

SCHEME OF TEACHING AND EXAMINATION OF I SEM B.ARCHITECTURE

Sl. No.	Subject Code	Title of the Subject	Teaching Scheme in Periods per Week (50 Mts)				Examination Scheme					
			Lecture	Studio	Pract	Total	Dur (hrs)	Theory Marks	Prog. Marks	Term work Marks	Viva Marks	Total
1	14ARC 1.1	Architectural Design-I	-	8	-	8	-	-	100	200	-	300
2	14ARC 1.2	Materials and Methods in Building Construction-I	1	5	-	6	4	100	50	-	-	150
3	14ARC 1.3	Architectural Graphics-1	-	4	-	4	-	-	50	100	-	150
4	14ARC 1.4	History of Architecture - I	3	-	-	3	3	100	50	-	-	150
5	14ENG 1.5	Building Structures-1	3	-	-	3	3	100	50	-	-	150
6	14HUM1.6	Communication Skills	3	-	-	3	-	-	50	-	-	50
7	14ART 1.7	Basic Design & Visual Arts	-	6	-	6	-	-	50	-	-	50
8	14ARC 1.8	Model Making workshop	-	-	3	3	-	-	50	-	-	50
			<b>10</b>	<b>23</b>	<b>3</b>	<b>36</b>	<b>-</b>	<b>300</b>	<b>450</b>	<b>300</b>	<b>-</b>	<b>1050</b>
<b>ARC= Architectural Subjects    ART= Art Subjects    ENG = Engineering Subjects    HUM = Humanities Subjects.</b>												
<b>No. of Subjects/Heads = 08</b>						<b>No. of Theory Examinations = 03</b>						
<b>Progressive Marks to be awarded by the subject teacher.</b>												
<b>Minimum Marks for passing: Progressive Marks 50%, Theory Marks, Term work Marks and viva marks 40% in each</b>												

SCHEME OF TEACHING AND EXAMINATION OF II SEM B.ARCHITECTURE

Sl. No.	Subject Code	Title of the Subject	Teaching Scheme in Periods per Week (50 Mts)				Examination Scheme					
			Lect	Studio	Pract	Total	Dur (hrs)	Theory Marks	Prog. Marks	Term work Marks	Viva Marks	Total
1	14ARC 2.1	Architectural Design-II	-	9	-	9	-	-	100	200	-	300
2	14ARC 2.2	Materials and Methods in Building Construction – II	1	5	-	6	4	100	50	-	-	150
3	14ARC 2.3	Architectural Graphics – II	-	4	-	4	-	-	50	100	-	150
4	14ARC 2.4	History of Architecture II	4	-	-	4	3	100	50	-	-	150
5	14ENG 2.5	Building Structures – II	3	-	-	3	3	100	50	-	-	150
6	14ARC 2.6	Theory of Architecture-I	3	-	-	3	3	100	50	-	-	150
7	14ENG 2.7	Site Surveying & Analysis	2	-	2	4	3	100	50	-	-	150
8	14ARC 2.8	Basic Design & Art Appreciation	-	3	-	3	-	-	50	-	-	50
			<b>13</b>	<b>21</b>	<b>2</b>	<b>36</b>	<b>-</b>	<b>500</b>	<b>450</b>	<b>300</b>	<b>-</b>	<b>1250</b>
<b>ARC= Architectural Subjects    ART= Art Subjects    ENG = Engineering Subjects    HUM = Humanities Subjects.</b>												
<b>No. of Subjects/Heads = 08</b>						<b>No. of Theory Examinations = 05</b>						
<b>Progressive Marks to be awarded by the subject teacher.</b>												
<b>Minimum Marks for passing: Progressive Marks 50%, Theory Marks, Term work Marks and viva marks 40% in each</b>												

## **14ARC 1.1: ARCHITECTURAL DESIGN-I**

**CONTACT PERIODS: 8 (STUDIO) PER WEEK**

**PROGRESSIVE MARKS: 100**

**TERM WORK MARKS: 200**

### **OBJECTIVE:**

**To develop the ability to translate abstract principles of design into architectural solutions for simple problems**

### **OUTLILNE:**

What architectural education entails? What being an architect involves? and Architecture's connection with other forms of knowledge: Science, Mathematics, Philosophy, Religion, etc.

Local stories on architecture.

Listing of important local buildings and explain why they are important

Listing and Drawing silhouettes of favorite buildings or places

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

Learning basics of architectural representation.

Measured drawing exercise of familiar objects & spaces- a table (object), a classroom and a staircase (static/transition spaces), pavilion, open/ enclosed spaces etc.

Collection and documentation of all building materials within 5 km radius

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

Concepts of volume and scale, width to height ratio.

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

Introduction to anthropometry; relationship of architecture with human body.

Introduction to furniture; relationship of objects with human body

Portfolio of study and design through drawing/representation.

