18ARC11 – ARCHITECTURAL DESIGN -I

CONTACT PERIODS : 8 (Studio) per week
PROGRESSIVE MARKS : 150
VIVA MARKS : 150

OBJECTIVES:
Beginning Design - To develop the ability to generate solutions to spatial constructs, which integrate principles of design with functional requirements.

PREAMBLE:
We inhabit and function in space, both the manmade and the natural i.e., "a life spent within an enclosure". These enclosures have functional and cultural meanings, are symbols of abstract ideas of that period in time.

> *"Architecture is the art we all encounter most often, most intimately, yet precisely because it is functional and necessary to life, it's hard to be clear about where the "art" in a building begins." - Jonathan Jones*
>
> *"Architecture is a discipline directly engaged with shaping enclosure, of erecting and toppling barriers or—more explicitly—of extending and limiting 'freedoms'." - E. Sean Bailey & Erandi de Silva*

OUTLILNE:

1. Introduction to Architecture:
   - What architectural education entails?
   - What being an architect involves?
   - Understanding of Architecture's connection with other disciplines of knowledge: Science & Technology, Mathematics, Philosophy, Religion, Sociology, Psychology, etc.

Method of learning: Observation & Study
- Documentation of local stories on architecture, important local buildings and other favourite buildings or places.
- Observing and documenting the built environment around and experiencing enclosures (field trips) to learn basics of architectural representation.

2. Introduction to Principles of Design:
   - Elements of form from abstract concepts like point, line, plane, mass and / or volume, 2D forms - circle, square and triangle, 3D forms – cube, sphere and pyramid, therefore , development of more complex forms by the method of addition and / or subtraction.
   - Concepts of volume and scale, width to height ratio.
   - Concepts of composition like rhythm, contrast, balance and symmetry.

Method of learning: Observation & Study
- Study models and sketches to explore the design principles.
- Drawings of study models - plans and sections (suitable scale).

3. Introduction to Anthropometry:
   - Understanding the relationship between function and spatial requirements with respect to the human body and its postures.
   - Minimum and optimum areas for mono functions.
   - User's data, movement and circulation diagrams.

Method of learning: Observation & Study

- Drawings of the human body in various postures with required measurements.
- Drawing exercise of artefacts, eg. - a table (object) with the human body - contextual.
- Measured drawing exercise of spaces – to get a grip of the functional and spatial aspects of the space, eg. - a classroom (mono functional) and a staircase (static/transitional), pavilions & open/ enclosed spaces (multi-functional).

4. Introduction to Design process –
   - Understanding the relationship between idea, context, space (form & structure), and functional requirements.
   - Introduction to the various methods of idea / concept generation - use of form, patterns in nature and in geometry, music, text, and other allied fields.
   - Space planning based on activity, which will involve the entire body, and its movement in space.

Method of learning: Observation & Study

- Understanding the difference and similarity while design of a non-enclosed space, a semi-enclosed space, an enclosed space.
- Study of patterns and use the pattern, both physical and material patterns as well as patterns of transformation and Integration. Appreciation of the difference between architecture and the chosen pattern.
- Design of functional furniture layout with requisite circulation, lighting and ventilation for a specific function.
- Design of Spaces such as pavilion, gazebo, kiosk, bus stop, stage, living/dining, bedrooms, Architect's office, Doctor's clinic etc,.
- Submission will include Idea generation, Study models, Sketches and drawings to achieve the desired results.

NOTE:

- Discussions, presentations, and case studies will cover all the topics.
- The portfolio covering all the assignments shall be presented for term work.

Learning outcome:

The student will get an introduction into the field of Architectural Design viz. a viz. the duality & the tension that exists between the form and function of a space.

