# Dr. A.P.J. Abdul Kalam Technical University
# Uttar Pradesh, Lucknow




## SYLLABUS 2025-26

## FACULTY OF ARCHITECTURE AND PLANNING, AKTU

## BACHELOR OF ARCHITECTURE (B. ARCH)

## B. ARCH. SEMESTER – III
## ZAR– 301, ARCHITECTURAL DESIGN - III

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 3 | 0 | 6 | 50 | 100 | 150 | - | 100 | - | 250 | 9 | - |

### COURSE OBJECTIVES

- To build a foundational understanding of building byelaws and their implications on residential design.
- To develop the ability to analyse spatial relationships within single-family homes.
- To introduce students to the integration of climatic response and structural systems in residential design.
- To foster the ability to read, interpret, and represent contours and other site features.
- To cultivate sensitivity toward designing and planning on contoured sites through strategic spatial and circulation approaches.

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to building byelaws** | Introduction to regulatory frameworks governing stand-alone residential building, focusing on interpretation and application of building byelaws across diverse plot types, sizes. |
| **MODULE-2** | **Spatial logic in residential design** | Exploration of spatial relationships within a single-family residence, examining functional adjacencies, circulation patterns, volumetric interplay, and the behavioural logic that shapes residential space-making. |
| **MODULE-3** | **Integration of climate and structure** | Exploration of climate responsive design strategies, basic services and structure in designing a single-family residential unit. |
| **MODULE-4** | **Understanding contoured site** | Introduction to contoured site, focusing on understanding and representing slopes and landform features through technical drawings. |
| **MODULE-5** | **Design on contours** | Design on sloping terrain, to create contour responsive small projects. |

### APPROACH

- Residence design to be treated as a major exercise.
- Site visits and case studies to develop a deeper understanding.
- Design on contours considered as minor exercise.
- Suggested exercises for contour sites: Tourist centre, Interpretation centre, Motel, Art hub, and other projects of similar scale.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understand the fundamental building byelaws applicable to residential plots of varying configurations. | L2-Understand |
| **CO2** | Apply spatial design for single-family residences that respond logically to functional adjacency and use patterns. | L3-Apply |
| **CO3** | Analyse climate responsiveness, basic services and structural understanding within a residence, identifying how each influences design decisions. | L4-Analyse |
| **CO4** | Evaluate sloping sites through contour interpretation and site conditions for design. | L5-Evaluate |
| **CO5** | Design small projects on contoured terrain, incorporating structure, and terrain responses. | L6-Create |

**REFERENCE BOOKS**


- Baker, L. (1998). *Houses: How to Reduce Building Costs*. Costford. *(Widely circulated compilation; published edition available).*
- Ching, F. D. K. (2014). *Building Construction Illustrated* (5th ed.). Wiley.
- Ching, F. D. K. (2015). *Architecture: Form, Space, and Order* (4th ed.). Wiley.
- Davis, H. (1999). *The Culture of Building*. Oxford University Press.
- De Chiara, J., Panero, J., & Zelnik, M. (1995). *Time-Saver Standards for Housing and Residential Development* (2nd ed.). McGraw-Hill.
- Francis, A. (1999). *Designing with People in Mind: Architectural Patterns and Human Behaviour*. Architectural Press.
- Hobbs, J. E., & Alauddin, R. (2014). *Site Engineering for Landscape Architects* (6th ed.). Wiley.
- Kendig, L. (2010). *Community by Design: New Urbanism for Suburbs and Small Communities*. APA Planners Press.
- McMorrough, J. (2015). *Materials, Structures, and Standards: All the Details Architects Need to Know but Can Never Find*. Princeton Architectural Press.
- Neufert, E., & Neufert, P. (2012). *Architects' Data* (4th English ed.). Wiley-Blackwell.
- Randhawa, T. S. (2003). *Vernacular Architecture of India*. Roli Books.
- Ruskin, J. (1981). *The Seven Lamps of Architecture*. Dover Publications. *(Classic reprint; still used academically.)*
- Russ, T. H. (2009). *Site Planning and Design Handbook* (2nd ed.). McGraw-Hill.
- Singh, G. (2017). *Building Planning and Drawing*. CBS Publishers.
- Steiner, F., & Butler, K. (2012). *Planning and Urban Design Standards*. Wiley.

