

15 ARC 1.1 – ARCHITECTURAL DESIGN -I

CONTACT PERIODS : 8 (Studio) per week

PROGRESSIVE MARKS : 100

TERM WORK MARKS : 200

OBJECTIVES:

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 favourite 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

15ARC 1.2: MATERIALS AND METHODS IN BUILDING CONSTRUCTION-I

CONTACT PERIODS: 6 Hours (1 Lecture +5 Studio) per week

THEORY MARKS: 100

PROGRESSIVE MARKS : 50

DURATION OF EXAM : 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

15ARC 1.3: ARCHITECTURAL GRAPHICS-1

CONTACT PERIODS: 4 (Studio) per week

TERM WORK MARKS: 100

PROGRESSIVE MARKS : 50

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

15ARC 1.4: HISTORY OF ARCHITECTURE - I

CONTACT PERIODS: 3 (Lecture) per week

THEORY MARKS: 100

PROGRESSIVE MARKS : 50

DURATION OF EXAM : 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

15 ENG 1.5: BUILDING STRUCTURES-1

CONTACT PERIODS: 3 (Lecture) per week

THEORY MARKS: 100

PROGRESSIVE MARKS : 50

DURATION OF EXAM : 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, 3rd ed, 5) Engg Mechanics, Ferdinand L Singer, Harper Collins publications, 3rd ed.

15HUM 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.

15 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.*

- 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

15ARC 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