REFERENCES:

1. Alain de Botton, " How Proust Can Change your life", Picador, 1997.
2. Alain de Botton, " The Architecture of Happiness", Sep. 2006, Vintage Books.
3. Alan Fletcher, " The art of looking sideways", Phaidon Press, 2001
   and Partis", Van Nostrand Reinhold, 1985
4. Anthony Di Mari and Nora Yoo, " Operative Design: A Catalogue of Spatial Verbs", 2012, BIS Publishers.
5. Anthony Di Mari, " Conditional Design: An Introduction to Elemental Architecture", 2014, 1st Edition, Thames & Hudson.
6. Bruno Munari,"Design as Art", Penguin UK, 25-Sep-2008
7. Charles George Ramsey and Harold Sleeper, " Architectural Graphic Standards", 1992, Wiley
8. Christopher Alexander, "Notes on the Synthesis of Form", 1964, Harvard University Press.
9. Debkumar Chakrabarti, " Indian Anthropometric Dimensions For Ergonomic Design Practice", 1997,

10. François Blanciak, " Siteless: 1001 Building Forms", 2008, MIT Press
11. Frank Ching, James F. Eckler, "Introduction to Architecture", 2012, John Wiley & Sons, US
12. Frank D.K. Ching, " Architecture: Form, Space, and Order", 4th Edition, Sep. 2014, John Wiley & Sons
13. Herman Hertzberger, "Lessons for Students in Architecture", 2005, 010 Publishers
14. Italo Calvino, " Invisible Cities", Harcourt Brace Jovanovich (May 3, 1978)
15. John Berger, " Way of Seeing", 1972, Penguin, UK
16. John Hancock Callender, " Time-Saver Standards for Architectural Design Data", 1982, McGraw-Hill
17. Michael Pause and Roger H. Clark, " Precedents in Architecture: Analytic Diagrams, Formative Ideas, National Institute of Design.
18. Paul Jacques Grillo, " Form, Function and Design", 1975 , Dover Publications, New York
19. Paul Jacques Grillo, " What is Design ?", 1960, P. Theobald
20. Paul Lewis,Marc Tsurumaki, David J. Lewis, "Manual of Section", Princeton Architectural Press, 2016
21. Peter H. Reynolds, " The Dot", 2013, Candlewick Press
22. Philip Jodidio, "Tree houses. Fairy tale castles in the air", 2012, Taschen
23. Robert W. Gill, "Rendering with Pen and Ink", Van Nostrand Reinhold (1 June 1984)
24. Tom Alphin, "The LEGO Architect", 2015, No Starch Press

18ARC12: MATERIALS AND METHODS IN BUILDING CONSTRUCTION-I

CONTACT PERIODS: 5 (1 Lecture +4 Studio) per week
VIVA MARKS: 75
PROGRESSIVE MARKS :75

OBJECTIVE: *Introduction to building components, wall construction in masonry , foundations in masonry, wooden doors and windows, use of timber for construction.*

OUTLINE:

MODULE 1

1. Overview of simple masonry building, its various components and materials used for construction.
2. Various conventions used for drawing plan, section and elevation.
3. Brick: Types, properties, uses and manufacturing methods.
4. Brick Walls: Types of brick walls and bonds, mortar types, plasters, buttresses, arches and lintels.

MODULE 2

5. Stone: Types, properties, quarrying and finishing.
6. Stone Walls: Bonds, arches and lintels.

MODULE 3

7. CMU: Hollow and solid concrete Blocks: Manufacture, uses and properties, CMU Wall construction and detailing.
8. Alternative materials for Wall construction: Clay Blocks, Fly Ash Blocks, Aerated Concrete Blocks, Stabilized Mud Blocks and Glass Blocks: Manufacture, uses and properties, wall construction and detailing.

MODULE 4

9. Masonry Foundation: Simple load bearing foundations in brick and stone.
10. Wood: Natural, hard and soft wood; quality, properties; joints in wood. Timber: Quality of Timber used in buildings, defects, seasoning and preservation.

MODULE 5

11. Wooden doors: Types of wooden Doors - battened, ledged, braced, panelled, flush and glazed doors; details of joinery.
12. Wooden windows: Types of wooden glazed windows; details of joinery.

Note:

- **Minimum of one plate on each topic. Study of building materials may be compiled in the form of portfolio.**
- **Site visits to be arranged by studio teacher. Construction plates and portfolio of material shall be assessed for progressive marks.**

Learning Outcome: The students would be able to understand the use of brick, stone and timber in construction of basic components of buildings viz. walls, foundations, doors & windows.