## B. ARCH. SEMESTER – III
## ZAR – 302, BUILDING CONSTRUCTION & MATERIALS – III

| PERIODS | | | EVALUATION SCHEME | | | | | | SUBJECT TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 0 | 3 | 25 | 75 | 100 | 50 | - | - | 150 | 4 | 3 HRS |

**COURSE OBJECTIVES**

- To familiarize the students with constituents, properties and uses of conventional and contemporary building materials used in construction.
- To understand the usage of these building materials in simple building works.
- To acquaint students with the usage of building materials such as, types of glass, ceramics and water proofing compounds.
- To develop skills in understanding the complexities and constraints of temporary constructions and defects in buildings with remedies.
- To familiarize students with the basic building construction practices on site/yard.

| | | |
|---|---|---|
| **Module-1** | **Glass and Ceramics.** | Introduction to Glass - Translucent, Transparent and Special glasses, Glass bricks and others.<br>Introduction to Patch and Spider fittings for glazed partitions and shutters.<br>Introduction to Ceramics - Terracotta, Faience, Fireclay, Stoneware, Earth ware, Vitreous China, Porcelain. |
| **Module-2** | **Roof Coverings, Terracing and Water Proofing Compounds.** | Introduction to Clay Tiles (Country, Allahabad, Mangalore tiles etc.), Stone Slating, Shingles, Thatch and others.<br>Introduction to Lime concrete, Mud phuska with brick tiles, Brick coba.<br>Types and application of various waterproofing compounds - Neoprene, Butyl, EPDM, PVC, Polyurethane.<br>Types and application of various additives and admixtures – Cementitious (crystalline) systems, Integral systems, Proprietary systems, Cementitious Coating system. |
| **Module-3** | **Joints.** | Types and details of various Special Construction joints, Expansion joints and Seismic joints. |
| **Module-4** | **Defects and Remedies.** | Complete understanding of various defects in buildings and their remedies.Various types of Defects caused by dampness, applied forces and changes in size. |
| **Module-5** | **Temporary Constructions.** | Types and details of Shoring (Raking, Flying and Needle), Underpinning. Timbering of shallow trenches.<br>Types and details of Centring, shuttering, and scaffolding. |

**APPROACH**

- Interactive lectures and seminars.
- For Material Study: Market/online surveys, and site visits.
- For Construction techniques: Preparation of models, reports, sheets/ sketches.
- Hands on activities in Workshop and Construction yard.
- Incorporate Innovative detailing in materials, techniques and recent advancements.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| CO1 | Understand the importance of conventional and contemporary building materials, relevant terminologies along with their applications. | L2-Understand |
| CO2 | Understand the terminologies for roof coverings and terracing, and analyse various types of additives, admixtures and water proofing compounds with their applications. | L4-Analyse |
| CO3 | Analyse types of Construction joints, Expansion joints and Seismic joints. | L4-Analyse |
| CO4 | Analyse various types of defects in buildings with their remedial measures. | L4-Analyse |
| CO5 | Understand various types of temporary constructions and temporary timbering. | L2-Understand |

