comfort, Human needs, factor, socially sensible output

Objectives: To understand the Statics and measurement of Human body, user experience, properties of human capabilities, System performance.

Sub Topics:

1. Introduction to human functions.
2. Ergonomics and design.
3. Disability, Ageing and Inclusive design.
4. Environmental Ergonomics.
5. Health effects of environmental stresses.

Sessional Work: Assignment, Hands-on practices, Model making

References :

1. Chaira, J. D. and Callender, J. H. (1987). Time Savers Standards for Building Types. Singapore: McGraw-Hill.
2. Crosbie, M. J. and Watson, D. (2005). Time Savers Standards for Architectural Design: Technical data for Professional Practice. 8th Ed. The McGraw-Hill Company.

Rural Architecture

Key Words: Indigenous material, Social Structure, Technology Adaption, Social Network, Kinship, Culture, Tradition, Climate, Craftsmanship, Gender, Occupation, Rituals and beliefs, Religion and festival.

Objectives:

- To develop Construction Techniques and planning strategies.
- Understanding of Informal and functional spaces design.
- To understand Climatic responsive design and the use of natural resources.

Sub Topics:

1. Social Structure.
2. Daily life and recreation.
3. Built Spaces- Understanding material and construction techniques.
4. Custom and rituals.
5. Art and artifacts.

Sessional Work: Workshop, Site visit, Assignment, Documentation

References :

1. Edward, S. and Maisel, J. (2004). Universal Design. New York: Taylor & Francis.
2. Preiser, W. (2001). Towards universal design evaluation. New York: McGraw-Hill.
3. Seidle, J. (1996). Barrier-free design. 1st Ed. New York: Routledge.
4. Story, M. F., Mueller, J. L. and Mace, R. L. (1998). The universal design file: Designing for people of all ages and abilities. North Carolina : North Carolina State University Press.
5. Jain, K. and Jain, M. (1992). Mud Architecture of the Indian Desert. Ahmadabad: Aadi Centre.
6. Muthiah, S., Meyappan, M., Ramswamy, V. and Muthuraman, V. (2000). The Chettiar Heritage. Chennai: Chettiar Heritage.

Traditional Arts and Crafts

Key Words: Diversifying culture, heritage, Rituals and beliefs, Religion and festival, Language and custom, food habits, Dressing, History(Early civilisation) or mythology, Heritage

Objectives:

- To develop Techniques and material explorations.
- To generation of creativity, Properties and behavior of material.
- Elements of particular art and craft form.

Sub Topics:

1. History of Traditional Arts in India.
2. History of Craft in India.
3. Various Forms of Art and craft based on region.
4. Methods and processes involved in Different forms of Art and craft.
5. Study of material and instruments requires for particular craft and Art Scope and Limitation.

Sessional Work: Workshop, Site visit, Assignment, Documentation

References :

- The Rich Heritage of Jammu And Kashmir Studies In Art, Architecture, History And Culture of the Region, Somnath Wakhlu Foreword By Karan Singh.
- Handmade in India: Crafts of India, Ranjan Aditi.

Biomimicry

Key Words: Nature, Adaptation, Relationship, Efficiency

Objectives:

- To develop understanding of bio mimicry in Architecture.
- TO develop understanding that simulate and co-opt processes occurs in nature.
- To understand the way biological systems solves the problem.

Sub Topics:

1. Introduction to Biomimicry.
2. The levels of mimicking in nature.
3. What is biomimetic design.
4. Examples of Biomimetics.

Sessional Work: Assignments, Model making

References :

- Biomimicry in Architecture by Michael Pawlyn.
- Biomimicry as a Metaphor for Perfect Integration in Sustainability by Asha Nilani Liyanage.
- Architecture Follows Nature-Biomimetic Principles for Innovative Design (Biomimetics) by Ilaria Mazzoleni.

Institutional Project 3

Institutional project aims at encouraging institutions to explore different areas.

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

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

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

Fourth Semester B.Arch.

4S-A-1

Architectural Design IV

This semester shall explore community, tradition, theoretical constructs, building systems and its implications on architectural design.

Objectives:

- Exploring the relationship between various building systems and design.
- Studying and understanding integration of building systems with architectural concepts and form.
- Understanding of a community setup, its people, and their spatial requirements.
- Exploring various theories and design process development in architectural design.

Sessional Work: Built and un-built spaces for multiple activities for a large group of people/community.

4S-A-2

Allied Design Studio IV

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

4S-A-3

Building Construction and Materials IV

Objectives: To impart knowledge on various types of floors and flooring material, partitions and paneling, various surface finishes. To equip students with advances in building construction methods and its applications.

Unit I: Introduction to Building Materials : -

Roof and Floor Tiles, Plaster, Finishes & all Plastic w.r.t composition, general know-how about their physical, chemical and structural properties, their utility and selection criteria

Unit II: Windows in Steel and Aluminum. Steel doors; design criteria and principles. Standard Terminologies and types.

Special doors such as Sliding, Sliding and Folding, Revolving Doors, Rolling Shutter, Collapsible Gates - Design Criteria and principles. Standard Terminologies.

Unit III: Paneled and Glazed Partitions out of Timber and Aluminum - Types, design principles and considerations, Standard Terminologies. Design details and drawing work, fixing details to surrounding elements / components.

Unit IV: Timber Roofs - Timber Trusses, Standard Terminologies, Types - Design Criteria, principles, construction details. Design details and drawing work of King Post and Queen Post Truss. General and Conceptual drawing work of other types of timber roofs.

Steel Roof - Trusses. types, design principles and considerations, Standard Terminology - Design details and drawing work of M.S. angle and Tubular Trusses.

North Light Truss system. Conceptual and drawing work of types of Steel Trusses.

General study of M.S. Frame and its various joints.

Unit V: Expansion Joints; types, design considerations, location consideration, principles and types.

References:

- Barry, R. (1999). The Construction of Buildings Vol.II. 5th Ed. New Delhi: East-West Press.
- Bindra, S. P. and Arora, S. P. (2000). Building Construction: Planning Techniques and Methods of Construction, 19th Ed. New Delhi: Dhanpat Rai Pub.
- McKay, W. B. (2005). Building Construction Metric Vol.1–IV, 4th Ed. Mumbai : Orient Longman.
- Rangwala, S. (2004). Building Construction. 22nd Ed. Anand: Charotar Pub. House.
- Rangwala, S. C. (1963). Building Construction: Materials and types of Construction, 3rd Ed. New York: John Wiley and Sons.

4S-A-4

Surveying and Documentation

Objectives: To enable the students to get conversant with locating the object positions in horizontal and vertical plane with desired accuracy as needed for architecture professionals.

To help the students understand the technique of graphical documentation of a built structure /environment through measured drawings

Surveying

Unit I: Introduction to surveying and leveling, types of surveying methods and application, Introduction to Chain Survey.

Unit II: Plane table survey, method and instruments used.

Unit III: Leveling, methods of leveling -dumpy level and its uses.

Unit IV: Contours, use of theodolite, contour survey.

Unit V: Planimeter and its use.

Unit VI: Total Station Survey
Practical**:**
a) Total Station Survey.
b) Plane table survey of cluster of buildings.
c) Leveling using dumpy level and water table.
d) Setting out site layout.
e) Contour survey, plotting contour maps.

Documentation
Unit VII: Measured Drawing: Measurement techniques of Heritage Structures and preparing measured drawing to suitable scale.

Sessional works: Practical record book, Sketches, notes and plates.

References

- Arror, K.R. (2004). Surveying Vol. 1-3. Delhi : Standard Book House.
- Chandra, A. M. (2002). Plane Surveying. New Delhi : New Age International.
- Ching Francis D.K.: Architectural Graphics.

4S-A-5

Structural Design & Systems IV

Objectives: To foster the understanding of basic principle of limit state design in RCC structural systems.

To develop the understanding of characteristics of soil on structural behavior.

Unit I: Overview of the Structural System in Architecture.

Study of different types of soils their characteristics, bearing capacities, Settlement of foundation. Study of structural elements like beams, columns & footings.
Theory of Determinate and indeterminate structures – degree of indeterminacy.

Unit II: **Deflection of beams**
Simply supported and cantilever beams by using Macaulay's method.

Unit III: Concept of fixity
Independent fixed beams with different loadings - BM and SF diagrams.
(By using First Principle method).

Unit IV: Method of Moment distribution (BM diagrams only)
a) For continuous beams (Up to three spans only, without settlement)

b) For Single portal frames (Without sway moments)

Unit V: Basic Principle of RCC

a) Different Limit states, partial safety factors, permissible stresses Introduction to RCC design, characteristics of RCC, assumptions, Neutral axis; balanced, under & over reinforced sections

b) Design of singly reinforced beams , doubly reinforced beams & Moment of resistance of T beam

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Sessional work: Sketches/ Notes/ Tutorials & Presentations

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

References :

- Punmia B.C.(2005) Soil Mechanics and Foundations Laxmi Publications, Hyderabad.
- Khurmi, R.S.(2010). Theory Of Structures SI Units. New Delhi: S. Chand And Co Ltd.
- Ramamrutham , S. : Narayanan, R.(2018). Theory of Structure. New Delhi: Dhanpat Rai Publications Ltd
- Dr. V. L Shah & Dr. S. R. Karve. (2014) Limit State Theory & Design of Reinforced concrete, Structures publications Pune.
- Punmia, B.C. (2015). R C C Designs. Delhi: Laxmi Publications.

4S-A-6

History of Architecture III

Objectives: To provide an understanding of the implications of the Mughal and Colonial rules in India and its Architecture.

Unit I: Mughal architecture in India, Forts and Cities during Mughal dynasty.

Unit II: Architectural contribution of Akbar, and Shahjahan.

Unit III: Provincial Architecture in India: Bengal, Malva, Mandu, Bijapur, Punjab, Kashmir, Gujarat.

Unit IV: Colonial and Post Independence Indian Architecture: Colonial architecture of Goa, Pondicherry and Bengal. Lutyens Delhi. City planning of Chandigarh.

Unit V: Indian Master Architects, their philosophies and works.

Exercises:

1. Understanding 2. Analysis, 3. Interpretation, 4. Synthesis, and 5. Transform of historical structures, in the form of small exercise and assignments.

The course should culminate in a term paper, documentation or design interpretation and transformation.

References

- Mehrotra, R. (2011). Architecture in India Since 1990. Pictor.
- Benevolo, L. (1977). History of Modern Architecture. 2 Vols., reprint, MIT Press.
- Jenks, C. (2007). The Story of Post-Modernism. London: Wiley and Sons.
- Grover, S. (2002). Islamic Architecture in India. New Delhi: CBS Publications.

4S-A-7

Building Services I

Objectives: Aim of this subject is make the students aware of the importance, installation and working of essential services in buildings and a way building services help in generating a cleaner and healthier built environment. The students shall also be made familiar with I.S. codes related to services. This part of the building services deals with various systems and components of water supply and its drainage. This also focuses upon the Architectural design consideration regarding space allocation and design of building elements to anchor the services so as to achieve balance of functional efficiency and building aesthetics.

Unit I: General idea of sources of water supply, qualitative & quantitative aspects, impurities, hard & soft water, standards for quality of water. Study of standards regarding water demand and consumption in different types of buildings.

Unit II: Layouts of water supply systems and their types, Connection from municipal supply to a building, design-construction of suction & storage tanks for a single tenement residence or bungalow by computing demands for domestic use. Study of Down take supply, water supply pipes, and their sizes, jointing, fixing and laying. Various valves, fittings and fixtures like taps, showers etc. Domestic water heaters and hot water supply system. Design of various spaces and building elements to anchor the services such as shafts, ducts etc.

Unit III: Principles of sanitation, water carriage systems, collection of waste matter in buildings. Study of Various sanitary fittings and fixtures like water closets, urinals, wash hand basins, sinks, flushing cisterns, shower trays, bath tubs, bidets, drinking water fountains etc with respect to building types and users. Design of various building elements to anchor the services such as walls, Floor and their features etc.

Unit IV: Various traps and their function, sewage collection and disposal system for a single tenement residence or bungalow. Various types of sanitary pipes and their jointing, fixing and laying, manholes, inspection chambers, intercepting chambers. Design of various spaces and building elements to anchor the services such as shafts, ducts, immediate surroundings of building etc.

Unit V: Self cleansing velocity, invert levels, drains on sloping sites, sewage disposal system in un-sewered localities- Complete study of septic tank - introduction, design principle, criteria, its working, utility and benefits. Its various types with respect to materials, capacity, design and construction. A Brief study of cesspools, aqua-privy, Soak Pit, leeching pits for individual building.

References

- Birdie, B. S. (1996). Water supply and Sanitary Engineering. Dhanpat Rai and Sons.
- Punmia, B. C., Jain, A. K. and Jain, A. K. (1995). Water Supply Engineering. New Delhi : Laxmi Publications.
- Punmia, B. C., Jain, A. K. and Jain, A.K. (1998). Waste Water Engineering. New Delhi : Laxmi Publications.
- Rangwala, S. C. (2005). Water Supply and Sanitary Engineering. Charoter Publishing.

4S-A-8

Climate and Architecture

Objectives: This part of subject provides scope to apply the knowledge of basic climatology gained in earlier semester, for design in different climatic conditions with emphasis on tropical climate.

Unit I: Study of effect of orientation, topography, vegetation, form, building materials and surfaces n the building design in response to the climate.

Unit II: Classification of tropical climate, its characteristics, shelters in six climatic regions in India.

Unit III: Study of passive techniques for heating and cooling, techniques of solar radiation control and heat transfer and insulation.

Unit IV: Environmental issues in urban areas, Urban climate change, concept of urban heat island, climatic elements and urban microclimate, site climate in urban areas.

Unit V: Climate responsive design approach, process and design detailing.

Sessional Work: Case studies, creative exercises with climatic considerations Use of simulation software.

References:

- Climate responsive architecture, *Arvind Krishnam*
- Manual of tropical housing and building, *O H Koenigsbereger* & Ingersol.
- Urban Microclimate, Evyatar Erell,
- Design with climate, Víctor Olgyay, Aladar Olgyay.
- John R. Mather -Climatology: Fundamentals and Application.

- Climatologically & Solar data for India – T. N. Seshadry.
- Tropical Architecture – Maxwell Fry & Jane Drew.