Human functions and their implications for space requirements. Minimum and optimum areas for mono functions. User's data, movement and circulation diagrams. Spatial interpretations – various activities and their relationship with spaces

Design of functional furniture layout, circulation, lighting and ventilation for spaces such as living/dining, bedrooms, Architect's office, Doctor's clinic etc,

***Note:***

The portfolio covering *all the assignments shall be presented for term work.*

***REFERENCES:***

1. "Time Saver Standards for Architectural Design Data" by John Hanock
2. "Architectural Graphic Standards" by Ramsay and Sleeper
3. Indian Anthropometric Dimensions for Ergonomic Design Practice by Debkumar Chakrabarti

## **14ARC 1.2: MATERIALS AND METHODS IN BUILDING CONSTRUCTION-I**

**CONTACT PERIODS: 6 Hours  
(1 Lecture +5 studio) Per Week  
PROGRESSIVE MARKS: 50**

**EXAM MARKS: 100**

**DURATION: 4 HRS**

**OBJECTIVE: To introduce building materials and building elements and their intrinsic relationship to basic Building Systems.**

**OUTLINE:**

### **Module 1**

1. **Making Buildings 1:** Materials, Building Systems Overview (know-how of building materials and construction)
2. **Making Buildings 2:** Various conventions used for drawing plan, sections and elevations.
3. **Introduction to Brick Masonry Construction:** Brick as a building material: Types, properties, uses and manufacturing methods.

### **Module 2**

4. **Brick masonry load bearing wall construction:** Types of brick masonry walls and bonds, foundations, mortar type, plasters, buttresses, arches and lintels.
5. **Field visit:** Brick kiln, Sawmill, stone quarry, etc –Report on site visit
6. **Stone Masonry Construction:** Stone as a building material: Types, properties and uses, quarrying, Stone masonry load bearing wall construction: Types of walls, bonds, arches and lintels

### **Module 3**

7. **Wall construction:** Introduction to wall construction and detailing with building materials: Hollow and solid Concrete Blocks, Hollow and solid clay Blocks, Fly ash Blocks, Aerated Concrete Block, stabilized mud blocks, Glass Blocks, etc. Properties, uses and manufacturing methods.

### **Module 4**

8. **Masonry Foundation:** Simple load bearing foundations in brick and stone
9. **Introduction to Wood as a Building Material:** Types – Natural, hard and softwood. Quality of timber used in buildings, defects, seasoning and preservation of timber.

## **Module 5**

10. **Wooden door assembly and production:** Types of wooden Doors, i.e., Battened, ledged, braced, paneled, flush and glazed doors. Study of joinery details.
11. **Wooden windows assembly and production:** Types of wooden glazed windows, study of joinery details.

### **Note:**

Minimum one plate on each topic, site visits to be arranged by studio teacher. Study of material application in the form of portfolio. All the plates on construction and portfolio on material application shall be assessed for progressive marks.

### **REFERENCES:**

- 1) Building Construction” by W.B. Mackay
- 2) Construction Technology” by Chudley
- 3) “Construction of Buildings” by Barry
- 4) ‘Building construction’ by Francis K Ching

## 14ARC 1.3: ARCHITECTURAL GRAPHICS-1

**CONTACT PERIODS: 4 (STUDIO) PER WEEK**

**PROGRESSIVE MARKS: 50**

**TERM WORK MARKS: 100**

**OBJECTIVE:** To introduce students to the fundamental concepts and techniques of graphical drawings, and multi-angle representations of built elements and built forms with applicable renderings.

### **OUTLINE:**

1. **Introduction to visual representation and scales:** The basic principles of drawing and sign conventions; the concept of scales and application in architecture.
2. **Practice in lettering:** Lettering used in architectural drawings, including different fonts.
3. **Introduction to Euclidian Geometry:** Exercises in lines and angles, construction of triangles, quadrilaterals and regular polygons. Introduction to the development of simple surfaces – cubes, cuboids and pyramids.
4. **Introduction to curves:** Construction of plane curves, ellipse, parabola, hyperbola and ovals. Exercise in physical modeling for parabola and hyperbola.
5. **Arches:** Typical arch forms and methods of drawing them.
6. **Orthographic projection (first angle projection):** Principles of orthographic projection; projections of points, lines, planes – explore all combinations.
7. **Orthographic projection of solids**
8. **Orthographic projection of architectural built elements and built forms:** (Simple to complex)
9. **3D Projections:** 3D representation in isometric projection of solids.
10. **3D Projections:** 3D representation in isometric projection of built elements and built forms (simple to complex).
11. **3D Projections:** 3D representation in axonometric projection of solids.
12. **3D Projections:** 3D representation in axonometric projection of built elements and built forms.
13. **Introduction to rendering:** Simple rendering of the 3D drawings of built elements and built forms – free-hand pencil rendering with shading and textures.

Note: A consolidated portfolio containing exercises related to each of the above modules to be presented for term work examination

### **REFERENCES:**

1. *Geometrical Drawing for Arts Students* by IH Morris
2. *Perspective* by SH Mullik
3. *Architectural Graphics* by D.K Ching

## **14ARC 1.4: HISTORY OF ARCHITECTURE - I**

**CONTACT PERIODS: 3 (LECTURE PER WEEK)**  
**PROGRESSIVE MARKS: 50**

**EXAM MARKS: 100**  
**DURATION: 3 HRS**

**OBJECTIVE:** To provide an introduction to the culture and architecture of early civilizations.

**OUTLINE:**

### **Module 1**

1. **Introduction** What History education entails? Architecture's connection with History
2. **Introduction to Pre-Historic Civilization:** Primitive man - shelters, settlements, religious and burial systems E.g.: Oval hut, Nice, Dolmen tomb, gallery grave, passage grave, Houses at Catal Huyuk, Henge Monuments, StoneHenge
3. **Introduction to River valley cultures:** generic forces shaping settlements and habitats:

### **Module 2**

4. **Indus Valley Civilization:** Forces shaping settlements and habitats:  
Layout of Mohenjodaro, House plan, Community well, Great Bath, Granary
5. **River valley cultures, Tigris and Euphrates:** Ziggurats at Warka, Ur and Tchoga Zanbil, Palace of Sargon.