REFERENCES:

1) Francis K Ching 'Building construction', Wiley; 5 edition (February 17, 2014)
2) R. Barry, "Construction of Buildings" Vol 1., 1999 by Wiley-Blackwell
3) Roy Chudley, "Construction Technology", 3rd Edition, Longman, 1999
4) W.B. Mckay, "Building Construction", Donhead, 2005

18ARC13: ARCHITECTURAL GRAPHICS-I

CONTACT PERIODS: 4 (1 Lecture + 3 Studio) per week
TERM WORK MARKS: 75
PROGRESSIVE MARKS : 75

OBJECTIVE: *To introduce students to the various concepts and techniques of architectural and graphic presentations. Train the students to work on drawing methods both in freehand and with instruments*.

OUTLINE:

1. **Introduction to Graphic Representations**: Basic principles and methods of drawing, methods of using instruments, and sign conventions.
    - Exercises in line - weightage and its application
    - Exercises in free-hand drawing.
2. **Exercises of Practice in Lettering**: Lettering used in architectural drawings, including different fonts.
3. **Introduction to Euclidian Geometry:** Exercises in lines and angles. Basic geometrical constructions, construction of triangles, quadrilaterals and regular polygons. Introduction to the development of simple surfaces of basic geometrical shapes and their applications.
4. **Arches:** Typical arch shapes and their construction methods.
5. Introduction to plane curves such as ellipse, parabola, hyperbola and ovals and their construction methods.
6. Introduction to reduced scales and its application to architectural drawings.
7. **Introduction to orthographic projection (First - angle projection):** Principles of orthographic projection, projections of points, lines and planes in different positions.
8. Orthographic Projection of Solids, architectural elements and built forms.
9. **3D Projections-I:** Isometric and Axonometric views of solids and architectural elements.
10. **3D Projections-II:** Isometric and Axonometric views of built forms.

Note: A consolidated portfolio containing exercises related to each of the above topics are to be submitted for term work examination.

Learning outcome: At the end of the semester, the students will be equipped with graphical skills which shall be useful in translating the graphical ideas into technically appropriate drawing presentations.

REFERENCES:

1) Francis D.K.Ching, "Architectural Graphics", Van Nostrand Reinhold Co., 1985
2) I.H.Morris, " Geometrical Drawing for Art Students", Longmans (1902)
3) Shankar Malik, " Perspective & Sciography", 1994, Allied Publisher

18ARC14: HISTORY OF ARCHITECTURE - I

CONTACT PERIODS: 3 (Lecture) per week
THEORY MARKS: 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3 HRS

OBJECTIVE: *To appreciate the culture and architecture of first societies and early civilizations. (The scope limited from Prehistory, Stone Age to civilizations across continents, early Iron Age); to develop critical reading, discussion and representation skills for architectural history.*

MODULE 1

1. **Introduction** meaning, methods and significance of History and Architecture's connection with History.
2. **Introduction to Pre-Historic Civilization (early cultures):** Primitive man - shelters, settlements, ritual centers (religious and burial systems) E.g.: Oval hut, Nice; settlement at Çatalhöyük; Megalithic architecture (Dolmen tomb, gallery grave, passage grave); Henge Monuments, Stonehenge.

MODULE 2

3. **Introduction to river valley cultures:** generic forces shaping settlements and habitats.
4. **Introduction to Desert and Mountainous Cultures:** Forces shaping settlements and habitats (environmental and cultural influences)
   E.g.: include First civilization of Americas, Andes, Mayans, early societies/ cultures in the Sahara, Thar, North America.
5. **Introduction to Tribal Cultures:** Forces shaping settlements and habitats
   E.g.:include Indigenous Peoples across the globe (environmental, cultural influences on settlements).

MODULE 3

6. **Indus Valley Civilization (Indus and Ghaggar Hakra):** Forces shaping settlements and habitats, E.g.: Mehrgarh, Layout of Mohenjo-Daro, dwellings and monumental architecture (House plan, Community well, Great Bath, Granary)
7. **Mesopotamia (Tigris and Euphrates):** Forces shaping settlements and habitats
   E.g.: Ziggurats at Warka, Ur and Tchoga Zanbil, Palace of Sargon.
8. **Egyptian Civilization (Nile):**Forces shaping settlements and habitats(funerary and sacred spaces), E.g.: Mastabas, Pyramid complex, Temple of Khons, Karnak.

MODULE 4

9. **Chinese Civilization (Yellow and Yangtze):** Forces shaping settlements and habitats.
   E.g.:Niuheliang Ritual Center and dwellings at Banpo, Shang dynasty (Layout of Zhengzhou, Palace and Tomb at Yin), Zhou dynasty (ritual complex and Wangcheng Plan).