Elective IV

Regional Architecture/ Furniture Design/ Design of Building Elements/ Building Bye Laws and DCR/ Theory of Design/ Institutional Project 4

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

Regional Architecture

Key Words: Region, architectural style, context, customs

Objectives:
- Developing understanding of context, regional techniques.
- To develop students cultural and custom understanding for particular region.

Sub Topics:
1. Regionalism in architecture
2. context and customs of making buildings in different regions of world.
3. Analyzing the Regional character.

Sessional Work: Assignments, Site visit

References:
- “Design with Climate” bioclimatic Approach to Architectural Regionalism by Victor Olgyay.

Furniture Design

Key Words : Creation, Evolution of object, Human scale, Ergonomics and Anthropometrics.

Objectives:
- To develop the skills by giving opportunity to work with the material and process technology.
- To develop Critical and analytical ability.

Sub Topics:
1. Introduction to furniture design.
2. Aspects of furniture design.

3. Structures and system to human scale.
4. Intricate user centric design.

Sessional Work:
Workshops ,Assignments

References :

- Baiche Bousmaha & Walliam Nicholas, Neufert Architect's Data. Blackwell science Ltd.
- Chiara De Joseph & crosbie. J. Michael. 1990. Time saver standards for building types. McGraw Hill company.

Design of Building Elements

Key Words : Building elements , meanings

Objectives: To develop an understanding of design elements and principles relative to their use in the architectural design process

Sub Topics:
1. Architectural Design Elements.
2. The Concept of Space.
3. Architectural Design Principles.
4. Additional Design Considerations.

Sessional Work: Assignments, Model making, Visits

References :

- Design Through Discovery, The Nature Of Design,
- The City Shaped: Urban Patterns and Meanings through History,
- Vitruvius – Ten Books on Architecture

Building Bye Laws and DCR

Key Words: Regulations , rules , mandatory

Objectives: To develop understanding of rules and regulations .

Sub Topics:
1. Introduction to building bye.
2. Rules and Regulation.
3. Zoning rules and regulations.
4. DCR.

Sessional Work: Assignments, Site visits

Theory of Design

Key Words: Architectural expressions, Social Discipline, Ideology, impact of Isms, revolution, Evolution, Variability of perception.

Objectives:

- To develop understanding of Design principles, Development of design vocabulary, generation of creativity, System integration.
- To give understanding of design as a broader field and the changing role of designer in society.
- To give exposure to methodologies, theories and models of the design process.
- To give deeper understanding of the process of creativity as well as to introduce techniques which will enable creative thinking.
- To help understand creativity with respect to the discipline of architecture.
- To introduce participatory approach to design.

Sub Topics :

1. The genesis of Indigenous Architecture.
2. Architecture as a socially useful discipline.
3. Design Methodology.
4. Design evaluation and criticism.

Sessional Work:

Assignment

References:

- Francis D. K. Ching, Architecture - Form, Space and Order, Van Nostrand Reinhold Company ,1979
- Roger H. Clark, Michael Pause, Precedents In Architecture, Van Nostrand Reinhold Company , 1996
- 1. K.W.Smithies, Principles of Design in Architecture, Van Nostrand Reinhold Company , 1981
- 4. Sam F. Miller, Design Process - A Primer For Architectural & Interior Design, Van Nostrand Reinhold Company , 1995
- Ernest Burden, Elements of Architectural Design – A Visual Resource, Van Nostrand Reinhold 3 company, 1994
- V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications, New Delhi, 1973.

Institutional Project 4

Institutional project aims at encouraging institutions to explore different areas.

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

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

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

Fifth Semester B.Arch.

5S-A-1

Architectural Design V

Objectives: The focus will be on exploration and application of various structural systems, building byelaws and building with multiple users.

The design process to deal with following aspects:

- Building byelaws and site surrounding.
- Structural system and exploration in material.
- Services in multistoried buildings

Sessional Work: Design of multiple dwelling units, apartment blocks, hostels or other multistoried buildings.

5S-A-2

Allied Design Studio V

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

5S-A-3

Building Construction and Materials V

Objectives: To familiarize the students with the design principles and considerations of advanced RCC structures.

Need for building repair and maintenance, cause and effect of building deterioration and defects, and material, methods and techniques of maintenance, repair and restoration are covered in the course.

Unit I: Advance RCC foundation, Types such as Strip Foundation, combined footings, Eccentric Footing. Foundation system for floating column on cantilever beam. Types of Raft foundations.

General study of Steel Grillage foundation, Machine Foundation, Cellular Foundation, Cassion Foundations.

Design Principles and Considerations for Pile Foundation, its types. Piles in Timber, Steel and R.C.C. both precast and *Cast-in-situ*, Under rimmed piles, pile caps.

Unit II: Design Principles and considerations of Advanced R.C.C. Structures - such as Grid / Coffered Slabs - Various types - Study of reinforcement detailing i) at crossing of beams ii) Grid beams with peripheral beams and columns.

Flat slabs, Flat-plate slabs - all types. Lift slab method of construction.

Unit III: Study of various defects in building - causes and remedies / precautions. Brief study about various Non-Destructive Tests - Concepts, purposes, such as Rebound Test, Penetration Test and Pull out Techniques, Surface Hardness Test.

Study of Building Structure Rehabilitation. Principles / Concepts, Causes / reasons. Various methods such as Grouting, Guniting, Jacketing - construction principles, techniques.

Unit IV: Study of Construction Chemicals / Admixtures, Need, purpose, types. A General study - with emphasis on commonly used chemicals / admixtures, repair solutions.

Water proofing aspect of building for different elements, avoiding dampness.

Unit V: Additions and Alteration in Existing Building. Introduction, Purpose / necessity - Design and Structural principles, techniques of modifications / alternations, precautions, essential studies, data and information required, its collection and analysis. Design, detailing and construction drawings providing solutions for various building elements.

Shoring, underpinning and scaffolding for building work.

References:

- Guha, P. K. (2011). Maintenance and Repairs of Buildings. New Delhi: New Central Book Agency.
- Chandler, I. (1992). Repair and Renovation of Modern Buildings. McGraw-Hill.
- Nayak, B. S. (2013). A Manual of Maintenance Engineering. New Delhi: Khanna Publishers.
- Mitchel “Advanced building construction.”
- V S Foster “advanced building construction.”

5S-A-4

Working Drawing I

Objectives:

The objective of this subject is to train the students for the preparation of:

1. Submission drawing as per the local building bye laws.
2. Working drawings required for carrying out actual construction *work.* The graphics of the drawings will be with specific reference to the code of practice for Architectural and Structural drawings as laid down in B.I.S. No.962 of 1960. The course of this subject shall be completed in two semesters i.e. Semester-5 and Semester-6. The course to be completed shall be as follows:

Unit I: Study of building bye-laws, building regulations, requirements of parts of Buildings etc. as per the National Building Code.

Unit II: Understanding the concept of Ground coverage, Built-up area, FSI/ FAR etc:

Unit III: Preparations of submission drawings for a single storied residence with approximate 75 Sq.Mt. built-up area.
Unit IV: Preparation of working drawings for the same building. The set of drawings to be prepared shall include Foundation / centre line plan (considering Load Bearing as well as R.C.C. Frame structure type), Floor Plan, Lintel level plan, Terrace Plan showing roof drainage arrangement. Sections, All elevations, Details of stair, Doors and windows, Flooring pattern, Kitchen, Architectural features etc. (Set of min. 10 drawings of imperial size prepared to facilitate the execution of building)

Unit V: Business graphics, multimedia presentations of the above work.

Sessional Work: Plates on above topics.

References:

- National Building Code (NBC).
- Latest Local Building Bye-Laws.
- Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). The professional practice of architectural working drawings. 4th Ed. Hoboken: John Wiley & Sons.

5S-A-5

Structural Design & Systems V

Objectives: In continuation of previous semester this course focuses on limit state method for the design of various types of slab, column and footing. Also it delivers the knowledge of basic requirements of earthquake resistant structures.

Unit I: Overview of the Structural System in Architecture.
Study of roof covering like flat slab, vaults and domes, folded plates, Shell roofs & Stair cases,
With suitable examples from historical and contemporary architecture
Study of IS 875 Part I, Part II and Part III and Study of IS 456 -2000.

Unit-II: Basic Concepts and design of different types of slab
Design of one way & two way slabs.
Conceptual study of continuous slab & cantilevered slab showing the reinforcement details.

Unit III: Design of RCC section in compression (Column)
Short column, Limitations of long columns and column subjected to uniaxial bending (by using Interaction curve chart)

Unit IV: Design of Isolated Footing.
Design of RCC Isolated Rectangular & square footing.

Unit V: Basic requirement of Earthquake resistant structures.
Study related to Plan irregularity & Vertical irregularity (Study of IS 1893Part I -2016)

Sessional work: Sketches/ Notes/ Tutorials & Presentations

Desirable: Site visits to develop better understanding regarding the reinforcement details and casting of various structural elements.
To prepare relevant study models on above.
Laboratory exposure wherever possible.

References:

- Bhavikatti, S. S. (2008). Design of RCC Structural Elements. Newade International Publishers.
- Punmia, B. C. (2007). Limit State Design of Reinforced Concrete. Delhi: Laxmi Publications.
- Ramamrutham , S. (2004).Limit State Design of Concrete structures New Delhi: Tata McGraw Hill Education
- Ramachandra, S. (2004). Limit State Design of Concrete Structures. Scientific publishers.
- Varghese, P.C. (2011). Limit state Design of Reinforced Concrete. PHI Learning.
- Design Aid SP 16.
- I S 456-2000.
- I S 1893 Part I -2016.
- I S 875-1987 (Part I, Part II, Part III)

5S-A-6

Contemporary Architecture

Objectives: To provide an understanding and appreciation of Contemporary trends in Indian and Western Architecture in terms of Ideas and directions through the works of outstanding architects.

Post-Independence Architecture in India:

- Le Corbusier in Chandigarh and Ahmedabad
- Louis Kahn's contributions
- Ideas and works of B V Doshi
- Ideologies of Charles Correa
- Raj Rewal, Achyut Kanvinde, Uttam Jain

Works of Contemporary Architects: Architects and their ideologies and philosophies towards architecture –

- Sanjay Mohe,
- Sanjay Puri,
- Brinda Somaya, Anupama Kundoo, Chitra Vishwanathan
- Manit Rastogi, Jaisim, B.S.Bhooshan etc.

Critical Regionalism: Philosophy and works of

- Laurie Baker,
- Hassan Fathy,

- Geoffrey Bawa
- Nari Gandhi

Architectural response to regional climate, culture, local materials, crafts and technology.

Non Indian

- Ideas and works of Richard Meier
- Mie Van der Rohe
- Peter Eisenmen
- Charles Moore
- Frank Gehry
- Zaha Hadid
- Rem Koolhas
- Santiago Calatrava
- Shigeu Ban
- I.M.Pei
- Moshe Safdie
- Ean Nouvel
- Bernard Tschumi
- Norman Foster
- Daniel Leibskind
- Kazuyo Sejima
- Renzo Piano
- Tadao Ando

References:

- Kenneth Framption : Modem Architecture -A Critical History
- Monographs of Modem Architects
- Henri Sterlin: Encyclopedias of World Architecture
- Singh, M. and Mukherjee, R. New Delhi- Making of a Capital. New Delhi: Roli Books
- Mehrotra, R. (2011). Architecture in India Since 1990. Pictor.
- Lang, J., Desai, M. and Desai, M. (2000). Architecture and independence: The search for identity – India 1880 to 1980. New Delhi : Oxford University Press

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5S-A-7

Building Services II

Objectives: This part of the building services deals with various systems and components of complex Sewage collection and its Disposal, hot water supply in high- rise buildings, Electrical services, refuse disposal systems and methods of storm water handling. The students shall be made aware of Architectural design consideration regarding space allocation and design of building elements to anchor these services so as to achieve balance of functional efficiency and building aesthetics.

Unit I: Sewage collection and disposal for large campuses, complexes, and high-rise buildings etc, STP system- comprehensive study of conventional sewage treatment plant, understanding, its principles, systems of treatment, sequence, possible space requirements, location criteria, application, merits and de-merits.

Unit II: Hot water supply in high-rise buildings, solar water heaters and their systematic layouts, various methods/ systems of hot water supply, their thermal

insulation and schematic pipe line network in a building. (for domestic application- small residence and for high rise buildings)

Unit III: Brief introduction to Electricity generation and distribution from Plant to Substation. Various wiring systems, electric fittings and appliances, Electrical Control and safety devices such as Switches, Fuse, Circuit breakers, Earthing- conventional and modern techniques, lightning conductor, etc. Calculation and distribution of loads. Detailed layout of electrical services in a single tenement residence or bungalow. Design of various building elements and their locations to anchor the services such as walls, Floor and their features, ceiling, Shafts or ducts etc.

Unit IV: Storm Water- Introduction, necessity, utility, importance, collection, Drainage- Principles, various methods/ systems, planning and application.

Unit V: Refuse disposal- Sources, types, collection, storage and transport, provisions for refuse disposal individual building level, refuse chutes- introduction, principle, design, construction and locational aspects. Function, utility and application, its limitation, merits and demerits.

References

- Abnwos, F. and Others. Electrical Engineering Hand Book
- Bureau of Indian Standards. (2005). Code of Practice for Electrical Wiring Installations IS-732.
- Punmia, B. C., Jain, A. K. and Jain, A.K. (1998). Waste Water Engineering. New Delhi : Laxmi Publications.
- Birdie, B. S. (1996). Water supply and Sanitary Engineering. Dhanpat Rai and Sons.

5S-A-8

Vernacular Architecture

Objectives: Efforts and activities related to promotion of Sustainable Architecture are underway, and this can be reinforced with the knowledge of Vernacular Architecture. The objective is to instill sensitivity towards the less explored field that is concerned with Architectural building traditions/practices that are local, ecologically sensible and culturally relevant. The course introduces grass root principles of indigenous architecture that has evolved over time in response to environment, climate, culture, economy and basic human needs. The course covers variations in built forms and their environmental performance across different climatic and geographical regions of India.

Unit I: Introduction to Vernacular Architecture: Definitions and theories, Categories, Contextual responsiveness with respect to Climatic, Geographical, Anthropological and Cultural influences.

Unit II: Environment and Materials: Local building materials, Skill set, Built form & elements, Construction techniques & environmental performance.

Unit III: Regional Variations in Built Form: Tribal Architecture: Settlement Pattern, Dwelling Typology, Symbolism, Typical features, Construction materials and techniques in North of Maharashtra – Korku tribe, South-East of Maharashtra- Gond tribe, South - West of Maharashtra – Kolam tribe.