### **Module 3**

6. **River valley culture, Nile:** Mastaba Tombs, Pyramid of Cheops, Temple of Khons, Karnak
7. **Introduction to Chinese Architecture:** Forces shaping settlements and habitats



8. **Introduction to Mayan and Japanese Architecture:** Forces shaping settlements and habitats

#### **Module 4**

9. **Introduction to Desert and Mountainous cultures:** Forces shaping settlements and habitats with examples
10. **Introduction to Pre-Classical Civilization:** Mycenea, Persia, Etruscan. Pre-Classical Civilization Examples: Tiryns, the Temple of Juno Sospita, the Palace of Persepolis.

#### **Module 5**

11. **Pre-classical Aryan & Mauryan :** Vedic and Epic Age Salient features Vedic Village
12. **Introduction to contemporary Tribal Cultures:** Forces shaping settlements and habitats in tribal cultures with examples

#### ***REFERENCES:***

1. History of Architecture in India” by Tadgell Christopher
2. Indian Architecture, Buddhist and Hindu period” by Brown Percy
3. Architecture of India, Buddhist and Hindu” by Grover, Satish

## 14 ENG 1.5: BUILDING STRUCTURES-1

**CONTACT PERIODS: 3 (LECTURE PER WEEK)**  
**PROGRESSIVE MARKS: 50**

**EXAM MARKS: 100**  
**DURATION: 3 HRS**

**OBJECTIVE: Introduction to principles of loads, structural materials and transmissibility of force with examples.**

**OUTLINE:**

### Module 1

1. **Evolution of Structures:** Historical perspective and definition of structure as a device for channeling loads that result from the use or presence of the building in relation to ground.
2. **Structural systems overview:** Vertical/lateral systems: wall, cantilever, moment frame, braced frame, horizontal one-way and two-way systems: truss, arch, vault, dome, shell, cable stayed, suspended, membrane.
3. **Experiment with Structures:** Example-1: Build a structure to house an un-boiled egg to be thrown from a building without breaking (avoid foam boxes and bulky structures). Example-2: Build a Structure of dimension 150x150x150mm using A4 size paper to withstand a load of 1 kilogram. Example-3: Build a beam or a truss using matchsticks to span a distance of 150mm, and test the maximum mid-span load the truss could carry. Example-4: Build a geodesic dome of 150mm dia using straws, ice cream sticks or matchsticks to span a distance of 150mm.

### Module 2

4. **Structural Materials:** Mechanical properties of Structural materials: wood, masonry, steel, concrete, fabric; energy use and rupture length. Advantages and disadvantages of Structural Materials and choice of Structural Material for domestic buildings, Industrial buildings, Tall buildings and Long Span buildings.
5. **Loads on Structures:** Dead load (DL), live load (LL), static, dynamic, impact, and thermal loads.

### Module 3

6. **Principle of transmissibility of forces:** Understanding load flow by tributary load and load path (slab, beam, and girder) and vertical members (post, wall, and footing); load path.

7. **Equilibrium of Forces:** Force, Reaction, Moment and Principle of Support conditions and their significance in resistance to forces and to maintain equilibrium.
8. **Basic principles of mechanics:** Tension, compression, shear, bending, torsion; symbols and notations; force and stress.

#### **Module 4**

9. **Stress/strain relations (Hooke's Law):** Modulus of Elasticity, linear and non-linear materials, elastic, plastic, and elastic-plastic materials; Poisson's Ratio; Thermal stress and strain.
10. **Graphic vector analysis:** Resultant and equilibrant of coplanar, concurrent and non-concurrent force systems. Parallelogram, force polygon, resultant, equilibrant, components; numeric method

#### **Module 5**

11. **Truss:** Truss concept of triangulation, common truss configurations.
12. **Truss loads and reactions:** For a given configuration of the trusses and center to center spacing, calculations of the dead weight of the truss and the dead weight of the roof cover and support reaction loads.

#### ***REFERENCES:***

- 1) STRUCTURES - Martin Bechthold, Daniel L Schodek, and PHI Learning Private limited, Sixth Edition
- 2) Structure in Architecture, the building of buildings, by Mario Salvadori
- 3) Structure and Design, by G. G. Schierle
- 4) Engg Mechanics – R K Bansal & Sanjay Bansal, Laxmi publications, New Delhi, 3<sup>rd</sup> ed
- 5) Engg Mechanics, Ferdinand L Singer, Harper Collins publications, 3<sup>rd</sup> ed.