10. **Japanese Civilization:** Forces shaping settlements and habitats.
    E.g.:Jōmon and Yayoi Period (dwellings), Kofun Period (burial mounds/ tumulus)

MODULE 5

11. **Introduction to Pre-Classical Civilization:** Mycenaean, Etruscan, Persian (Achaemenid) E.g.: Lion Gate and Treasury of Atreus, Mycenae; Palace of Tiryns (megaron), Etruscan Temples (Juno Sospita, Lanuvium), Tomb of Cyrus, Pasargadae, Palace of Persepolis.
12. **Introduction to Pre-Classical Architecture (Indian sub-continent):** Aryan and earlyMauryan E.g.: Vedic village, Vedic Town and city planning principles (mandalas), Palace at Pataliputra.

NOTE: Progressive marks to include Submission of a portfolio of sketches, Assignments and study models

Learning Outcome: At the end of the course the students will be able to appreciate geographical, geological, social, cultural and political factors that influenced the early society and its architecture. They will also understand the use of materials and structural/construction systems explode during that era.

REFERENCES:

1. Francis D K Ching, Mark M. Jarzombek, Vikramaditya Prakash, "A Global History of Architecture" by Wiley and Sons, 2011.
2. Percy Brown , "Indian Architecture Buddhist and Hindu", Read Books, 2010.
3. Sir Banister Fletcher; edited by Dan Cruickshank , "History of Architecture", CBS Publishers and Distributors, 2003
4. Satish Grover, "Buddhist and Hindu Architecture in India", CBS Publishers and Distributors, 2003

18ENG15: BUILDING STRUCTURES-I

CONTACT PERIODS: 3 (1 Lecture + 2 Pract./Tutorial/Seminars) per week
THEORY MARKS: 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3 HRS

OBJECTIVE: *Introduction to principles of mechanics, structural material & different force system & on structural properties.*

OUTLINE:

MODULE 1

1. Different construction materials with emphasis on structural properties viz. steel , concrete, wood, glass, aluminium. Different types of loads, the structure is being subjected to as per IS 875 Part I & II.

MODULE 2

2. Mechanics - Classification of mechanics, force, characteristics of force, classification of force system, Resultant of force, Composition of force, Axioms in mechanics, Principles of transmissibility, Moment of force, Resultant of coplanar concurrent force system, and Free body diagrams.

MODULE 3

3. Resultant of coplanar noncurrent force system, couple & characteristics of couple, different types of loads, different types of beams, statically determinate & statically indeterminate, different types of supports, problems on support reactions, Equilibrium of Co-planar Concurrent and Non-Concurrent forces.

   Note: In the numerical pertaining to support reactions, loading on the beam shall be restricted to only **point load & uniformly distributed load**].

MODULE 4

4. Center of gravity, centroid, to locate the centroid of composite section from the 1st principles. Moment of inertia, radius of gyration, parallel axis theorem, perpendicular axis theorem. Numericals on determination of moment of inertia of composite section about any defined axis.

   Note: In the question paper restrict the question to the numericals **and not on the derivation of the formula.**

MODULE 5

5. Truss - Triangulation concept, different types of trusses, assumption made in the analysis of truss. Analysis of the truss by the **"Method of Joints" (Simple problems)** to calculate the dead weight of the truss from given data.

Learning outcome: At the end of the course the students will have the ability to understand the mechanics of forces acting on rigid bodies and the structural properties.

REFERENCES:

1) R.K.Bansal, " A Textbook of Engineering Mechanics", Laxmi Publications, 2008
2) S.S. Bhavikatti, " Engineering Mechanics", New Age International, 1994.
3) S. Ramamrutham, " Engineering Mechanics ", Dhanpat Rai Publishing, New Delhi, 2016.

18ART16: BASIC DESIGN & VISUAL ARTS

CONTACT PERIODS: 4 (Studio) per week
PROGRESSIVE MARKS : 100

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

1) **Composition :** Elements of Design & Principles of Design**.**

2) **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) **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.).

4) **Additive and Subtractive of Forms**

5) **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.

6) **Freehand sketching:** Objects and surroundings.