Unit IV: Regional Variations in Built Form: Traditional Architecture: Settlement Pattern, Dwelling Typology, Symbolism, Typical features, Construction materials and techniques in Leh Laddakh, Kutchha, Coastal Telangana, Western Ghats and North East region.

Unit V: Living style, beliefs, festivals and Spaces: Space- Activity relationship; living style and beliefs reflected on space usage and design with respect to Central Indian rural agrarian society; Indian Festivals and built habitat.

References:

- Brunskill, R. W. (1987). *Illustrated Handbook of Vernacular Architecture*. Castle Rock: Faber &Faber.
- Carmen, K. (1986). *VISTARA – The Architecture of India.* The Festival of India Publications.
- Cooper%_ __and Dawson%__. (1998). *Traditional buildings of India*. London : Thames & Hudson.
- Jain, K. and Jain, M. (1992). *Mud Architecture of the Indian Desert.* Ahmadabad: Aadi Centre.
- Kenneth, F. (1983). *Towards a Critical Regionalism: Six points for an architecture of resistance*, In *The Anti-Aesthetic: Essays on Postmodern Culture*. (Ed.) Hal, F. Seattle : Bay Press.
- Muthiah, S., Meyappan, M., Ramswamy, V. and Muthuraman, V. (2000). *The Chettiar Heritage*. Chennai: Chettiar Heritage.
- Oliver, P. (1997). *Encyclopedia of Vernacular Architecture of the World*. Cambridge: Cambridge University Press.
- Pramar, V. S. (1989). *Haveli-Wooden Houses and Mansions of Gujarat*, Ahmadabad: Mapin Publishing.
- Rapoport, A. (1969). *House, Form & Culture*. Eaglewood : Prentice Hall Inc.
- Tillotsum, G. H. R. (1989). *The tradition of Indian Architecture: Continuity, Controversy and Change since 1850.* Delhi : Oxford University Press.

5S-A-9

Elective V

Pattern Language/ Product Design/ Advanced Spatial Analysis/ Behavioural Architectural/ Rhapsodic Architecture/ Vastu Shastra/ Institutional Project 5

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

Pattern Language

Objectives: Aim of this subject is to introduce students to the pattern language and its use to take decisions for different levels of design.

- What is design pattern and reasons to use it.
- Advantages of pattern over design guidelines.
- Vocabulary, syntax and grammar of pattern language.
- Common and optional elements of pattern library.
- Study of selected patterns from reference book and other examples.

Note:

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

Reference books

1. The timeless way of Building by Christopher Alexander.
2. A pattern language by Christopher Alexander and Sara Ishikqwa.
3. The Oregan Experiment by Christopher Alexander and Sara Ishikqwa..
4. Pattern Theory : Introduction and perspectives on the Tracks of Chiristopher Alexander.

Product Design

Key Words: Historical background, form semantics, bio mimicry, purpose function, systems, human factors, need, recyclability.

Objectives:

- To provide Knowledge about the various styles of furniture manufactured in various materials is vital to an architect.
- Understanding the methods and techniques involved in furniture and product design.
- To develop the skill of material explorations.
- To understand man machine system and human performance and system reliability.
- To Understand applied anthropometrics and ergonomics,
- To understand the multiutility oriented approach.

Sub Topics :

1. Introduction to product design.
2. Human Factors.
3. Aspects of product design
4. Design exercises.

Sessional Work:
Project, Assignment, Site visit

References:

- De Chiara and Callender - Time Savers Standards for Building Types
- De Chiara and Callender - Time Savers Standards for Architectural data
- Time Saver Standards for Interior Design
- Andrew Alpern, Handbook of specialty Elements in Architecture, SMcGrawhill Co., USA, 1982
- Francis D. K. Ching, Interior Design Illustrated, VNR Publications, New York, 1987.
- An invitation to Design, Helen Marie Evans

Advanced Spatial Analysis

Key Words: Complexity, Functionality, Geography, Space, Location, Built Environment, Spatial Analysis, Measurement, Transformation, Tolerance, Buffer, Density Estimation.

Objectives:

- To develop the skill of Modelling & Mapping.
- To study Visualisation, Compilation, Sequences.
- To understand the Methods of examine.
- To study Application of convolution in GIS.

Sub Topics :

1. Introduction.
2. Analysis based on location.
3. Analysis based on distance.
4. Qualitative and quantitative research methodology.
5. Conclusion.

Sessional Work:
Site visit, Assignment, workshop

References:

- Advanced spatial analysis: the CASA book of GIS, P. Longley, M Batty - 2003
- Advanced spatial statistics: special topics in the exploration of quantitative spatial data series DA Griffith –2012.

Behavioural Architectural

Objectives: The aim of this elective is to understand the significance of knowledge of human behaviour while designing the built environments for various activities.

Approach to the issue of mutual relationship between people and the physical environment from the perspective of an inter disciplinary discourse, environmental psychology.

- What is Environmental Psychology.
- Describing the mutual relationship between people and the environment.
- Components of Architecture which affects Human Psychology.
- Study and analysis of examples of behaviour facilitation.

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

Reference Books:

1. Environmental psychology: Behaviour and experience in context by Carsidy T. 1997 Psychology Press, Hove, East Sussex.
2. Designing places for people: A handbook on human behaviour for architects, designers, and facility managers by Deasy M.L.
3. Environmental psychology: Principles and practice, by Gifford R. 2002, Optimal Books Publishers. Canada 2002.
4. Creating architectural theory: The role of the behavioral sciences in environmental design by Lang. J. - Van Nostrand Reinhold. New York.
5. Psychology of Architectural Design (Architecture & Design Science) by Akin. O

Rhapsodic Architecture

Vastu Shastra

Key Words: Ancient Hindu System, Science of architecture.

Objectives: To develop understanding of rules and regulations .

Sub Topics:
1. Importance of vastu shatra in Architecture.
2. Terminologies in vastu shatra.
3. Principles in vastu shatra.
4. Examples in Architecture based on Vastu Shatra.

Sessional Work: Assignments, Site visits, Plates

References:

- Indian Vastu Shastra: Science of Construction & Architecture of Building by Vaibhav Chawadre.
- The Miracles of Vaastu Shastra Paperback – 2013 by Shanku Shiva Dass.
- Golden Rules Of Vastu Shastra - Remedies And Solutions – 2004 by Suman Pandit.

Institutional Project 5

Institutional project aims at encouraging institutions to explore different areas.

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

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

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

Sixth Semester B.Arch.

6S-A-1

Architectural Design VI

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

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

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

6S-A-2

Allied Design Studio VI

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

6S-A-3

Building Construction and Materials VI

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

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

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

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

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

References:

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

6S-A-4

Working Drawing II

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

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

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

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

Unit III: Site development Plan showing landscaping roads .

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

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

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

Sessional Work: Plates on above topics.

References:

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

Structural Design & Systems VI

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

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

Unit I: Overview of the Structural System in Architecture.
Study of concept & configuration in steel structure like geodesic dome, space frame, tensile structure and other Innovative structural forms.
With suitable examples from historical and contemporary architecture.

Unit II : Study of IS 800- 1984 – Design Considerations.
(Without Limit state method)

Steel Connections – Welded Joints
1. Types of Welds.
2. Concentric Sections.
3. Eccentric Sections.
4. Sections in Bending.
5. Sections in Torsion.

Unit III: Design of Tension Members
(Using standard sections)

Unit IV: Design of Compression members
(Using standard sections)

Unit V : Design of Built in Columns
(Excluding Design of Battens and Lacings)

Sessional work: Sketches/ Notes/ Tutorials & Presentations

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

References:

- Ramachandra .S Design of steel structures Vol. I, Standard publication, New Delhi, 1992.
- Vazirani V.N, and Ratwani M. M, Steel structures, Khanna Publications, New Delhi, 1995.
- Duggal S.K. (2017) Design of Steel Structures, Mcgraw Hill Education.

- L. S. Negi (2017) Design of Steel Structures, Mcgraw Hill Education.
- Steel Tables by Ramamrutham , S. New Delhi: Dhanpat Rai Publications Ltd.
- IS 800- 1984.

6S-A-6

Theory of Architecture

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

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

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

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

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

Unit VI: Organization of Forms and Spaces

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

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

Unit VIII: Principles of Composition.

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

Unit V: Circulation
Study of circulation pattern and its relation to organization functional spaces and activities.

Sessional Work: Case studies, notes, plates and presentations.

Building Services III

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

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

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

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

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

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

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

References:

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

Landscape Architecture I

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

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

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

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

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

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

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

References:

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

Elective VI

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

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

Campus Planning

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

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

Sub Topics :

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

Sessional Work:
Project, Assignment, Site visit

References:

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

Interior Design

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

Objectives:

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

Sub Topics :

1. Introduction to interior design.
2. History of interior architecture design.
3. Elements of interior architecture- Enclosing elements.

4. Elements of interior architecture- Lighting accessories and interior landscaping.
5. Elements of interior architecture- Space planning and furniture design.

Sessional Work:
Project, Assignment, Site visit

References:

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

Architectural Appreciation

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

Objectives:
To enhance the Development of vocabulary.
To help in generation of creativity.
To provide knowledge about Cultural understanding.

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

Sessional Work:
Studio, Lab, Workshop, Practical, Assignments.

References:

- Cantanese, A. J. and Snyder, J. C. (1988). Introduction to Architecture. New York : McGraw hill Books Co.
- Ching, F. D. K., Jarzombek, M. and Prakash, V. (2010). A Global History of Architecture. 2nd Ed.John Wiley & Sons.
- Fred, S. K. (2009). Art through the ages a Global History. 3rd Ed. Clark Baxter.

- Heidegger, M. (1993). The origin of the work of Art-Basic writings. Harper Collins.
- Heskett, J. (2002). Design-A very short introduction. Oxford University Press.
- Rapoport, A. (1969). House Form and Culture. New Jersey : Prentice Hall.
- Salingaros, N. (2009). A Theory of Architecture. Umbau-Verlag.
- Vitruvius, Translation: Morris, H. M. (1960). The Ten Books on Architecture.

Green Architecture

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

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

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

Sessional Work:
Assignments, Workshops, Studios

References:

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

Biophilic Architecture

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

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

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

Note:

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

Reference Books:

1. The Experience of Nature
   A psychological Perspective
   Author - Terrapin Bright Green LLC.
2. Patterns of Biophilic Design
   Author - Terrapin Bright Green LLC.
3. Building for life.

- Designing and understanding the nature by design
- Human - Nature connection
  Author - Stephen R. Kellert

4. The theory science and Practice of Bringing.
   Buildings to life.
   Author - Stephen R. Kellert
   Martin L

Institutional Project 6

Institutional project aims at encouraging institutions to explore different areas.

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

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

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

Seventh Semester B.Arch.

7S-A-1

Architectural Design VII

Objectives: Study of this subject will emphasis on design projects of increasing structural and design complexity with full opportunity, coordination, collection and analysis of data. Emphasis will be on preparation of design program considering the technical knowledge & impact of socio-economic factors, preparation of drawings and detailing.

The studios can focus on:

1. Design orientation of advance and specialised buildings and environmental services, climate and acoustical system oriented buildings, appropriate structural buildings and construction techniques.
2. Orientation on development control rules like, density, zoning, FSI etc. redevelopment.

Sessional Work: It will include appropriate exercises on one or more of the above mentioned aspects followed by at least 2 design problems arranged in a sequence of complexity. Site visits, audio, visual presentation and library reference is emphasized.

1. Public Buildings: Theatre, museum, auditorium, recreation, complexes, stadium, etc.
2. High rise apartment, offices, hospitals, laboratories, campus etc.
3. Urban design level problems such as commercial complexes, group housing, area development etc.

7S-A-2

Allied Design Studio VII

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

7S-A-3

Appropriate Building Technology

Objectives: The objective of this course is to instill the knowledge of alternate thought process dealt with People, Place and Time. The various appropriate materials and techniques evolved in traditional and modern time having environmental and cost concern with its concept and design criteria. They evolved through situation analysis by traditions, individuals and agencies; will help serve society demanding more conscious efforts in conservation of energy.

Techniques to be taught on the following criteria:

1. Concept / Appropriateness behind the technique.
2. Design Criteria for the technique, Advantages, disadvantages.
3. Agencies / Individuals associated with the technique.
4. Potential area for application and
5. Compatibility with other techniques.

Unit I: Concept of Appropriate Technology and its relevance in present context. Methods and criteria for situation analysis leading to decision making for the choice of the technique.

Unit II: Soil as building material, Sampling Technique, Stabilization of Soil, Various Field and Lab test. Various techniques for foundation as Inverted Arch Foundation, Inverted Saucer Foundation along with marshy and flood prone areas.

Unit III: Walling techniques such as Cob wall, Wattle and Daub, Adobe wall, Rammed Earth wall, Wardha Block wall, Compressed Stabilized Earth block masonry, Pre-cast Stone Block wall, Skew brick masonry, Brick masonry using Joshi Bond, Swastik Bond. Water proofing techniques and methods for soil walls.

Unit IV: Brick floor, Terracotta tile floor, Roofing techniques such as Filler Slab roof, Nubian Vault, Ferro cement vaults, Guna tile vault, RCC Joist Brick panel roofing, etc.

Unit V: Bamboo as building material with elements like Columns, Trusses, Girders and other applications. Openings such as Frameless doors and windows, Jallies in Brick and Terracotta blocks, Boards and panels using agriculture waste, Bamboo Ply etc.

Unit VI: Services such as Bio-gas plant, Solar water heater, Solar PV panels and concept of net metering, Roof top rain water harvesting technique, Spill water recycling technique, Compost latrines, Kitchen platform for Indian cooking, Garbage recycling such as Vermi compost manure (4 pit).

References:

- CBRI, Roorkee Publications and Handbook.
- HUDCO Building Center manual and Publications.
- Publications of Center of Science for Villages such as ‘Building Dreams in Mud’.
- ‘Venu Bharti’ by Ar. Vinoo Kaley, Nagpur and Articles by Ar. Ashok Joshi, Nagpur.
- Publication of Auroville Building Center, Pondicherry.
- Publications and manual of Laurie Baker Center, N. Delhi.
- Handbook and Publication of Bamboo Mission of India.

7S-A-4

Working Drawing III (Interior Design & Detailing)

Objectives: To study the Interior Design principles and their applications in interiors and to foster creative ability and inculcate skills to understand and conceive architectural design.