## 14HUM 1.6: COMMUNICATION SKILLS

**CONTACT PERIODS: 3 (LECTURE) PER WEEK**

**PROGRESSIVE MARKS: 50**

**OBJECTIVE: To develop skills in effective communication – both written and verbal and to explore the potential of media technology and the Internet to enhance communication.**

### **OUTLINE:**

1. **Introduction:** Introduction to course objective and framework of assignments and assessment. Discussion on exploratory topics.
2. **Reading and listening comprehension:** Reading of a passage from famous books (e.g. Samskara). Students to draw an image on A4 paper based on the read passage.
3. **Verbal presentations:** Understanding the differences among seminars, conferences, convention, congress, debates, extempore speeches, panel discussions etc. Students to write a brief synopsis on seminar topic to be submitted to seminar committee for acceptance.
4. **Introduction and discussion on exploratory topic for a survey questionnaire:** Need to document infrastructure (or lack of) on college campus and students to prepare a fifteen point questionnaire with info- graphics and conduct survey.
5. **Interpretation of materials:** such as questionnaires, application forms, analysis of materials such as texts, reports, technical literature.
6. **Notes taking:** From spoken and written English.
7. **Comprehension of lectures and speeches to locate key points**
8. **Analytical Writing:** To develop the ability to write concisely and correctly and present ideas in a logical manner.
9. **Introduction and discussion on exploratory topic for a letter:** Understanding the difference between formal and informal letters etc. Students to Write /draw a letter to fellow architects, clients, public authorities, contractors, enquiries to industries, dealers.
10. **Article writing:** on a Design or a Building, Introduction to Design Basis Report
11. **Writing a term paper:** term paper is a research paper written by students over an academic term
12. **Introduction and discussion on exploratory topic for a brief essay:** Observation based writing. Topic for assignment: PATTERNS (in nature, Architecture, art, mathematics, language, infrastructure, social systems etc.) and student to write and illustrate a 300 word essay on patterns.
13. **Using the Internet to enhance communication**

## **REFERENCES:**

- 1) Working in English: Teachers Book, Jones Leo. 2) Communicative English for Professional Courses, Mudambadithaya G.S. 3) English Conversation Practice, Taylor, Grant.

## **14 ART 1.7: BASIC DESIGN & VISUAL ARTS**

**CONTACT PERIODS: 6 (STUDIO) PER WEEK**

**PROGRESSIVE MARKS : 50**

**OBJECTIVE: To encourage a critical orientation to design thinking and action.**

### **OUTLINE:**

1. **Observation & Study 1:** Selection of two outdoor objects/systems and observation of their natural occurrence, relationships with context, form & structure, colors & textures, and function Sketching & visual representation in various media.  
3 dimensional modeling in appropriate medium (clay/paper/wire/plaster/wax etc.).
2. **Observation & Study 2:** Selection of two indoor objects/systems and observation of their situation, relationships with context, form & structure, colors & textures, and functions. Sketching & visual representation in various media.  
3 dimensional modeling in appropriate medium  
(Clay/paper/wire/plaster/wax etc.).
3. **Material Study-1:** Selection of two materials used in everyday life (textiles, Earthenware, terracotta, metals, stone, plastic, glass etc.) Study of properties, Strength, examples of use.
4. **Material Study-2:** Sketching & visual representation of material in various media, like Paper, clay, plaster, wood, wire, wax, photography
5. **Material Study-3:** Hands-on making of object/joint/structure of own choice with one of the materials studied.
6. **Design of a non-enclosed object using the materials studied.** E.g. park Seat, bollard, push-cart, etc.
7. **Design of a semi-enclosed object/space using the materials studied.** E.g. gazebo, kiosk, bus stop, stage set, etc.
8. **Design of an enclosed object/space using the materials studied.** e.g. Security cabin, grocery store, caravan etc.

***REFERENCES:***

- 1) 'The Art of Color and Design' by Maitland Graves
- 2) 'Ways of Seeing' by John Berger
- 3) 'Design of Everyday Things' by Donald Norman
- 4) "Rendering with Pen and Ink" by Robert Gill

## **14ARC 1.8: MODEL MAKING WORKSHOP**

**CONTACT PERIODS: 3 (PRACTICAL) PER WEEK**

**PROGRESSIVE MARKS : 50**

**OBJECTIVE: To train the students to experiment and manipulate materials leading to creative exploration of forms.**

### **OUTLINE:**

1. Carpentry: Introduction to the use of different types of woods available and tools used in carpentry.
2. Joints: Different types of joints, joinery details (which are commonly used in timber construction and interiors). Application of veneers/laminates on different types of timber surfaces i.e., Teak and commercial woods viz ply, block boards, particle boards. Engraving and carving. Polishing and painting.
3. Model generation: Pyramid, cube, cone, polygon using particle/block board and polishing, engraving, painting etc (which ever is possible) of the same
4. Clay-I:- Generation of basic forms – cube, cone, dome and arch
5. Clay-II:- Walls, corbel/free forms and surface finishes
6. Bricks I:- Types of Joints, tools used & model generation - walls (types – linear, curved, zig-zag etc) corbel
7. Bricks II:- Form Generation-dome, arches, free forms
8. STONE-I:- Study/types of joints, tools used - wall and corbel form generation
9. STONE-II:- Generation of forms – arches, domes
10. Cob/Wattle and daub construction, earth construction
11. Composite Forms : Experimental form generation combining two/three materials eg: clay & brick, brick & wood, stone & brick, brick & metal (rods/pipes/wires, wood & metal etc)
12. Free Forms: Funicular shells, Tensile structures using Fabrics, canvas, plastic (tubes & sheets) etc

## 14ARC 2.1 – ARCHITECTURAL DESIGN - II

**CONTACT PERIODS: 9 (STUDIO) PER WEEK**  
**PROGRESSIVE MARKS: 100**

**TERM WORK MARKS: 200**

**OBJECTIVE:** To expose the students to the grammar of creating architectural space and form, including the study of variables like light, movement, transformation, scale, structure & skin

### **OUTLINE:**

Nature of Space; PLACE: A “boundary”, a “center” and a “spirit” PATH: A “way” and a “goal” DOMAIN: A conglomeration of paths and goals that forms a “whole” with its own “identity”

Materials Eg. Masonry (brick & stone), Steel/Glass with cladding infill, exposed Concrete

Enclosure, Ambiguity, Transparency in Plan, Section and Elevation, with concept sketches and diagrams so that presentation is self-explanatory ex. 1:50 plans, sections, and elevations.