**REFERENCE BOOKS**


- Arora, S. P., & Bindra, S. P. (2024). Building construction. Dhanpat Rai Publications Pvt. Ltd.
- Barry, R. (2014). The Construction of Buildings (Vols. I–IV). Wiley-Blackwell.
- Ching, F. D. K., & Adams, C. (2025). Building Construction Illustrated. Wiley.
- Chudley, R. (2024). Construction Technology. Longman.
- Gambhir, M., & Jamwal, N. (2011). Building Materials: Products, Properties and Systems. Tata McGrawHill.
- Gupta, R. K. (2019). Civil Engineering Materials and Construction Practices. Jain Brothers.
- McKay, W. B. (2021). Building Construction. Routledge.
- Mills, C. B. (2011). Designing with Models: A Studio Guide to Making and Using Architectural Models. Thomson & Wadsworth.
- Morris, M. (2006). Architecture and the Miniature: Models. John Wiley & Sons.
- National Building Code of India (2016). Bureau of Indian Standards.
- Punmia, B. C., Jain, A. K., & Jain, A. K. (2017). Building construction. Laxmi Publications.
- Rangwala, S. C. (2022). Building construction. Charotar Publishing House.
- Rangwala, S. C. (2024). Engineering materials (44th ed.). Charotar Publishing House.
- Raghuwanshi, B. S. (2012). A Course in Workshop Technology (Vols. I & II). Dhanpat Rai & Co.
- Roy Chowdhury, K. P. (2005). Engineering materials. Elsevier Butterworth-Heinemann
- Wenninger, M. J. (2014). Spherical models (Reprint edition). Courier Corporation.

## B. ARCH. SEMESTER – III
## ZAR – 303, ARCHITECTURAL GRAPHICS-III

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 0 | 4 | 25 | 75 | 100 | 50 | - | 50 | 150 | 5 | 3 Hrs |

**OBJECTIVES**

- To represent shades and shadows in architectural drawings through sciography techniques.
- To equip with perspective making skills.
- To enhance skills through rendering in sciography.
- To introduce non-conventional methods of graphical representation.
- To enhance ability to render complex urban spaces through advanced sketching techniques.

| | | |
|---|---|---|
| **MODULE-1** | **Sciography** | Values in Shades and shadows, constructing plan shadows (point, line and plane), constructing shadows in elevations (point, line and plane), quick methods for constructing shadows, presentation techniques in Sciography. Shades and shadows in perspective views for exteriors. |
| **MODULE-2** | **Perspective Drawing** | Two-point exterior perspective views, using measure point method, of simple & medium sized buildings- isolated or in-group, showing shades and shadow using different media like- Pencil, Pen-Ink, Water Colour, Poster, and Airbrush etc. Free hand perspective and other innovative methods of perspective presentation techniques should be encouraged. |
| **MODULE-3** | **Architectural Presentation & Graphic Representation** | Visual representation of textures, finishes, and objects in both 2D and 3D architectural drawings. Presentation drawings of small architectural projects—covering plans, elevations, sections, and site layouts—while applying rendering techniques and sciography to enhance depth. |
| **MODULE-4** | **Techniques & Mediums of Art** | Introduction to traditional and experimental printmaking techniques such as woodcut, linocut, and serigraphy (screen printing) in the form of models. Through hands-on practice to explore how different surfaces, tools, and inks contribute to visual texture, depth, and repetition in graphic compositions. |
| **MODULE-5** | **Advanced Urban Sketching & Rendering** | On-site and sketching of complex urban environments, architectural details in perspectives by focusing on precision, composition, tonal control, and material articulation. Mixed-media integration by use of digital media, combining graphite, ink, markers, watercolour washes, and digital overlays. |

**APPROACH**

- Learning observational skills, hand control through freehand sketching and lettering.
- Sketching should be encouraged to understand depiction of ideas and designs.
- On site studies for better understanding of scale, proportion, textures and finishes.
- Aligning students with colour theory, pen & ink, wash techniques, monochrome vs colour contrasts.

| COs | COURSE OUTCOMES | BL LEVEL |
|---|---|---|
| **CO1** | Apply sciography techniques in architectural drawings. | L3- Apply |
| **CO2** | Apply techniques to make perspective drawing and use different mediums. | L3- Apply |
| **CO3** | Apply rendering techniques in sciography to enhance depth. | L6- Create |
| **CO4** | Create models using traditional and experimental techniques. | L4- Apply |
| **CO5** | Apply mix media techniques for sketching and rendering. | L4- Apply |