Unit I: Working Drawing (Interior Design): In continuation of previous semester, students shall be required to produce detailed working drawing (Plans, Elevations and Furniture details) of all the major furnishing items proposed along with specification.

Unit II: Graphical Presentation: To produce business graphics, multimedia presentations of the previous semester project.

Sessional Work: Plates on above topics.

References:

- Joe, B. (Ed). (2002). Details in Architecture: Vol. I-V. Victoria : The Images Publishing group.
- "Human Dimensions and Interior Space" by Panero un Julious & Zclink Martin.
- Living Areas·- Internal Spaces by Shirish Vasat Bapat.
- Ching, F. D. K. (1987). Interior Design Illustrated. New York : V.N.R. Publications.

7S-A-5

Specification

Objectives: Art of writing specifications for materials and works is very important in which emphasis on the required qualities of materials and proper sequence of construction should be brought out.

Unit I: Introduction, importance of specifications building construction activity. Types of specifications and its applications. Method of writing specifications (contents, correct order and sequence), use of Indian standard codes and specifications, PWD specifications.

Unit II: Specifications of basic building materials such as bricks, stones, aggregate, cement, steel, timber etc. Specifications of materials used in flooring and finishing such *as* ceramic tiles marble-mosaic tiles, paints and varnishes. Specifications of materials used in roofing and roof covering such as tiles, A.C, G.I. and Aluminum sheets etc.

Unit III: Specifications for fixtures and fastenings; Study of proprietary materials along with manufacturer's specifications, trade names of such materials.

Unit IV: Specifications of works for a residential building of load bearing type or R.C.C. framed type. Specification of construction of steel structure, ceilings and partitions, paneling insulation and Water proofing.

Unit V: Specifications for items of services such as drainage, wafer supply, electrical installation.

Unit VI: Specifications for demolition-work, temporary construction like sheds, exhibition stalls, gateways.

References:

- C.P.W.D. Standard Schedule of Rates.
- Birdie, G. S. (2005). Text Book of Estimating and Costing. Dhanpat Rai Publishing.
- Chakraborty, M. Estimating, Costing, Specification & Valuation.
- Dutta, B. N. (1998). Estimating and Costing in Civil Engineering. 24th Ed. UBS Publishers Distributors Ltd.

7S-A-6

Human Settlement Planning

Preface: This Subject Sets up the premise for domain which is beyond Architecture. Architecture which is confined to a boundary with single ownerships and single land parcels, The domain of Human settlement allows to look at the multiple Owners and Multiple Land parcels.

This domain of humanity which has strong connect with how cities / settlements have grown over times has strong reflections of Culture, History, social Values, Lifestyle and sense of community.

Architecture as integrated part of this Urban Fabric, has strong reflections of cities urban form, values and cultural ethos, which are manifested in built environment with strong sense of belongingness and association. Sensitizing Students to make them aware of broad principles of settlement in such period will help them know how cities have grown and taken shape over a period of time and what has been reflection into Architecture, being integrated part of the urban Domain .

The History of Architecture and theory's are deeply rooted into the settlement pattern of the urban fabric and hence the study of this subject shall focus on 2 major domains:

- **Evolution of Urbanity:** Understanding terminologies and key definitions with parameters. Connecting History with stages of Evolution of Settlement and learning's from the past which offered cities which were process driven, demand driven and evolved out of necessity. This Continues with contribution of Various

Masters and Pioneers in the field of Urban Planning and various tools of reading the city .

- **Urban Design Theories & Present Concept:** This reflects upon the contribution done by Masters and Pioneers in the field of urban design. Develops an understanding about the planning process and how the democratic setup allows people participation and government policies to generate the Urban form which address to the present day demand.

Objectives: The Study aims at Understanding terminologies and key definitions. Connecting History with stages of Evolution of Settlement and learning's from the past which offered cities which were process driven, demand driven and evolved out of necessity. This Continues with contribution of Various Masters and Pioneers in the field of Urban Planning and various tools of reading the city.

Unit I: Introduction to Urban Planning its scope and relevance. Establish Connect between Architecture and Human Settlements. Understanding key definitions of various components which constitutes a settlement. Understanding Culture, Society, Context and Aesthetics. Broad comparison between, Rural - Urban, Local - Global, Urban Planning - Urban Design .

Unit II: Evolution of Urbanity in India and World. **Social and Cultural influence on** designing and development of settlements from ancient times through Medieval, Renaissance and Industrial revolution to present day development.

Unit III: Urban planning in India. Understanding Settlement Planning principles of Vedic & Buddhist settlements. British Planning in India, Planning after independence. Factors governing the location and growth of towns.

Unit IV: Pioneers and their works, Planning concepts of Patric Geddes, Ebnezer Howard, Le-Corbusier, C. A. Parry, Clarence Stein, Doxiadis, Kevin Lynch, F.L. Wright.

Unit V: Planning as a team work, Role of Architects/ Planners in a team, Importance and methodologies of surveys in the planning process Development control rules, zoning, density, height, FSI Structures, Transfer of Development Rights (TDR), Special Economic Zones (SEZ), Transit oriented Development (ToD). Factors governing the location and growth of towns. Overview of Planning Legislation.

Sessional Works: Notes and Seminar of above topics.

The study of this subject continues with emphasis on planning philosophies and the student to carry out the further studies in the specialized field of Urban Planning.

Building Services IV

Objectives: This part of the building services deals with various systems and components of Fire detection and Fighting system, provision of essential spaces and elements, Electromechanical means of vertical transportation in buildings, Communication systems etc., for large scale projects. The students shall be made aware of Architectural design consideration regarding space allocation and design of building elements to anchor these services so as to achieve balance of functional efficiency, user safety and building aesthetics. This shall also help student to establish a sound communication in terms of design with a wide range of consultants, fabricators, wanders and contractors.

Unit I: Causes of fire in buildings, types of fire, spread of fire, smoke and poisonous gases. Need of fire safety and preventive measures. Fire fighting regulations with reference to National Building code.

Provision in building such as Fire escape, stairways and escape routes. Study of Fire detection systems such as smoke detectors, heat detectors, fire alarms etc. Water demand for fire fighting, provision for storage tanks.

Fire extinguishing systems, Unit fire extinguishers, Chemical and foam extinguishers, Dry and Wet risers, fire hydrants etc.

Unit II: Electromechanical means of vertical transportation in buildings, requirements, occupant load, study of elevators and types based on operational system and uses. Various components of elevators based on operational system. Standard space requirements and architectural implications.

Unit III: Escalators, Trav-o-lators and Conveyor system, its components, arrangements and functioning, space requirements, construction details.

Unit III: Communication systems in buildings, Video conferencing, Security and Surveillance system, Computer networks. Trenches and conduits to accommodate the systems..

Introduction to Building Automation, Building Management systems, components of BAS, Architectural implications.

Unit IV: Systems of DTH, Introduction, Its classification with respect to Single and multi user. DTH layout and its Architectural implications.

Sessional Work: Layout of Design project including layout for water supply, sanitation, electrical, RWH, Fire Fighting systems, HVAC.

References:

- National Building Code (NBC), chapter 5
- Bovay, H. E. (1981). Handbook of Mechanical & Electrical systems for Buildings. McGraw-Hill Higher Education.

7S-A-8

Landscape Architecture II

Objectives: To make students aware about relationship and response of man to his environment. To develop critical thinking towards the field of landscape and understand its scope in practical.

Unit I: Site Planning And Development.

Site Location: The site must be placed within its proper geographical, political, and functional context. This fixes the site in relation to adjacent land uses, community transportation patterns, utility and infrastructure availability, employment, commercial, cultural and recreational centers.

Existing Conditions: Depending upon the size and complexity of the site, this may be one or a series of base plans or maps that delineates and evaluates the physical attributes and constraints for the parcel of land.

Topography and Slopes: Treatment of these factors requires base information in the form of contours and elevations to a degree of accuracy appropriate to the proposed development.

Geology and Soils: The soils characteristics which are frequently a direct product of the underlying geology. The soils may be important in terms of stability, suitability for structural foundations, erosion susceptibility, surface drainage, and soil fertility to support plant growth.

Vegetation: Detailed plant identification and location of specimen plants may require field study and measurement. The significance of vegetative information relates to a range of development issues. The visual character and spatial definition of a site is impacted by the amount and category of vegetation – from ground cover to canopy, from new growth to mature stands of trees, etc.

Hydrology and Drainage: Surface hydrology is an integral part of the slopes and subsurface drainage systems. The kinds of information normally indicated and analyzed include determination of watersheds (basically a system of ridge lines and valleys or drainage patterns), duration and volume of flow, swales, streams, standing water, and flood plain definition. Susceptibility to erosion and the problem of sedimentation to off-site water flow are also problems to be noted.

Views: A visual analysis is the most practical means of determining positive and negative on-site and off-site views. This study is useful in determining the visual character of the site itself as viewed from the outside as well as the visual impact of its surroundings upon potential on-site development. Factors to be examined include mass and space definition from natural and man-made elements, off-site views to be accentuated or screened, and on-site view opportunities or problems

Unit II: Landscape Design Project
Application and implementation of landscape elements into a design for a residential areas, urban spaces, campus design at institutional & industrial level, reclaimed lands, etc.

Unit III: Understanding and analyzing ***CONTEMPORARY LANDSCAPE DESIGN***. Elements of design, scopes and limitations of the same.

Unit IV: Introduction of ***SUSTAINABLE LANDSCAPE PRACTICES***.
Improve habitats for fauna and flora.
Improve recreational facilities.

Understanding the indigenous practices carried out in and around Indian context.

Sessional Work: Could be in the form of a write-up, abstracts, Sketches, Manifestation of Design into Architectural Drawing, etc.

References:

1. Lynch, K. (1962). *Site Planning*. Cambridge : The MIT Press.
2. Design with Nature, Ian Mcharg.
3. Campus Design in INDIA by *Achyut Kanvinde.*
4. Simonds, J. O. (2006). *Landscape Architecture: A Manual of Land Planning and Design*.

Elective VII

High Rise Buildings/ Architectural Conservation/ Housing/ Industrial Architecture/ High-tech Architecture/ Institutional Project 7

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

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High Rise Buildings

Key Words: criteria, zoning, stacking, systems

Objectives: Ability to understand the process of designing in tall buildings.
Sub Topics :

1. Design philosophy, static and dynamic approach, Structural systems and concepts, Effect of openings. Large panel construction. Foundation superstructure interaction.
2. Gravity and lateral load resisting Structural Systems.
3. Behavior of various structural systems.
4. Basics of stability of tall buildings.

Sessional Work:
Project, Assignment, Site visit

References:

- Taranath B.S, “Structural Analysis and Design of Tall Buildings”? McGraw Hill, New York.
- Jain, V.K. , Designing and installation of services in building complexes and high rise buildings, Khanna Publishers, New Delhi.
- Gupta, Y.P., High rise structures ;design and constructions practices for middle level cities, NewAge International Publishers, New Delhi.
- Bryan Stafford Smith & Alexcoull, “Tall building structures Analysis and Design” John Wiley.
- HojjatAdeli and AmgadSaleh, “Control optimization and smart structures : high performance bridges and buildings of the future”, John Wiley, New York.
- HojjatAdeli and Xiaomo Jiang, “Intelligent infrastructure: neuralnetworks, wavelets and chaos.
  Theory for intelligent transportation systems and smart structures”, CRC Press, Boca Raton.
- Schwartz,Mel, Smart materials, CRC Press, Boca Raton.

Architectural Conservation

Key Words: Heritage, conserve, culture, survey

Objectives:
- To develop understanding about the importance of historical and heritage buildings.
- To provide Knowledge about the various techniques of conservation in architecture and the development of the commitment to conserve old buildings of cultural importance.

Sub Topics:
1. Introduction- Definition of conservation, Need for conservational activities, brief study in India and abroad, Role of architect in conservation program.
2. History- Origin and evolution of conservational programs, survey and studies required - methodology and implementation.
3. Community participation- Social, cultural, historical and economical values of Conservational projects, involvement of community. Conflict and compatibility between conservation and development - the need to strike a balance.
4. Case studies of conservation programs- Case studies of conservation programs which are successful by government and non-governmental agencies.

5. Rules and regulations - Rules and regulation, administrative aspects, new concepts in conservation.

Sessional Work:
Assignments, Studios.

References:
- Bernard Fielder (INTACH), Guide to Conservation.
- Conservation of European Towns.
- Peter Marston – The book of the Conservation – Orion House, London.

Housing

Key Words: Hierarchy, Economy, affordability

Objectives:
- To create awareness about the causes and consequences of housing problems and to impart knowledge about the possible solutions.
- Understanding of the various issues involved in urban and rural housing and knowledge about the planning and design solutions for low income groups.

Sub Topics :
1. Concept of Housing.
2. Housing types.
3. Patterns of housing.
4. Social and cultural and economical factors of housing.

Sessional Work:
Project, Assignment, Site visit.

References:
- Babur Mumtaz and Patweikly, Urban Housing Strategies, Pitman Publishing, London, 1976.
- GeofreyK.Payne, Low Income Housing in the Development World, John Wiley and Sons, Chichester, 1984.
- John F.C.Turner, Housing by people, Marison Boyars, London, 1976.
- Martin Evans, Housing, Climate and Ocmfort, Architectural Press, London, 1980.
- Forbes Davidson and Geoff Payne, Urban Projects Manual, Liverpool University Press, Liverpool, 1983.

Industrial Architecture

Key Words: Factory, occupancy, long span.

Objectives:
- Role of architects in the design of modern industrial buildings.
- A basic knowledge of industries in respect of type and category.
- Planning considerations in the development of master plan including site selection and site layout. Design for loading / unloading area.

Sub Topics :
1. Industrial estates.
2. Integrated aspects of design.
3. Steel structures and concrete structures.
4. Aspects of external environments.

Sessional Work:
Project, Assignment, Site visit

References:
- Adam J., Hausmann K., and Juttner F., A Design Manual – Industrial Buildings.
- Blum M. L., and Naylor J. C., Industrial Psychology, CBS, Delhi.
- Drury J., Factories – Planning, Design and Modernization.
- Hansen D., Indoor Air Quality Issues.
- Munce, J. F., Industrial Architecture – an Analysis of International Building Practice, F. W. Dodge Corporation, New York.
- Philips A., The Best in Industrial Architecture.
- Reid K., Industrial Buildings; The Architectural Record of a Decade; F. W. Dodge Corporation, New York.
- Sinha, R. K. and Heart, S., Cleaner Production – Greening of Industries for Sustainable Development.