Emphasis on work in studio by hand drawing and study model with lift off roof.

The One Room House

Lecture cum discussion on the Poetics of Space like light, movement, transformation, scale, structure and skin (case study based): keywords for discussion: contemplative / severe / dramatic / minimalist / natural / organic / contemporary / traditional.

Understanding the role of physical (terrain, climate, materials, etc.) and cultural factors (open, closed, transition spaces) that inform architecture.

Projects shall be explored with the help of models and sketches.

Any One Room enclosure could be taken to explore the implication of light, movement, transformation, scale, structure and skin.

Emphasis on freeing the expression of the poetic self, rather than on meeting external standards, and student development of self-explanatory presentations

Case study assignment (done in groups of four students per group): One from library/internet research and one from actual experience.

Project presented in the form of a portfolio.



Emphasis on studio work/participation and Hand drawings.

Formulate a process of testing the various elements of space making learnt earlier in the semester through a project on an actual site. The project examples could be: A House for myself, Guest House, Farm house, Villa, Container house, Courtyard house, Tree house, etc.

**References:**

1. Time Saver Standards for Architectural Design Data” by John Hanock
2. Architectural Graphic Standards” by Ramsay and Sleeper
3. Indian Anthropometric Dimensions for Ergonomic Design Practice by Debkumar Chakrabarti

## **14ARC 2.2: MATERIALS AND METHODS IN BUILDING CONSTRUCTION-II**

**CONTACT PERIODS: 6 Hours**  
**(1 hr Lecture+ 5 hrs Studio ) Per Week**  
**PROGRESSIVE MARKS : 50**

**EXAM MARKS : 100**  
**DURATION: 4 HRS**

**OBJECTIVE: To introduce Building materials especially RCC and building elements, and their intrinsic relationship to basic Building systems, which includes roofing for medium spans, Concrete columns, Concrete foundations and staircases.**

### **OUTLINE:**

#### **Module: 1**

- 1) **Introduction to Timber** : Timber, various parts, their purposes and method of construction. Use of tiling for roofing.
- 2) **Timber Roof** – Lean to roof, Collared Roof, King post roof, Queen Post Roof; Detailed Drawing of one roof system
- 3) **Introduction to Steel Roof** – Steel trussed roof, their purposes and method of construction. Use of GI sheets and aluminum sheets for roofing.

#### **Module: 2**

- 4) **Introduction to Cement and Steel as a Building material:** Cement – Types of cement, their applications, laboratory and field tests. Properties and architectural uses of reinforced steel. Reinforced Cement Concrete as a building material: Concrete Ingredients, grades of concrete, admixtures, properties of concrete, production of concrete, mix, proportioning (Site visit to a Ready-mix concrete (RMC) batching plant)

#### **Module: 3**

- 5) **Reinforced Cement Concrete as a building material:** Form work, placing, and compaction, curing of concrete, sampling and testing of concrete. Construction joints, expansion joints, finishes in concrete, chemical admixtures. (Site visit to concreting construction site)
- 6) **RCC Foundations** (Isolated footing) and Columns (Square and Round) Raft foundations, Grillage foundations and combined footing.

#### **Module: 4**

- 7) **Introduction to Staircase:** Anthropometry of stairs, types of Staircases and construction methods of staircase in – Masonry, timber, RCC, Steel and Composite.
- 8) **Timber Stairs:** Single and Double Stringer stairs: Means and methods of Construction

9) **RCC Stairs:** Waist slab, folded plate, Stringer stairs, precast stairs: Means and methods of Construction

#### **Module: 5**

10) **Steel Stairs:** Stringer stairs, Folded Type, Spiral stairs, Fire escape stairs: Means and methods of Construction

11) **Composite Stairs:** Brick/stone, Steel/Timber, Concrete/wood, steel/ glass: Means and methods of Construction

**Note:** Minimum one plate on each topic, site visits to be arranged by studio teacher. All the plates on construction and portfolio on material application shall be presented for progressive marks.