**REFERENCE BOOKS**


- Bernard Alkins - 147, Architectural Rendering, Walter Foster Art Books, 1986.
- Emily Louise Howard, Block Printing Magic: The essential guide to Designing, carving and taking your artwork further with relief printing.
- Francis Ching, Architectural Graphics, Van Nostrand and Reinhold Company, NY 197.
- IH. Morris, Geometrical Drawing for Art Students - Orient Longman, Madras, 2004.
- Interiors: Perspective in Architectural Design Graphic - SMA Publishing Co. Ltd., Japan, 1967.
- Robert Craig, Block printing: techniques for Linoleum and Wood by Sandy Allison
- Susan Yestes, Beginner's Guide to Linocut

## B. ARCH. SEMESTER – III
## ZAR – 304, STRUCTURES - II

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 2 | 1 | 0 | 15 | 35 | 50 | 50 | - | 50 | 100 | 3 | 3 HRS. |

**COURSE OBJECTIVES**

- To understand the structural behaviour and design concepts of key RCC elements (slabs, beams, columns, footings, stairs),
- To interpret basic reinforcement detailing and IS code provisions.

| | | |
|---|---|---|
| **MODULE-1** | **Basics of RCC Design Philosophy & Codes** | RCC role in buildings, Types of design methods (Working Stress, Limit State (conceptual only), Characteristic load and strength, Partial safety factors, Introduction to IS 456:2000 & relevant clauses for architects, Load combinations. |
| **MODULE-2** | **RCC Slabs and Beams** | Types of slabs: One-way, Two-way (with design concepts) Application of flat slabs, cantilever slabs, flat slab hall Beam types: Singly & doubly reinforced (concept + reinforcement intent), Visual understanding of moment zones, load transfer, Basic reinforcement detailing & cover requirements (slabs & beams). |
| **MODULE-3** | **Columns and Footings** | Column behaviour: axial and bending, Effective height, minimum eccentricity, Basic design intent of column and strut. Foundation types: isolated, combined, pile (basic overview), Square footing design concept Reinforcement layout and anchorage in column- footing |
| **MODULE-4** | **Reinforcement Detailing** | Good practices in RCC detailing, Nominal cover, bar spacing and anchorage, Lapping/splicing bars, Curtailment of bars in flexural members, Reading and preparing simple Bar Bending Schedules (BBS), Common on-site errors. |
| **MODULE-5** | **RCC Elements in Design Application** | RCC stairs - Types, reinforcement details, RCC frames in buildings, column spacing, RCC design for cantilevered elements, Design of single room. |

**APPROACH**

- Code-based teaching using IS 456:2000 clause reading with real plan examples.
- Sketch-based practice for reinforcement zones and load transfer diagrams.
- Case-study method with examples of column–footing failures and correct design intent

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Explain the fundamental RCC design methods (WSM & LSM) and apply IS 456 load combinations in basic architectural decisions. | L2- Understand |
| **CO2** | Apply slab/beam behavior concepts to identify load transfer and reinforcement intent in one-way, two-way slabs and beams. | L3 – Apply |
| **CO3** | Analyse column behavior (axial + bending) and evaluate the suitability of footing types for given architectural layouts. | L4 – Analyse |
| **CO4** | Create correct reinforcement details and a simple Bar Bending Schedule (BBS) for basic RCC elements. | L5 – Create |
| **CO5** | Develop conceptual RCC layouts for stairs, cantilevers, frames, and a small 1-room unit. | L3 – Apply |

**REFERENCE BOOKS**


- Bureau of Indian Standards (BIS). (1987). SP-34: Handbook on reinforcement detailing (Special Publication No. 34). BIS.
- Jain, A. K. (2012). Reinforced concrete limit state design. Nem Chand & Bros.
- Pillai, S. U., & Menon, D. (2010). Reinforced concrete design. Tata McGraw-Hill.
- Ramamrutham, S. (2012). Design of reinforced concrete structures. Dhanpat Rai Publications.
- Varghese, P. C. (2008). Limit state design of reinforced concrete. Prentice-Hall of India.