High-tech Architecture

Key Words: Structural expression, Modernism, industrial appearance

Objectives:
- To understand and explore the new methods of construction.
- To understand the material explorations and techniques involved in high tech Architecture.

Sub Topics:
1. Evolution of high tech Architecture.
2. Characteristics of high tech architecture.
3. Examples of High tech Architecture.

Sessional Work: Assignments, Site visits, Plates

References :
- Detail in Contemporary Residential Architecture by Virginia McLeod.
- Reyner Banham and the Paradoxes of High Tech by Todd Gannon.
- Eco-tech: Sustainable Architecture and High Technology by Catherine Slessor.

Institutional Project 7

Institutional project aims at encouraging institutions to explore different areas.

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

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

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

Eighth Semester B.Arch.

8S-A-1

Practical Training

Details of Practical Training:

1. The Practical Training of one semester duration (under a **Registered Architect** or firm headed by an Architect having experience **more than 5 years** only) envisages the following varied experience in order to ensure exposure of a student to various tasks.
   a) Office experience in respect of preparation of working drawing, detailing drawings of perspective, preparation of architectural models, study of filling systems of documents, drawings, ammonia prints and preparation of tender document.
   b) Site experience, in respect of supervision of the construction activity, observation, layout on site, study of the staking methods of various building, materials, taking the measurement and recording.
2. Student will have to maintain a weekly record of their engagement for the period of training. This will be recorded in an authorized log-book to be counter-signed by architect at the end of each month.
3. At the end of the training period, student will have to procure a certificate of training and satisfactory performance from the concerned office in the prescribed form.
4. Certificate of satisfactory completion of training same shall be submitted to the Principal of the College, immediately after training, through Head of Architecture Department along with the report and drawings made during the training period and appear for Viva-Voce at a prescribed date by the University.

8S-A-2

Documentation

In this part of the training, student is expected to undergo documentation and report of a project preferably within vicinity of firm's location with following.

Student shall select a completed project of the architect's office, so as to understand the complete design & working process of the firm carrying a 'Critical Analysis' on

a. Initial sketch design,
b. Sanction drawings,
c. Working drawings,
d. Structural drawings,
e. Photographs – during construction, after completion,
f. Report elaborating entire process, consultants involved and post occupancy analysis.

Nineth Semester B.Arch.

9S-A-1

Architectural Design VIII

Objectives: The objective of this studio is to introduce the complexities of large-scale architectural interventions in specific urban settings, having multiple stakeholders. The projects will focus on how to harmonise and contextualise the architectural design with the immediate built environs and the larger urban fabric along with understanding the interface between public and private domain.

The studios should focus upon:

1. Understanding user aspirations and user affordability.
2. Study of urban environment, complex building forms, and their design including positive and negative space relationship, Parking Provision, understanding of Precincts and pedestrian-vehicular movement.

Sessional Work: Large scale project in the public domain, situated within an existing urban fabric, such as: redevelopment of commercial areas, waterfront development, transit-hubs, market squares, densification along transit corridors, mixed use complexes.

9S-A-2

Allied Design Studio VIII

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

9S-A-3

Advance Construction

Objectives: Study is to aim at teaching students the advance and more complex aspects of construction industry. It also aim at exposing them to systems and technology of construction use for large spaces with complex utilities.

Unit I: Stressed Skin Structures - Introduction

A) Suspended / Tensile Roof Structures - Introduction, definition, design and structural principles - All types, a complete architectural study. Constructional aspect, erection of cable roofs. Examples, Merits and Demerits.

B) Tensile Membrane and Pneumatic Structures – Introduction, definition, design and structural principles - all types, a complete architectural study. Constructional aspects, Examples, Merits, Demerits.

Unit II:

A) Shell Roofs : - Introduction, definition, design and structural principles. Types of Shell Structures. Complete study of Single and Double Curvature. Examples, merits, demerits. Terminologies - Ruled Surface Shells, Conoid, Shells of Translation, Rotational Shells, Torus etc.

B) Folded Plate / Slab Construction - Introduction, definition, design and structural principles. Examples, merits, demerits.

Unit III: Timber Engineering- Study of design and construction techniques / systems to cover large spans using short length timber / laminated timber. Design and structural principle. Examples – a brief study of use of these techniques / systems for constructing various structural components such as Beams (all types), Web Beam, Trusses, Portal Frames; Lamella etc.

Unit IV: Introduction to High Rise Buildings, Design and Structural principles. Understanding Lateral Load Effects. Principles / Concepts for resistance to Lateral forces and related optimum Structural Systems / Solutions. Structural Schemes / Systems - various types, their Design and Structural principles, their co-relation and interpretation in Architectural design solutions - a complete study - with examples and comparative summaries. Compatible floor systems, foundation systems - their design and structural aspects.

Unit V: Introduction to Cladding, definition, types and materials for their construction. Design and structural consideration and fixing details.

Glazed Walling / Structural Glazing / Curtain Walling in various materials.

References:

- Hayder, A. R. (2014). Strengthening Design of Reinforced Concrete with FRP. CRC Press.
- Ching, F. D. K. (2000). Building Construction Illustrated. 3rd Ed. Wiley.
- Rai, M. (1986). Advances in Building Materials and Construction. CSIR.

9S-A-4

Professional Practice I

The study of this subject is to enable the student to acquaint with the various responsibilities of an architect and understand the technicality of the profession.

Unit I: Nature of profession, difference between trade, business and profession, taking instructions from the client, its interpretation, design process and its stages.

Unit II: Role of professional society, Professional code of conduct, Ethical ways of getting architectural commission, Importance of conduct of architectural competitions, architectural copy right.

Unit III: Responsibilities and Liabilities of an architect towards the client. Scale and basis of fees. Professional charges of various jobs. Stages of architectural design and the specific task in each of such stage.

Unit IV: Architects Act 1972, its effects on profession and education.

Unit V: Architects Office, Organisation and Administration, Office Set up, Correspondence, filing, preparation of drawing, standardization and documentation.

Unit VI: Professional partnership, various options, advantages. Partnership deal, responsibilities and liabilities of partners. Provisions of Professional Tax, Service Tax, Income Tax rules.

Sessional Work: Notes, Assignments and class test.

Reference Books:

- Professional Practice by Roshan Namavati.
- COA Handbook of Professional Documents.
- Architectural Practice and Procedure by Ar. V. S. Apte.
- Architectural Practice in India by Prof. Madhav Deobhakta and Ar. Meera Deobhakta.

9S-A-5

Estimation

Objectives: This course is intended to impart students with the necessary technical knowledge for preparation and calculating estimates and detailed costing for small to medium scale projects.

Unit I: Purpose of Estimating, types of estimates

Unit II: Bill of quantities for single story structures - (a) Load bearing (b) R.C.C, frame.

Unit III: Study of IS-l200.

Unit IV: Estimation of quantities for R.C.C. structural members like footing, column, beam and slab.

Unit V: Estimation for electrification, water supply *&.* sanitation, (only for residential buildings)

Unit VI: Rate Analysis - general, factors affecting the rate of an Item, rate analysis for R.CC. work, brick work, plaster work, flooring painting, doors and windows

Unit VII: Introduction to Estimation digital spread sheets. Study of Tender Document, CSR, SSR, Comparative analysis.

References:

- Dutta, B. N. (1998). Estimating and Costing in Civil Engineering. 24th Ed. UBS Publishers Distributors Ltd.
- Birdie, G. S. (2005). Text Book of Estimating and Costing. Dhanpat Rai Publishing.
- Chakraborty, M. Estimating, Costing, Specification & Valuation.

9S-A-6

Urban Design

Objectives: This reflects upon the contribution done by Masters and Pioneers in the field of Urban Design. Develops an understanding about the planning process, Urbanization and how the democratic setup allows people participation and government policies to generate the Urban form which address to the present day demand.

Unit I: Introduction to Urban Design, its scope and relevance. Elements & Principles of urban design (Streets , Buildings, public Space, transport and Landscape) and Elements and Principles of Urban forms (Grain, Tissue, Texture, Skyline, Massing etc). Comparison between Architect, Urban Designer and Urban Planner.

Unit II: Contributions by Urban Designers in Contemporary and modern urban scenario like Leon Krier, Rob Krier, Christopher Alexander, Jen Jecob.

Unit III: Understanding various theories in Urban Design, through examples like New Urbanism, Pedestrianisation, Malls and Plazas, Public Realms, River Front and Lake Front Developments.

Unit IV: Reading of Urban Fabric through various representation techniques and Methods, parameters and attributes for Urban Analysis.

Sessional works :

Book readings on various Urban Design Theories. Conducting settlement studies of a precinct / neighborhood.

Reference Books :

- History of Urban Form by A.E.J Morris

- Urban Pattern
- Image of City
- Pattern language
- Open Spaces
- Streets
- Sessional work :- Urban Settlement Study

9S-A-7

Acoustics and Illumination

Objectives: Subject is dealt with the study of importance of acoustics in design for acoustically sound environment in both enclosed and open space. And also the importance of illumination in architecture defining and enhancing spaces.

Unit I: Basic introduction of Acoustics, Origin of sound, propagation of sound, Behavior of sound. Inverse square law. Reverberation of sound, Sabins formula and reverberation time calculations. Acoustical defects & their remedies. Noise (Structural Borne noise & Air borne noise).

Unit II: Use of Various Acoustic Calculating instruments to achieve RT with applied material. (For ex. Sound intensity Caliberator, Impedance tube, RT analyser or RT analysis application etc.)

Unit III: Acoustical materials, Surface treatment, Sound absorbing materials & their properties. Constructional and planning measures for good acoustical design of building in general, Acoustical treatment of Auditorium / Lecture Halls / Conference hall / Recording Studio / Broadcasting Studio

Unit IV: Sound Isolation & Insulation. Construction Details and material application for sound isolations of floor, wall and ceilings. For ex. Floating Floors. Study of sound reinforcement systems.

Illumination

Unit V: Fundamental study of lights, its radiation and behavior, inverse square law and cosine law. Artificial light calculation by Lumen Method. Use of Photometer and other equipments to calculate intensity of light.

Unit VI: Natural light its use as direct and diffuse light, analysis & design of openings, daylight prediction techniques.

Unit VII: Light sources, various types of Lamps and their characteristics. Luminaries, their types , properties, uses, Cost and Market survey.

Unit VIII: Artificial Lighting systems: Design issues; Lighting for Various purposes; Interior lighting: Ambient, Task & Accent lighting- scallops, wall washers, luminous ceiling, etc.

Exterior lighting: street, public spaces, heritage buildings, Landscape, sports grounds, facade lighting, etc.

References:

- Eagan, D. M. (2002). Architectural Lighting, 2nd Ed. McGraw-Hill
- Barron. M. (2009). Auditorium acoustics and architectural design. 2nd Ed. Taylor & Francis
- Eagan, D. M. (2002). Concepts in Architectural Acoustics.
- Conceptnine, R. (2008). The Architecture of Light: Architectural Lighting Design Concepts and Techniques. Sage Publications.

9S-A-8

Environmental Science and Architecture

Objectives: Understanding complex relationship between natural and build environment with emphasis on strategies to transform the built environment considering the environmental issues.

Unit I: Nature, man and their relationship with past and present, urbanization and its impact on the environment, urban climate, causes of global warming and ozone layer depletion, its future effects. Pollution, its types, impact of pollution on natural and manmade environment resulting to climate change .Development vs. Growth. Definition of sustainable development.

Unit II: Study of earth's resources such as Land, Water, Air, Vegetation, its composition, qualitative aspects, availability and limitations, consumption of resources in built environment. Study of natural structures and processes in solving manmade problems and enabling design concept of urban ecology and landscape urban studies.

Unit III: Introduction to eco-friendliness of building material accessed through embodied energy. Introduction to natural systems, natural processes like ecology, environment, ecosystems and its composition , various cycles like water, air, energy flow.

Unit IV: Strategies with respect to ISO rating systems, assessment and rating systems like GRIHA, LEED, IGBC, ECBC etc. Environment friendly development practices through D.C. rules to transform the built environment. Integration of renewable energy systems in built environment.

Unit V: Use of building simulation software for energy evaluation at design development stage like ECOTEC, Design Builder. Energy Plus, Radiance, IECC etc.

References:

Earthscape: A Manual of Environmental Planning and Design by J.O.Symonds.
Elements of Air : The nature of Atmosphere & Climate, M.Allaby.

Elective VIII

Sustainable Development/ Earthquake Resistant Architecture/ Architectural Journalism/ Disaster Mitigation and Management/ Composite Technology/ Specialised Services/Institutional Project 8

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

Sustainable Development

Key Words: Natural resources, Ecosystem services, economic development, Social development, condition of site, cultural and religious impact

Objectives:

- To understand the Utilization of design method.
- To study the material & Energy.
- To understand the system of harnessing waste and reuse.
- To study the cost effective ways of construction.
- To understand waste management system.

Sub Topics:

1. Sustainable design method and material optimization.
2. Environmental and social consideration.
3. Energy and water usage optimization.
4. Biomimetics
5. Case studies of sustainable buildings.

Sessional Work:
Assignments, Workshops, Studios.

References:

- Sustainable design manual, Vols 1& 2, The energy and resource institute, New Delhi.
- Charles. J. Kibert, 'Sustainable Construction' John Wiley and sons Inc, USA.
- N.D. Kaushika, Energy, Ecology and Environment, Capital Publishing Company, New Delhi.
- John Fernandez, Material Architecture, Architectural Press, UK.
- Rodney Howes, Infrastructure for the built environment, Butterworth Heineman.
- G.Tyler Miller JR, Living in the Environment, Wardsworth Publishing Company, USA.

Earthquake Resistant Architecture

Key Words: Epicenter, Elementary seismology, structural detailing, site planning, earthquake resistance design.

Objectives:

- To create awareness about the importance of seismic forces affecting building design and to impart knowledge about seismic safety aspects.
- To understand Basic understanding of elementary seismology and behavior of buildings during earthquakes.
- Exposure to seismic design principles, structural detailing and concepts of site planning and architectural design for earthquake resistance.

Sub Topics:

1. Elementary seismology.
2. Site planning, building forms and architectural design concepts for earthquake resistance.
3. Performance of ground and buildings in past earthquakes.
4. Seismic design principles.
5. Structural detailing & earthquake resistant construction details.