7) Exercises of freehand pencil drawings, sketches of objects, solids, furniture, architectural elements and built forms.

8) Exercises of rendering techniques using pencil and pen of objects, built forms showing light, shade, shadow and textures.

9) **Material Study-2:** Sketching & visual representation of material in various media, like Paper, clay, plaster, wood, wire, wax, photography.

10) **Material Study-3:** Hands-on making of object/joint/structure of own choice with one of the materials studied.

Learning Outcome: At the end of the course the students would have understanding of various principles of design. They would be able to appreciate the scope and limitations of using different materials for creating different forms and shapes.

REFERENCES:

1) Donald Norman , 'Design of Everyday Things" , Basic Books; 2 edition (5 November 2013)
2) John Berger , 'Ways of Seeing' 1972, Penguin, UK
3) Maitland Graves , 'The Art of Color and Design' , McGraw-Hill, 1951
4) Robert Gill, "Rendering with Pen and Ink" , Thames & Hudson; Revised, Enlarged edition (2 April 1984)

18ARC17: MODEL MAKING WORKSHOP

CONTACT PERIODS: 3 (Pract./Tutorial/Seminars) per week
PROGRESSIVE MARKS : 50

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

OUTLINE:

1. Generation of basic forms-cube, cone, dome and arch.
2. Generating of organic and geometrical forms/objects.
3. Generation of forms &Material exploration: hands on skill by using wood, bamboo, metal wire, thread, balsa wood, clothe, paper board etc.
4. Composite forms: Experimental form generation by combining various materials and shapes. (rods, pipes, slabs,etc.)
5. Free Forms: Tensile structures, Funicular Shells using wood, fabric, plastic etc.
6. Architectural forms: making of windows, wall doors, roofs, trees, shrubs, roads, vehicles etc.
7. Introduction to digital modeling like 3D printing and laser cutting.

Note: Student may be encouraged to use environment friendly materials.

Learning Outcome: At the end of the course the students would be able to use variety of materials to construct architectural models and different geometrical forms.

REFERENCES:

1. Arjan Karssen & Bernard Otte, "Model Making: Conceive, Create and Convince", Frame Publishers (November 11, 2014)
2. David Neat , "Model-Making: Materials and Methods", CroWood Press, 2008
3. Jocqui Atkin, "250 tips, techniques, and trade secrets for potters", Barron's Educational Series, 2009
4. Matt Driscoll, "Model Making for Architects", The Crowood Press Ltd, 2013
5. Megan Werner," Model making", Princeton Archit.Press,2010
6. Nick Dunn, "Architectural Model Making", Laurence King Publishing, 2014
7. Roark T. Congdon, "Architectural Model Building", Fairchild Books; 1 edition, 2010

18HUM18: COMMUNICATION SKILLS

CONTACT PERIODS: 2 (Pract./Tutorial/Seminars) 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. **Listening Comprehension:** Comprehension of lectures and speeches to locate key points.
4. **Verbal presentations:** Understanding the differences among seminars, conferences, convention, congress, debates, extempore speeches, panel discussions etc. Students to make brief oral and visual presentations on selected topics. Importance of gesture , posture and expressions in verbal presentations.
5. **Analytical / Technical Writing:** To develop the ability to write concisely and correctly and present ideas in a logical manner.
6. **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.
7. **Interpretation of materials:** such as questionnaires, application forms, analysis of materials such as texts, reports, technical literature.
8. **Notes taking:** From spoken and written English.
9. **Formal / Informal Communication:** 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 and book review:** An article or paper on a chosen topic. Writing of a review on a chosen book on art or architecture**.**
12. **Using the Internet to enhance communication**

Learning outcome: The course would enable the students to communicate effectively using verbal, visual and electronic modes and media.

REFERENCES:

1) A K Jain, A M Sheikh & Pravin S R Bhatia," Professional Communication Skills", S. Chand Publishing, 2001
2) Jones Leo , "Working in English: Teachers Book", Cambridge University Press, 2001.
3) Marsha J. Ludden, "Effective Communication Skills", Jist Works; 2 edition, 2001
4) Mudambadithaya G.S , "Communicative English for Professional Courses", Sapna Book House, 2002.
5) Taylor, Grant , "English Conversation Practice", McGraw Hill Education; 1 edition, 2001.