**REFERENCES:** 1) *“Building Construction”* by W.B. Mackay 2) *“Construction Technology”* by Chudley 3) *“Construction of Buildings”* by Barry

## 14ARC 2.3: ARCHITECTURAL GRAPHICS-II

**CONTACT PERIODS: 4 (STUDIO) PER WEEK**

**PROGRESSIVE MARKS: 50**

**TERM WORK MARKS: 100**

**OBJECTIVE: Development of visual representation and conceptual communication in the field of spatial design through 3D drawing techniques with applicable renderings that include shades and shadows.**

### **OUTLINE:**

- 1. 3D Projections:** 3D representation in exploded axonometric projection of built elements and built forms.
- 2. Development of surfaces:** Advanced topics with application to built forms, Suggested examples: Domes, curved roofs, etc.
- 3. Section of solids, true shapes of sections**
- 4. Inter-penetration of geometric solids:** Combination of different forms.  
examples: Cylinder with cube or regular polygons, dome with a cube, etc.
- 5. Perspective drawings:** History of perspective drawings with examples from international and Indian context. Principles of perspective drawings and examples of the visual effects of three dimensional objects when seen in perspective.
- 6. Studies in perspective drawing:** Picture plane, station point, vanishing point, eye level, ground level, their variation and their resultant effects. Examples of simple geometric objects.
- 7. One-point perspective drawings:** Perspective drawings of simple built form with simple built elements –Suggested example: Interior view of a single room and built elements in incremental steps. Technical steps with the object falling within the cone of vision, object going out of the cone of vision, and objects and elements closer. Analysis of the differences with previous technical images.  
Perspective drawings of everyday objects like chair and table without many design features. Generate multiple perspective drawings by altering the VP and PP, and by keeping SP fixed for the same examples.
- 8. 2-point perspective drawings:** Perspective drawings of simple geometrical objects and their combinations. Examples: Perspective drawings of built forms with built elements  
Perspective drawings of simple everyday objects. Generate multiple views of the same objects.
- 9. Principles of shade and shadows:** Principles of drawing shade and shadow  
Exercises exploring the principles of drawing shade and shadow in perspective drawings – drafting shade and shadows to examples from the perspective drawings.

**10. Free-hand perspectives:** Exercises in free-hand techniques for generating perspective drawings with multiple views on site with simple rendering. Introduce simple street elements and simple trees for the buildings generated in the perspective drawing classes.

***REFERENCES:***

1. *Geometrical Drawing for Arts Students* by IH Morris
2. *Perspective* by SH Mullik
3. *Architectural Graphics* by D.K Ching
4. *Rendering with pen and ink* by Robert Gill

## 14ARC 2.4: HISTORY OF ARCHITECTURE-II

**CONTACT PERIODS: 4 (LECTURE) PER WEEK**  
**PROGRESSIVE MARKS: 50**

**EXAMMARKS: 100**  
**DURATION: 3 HRS**

**OBJECTIVE: To provide an understanding of the evolution of Hindu Architecture in India in its various stylistic modes, characterized by technology, ornamentation and planning practices**

### **OUTLINE:**

#### **Module: 1**

1. **Introduction to Classical (Buddhist):** Mahayana phase, stupa and rock cut cave Architecture
2. **Buddhist Examples:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Great Stupa at Sanchi, Chaitya at Karli, Viharas at Ajanta, and Toranas at Sanchi b) Domestic (Built to inhabit) and c) Civic space
3. **Introduction to Jain Architecture:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; b) Domestic (Built to inhabit) and c) Civic space;

#### **Module: 2**

4. **Evolution of Hindu temple:** Indo Aryan and Dravidian – Early temples at Udaigiri, Tigawa and Sanchi.
5. **Evolution of Hindu temple:** Dravidian Experiments at Aihole (Durga temple and LadKhan temple), Deogarh, Bhitargaon and Badami.
6. **Beginnings of Dravidian architecture:** Pallavas, rathas at Mamallapuram, Shore temple, Kailsanatha and Vaikuntaperumal temples at Kancheepuram.

### Module: 3

7. **The Cholas contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Brihadeshwara temple at Thanjavur and Gangaikonda Cholapuram b) Domestic (Built to inhabit) and c) Civic space;
8. **The Pandyan & Madurai Dynasties contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Gopurams Madurai (Meenakshi temple) and Srirangam. b) Domestic (Built to inhabit) and c) Civic space;

### Module: 4

9. **The Hoysala contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Eg: Channakesava temple, Belur, Hoysalesvara temple, Halebid, Kesava temple, Somnathpur b) Domestic (Built to inhabit) and c) Civic space;
10. **Indo Aryan Mode:** the beginnings in Orissa – the Lingaraja at Bhubaneshwar.

### Module: 5

11. **Hindu architecture at Rajputana & Khajuraho group:** (Temple of Surya, Orisa, Marwar) and Gujarat (Temple of Surya, Modhera). The Khajuraho group: Khandariya Mahadev, Jain temples – Chaumukh temple at Ranpur
12. **Later Dravidian period:** the Vijayanagar and– Noted temples at Hampi (Vitthala temple and Hazara Rama temple),

NOTE: Site visit and documentation of a Temple may be made for part assessment of the progressive marks.

#### **REFERENCES:**

- 1) “Indian Architecture, Buddhist and Hindu Period” by Brown, Percy
- 2) “Architecture of India – Buddhist and Hindu” by Grover Satish

## 14ENG 2.5: BUILDING STRUCTURES II

**CONTACT PERIODS: 3 (LECTURE) PER WEEK**  
**PROGRESSIVE MARKS: 50**

**EXAM MARKS: 100**  
**DURATION: 3 HRS**

**OBJECTIVE: Introduction to transmissibility of forces & reactions and to basic structural system of beams and columns.**

### **OUTLINE:**

#### **Module 1**

- 1) **Geometric properties:** Centroid, Centroidal axes and Moments of Inertia for regular sections by Parallel Axis Theorem.
- 2) **Beams and support reactions:** Beams and supporting conditions - Types of supports – Implications for computational and structural performance.
- 3) **Bending and Shear force in beams:** Method of balancing moments and free-body diagrams.