Sessional Work:
Assignments, Studios.

References:

- Ed. CVR. Murthy & S.K. Jain, Course notes on Seismic design of Reinforced concrete structures, IIT Kanpur,2000
- Earthquake tips, Learning earthquake design and construction, CVR. Murthy, National information centre of earthquake engineering, IIT Kanpur & BMTPC New Delhi.

Architectural Journalism

Key Words: Themes, critics, architectural writers

Objectives: Develop the skills of interpreting document for the design which actually draws communication between the reader and the architect.

Sub Topics:

1. Introduction to Journalism.
2. To understand the Analysis of works.
3. Literature Review.
4. Architectural Criticism.

5. Project report writing.
6. To carry out interactions with Field experts.

Sessional Work:
Assignments, Studios, Presentations.

References:
- Agarwal V. B., Handbook of Journalism.
- Kamath K. V., Professional Journalism.
- Kamath K. V., Journalist hand book.
- Harold Evens, Handling News Paper Text.

Disaster Mitigation and Management

Key Words: Disaster, Risk, Impact, Vulnerability, Mitigation

Objectives:
- To study design consideration.
- To study adaptable building construction techniques.
- To study codes and practices.
- To study innovative technologies.
- To study awareness program.

Sub Topics:
1. Introduction on Disaster.
2. Risk and Vulnerability Analysis.
3. Disaster Preparedness and Response.
4. Rehabilitation, Reconstruction and Recovery.
5. Role of Architecture in Mitigation (Portable & temporary structures).

Sessional Work:
Assignments, Workshops.

References:
- Dr. Mrinalini Pandey Disaster Management.
- Tushar Bhattacharya Disaster Science and Management.
- Jagbir Singh Disaster Management : Future Challenges and Opportunities.
- Shailesh Shukla, Shamna Hussain Biodiversity, Environment and Disaster Management.
- C. K. Rajan, Navale Pandharinath Earth and Atmospheric Disaster Management: Nature and Manmade.

Composite Technology

Specialised Services

Institutional Project 8

Institutional project aims at encouraging institutions to explore different areas.

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

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

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

Tenth Semester B.Arch.

10S-A-1

Project

This is culmination of undergraduate studies and hence shall display the capability of the candidate to conceive / formulate a design project with complexity and provide solution, aptly demonstrated through supporting research. The major area of study and research can include advanced architectural understanding, including contemporary design processes, urban design, urban-infill, environmental design, conservation and heritage precincts, housing etc. However, the specific thrust should be architectural design of built environment. Understanding of structural systems, specialized details, universal design considerations, services, fire safety as integral part of the proposal. Preparation of presentation drawings, construction details and schematic layout of services with study model are part of the requirements for submission.

Project shall be effectively demonstrated through drawings, models, walk-through etc. along with project report.

10S-A-2

Seminar and Research

Seminar are intended to develop the capacity of the students to work either in group or individually undertaking research in a given subject relating to architecture and presenting his observation graphically and through a seminar presented in different stages. This is to equip the students finally with a skill to sale his project efficiently and effectively. Guidelines can be as mentioned below.

Seminar I: Subject shall be allotted to group of students from the below mentioned broad categories.

1. History of Architecture / Interior Design.
2. Appreciation / Critical a appraisal of Architectural projects.
3. Research in Architecture.
4. Role of allied / applied science in architecture.
5. Building byelaws and legislation.

Seminar II: This seminar shall be presented by an individual student on the subject relating to architectural understanding of doctrine and work of great Master of Architecture. Review of publications on architecture by eminent authors, Individual project reviews etc.

Marks shall be granted on the basis of documentation / Seminar presentation contents etc.

10S-A-3

Professional Practice II

Unit I: Tender, types of tender, tender document, tender notice, procedure for opening and selection of tender, analysis bids, comparative statement, report to owner, work order.

Unit II: Contract, type of contract, contract document. Detailed knowledge of various condition of contract as published by Indian Institute of Architects with special reference to responsibilities and liabilities of architect, contractor and the client.

Unit III: Arbitration, arbitration Proceeding and award, provision of fire insurance policy, architects responsibility towards fire loss assessment and claim report.

Unit IV: Easements rights, acquisition of such rights, remedies for interference and loss of easement, Dilapidation, procedure for preparing report and schedule of dilapidation, settlement of such claims.

Unit V: General information and introduction to various acts and laws such as land acquisition Act., urban land ceiling Act. Building bye-laws, Sale deed procedure, ownership documents.

Sessional Work: Notes, Tutorials & report writing on above topics.

Reference Books:

- Professional Practice by Roshan Namavati.
- COA Handbook of Professional Documents.
- Architectural Practice and Procedure by Ar. V. S. Apte.
- Architectural Practice in India by Prof. Madhav Deobhakta and Ar. Meera Deobhakta.

10S-A-4

Project Management & BIM

Objectives: To understand the fundamentals of management and its applications in architectural practice, To understand the complexities & challenges of constructability of design is primary focus to learn this subject for students of architecture. To make students of architecture aware about the practical ground realities of construction and maintain the harmony between the design and its construction phase.

Unit I: Historical review of large construction projects and management techniques. Fundamentals of project management, SWOT analysis of project. Stages of project management.

Unit II: Preparation of project proposals (DPR), Different financial models of projects (BOT, PPP, SPV), Role of money lending institutions, Tendering & bidding process.

Unit III: Schedule of construction project, Study of bar charts, milestone charts, Fundamentals of CPM (Critical Path Method), PERT (Project Evaluation and Review Technique).

Unit IV: Management of construction activities at site, Study of Construction Machinery, Equipments and tools.

Unit V: Construction site practices for quality control and HSE practices.

Unit VI: Introduction about BIM (Building Information Modeling), its benefits and application in construction project. Various software available for BIM.

References:

- Callahan, M. T., Quackenbush, D. G., & Rowings, J. E. (1992). Construction Project Scheduling.
- McGraw-Hill.
- Chitkara, K. K. (2004). Construction Project Management: Planning, Scheduling and Controlling. Tata McGraw–Hill Education.
- Punmia, B. C., and Khandelwal, K. K. (2006). Project planning and control with PERT and CPM.
- New Delhi: Laxmi Publications.
- Wiest, J. D., and Levy, F. K. (1982). A Management Guide to PERT/CPM. New Delhi: Prentice Hall of India.

10S-A-5

Valuation

Objectives: The aim of this subject is to introduce the students to **Valuation** as a profession. The study shall include the topics as under.

Unit I: Aims and objectives of valuation in respect of Building and land.

Unit II: Essential Characteristics of value, regarding the building.

Unit III: Factors affecting the value of built up property-supply and demand, cost of reproduction, occupation of value. Gild edged Security.

Unit IV: Methods of valuation, such as rental method of valuation, land building basis, development method of valuation, valuation for rating purpose, valuation for Gov. Taxation, Valuation for mortgage.

Unit V: International Standards of Valuation, types of Assets, Recommendation for valuation of types of Assets.

Unit VI: Insolvency and Bankruptcy Code (IBC), Aims and Objectives of IBBI.

Sessional: Notes, exercise on the above topics. Study and preparation of valuation report.

Reference Books :

- Theory & Practice of Valuation by R. Namavati.
- Valuation of Real Property by S.C. Rangwala.
- Estimating, Costing and valuation by S.C. Rangwala.

SCHEME OF EXAMINATION – B.Arch.

FIRST YEAR B.ARCH.

Semester – 1

Sr. No.	Sub. Code	Sub. Name	Paper Code	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	1S-A-1	Architectural Design -I	BAR01S01	PC	AR	1	0	3	0	**4**	1	0	4.5	0	**5.5**	Sessional		200	200	100
2	1S-A-2	Allied Design Studio-I	BAR01S02	PC	AR	1	0	2	0	**3**	1	0	3	0	**4**	Sessional		100	100	50
3	1S-A-3	Building Construction and Materials -I	BAR01S03	BS&AE	AR	2	0	3	0	**5**	2	0	4.5	0	**6.5**	Sessional		150	150	75
4	1S-A-4	Architectural Graphics I	BAR01S04	PC	AR	2	0	0	2	**4**	2	0	0	1	**3**	Sessional		100	100	50
5	1S-A-5	Sturctural Design & Systems-I	BAR01S05	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		100	100	50
6	1S-A-6	History of Civilisation	BAR01S06	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		100	100	50
7	1S-A-7	Computer Application I	BAR01S07	PC	AR	1	0	0	1	**2**	1	0	0	0.5	**1.5**	Sessional		50	50	25
8	1S-A-8	Workshop I	BAR01S08	PC	AR	0	0	0	3	**3**	0	0	0	1.5	**1.5**	Sessional		100	100	50
9	1S-A-9	Elective I	BAR01S09	EC	AR	1	2	0	0	**3**	1	1	0	0	**2**	Sessional		100	100	50
Total										**30**					**29.0**			**1000**	**1000**	

Elective I Art Appreciation / Numerical Ability / Presentation Skills / Sketching and Rendering / Public Speaking / Institutional Project 1

SCHEME OF EXAMINATION – B.Arch.

FIRST YEAR B.ARCH.

Semester – 2

Sr. No.	Sub. Code	Sub. Name	PAPER CODE	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	2S-A-1	Architectural Design II	BAR02S01	PC	AR	1	0	3	0	**4**	1	0	4.5	0	**5.5**	Sessional		150	200	100
			BAR02P01													Viva Voce		50		
2	2S-A-2	Allied Design Studio-II	BAR02S02	PC	AR	1	0	2	0	**3**	1	0	3	0	**4**	Sessional		100	100	50
3	2S-A-3	Building Construction and Materials -II	BAR02T03	BS&AE	AR	2	0	3	0	**5**	2	0	4.5	0	**6.5**	Paper	3	100	150	40
			BAR02S03													Sessional		50		25
4	2S-A-4	Architectural Graphics II	BAR02T04	PC	AR	2	0	0	2	**4**	2	0	0	1	**3**	Paper	3	60	100	50
			BAR02S04													Sessional		40		
5	2S-A-5	Sturctural Design & Systems-II	BAR02T05	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper	3	60	100	50
			BAR02S05													Sessional		40		
6	2S-A-6	History of Architecture I	BAR02S06	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		100	100	50
7	2S-A-7	Computer Application II	BAR02S07	PC	AR	1	0	0	1	**2**	1	0	0	0.5	**1.5**	Sessional		50	50	25
8	2S-A-8	Workshop II	BAR02S08	PC	AR	0	0	0	3	**3**	0	0	0	1.5	**1.5**	Sessional		100	100	50
9	2S-A-9	Elective II	BAR02S09	EC	AR	1	2	0	0	**3**	1	1	0	0	**2**	Sessional		100	100	50
Total										**30**					**29.0**			**1000**	**1000**	

Elective II 2 Art in Architecture / Graphic Designing / Fundamentals of Painting / Fundamentals of Sculpture / Architectural Photography / Institutional Project

SCHEME OF EXAMINATION – B.Arch.

SECOND YEAR B.ARCH.

Semester – 3

Sr. No.	Sub. Code	Sub. Name	PAPER CODE	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	3S-A-1	Architectural Design III	BAR03S01	PC	AR	1	0	4	0	**5**	1	0	6	0	**7**	Sessional		150	200	100
			BAR03P01													Viva Voce		50		
2	3S-A-2	Allied Design Studio-III	BAR03S02	PC	AR	1	0	2	0	**3**	1	0	3	0	**4**	Sessional		100	100	50
3	3S-A-3	Building Construction and Materials -III	BAR03T03	BS&AE	AR	2	0	3	0	**5**	2	0	4.5	0	**6.5**	Paper	3	100	150	40
			BAR03S03													Sessional		50		25
4	3S-A-4	Architectural Graphics III	BAR03S04	PC	AR	1	0	0	2	**3**	1	0	0	1	**2**	Sessional		100	100	50
5	3S-A-5	Structural Design & Systems III	BAR03T05	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper	3	60	100	50
																Sessional		40		
6	3S-A-6	History of Architecture II	BAR03S06	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		100	100	50
7	3S-A-7	Computer Application III	BAR03S07	PC	AR	0	0	0	2	**2**	0	0	0	1	**1**	Sessional		50	50	25
8	3S-A-8	Climatology	BAR03T08	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper	3	60	100	50
			BAR03S08													Sessional		40		
9	3S-A-9	Elective III	BAR03S09	EC	AR	1	2	0	0	**3**	1	1	0	0	**2**	Sessional		100	100	50
Total										**30**					**30.0**			**1000**	**1000**	

Elective III Scale and Proportion / Anthropometrics & Ergonomics / Rural Architecture / Traditional Arts and Crafts / Biomimicry / Institutional Project 3

SECOND YEAR B.ARCH.

Semester – 4

Sr. No.	Sub. Code	Sub. Name	PAPER CODE	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	4S-A-1	Architectural Design IV	BAR04S01	PC	AR	1	0	4	0	**5**	1	0	6	0	**7**	Sessional		150	200	100
			BAR04P01													Viva Voce		50		
2	4S-A-2	Allied Design Studio-IV	BAR04S02	PC	AR	1	0	2	0	**3**	1	0	3	0	**4**	Sessional		100	100	50
3	4S-A-3	Building Construction and Materials -IV	BAR04T03	BS&AE	AR	2	0	2	0	**4**	2	0	3	0	**5**	Paper	3	100	150	40
			BAR04S03													Sessional		50		25
4	4S-A-4	Surveying and Documentation	BAR04S04	BS&AE	AR	1	0	0	2	**3**	1	0	0	1	**2**	Sessional		100	100	50
5	4S-A-5	Structural Design & Systems IV	BAR02T05	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper	3	60	100	50
			BAR04S05													Sessional		40		
6	4S-A-6	History of Architecture III	BAR04S06	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		100	100	50
7	4S-A-7	Building Services - I	BAR04T07	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper	3	60	100	50
			BAR04S07													Sessional		40		
8	4S-A-8	Climate and Architecture	BAR04S08	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		100	100	50
9	4S-A-9	Elective IV	BAR04S09	EC	AR	1	2	0	0	**3**	1	1	0	0	**2**	Sessional		50	50	25
Total										**30**					**30.0**			**1000**	**1000**	

Elective IV Regional Architecture / Furniture Design / Design of Building Elements / Building Bye Laws and DCR / Theory of Design / Institutional Project 4

SCHEME OF EXAMINATION – B.Arch.

THIRD YEAR B.ARCH.