## B. ARCH. SEMESTER – III
## ZAR – 305, HISTORY OF ARCHITECTURE - II

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 2 | 1 | 0 | 15 | 35 | 50 | 50 | - | 50 | 100 | 3 | 3 HRS |

**COURSE OBJECTIVES**

- To understand the evolution of Indian architecture within socio-cultural, religious, and political contexts.
- To Analyse architectural developments through Buddhist, Jain and Hindu phases.
- To study spatial organization, materials, and techniques used in different historical periods.
- To develop analytical and comparative understanding of architectural forms and spaces.
- To enhance critical appreciation of Indian architectural heritage

| | | |
|---|---|---|
| **MODULE-1** | **Aryan civilization** | Early and later Vedic periods and their comparison. Town planning principles, motifs and patterns. Brick altars and their significance. |
| **MODULE-2** | **Buddhist architecture** | Buddhist philosophy and Architecture: Evolution of stupas, lats, viharas, chaityas—rock-cut and structural; symbolic meaning and form. The spatial and functional connotations. |
| **MODULE-3** | **Hindu Architecture – Indo-Aryan School** | Hindu Philosophy, iconography, and geometric principles of temple design. Development of Nagara style. Regional schools: Gujarat, Orissan, Khajuraho. Comparison in spatial attributes, scale and details. |
| **MODULE-4** | **Hindu Architecture – Dravidian School** | Development of the Dravidian style. contributions of Chalukyas, Pallavas, Cholas, and Pandyas. Temple-town morphology under the Nayaks. Comparative study of Dravidian and Nagara forms—structure, material, and ornamentation. |
| **MODULE-5** | **Jain Architecture** | Jain philosophy and Architecture: Evolution of temple forms at Mount Abu, Palitana, and Girnar; Comparative analysis of Buddhist and Jain architectural expression. |

**APPROACH**

- Interactive lectures, discussions, and visual presentations.
- Analytical sketching and comparative studies of monuments.
- Field visits and documentation exercises.
- Seminars on architectural philosophies and stylistic developments.

| COs | COURSE OUTCOME | BL LEVEL |
|---|---|---|
| **CO1** | Understand key features of Aryan and Vedic architecture, including planning ideas, motifs, and brick altars. | L2 – Understand |
| **CO2** | Understand the evolution and symbolism of Buddhist architectural forms such as stupas, chaityas, viharas, and lats. | L2 – Understand |
| **CO3** | Analyse principles of the Nagara temple tradition across major regional styles. | L4 – Analyse |
| **CO4** | Analyse Dravidian temple architecture and the development of temple-town morphology. | L4 – Analyse |
| **CO5** | Analyse Jain temple architecture and its comparison with Buddhist traditions. | L4 – Analyse |

**REFERENCE BOOKS**


- Brown, P. (1976). Indian architecture: Buddhist and Hindu periods. D. B. Taraporevala Sons.
- Bubber, D. K. (2005). The spirit of Indian architecture.
- Fergusson, J. (1910). History of Indian and Eastern architecture (Vol. 2). Cambridge University Press.
- Grover, S. (1980). The architecture of India: Buddhist and Hindu periods. Vikas Publishing.
- Grover, S. (2005). Masterpieces of traditional Indian architecture.
- Havell, E. B. (1913). Indian architecture: Its psychology, structure, and history from the first Muhammadan invasion to the present day. J. Murray.
- Jain, P. C. (2015). Early Indian art and architecture. Bharatiya Kala Prakashan.
- Kramrisch, S. (1946). The Hindu temple (Vols. 1 & 2). Motilal Banarsidass.
- Michell, G. (1995). Architecture and art of Southern India: Vijayanagara and the successor states, 1350–1750 (The New Cambridge History of India). Cambridge University Press.
- Rajan, K. V. S. (1998). Rock-cut temple styles: Early Pandyan art and the Ellora shrines. Somaiya Publications.
- Tillotson, G. H. R. (1998). Paradigms of Indian architecture: Space and time in representation and design. Routledge.