#### **Module 2**

- 4) **Bending Moment and Shear Force Diagrams:** Concept of Shear force and Bending Moment diagrams. BMD and SFD for simple beams subjected to loads. BMD and SFD for intermediate beams 2span, 3span and 4span beams (bending moment diagrams to be provided).
- 5) **Bending and Shear Stress in beams:** Theory of simple bending - Concept of bending and shear stress distribution at a cross section due to bending moment and shear for Rectangular, I and T sections.

#### **Module 3**

- 6) **General formula:** Moment of Inertia, Section Modulus, Bending and Shear Stress.
- 7) **Deflection:** Determination of deflection for simply supported, fixed, continuous and Cantilever beams subjected to loads using standard formulas.

#### **Module 4**

- 8) **Columns and Struts:** Introduction to Short and long columns.
- 9) **Theory of Columns:** Buckling; effective length, critical load, slenderness ratio; Euler formula; "Kern" and rule of inner third.



## Module 5

- 10) **Steel Columns:** Axial stress and combined axial and bending stress design and analysis of steel columns.
- 11) **RCC columns:** Definition of short column as per IS 456 and design of short RCC columns (composite action, load taken by steel and load taken by concrete respectively).

### ***REFERENCES:***

- 1) STRUCTURES - Martin Bechthold, Daniel L Schodek, and PHI Learning Private limited, Sixth Edition
- 2) Structure in Architecture, the building of buildings, by Mario Salvadori
- 3) Structure and Design, by G. G. Schierle
- 4) Strength of Materials – R K Bansal, Laxmi Publications, New Delhi, 3<sup>rd</sup> ed'
- 5) Applied Mechanics & Strength of Materials – I B Prasad

## 14ARC 2.6 –THEORY OF ARCHITECTURE-I

**CONTACT PERIODS: 3 (LECTURE) PER WEEK**  
**PROGRESSIVE MARKS: 50**

**EXAM MARKS: 100**  
**DURATION: 3 HOURS**

**OBJECTIVE: To acquaint the students with the basic aesthetic principles involved in architectural design and the grammar of architectural aesthetics.**

**OUTLINE:**

### Module 1

- 1. Definition of Art and role of Art in Society:** Role and meaning of art, various types of arts- fine arts, performing arts, commercial arts, industrial arts, folk arts, abstract art, visual arts, spatial arts, temporal arts, pop art etc., relationship of architecture with other arts like Painting and Sculpture.
- 2. Principles of Aesthetics and Architectural Composition -1** – Unity, Balance, Proportion, Scale in Architectural composition. Illustrations and its application to the practice of design with historical as well as contemporary buildings:

### Module 2

- 3. Principles of Aesthetics and Architectural Composition -2:** Contrast, harmony, accentuation, restraint in Architectural composition. Illustrations and its application to the practice of design in historical as well as contemporary building.
- 4. Principles of Aesthetics and Architectural Composition -3:** Repose, vitality, strength in Architectural composition. Illustrations and its application to the practice of design in historical as well as contemporary building.

### Module 3

- 5. Organizing principles of Aesthetics and Architectural Composition -1:** Symmetry, asymmetry, hierarchy, datum, axis, rhythm in Aesthetics and Architectural Composition and its application to the practice of design.
- 6. Spatial organizations of Masses in Architecture -1:** Centralized and clustered; Illustrations of centralized and clustered massing in spatial organizations of masses in Architecture and its application to the practice of design with both historical as well as contemporary buildings.

#### Module 4

7. **Spatial organizations of Masses in Architecture -2:** linear, radial, grid organization. Illustrations of linear, radial, grid organization in spatial organizations of masses in Architecture and its application to the practice of design with both historical as well as contemporary buildings.
8. **Ornamentation in Architecture:** Historical perspective of the use of ornament in buildings and use of ornament as a decoration to embellish parts of a building. Use and need of ornament in architectural design – different types of ornamentation in buildings.
9. **Ornamentation in Architecture Criticism**–Argument against ornamentation. Ideas of architect Adolf Loos (Ornament and Crime); Ornaments as economically inefficient and morally degenerate, reduction of ornament or lack of decoration as the sign of an advanced society.

#### Module 5

10. **Materials, Materiality and Tectonics:** Aesthetic and structural potentials in Architecture of materials like brick, timber, stone, concrete, glass.
11. **Style in Architecture:** Basis for classification of styles including chronology of styles arrangement according to order that changes over time. Evolution of styles; reflecting the emergence of new ideas as reaction to earlier styles as a result of changing of fashions, beliefs, technology etc.
12. **Perceptions in Architecture:** Experience of architecture in basic psychological and physiological terms. Way in which human minds and bodies respond to space, light, texture, color, and other architectural elements.