Semester – 5

Sr. No.	Sub. Code	Sub. Name	Paper Code	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	5S-A-1	Architectural Design V	BAR05S01 BAR05P01	PC	AR	1	0	4	0	**5**	1	0	6	0	**7**	Sessional Viva Voce		100 100	200	50 50
2	5S-A-2	Allied Design Studio-V	BAR05S02	PC	AR	1	0	2	0	**3**	1	0	3	0	**4**	Sessional		100	100	50
3	5S-A-3	Building Construction and Materials -V	BAR05T03 BAR05S03	BS&AE	AR	2	0	2	0	**4**	2	0	3	0	**5**	Paper Sessional	3	100 50	150	40 25
4	5S-A-4	Working Drawing -I	BAR05S04 BAR06P04	PC	AR	2	0	0	2	**4**	2	0	0	1	**3**	Sessional Viva Voce		50 50	100	50
5	5S-A-5	Structural Design & Systems V	BAR05T05 BAR05S05	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper Sessional	3	60 40	100	50
6	5S-A-6	Contemporary Architecture	BAR05S06	PC	AR	1	1	0	0	**2**	1	0.5	0	0	**1.5**	Sessional		100	100	50
7	5S-A-7	Building Services - II	BAR05T07 BAR05S07	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper Sessional	3	60 40	100	50
8	5S-A-8	Vernacular Architecture	BAR05S08	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		100	100	50
9	5S-A-9	Elective V	BAR05S09	EC	AR	1	2	0	0	**3**	1	1	0	0	**2**	Sessional		50	50	25
Total										**30**					**30.0**			**1000**	**1000**	

Elective V Pattern Language / Product Design /Advanced Spatial Analysis / Behavioural Architectural / Rhapsodic Architecture/ Vastu Shastra / Institutional Project 5

THIRD YEAR B.ARCH.

Semester – 6

Sr. No.	Sub. Code	Sub. Name	Paper Code	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	6S-A-1	Architectural Design VI	BAR06S01 BAR06P01	PC	AR	1	0	4	0	**5**	1	0	6	0	**7**	Sessional Viva Voce		100 100	200	50 50
2	6S-A-2	Allied Design Studio-VI	BAR06S02	PC	AR	1	0	2	0	**3**	1	0	3	0	**4**	Sessional		100	100	50
3	6S-A-3	Building Construction and Materials -VI	BAR06T03 BAR06S03	BS&AE	AR	2	0	2	0	**4**	2	0	3	0	**5**	Paper Sessional	3	100 50	150	40 25
4	6S-A-4	Working Drawing -II	BAR06S04 BAR06P04	PC	AR	2	0	0	2	**4**	2	0	0	1	**3**	Sessional Viva Voce		50 50	100	50
5	6S-A-5	Structural Design & Systems VI	BAR06T05 BAR06S05	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper Sessional	3	60 40	100	50
6	6S-A-6	Theory of Architecture	BAR06S06	PC	AR	1	1	0	0	**2**	1	0.5	0	0	**1.5**	Sessional		100	100	50
7	6S-A-7	Building Services - III	BAR06T07 BAR06S07	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper Sessional	3	60 40	100	50
8	6S-A-8	Landscape Architecture I	BAR06S08	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		100	100	50
9	6S-A-9	Elective VI	BAR06S09	EC	AR	1	2	0	0	**3**	1	1	0	0	**2**	Sessional		50	50	25
Total										**30**					**30.0**			**1000**	**1000**	

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

SCHEME OF EXAMINATION – B.Arch.

FOURTH YEAR B.ARCH.

Semester – 7

Sr. No.	Sub. Code	Sub. Name	Paper Code	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	7S-A-1	Architectural Design VII	BAR07S01	PC	AR	1	0	4	0	**5**	1	0	6	0	**7**	Sessional		150	250	75
			BAR07P01													Viva Voce		100		50
2	7S-A-2	Allied Design Studio-VII	BAR07S02	PC	AR	1	0	2	0	**3**	1	0	3	0	**4**	Sessional		100	100	50
3	7S-A-3	Appropriate Building Technology	BAR07P03	BS&AE	AR	1	0	2	0	**3**	1	0	3	0	**4**	Paper	3	60	100	50
			BAR07S03													Sessional		40		
4	7S-A-4	Working Drawing -III (Interior Design & Detailing)	BAR07S04	PC	AR	2	0	0	2	**4**	2	0	0	1	**3**	Sessional		50	100	25
			BAR07P04													Viva Voce		50		25
5	7S-A-5	Specification	BAR07S05	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		50	100	50
			BAR07P05													Viva Voce		50		
6	7S-A-6	Human Settlement Planning	BAR07T06	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper	3	60	100	50
			BAR07S06													Sessional		40		
7	7S-A-7	Building Services - IV	BAR07T07	BS&AE	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper	3	60	100	50
			BAR07S07													Sessional		40		
8	7S-A-8	Landscape Architecture II	BAR07S08	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Sessional		100	100	50
9	7S-A-9	Elective VII	BAR07S09	EC	AR	1	2	0	0	**3**	1	1	0	0	**2**	Sessional		50	50	25
Total										**30**					**30.0**			**1000**	**1000**	

Elective VII: High Rise Buildings / Architectural Conservation / Housing / Industrial Architecture / Hightech Architecture / Institutional Project 7

FOURTH YEAR B.ARCH.

Semester – 8

Sr. No.	Sub. Code	Sub. Name	Paper Code	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	8S-A-1	Practical Training	BAR08S01 BAR08P01	PAEC	AR	0	0	0	20	20	0	0	0	10	10	Sessional Viva Voce		250 150	400	250
2	8S-A-2	Documentation	BAR08S02	PC	AR	0	0	0	10	10	0	0	0	5	5	Sessional		100	#REF!	50
Total										30					15.0			500	#REF!	

SCHEME OF EXAMINATION – B.Arch.

FIFTH YEAR B.ARCH.

Semester – 9

Sr. No.	Sub. Code	Sub. Name	Paper Code	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	9S-A-1	Architectural Design VIII	BAR09S01 BAR09P01	PC	AR	1	0	5	0	6	1	0	7.5	0	8.5	Sessional Viva Voce		150 100	250	75 50
2	9S-A-2	Allied Design Studio-VIII	BAR09S02	PC	AR	1	0	2	0	3	1	0	3	0	4	Sessional		100	100	50
3	9S-A-3	Advanced Construction	BAR09T03 BAR09S03	BS&AE	AR	2	0	1	0	3	2	0	1.5	0	3.5	Paper Sessional	3	60 40	100	50
4	9S-A-4	Professional Practice -I	BAR09T04 BAR09S04	PAEC	AR	2	1	0	0	3	2	0.5	0	0	2.5	Paper Sessional	3	60 40	100	50
5	9S-A-5	Estimation	BAR09S05 BAR09P05	PC	AR	1	2	0	0	3	1	1	0	0	2	Sessional Viva Voce		50 50	100	50
6	9S-A-6	Urban Design	BAR09S06	PC	AR	2	1	0	0	3	2	0.5	0	0	2.5	Sessional		100	100	50
7	9S-A-7	Acoustics and Illumination	BAR09T07 BAR09S07	BS&AE	AR	2	1	0	0	3	2	0.5	0	0	2.5	Paper Sessional	3	60 40	100	50
8	9S-A-8	Enviornmental Science and Architecture	BAR09S08	BS&AE	AR	2	1	0	0	3	2	0.5	0	0	2.5	Sessional		100	100	50
9	9S-A-9	Elective VIII	BAR09S09	EC	AR	1	2	0	0	3	1	1	0	0	2	Sessional		50	50	25
Total										30					30.0			1000	1000	

Elective VIII Sustainable Development/ Earthquake Resistant Architecture/ Architectural Journalism / Disaster Mitigation and Management / Composite Technology/ Specialised Services / Institutional Project 8

FIFTH YEAR B.ARCH.

Semester – 10

Sr. No.	Sub. Code	Sub. Name	Paper Code	Category	Board	Load Per Week					Credits					Paper / Sessional	Duration in Hours	Max. Marks	Total Marks	Min. Pass Marks
						L/D	T	S	P	Total	L	T	S	P	Total					
1	10S-A-1	Project	BAR10S01	PC	AR	2	0	8	2	**12**	2	0	12	1	**15**	Sessional		300	500	150
			BAR10P01													Viva Voce		200		100
2	10S-A-2	Seminar and Research	BAR10S02	PAEC	AR	1	4	0	0	**5**	1	2	0	0	**3**	Sessional		100	200	100
			BAR10P02													Viva Voce		100		
3	10S-A-3	Professional Practice -II	BAR10T03	PAEC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper	3	60	100	50
			BAR10S03													Sessional		40		
4	10S-A-4	Project Management & BIM	BAR10S04	PAEC	AR	1	2	0	0	**3**	1	1	0	0	**2**	Sessional		100	100	50
5	10S-A-5	Valuation	BAR10T05	PC	AR	2	1	0	0	**3**	2	0.5	0	0	**2.5**	Paper	3	60	100	50
			BAR10S05													Sessional		40		
Total										**26**					**25.0**			**1000**	**1000**	

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY
'Established by Government of Central Provinces Education Department by Notification No. 513 dated the 1st of August, 1923 &
presently a State University governed by Maharashtra Public Universities Act, 2016 (Mah. Act No. VI of 2017)

THE FACULTY OF SCIENCE AND TECHNOLOGY

DIRECTION NO. 7 OF 2021

ADMISSION AND EXAMINATIONS OF STUDENTS IN THE FULL TIME, SEMESTER PATTERN (CREDIT BASED SYSTEM) PROGRAMME LEADING TO THE AWARD OF THE DEGREE OF BACHELOR OF ARCHITECTURE (B.ARCH) DIRECTION, 2021.

Whereas, The Maharashtra Public Universities Act, 2016 (VI of 2017) has come into force from 1st March 2017;

AND

Whereas, Rashtrasant Tukadoji Maharaj Nagpur University (hereinafter "the University") is now being governed by The Maharashtra Public Universities Act, 2016 (VI of 2017) (hereinafter the Act);

AND

Whereas, the Board of Studies in Architecture, in the Faculty of Science and Technology, at their meetings held on 17/06/2020, keeping the guidelines of Council of Architecture, New Delhi (COA) in mind has decided to make uniform guidelines to design new 278 credits curriculum for the Bachelor of Architecture (B.Arch) program leading to the award of degree of Bachelor of Architecture (Full time), in the Faculty of Science and Technology;

AND

Whereas, the Faculty of Science & Technology in its meeting held on 21/07/2020 and the Academic Council in its meeting held on 28/08/2020, vide item no 17, have approved the 278 credits program leading to the award of the degree of Bachelor of Architecture (B.Arch.) (Full Time) (Semester Pattern) (Credit Based System). in the Faculty of Science and Technology;

AND

Whereas, introduction of new academic program requires making of an Ordinance as per the provisions of section 73(1) of the Act, however, since Ordinance making is a time consuming process and there is urgency in introducing the new 278 credit based Bachelor of Architecture (Full Time) program in the faculty of Science and Technology from the academic session 2020-21 justifying issuance of a Direction by the Vice- Chancellor, as an interim measure;

Now, therefore, I, Dr. Subhash R. Chaudhari, Vice-Chancellor of Rashtrasant Tukadoji Maharaj Nagpur University, in exercise of my powers under section 12(8) of the Act, do hereby issue the following Directions:-

1. This Direction shall be called "**ADMISSION AND EXAMINATIONS OF STUDENTS IN THE FULL TIME, SEMESTER PATTERN (CREDIT BASED SYSTEM) PROGRAMM LEADING TO THE AWARD OF THE DEGREE OF BACHELOR OF ARCHITECTURE (B. ARCH.), DIRECTON, 2021".**
2. This Direction shall come in to force from the date of its issuance.
3. This Direction shall be applicable from the academic session 2020- 21 for first year of the program and progressively Onwards.
4. In this Direction unless the context requires otherwise: -
   a. **"ATKT"** means "Allowed to Keep Term" in the higher semester, as per the rules herein.
   b. **"Board of Studies"** means the Board of Studies in **Architecture**, in the Faculty of Science and Technology.
   c. **"Course"** means a theory, practical (or the combination of theory and practical) subject, and research project, prescribed for any semester and

5. Admission and eligibility to the Program:

(a) Subject to the compliance with the provisions of this Direction and other Ordinances/Directions, in force from time to time, an applicant for admission to Semester-I of the programme shall have passed 12th (Science) examination with subjects specified in Director of Technical Education (Maharashtra)"s and Council of Architecture, New Delhi circulars issued from time to time

(b) The minimum percentage of marks in the qualifying examination shall be as per the applicable governing rules Framed by Government of Maharashtra from time to time.

6. Duration of the Programme:

i. The B.Arch. programme shall consist of 5 Years (Ten Semesters)

7. Medium of Instructions: The medium of instructions and examinations shall be English.

8. Structure of the Programme:

i. The detail structure of the B.Arch. program shall be as given in Annexures A1-A2.

9. Curriculum of the Programme:-

The detail content of the courses prescribed for each semester of the B.Arch. programme shall be as determined by the relevant Board of Studies and notified by the University from time to time.

10. Scheme of Examinations: -

i) Subject to the provisions of the general rules of the University with respect to conduct of examinations and in particular the rules regarding payment of examination fees, award of grace marks, and the maximum and minimum passing marks and eligibility for getting exemption in any passing heads, as shown in the relevant Annexures herein, there shall be end semester examination to be conducted by the University as per the scheme and modalities to be notified from time to time.

ii) An examinee who does not pass or who fails to present herself for the examination(s) shall be eligible for reappearing in the same examination on

payment of a fresh fee and such other fees as may be prescribed from time to time. However, re-admission to the semester would be allowed only when a regular session is running for a particular semester.

1. Annexure A-1 :B.Arch. 1st to 10th Semester Scheme of Examination
2. Annexure A-2 :B.Arch. 1st& 10th Semester Absorption Scheme

11. Calculation of SGPA and CGPA

Degree will be based on SGPA and CGPA calculations since First Semester

a) SGPA and CGPA will be calculated on the basis of the grades as detailed below

i) Conversion of Marks to Grades using Absolute Grading system.

- For each course taken, the student will be assigned with a grade based on the combined performance in all the assessments.
- Table -1 shows the various grades awarded to students with mark range as indicated.