## B. ARCH. SEMESTER – III
## ZAR – 306, BUILDING SERVICES-I (PLUMBING & ELECTRICAL SYSTEMS)

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 2 | 1 | 0 | 15 | 35 | 50 | 50 | - | 50 | 100 | 3 | 3 HRS |

**COURSE OBJECTIVES**

- To understand the basic principles, components, and systems involved in building services.
- To enable integration of water supply, plumbing, sanitation, electrical, and lighting systems in architectural design.
- To familiarize with service layouts and technical detailing for different building types.
- To develop sensitivity toward efficient service design

| | | |
|---|---|---|
| **MODULE-1** | **Water Supply Systems** | Sources of water; Water quality; Treatment and purification; Storage and distribution; Overhead and underground tanks; Pumps and pressure systems; Pipe materials and fittings; Hot and cold water supply; Flow control; Firefighting water systems |
| **MODULE-2** | **Plumbing and Sanitation Systems** | Purpose and principles of sanitation, Collection and conveyance of waste matter, Quantity and quality of refuse, Design and construction of sewer and sewer appurtenances, Sanitary fittings, fixtures and appliances; Slope and gradient design; Rainwater harvesting; Sewage disposal; Septic tanks; Plumbing codes and standards |
| **MODULE-3** | **Electrical Systems in Buildings** | Generation, Transmission and distribution of electricity. Basic electrical terms, Supply systems, Single and three-phase supply, Distribution boards, Circuits, Wiring systems, Load calculation, Power requirements, Safety measures, Renewable energy integration, Earthing, Protection of electrical installations and human lives, Protection against Lightning, Electrical codes. |
| **MODULE-4** | **Illumination** | Lighting principles; Natural and artificial lighting; Luminaires and lamps; Lighting levels and lux standards; Energy-efficient lighting; Task, ambient and accent lighting; Lighting controls and automation; Emergency lighting; Façade lighting; Lighting standards and sustainability |
| **MODULE-5** | **Service Layouts and Design Considerations** | Electrical layout plans; Methods for Lighting calculations, Plumbing and sanitary layouts; Toilet/kitchen/utility details (plan, section, fixture coordination); Service shafts and risers; Vertical and horizontal distribution; Coordination with structural and architectural design; Residential, commercial, institutional and high-rise considerations; Accessibility and maintenance |

**APPROACH**

- Interactive lectures and tutorials
- Case studies and field visits
- Practical service layout exercises
- Use of standards and codes

| COs | COURSE OUTCOME | BL LEVEL |
|---|---|---|
| **CO1** | Understand the working principles of water supply and distribution systems in buildings | L2 – Understand |
| **CO2** | Integrate plumbing and sanitation systems based on building type and scale | L3- Apply |
| **CO3** | Understand working principles of electrical and lighting systems in buildings | L2 – Understand |
| **CO4** | Integrate electrical and lighting systems based on building type and scale | L3- Apply |
| **CO5** | Create electrical, lighting, and plumbing service layout drawings for small or medium scale projects. | L6 - Create |

**REFERENCE BOOKS**


- Bureau of Indian Standards. (2016). National building code of India 2016 (Latest ed.).
- Bureau of Indian Standards. (1993). IS 1172: Code of basic requirements for water supply, drainage and sanitation (4th rev.).
- Central Public Works Department. (2013). General specifications for electrical works (Part 1: Internal). Government of India.
- De Chiara, J., & Callender, J. (1990). Time-saver standards for building types (3rd ed.). McGraw-Hill.
- Hall, F., & Greeno, R. (2024). Building services handbook (10th ed.). Routledge.
- Indian Plumbing Association. (n.d.). A guide to good plumbing practices.
- Karlen, M., & Benya, J. R. (2017). Lighting design basics (3rd ed.). Wiley.
- Lechner, N. (2014). Heating, cooling, lighting: Sustainable design methods for architects (4th ed.). Wiley.
- Raina, K. B., & Bhattacharya, S. K. (2007). Electrical design estimating and costing. New Age International.
- Rangwala, S. C. (2016). Water supply and sanitary engineering (Environmental engineering). Charotar Publishing House.