#### **REFERENCES:**

1. Form, Space and Order” by Francis DK Ching
2. Design Fundamentals in Architecture” by Parmar VS
3. Theory of Architecture by Paul Alan Johnson
4. Creating Architectural Theory by John Lang

## 14ENG 2.7: SITE SURVEYING & ANALYSIS

**CONTACT PERIODS: 4**  
**(2 LECTURE + 2 PRACTICAL) PER WEEK**  
**PROGRESSIVE MARKS: 50**

**EXAM MARKS: 100**  
**DURATION: 3HRS**

**OBJECTIVE: To develop the knowledge and skills related to surveying and levelling principles and practice and carrying out surveys of land of medium complexity and preparation of survey plans.**

### OUTLINE

#### Module 1

- 1) **Introduction to Surveying** – Definition, classification, principles of surveying, character of work, shrunk scale.
- 2) **Survey Theory-1:** Chain Survey: Instruments used, Types of chain, Instruments for ranging.

#### Module 2

- 3) **Survey Theory-2:** Chain Survey: Setting out angles, erecting perpendiculars. Plane table survey – Plane table and accessories.
- 4) **Survey Theory-3:** Introduction to Levelling; Definition, classification, booking and reduction of levels, longer levelling, errors.

#### Module 3

- 5) **Contouring:** Characteristics of contours, direct and indirect methods of contouring, interpolation, and uses of contours.
- 6) **Introduction to contemporary survey Instruments (Theodolite and Total station):** Theodolite; instrument for measuring angles in the horizontal and vertical planes. Total station; electronic theodolite integrated with an electronic distance measurement to measure slope distances.

#### Module 4

- 7) **Observations of a Site (Up to 1 acre):** Survey without instruments using geometry and one's own body. To learn to read the terrain by intuition and by measure, including photography as a surveying method.
- 8) **Analysis of a Site (Up to 1 acre):** On site factors; Analysis of natural factors, topography, hydrology, soils, landforms, vegetation, climate, microclimate.; influence of water bodies

## **Module 5**

- 9) **Studying survey drawings:** Learning to read a land survey drawing; type of land survey drawing, Scale and North direction in drawing, legend or list of the symbols used on drawings, counter indications on a drawing, grid references for measurements etc.
  
- 10) **Field Work-1:** Setting out works such as center lines of a building(working drawings of a small residence to be provided)

### ***REFERENCES:***

- 1) Surveying Vol I by DR PC Punmia
- 2) Surveying and Levelling (Part-1) by Kanetkar TP and Kulkarni SV

## 14 ART 2.8: BASIC DESIGN & ART APPRECIATION

CONTACT PERIODS: 3 (STUDIO) PER WEEK

PROGRESSIVE MARKS: 50

### OBJECTIVE:

To explore the relationship between materiality & space, between building, the environment and culture and to initiate an understanding of abstraction and analysis of space and form.

### OUTLINE:

1. **Mapping-1:** Conceiving one's own map – from home to studio/of the campus/of a Neighborhood. Explore issues of movement, navigation, circulation, direction and discovery through exercises.
2. **Mapping-2:** Drawing and Reading of maps – Explore issues of representation, scale, starting point, orientation, landmarks, imagery. Use of different methods of rendering.
3. **Patterns-1:** Study of pattern-making in nature, (Such as trees, leaves, crystals, shells etc.) Observation & representation of 2-dimensional patterns in various visual media.eg. Charcoal/pencil/crayon/oils etc.
4. **Patterns-2:** Study of pattern-making in technology. (Such as geodesics, nanotech, fractals etc.) Observation & representation of 2- & 3-dimensional patterns in various media.eg. wire/soap bubble/ photographs/digital models etc.
5. **Patterns-3:** Use of patterns to synthesize and create form. Use of Both physical and material patterns as well as patterns of transformation and Integration. Appreciation of the difference between architecture and pattern.
6. **Structure-1:** Understanding gravity, and the different ways we resist it. Study of Material & structure in nature, and how design brings them together. Sketch analysis of Structure and form in an example taken from Patterns-1.
7. **Structure-2:** Hands-on Design exercise – creation of a simple design in which form is distinct from structure. Eg. Portal frames, tensile structures
8. **Structure-3:** Hands-on Design exercise – creation of a simple design in which form is integral with structure. Eg. Shells, massive forms, pneumatics
9. **Scale-1:** Dimensional understanding of the human body; in static and dynamic modes. Measured drawing of space needed for basic postures & movements.

10. **Scale-2:** Study of the relationship between human body and the built environment understanding usage and comfort. Eg. Bazaar, doctor's clinic, train carriage etc.

11. **Orientation & Climate:** Understanding of the significance of the Cardinal directions, and the role played by Sunlight, Wind and Rain in determining design response

12. **Culture & Design:** Understanding social attitudes to Built-form: extroverted/introverted, formal/informal, typical/individual, simple/labyrinthine, contiguous/isolated etc.

13. **Documentation:** Sketch/photographic documentation of a neighborhood or settlement street pattern, house form & community spaces a) Analysis-1: Sketched analysis of built form in terms of patterns, structure and scale b) Analysis-2: Sketched analysis of built form in terms of orientation & climate c) Analysis-3: Sketched analysis of built form in terms of culture & society

#### ***REFERENCES:***

1)'The Concise Townscape' by Gordon Cullen 2)'The Image of the City' by Kevin Lynch 3)'Architecture: Form, Space & Order' by Francis Ching 4)"Cradle to Cradle: remaking the way we make things'" by Michael Braungart, William McDonough 5)'The Timeless way of Building' by Christopher Alexander 6)"Human Centered Design Toolkit' by IDEO