Table-1: Award of Grades for Theory Courses

(a) Course/Subject carrying maximum 100 marks

Marks Range)	Grade
X ≥ 91	AA
91 >X ≥ 85	AB
85 >X ≥ 76	BB
76 >X ≥ 66	BC
66 >X ≥ 56	CC
56 >X ≥ 45	CD
X<45	FF
Absent	ZZ

X = Marks obtained out of 100

(b): Course/Subject carrying maximum 50 marks

Marks Range(for Max 50 marks)	Grade
X ≥ 46	AA
46 >X ≥ 42	AB
42 >X ≥ 38	BB
38 >X ≥ 33	BC
33>X ≥28	CC
28>X ≥ 23	CD
X<23	FF
Absent	ZZ

X = Marks obtained out of 50

(c): Award of Grades for Practical Courses

Marks Range (for Max 50 marks)	Grade
X ≥ 46	AA
46>X ≥ 42	AB
42>X ≥ 38	BB
38 >X ≥ 34	BC
34>X ≥30	CC
30>X ≥ 25	CD
X<25	FF
Absent	ZZ

X = Marks obtained out of 50

- Audit Course does not carry any credit, hence, will not be considered in the SGPA/CGPA calculation. But the grade card will reflect "Audit course" and will be awarded with grade as in Table-1(a or b or c). However, the student will have to pass the course with minimum required attendance and evaluation result to clear the semester.

ii) Obtaining Grade Point

- The academic performance of a student will be graded on Ten point scale.
- The qualitative assessment of student's performance will be indicated by these grades.
- Each grade is associated with a grade point as listed in Table-2.

Table-2: Grades and Equivalent Grade Points

Grade	Grade Point
AA	10.00
AB	9.00
BB	8.00
BC	7.00
CC	6.00
CD	5.00
FF	0
ZZ	0

iii) Calculating SGPA and CGPA

 The grades up to „CD' awarded to student in all the courses shall be converted into a Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA).

 $SGPA = S_m = \frac{\sum Ci * Pi}{\sum (Ci)}$

Where S_m=SGPA of „m^{th}' semester; C_i =

Credit of „i^{th}' Course

Pi- Grade point earned of i^{th} course

 $CGPA = \frac{\sum Cj \square Pj}{\sum (Cj)}$

Where, P_j= Grade points earned in the j^{th} course;

C_j = Credit of j^{th} course up to semester for which CGPA is to be calculated.

J= 1,2, … m represents the number of courses in which a student is registered up to the semester for which CGPA is to be calculated.

iv) Incentive credits to the students participating in NCC/NSS/ Games & Sports/Cultural Activities/Curricular and Co-curricular Activities will be awarded as per the University prevailing ordinance"

12. Class/Division

The class/division in academic performance of the student for the complete duration of program to be classified as follows:

- First Class with distinction: CGPA 7.5 and above,
- First Class: CGPA 6.0 and above, but less than 7.5, and
- Second Class: CGPA less than 6.0

As per requirements, the conversion of the performance index CGPA into equivalent percentage of marks, the formula shall be used is-

Percent marks = (CGPA)*10.

13. Award of Merit Ranks

The students admitted to the programme governed by this Direction on successful completion of the programme shall be eligible to be awarded a merit rank as per the general rules of the University in this regard.

14. Exit Policy for Failure/Dropout Students:

i). Student who wish to exit without completing First year and who is noteligible for award of "certificate/Diploma/Degree" should undergo hands on training for getting Certificate.

S. No.	Award	Year of Completion
1	Certificate	Certificate on exit after First Year
2	Diploma	Diploma on exit after Second Year
3	Degree	Degree on exit after Third Year
4	P.G.	P.G. on exit after Fourth Year
5	P.G. with honors	PG with honors on exit after Fifth Year

15 A.T.K.T Rules

I.) For calculation of passing heads, any decimal fraction should be rounded off to lower digit.

ii) Passing the semester shall include all the credit and audit subject heads.

iii)For getting promotion in the higher class (under ATKT) a student must obtain minimum 40% credits prescribed for a particular year, comprising two semesters.

16. ABSORBTION SCHEME

i. After introduction of the 278 credit program under this Direction existing B.Arch. program shall be discontinued in a phase-wise (progressive) manner and the failure students of the said program shall be provided maximum five attempts to clear all the courses/subject(s) of the said program after which they shall be absorbed in the 278 credit program under this Direction as per the absorption scheme hereunder.

ii. The students of the existing program shall also be entitled to join the 278 credit program as per the absorption schemes provided by relevant Board of Studies. However, student will have to appear for the examinations under new 278 Credit Scheme for the matchable subjects in which student has not cleared the subject in the existing program.

iii.a) A student having passed in particular course/subject heads of the existing program at any semester level shall be exempted from such subject heads at any level (lower/higher) of the new 278 Credit programme. If any course/subject is named with a new nomenclature but is having similar contents it shall also be exempted. The respective Board of Studies shall prepare and notify the list of such subjects. Wherever a student is absorbed in the new 278 credit course with benefit of exemption in courses/subjects, in any semester, proportionate marks/grades shall be awarded in the concerned course/subject heads.

b) Wherever a new course/subject has been introduced in the new 278 Credit programme in any semester which was not to be found in the existing programme the internal marks shall be awarded in proportion to the marks/grades earned by a student in the university/external examination in the concerned new course/subject head.

c) Student being absorbed in new 278 Credit Pattern shall be exempted from the subject/s which she has cleared in the existing semester pattern as per the absorption scheme provided by the concern B.O.S. However the subject/s which he/she has not cleared in the old semester pattern and having no equivalent subject at any level of new 278 Credit Pattern shall not be considered during the absorption irrespective of the status of the result of that subject.

17. If any difficulty in implementation of the scheme of this Direction is encountered or any doubt regarding interpretation of any provision of this Direction arises the matter shall be referred for decision of the Vice- Chancellor whose decision shall be final and binding on all the concerned people.

(Dr. Subhash Chaudhari)
Vice-Chancellor

Nagpur
Date: 10-2-2021

 ABSORPTION SCHEME B.ARCH.

Subjects Listed semesterwise as per CBS pattern Scheme of Examination

Code	CBS Course Subjects	Corresponding Old Course Subjects	Year/ Sem
	FIRST SEMESTER B.ARCH.		
1S-A-1	Architectural Design - I	Basic Design & Visual Art	1st Sem
1S-A-2	Allied Design Studio - I	Elective - b (Any of the elective heads)	1st Sem
1S-A-3	Building Construction and Materials - I	Construction Tech. & Materials I	1st Sem
1S-A-4	Architectural Graphics - I	Architectural Graphics I	1st Sem
1S-A-5	Structural Design & Systems - I	Structural Design & Sys. I	1st Sem
1S-A-6	History of Civilisation	History of Art & Archi. I	1st Sem
1S-A-7	Computer Application - I	Computer Application (NG)	1st Sem
1S-A-8	Workshop - I	Workshop Practice I	1st Sem
1S-A-9	Elective I (Any one)	Elective A (Any of the elective heads)	1st Sem
	SECOND SEMESTER B.ARCH.		
2S-A-1	Architectural Design - II	Architectural Design -I	2nd Sem
2S-A-2	Allied Design Studio - II	Climatology	2nd Sem
2S-A-3	Building Construction and Materials - II	Construction Tech. & Materials II	2nd Sem
2S-A-4	Architectural Graphics - II	Architectural Graphics - II	2nd Sem
2S-A-5	Structural Design & Systems - II	Structural Design & Sys. II	2nd Sem
2S-A-6	History of Architecture I	History of Art & Archi.- II	2nd Sem
2S-A-7	Computer Application - II	Elective - b (Any of the elective heads)	2nd Sem
2S-A-8	Workshop - II	Workshop Practice - II	2nd Sem
2S-A-9	Elective II (Any one)	Elective - a (Any of the elective heads)	2nd Sem
	THIRD SEMESTER B.ARCH.		
3S-A-1	Architectural Design - III	Architectural Design -II	3rd Sem
3S-A-2	Allied Design Studio - III	Surveying & Levelling	3rd Sem
3S-A-3	Building Construction and Materials - III	Construction Tech. & Materials III	3rd Sem
3S-A-4	Architectural Graphics - III	Architectural Graphics - III	3rd Sem
3S-A-5	Structural Design & Systems - III	Structural Design & Systems - III	3rd Sem
3S-A-6	History of Architecture II	History of Art & Architecture - III	3rd Sem
3S-A-7	Computer Application - III	Elective - a (Any of the elective heads)	3rd Sem
3S-A-8	Climatology	Climate & Architecture	3rd Sem
3S-A-9	Elective III (Any one)	Elective - b (Any of the elective heads)	3rd Sem

	FOURTH SEMESTER B.ARCH.		
4S-A-1	Architectural Design - IV	Architectural Design III	4th Sem
4S-A-2	Allied Design Studio - IV	Elective - b (Any of the elective heads)	4th Sem
4S-A-3	Building Construction and Materials - IV	Construction Tech. & Materials - IV	4th Sem
4S-A-4	Surveying and Documentation	Architectural Graphics - IV	4th Sem
4S-A-5	Structural Design & Systems IV	Structural Design & Sys. IV	4th Sem
4S-A-6	History of Architecture III	Theory of Architecture - I	4th Sem
4S-A-7	Building Services - I	Building Servies - I	4th Sem
4S-A-8	Climate and Architecture	Theory of Landscape Archi.	4th Sem
4S-A-9	Elective IV (Any one)	Elective - a (Any of the elective heads)	4th Sem
	FIFTH SEMESTER B.ARCH.		
5S-A-1	Architectural Design - V	Architectural Design- IV	5th Sem
5S-A-2	Allied Design Studio - V	Specifications	5th Sem
5S-A-3	Building Construction and Materials - V	Construction Tech. & Materials - V	5th Sem
5S-A-4	Working Drawing - I	Architectural Graphics - V	5th Sem
5S-A-5	Structural Design & Systems V	Structural Design & Sys. V	5th Sem
5S-A-6	Contemprory Architecture	Theory of Architecture - II	5th Sem
5S-A-7	Building Services - II	Building Servies - II	5th Sem
5S-A-8	Vernacular Architecture	Elective - b (Any of the elective heads)	5th Sem
5S-A-9	Elective - V (Any one)	Elective - a (Any of the elective heads)	5th Sem
	SIXTH SEMESTER B.ARCH.		
6S-A-1	Architectural Design - VI	Architectural Design - V	6th Sem
6S-A-2	Allied Design Studio - VI	Estimate & Costing	6th Sem
6S-A-3	Building Construction and Materials - VI	Construction Tech. & Materials - VI	6th Sem
6S-A-4	Working Drawing - II	Architectural Graphics - VI	6th Sem
6S-A-5	Structural Design & Systems VI	Structural Design & Sys.-VI	6th Sem
6S-A-6	Theory of Architecture	Design of Human Settlement	6th Sem
6S-A-7	Building Services - III	Building Services - III	6th Sem
6S-A-8	Landscape Architecture - I	Elective - b (Any of the elective heads)	6th Sem
6S-A-9	Elective - VI (Any one)	Elective - a (Any of the elective heads)	6th Sem

	SEVENTH SEMESTER B.ARCH.		
7S-A-1	Architectural Design - VII	Architectural Design - VII	7th Sem
7S-A-2	Allied Design Studio - VII	Research Skills & Proj. Intro.	7th Sem
7S-A-3	Appropriate Building Technology	To be Appeared	
7S-A-4	Working Drawing - II (Interior Design & Detailing)	Elective - b (Any of the elective heads)	7th Sem
7S-A-5	Specification	To be Appeared	
7S-A-6	Human Settlement Planning	Structural Design & Sys. VII	7th Sem
7S-A-7	Building Services - IV	Building Services - IV	7th Sem
7S-A-8	Landscape Architecture - II	To be Appeared	
7S-A-9	Elective - VII (Any one)	Elective - a (Any of the elective heads)	7th Sem
-	-	Construction Technology & Material -VII	7th Sem
-	-	Acoustic and Illumination	7th Sem

	EIGHTH SEMESTER B.ARCH.		
8S-A-1	Practical Training	Practical Training	8th Sem
8S-A-2	Documentation	To be Appeared	
	NINTH SEMESTER B.ARCH.		
9S-A-1	Architectural Design - VIII	To be Appeared	
9S-A-2	Allied Design Studio - VIII	To be Appeared	
9S-A-3	Advanced Construction	To be Appeared	
9S-A-4	Professional Practice - i	To be Appeared	
9S-A-5	Estimation	To be Appeared	
9S-A-6	Urban Design	To be Appeared	
9S-A-7	Accoustics and Illumination	To be Appeared	
9S-A-8	Environmental Science and Architecture	To be Appeared	
9S-A-9	Elective - VIII (Any one)	To be Appeared	
	TENTH SEMESTER B.ARCH.		
10S-A-1	Project	Project	10th Sem
10S-A-2	Seminar and Research	Elective - a (Any of the elective	10th Sem
10S-A-3	Professional Practice - II	Professioanl Practice	10th Sem
10S-A-4	Project Management & BIM	Construction Tech. & Materials VIII	10th Sem
10S-A-5	Valuation	To be Appeared	

Note:

1 The new scheme marking to be converted as per the old syllabus marking for respective subject

2 The new scheme sessional subject to be marked proportionate to the old course theory subject

Code
1S-A-1
1S-AA-2
1S-A-2
1S-A-5
1S-A-3
IS-A-4
IS-A-7
IS-A-6
IS-AA-1

2S-A-1
2S-A-7
2S-A-2
2S-A-5
2S-A-3
2S-A-4
2S-AA-2
2S-A-6
2S-AA-1

3S-A-1
3S-A-6
3S-A-2
3S-A-5
3S-A-3
3S-A-4
3S-AA-1
3S-A-7
3S-AA-2

4S-A-1
4S-AA-2
4S-A-2
4S-A-5
4S-A-3
4S-A-6
4S-A-4
4S-A-7
4S-AA-1
5S-A-1
5S-A-7
5S-A-2
5S-A-5
5S-A-3
5S-A-6
5S-A-4
5S-AA-2
5S-AA-1
6S-A-1
6S-A-7
6S-A-2
6S-A-5
6S-A-3
6S-A-6
6S-A-4
6S-AA-2
6S-AA-1

7S-A-1
7S-A-5
7S-AA-2
7S-A-4
7S-A-3
7S-AA-2
7S-A-2
7S-A-6

9S-A-1
8S-A-1
8S-AA-1
8S-A-3
8S-A-2