## B. ARCH. SEMESTER – III
## ZAR – 307, VERNACULAR ARCHITECTURE

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 2 | 1 | 0 | 15 | 35 | 50 | 50 | 0 | 50 | 100 | 3 | 3 HRS |

**COURSE OBJECTIVES**

- To sensitize students to the principles of vernacular architecture as a foundation for sustainable, climate-responsive, and culturally relevant design.
- To introduce indigenous building traditions that are cost-effective, ecologically balanced, and rooted in local resources and community practices.
- To develop a vocabulary and analytical framework for describing and interpreting vernacular-built forms in meaningful architectural terms.
- To examine variations in built environments across different climatic and geographical regions of India, emphasizing their environmental performance.
- To explore contemporary applications of vernacular wisdom through case studies that demonstrate adaptation and integration in modern architectural practice.

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to Vernacular Architecture** | Definition and relevance of Vernacular Architecture, its nature, purpose & scope. Importance of sustainable material, resources and climate sensitivity. Creativity and design in limited means |
| **MODULE-2** | **Vernacular as shelter** | Study of examples of vernacular architecture in history of world architecture with special emphasis on world architecture to understand shelter based on functions, building materials, construction techniques, art & craft, local conditions, traditions, climate & geography, religion & culture. |
| **MODULE-3** | **Lessons from Vernacular and its vocabulary** | Issues of concern in present day architecture and causative forces of the vernacular form. Study of vernacular settlements on basis of parameters like Sense of Place, Spontaneity & Variation, Control, Open Ended Form-Relationship, Symbols & Meanings, etc. |
| **MODULE-4** | **Study of Indian Vernacular Settlements** | Documentation and Analysis of selected vernacular settlements in Indian subcontinent. Examine them against pre-defined parameters along with Indigenous building materials and construction elements in response to climate, socio-cultural settings, availability of materials, etc. |
| **MODULE-5** | **Vernacular wisdom in Contemporary architecture** | Relevance of vernacular wisdom in contemporary architecture. Study works of architects such as Laurie Baker, Hasan Fathy, Gerard Da Cunha,B.V doshi, Charles Correa, Raj Rewal etc whose works are influenced by the vernacular architecture of that region. |

**APPROACH**

- Expert lectures with visual demonstrations and videos.
- Case studies by students of various vernacular settlements in the Indian Subcontinent.
- Preparing Drawings and Models of Settlements and details of its various elements.
- Presentations and Seminars by students on Case Studies.
- Short Field Visits to study and various aspects of the settlements.
- Documentation via drawings and sketches.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Explain the fundamental principles and relevance of vernacular architecture. | L2-Understand |
| **CO2** | Identify and compare indigenous building materials and techniques of the vernacular settlements | L5-Evaluate |
| **CO3** | Study the architectural vocabulary of vernacular settlements to describe and interpret vernacular built forms.<br>Sketch Up interface. | L5-Evaluate |
| **CO4** | Evaluate variations in settlement patterns and built forms in different regions of India. | L5-Evaluate |
| **CO5** | Demonstrate the relevance of vernacular architecture in contemporary practice. | L4-Analyse |

**REFERENCE BOOKS**


- Bhatia, G. (1994). Laurie Baker: Life, work, writings. Penguin Books.
- Jain, K., & Jain, M. (2000). Architecture of the Indian desert. Aadi Centre.
- Kagal, C. (Ed.). (1986). Vistāra: The architecture of India. The Festival of India.
- Oliver, P. (1997). Encyclopedia of vernacular architecture of the world. Cambridge University Press.
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## B. ARCH. SEMESTER – IV
## ZAR– 401, ARCHITECTURAL DESIGN - IV

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 3 | 0 | 6 | 50 | 100 | 150 | - | 100 | - | 250 | 9 | - |

**COURSE OBJECTIVES**

- To develop an understanding of fundamental structural systems and their relevance to architectural design.
- To introduce the organisational principles and typological characteristics of small to medium scale campus environments.
- To analyse site-specific and climatic parameters that influence campus planning and spatial decision-making.
- To understand spatial organisation, zoning strategies, and circulation frameworks at a campus scale

| | | |
|---|---|---|
| **MODULE 1** | **Introduction to types of structural systems** | Understanding fundamental structural systems. Understanding structural behaviour and its implications on spatial organisation and form development. |
| **MODULE-2** | **Introduction to campus typologies** | Understanding small to medium scale campus types and their organisational principles. Project formulation, functional adjacencies, circulation hierarchies, and space standards relevant to academic, institutional, or cultural campuses. |
| **MODULE-3** | **Site analysis for campus design** | Understanding site conditions, including climate, orientation, topography, vegetation, access, and surroundings. Introduction to site analysis parameters that guide campus planning and design decisions. |
| **MODULE-4** | **Spatial organisation and design strategies** | Analysis of spatial organisation at campus scale, focusing on zoning, clustering of functions, open-spaces, pedestrian circulation, vehicular access, and service areas. |
| **MODULE -5** | **Campus design** | Integration of climate, structure, and services in campus project. |

**APPROACH**

- Case studies to acquaint students to typologies of campuses.
- Explore types of structural systems through physical models.

- Suggested design exercises include sports schools, primary/secondary school, women empowerment centres, rehabilitation centres, cultural campus, etc.
- Learnings about structural systems could be applied in campus design

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understand the fundamental structural systems and explain their influence on basic spatial organisation decisions. | L2-Understand |
| **CO2** | Apply principles of campus typologies and organisational frameworks to assess programmatic and spatial requirements. | L3-Apply |
| **CO3** | Analyse site-related determinants—such as climate, topography, orientation, access, and surroundings—and derive design parameters for campus development. | L4-Analyse |
| **CO4** | Evaluate spatial organisation strategies, zoning logics, and circulation systems to determine their suitability for campus-scale design scenarios. | L5-Evaluate |
| **CO5** | Design of buildings based on varied structural systems. Design of small to medium campus, integrating climate, structure, and services. | L6-Create |

**REFERENCE BOOKS:**


- Allen, E., & Iano, J. (2019). Fundamentals of Building Construction: Materials and Methods (7th ed.). Wiley.
- Barnett, J. (2011). Urban Design as Public Policy. McGraw-Hill.
- Brown, G. Z., & DeKay, M. (2014). Sun, Wind, and Light: Architectural Design Strategies (3rd ed.). Wiley.
- Ching, F. D. K. (2014). Building Construction Illustrated (5th ed.). Wiley.
- Ching, F. D. K. (2015). Architecture: Form, Space, and Order (4th ed.). Wiley.
- Ching, F. D. K., & Adams, C. (2013). Building Structures Illustrated: Patterns, Systems, and Design (2nd ed.). Wiley.
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- De Chiara, J., Panero, J., & Zelnik, M. (1995). Time-Saver Standards for Housing and Residential Development (2nd ed.). McGraw-Hill.
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- Russ, T. H. (2009). Site Planning and Design Handbook (2nd ed.). McGraw-Hill.
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## B. ARCH. SEMESTER – IV
## ZAR – 402, BUILDING CONSTRUCTION & MATERIALS – IV

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 0 | 3 | 25 | 75 | 100 | 50 | - | - | 150 | 4 | 3 Hrs |

**COURSE OBJECTIVES**

- To familiarize the students with constituents, properties and uses of conventional and contemporary building materials in construction.
- To understand the usage of these building materials in simple building works.
- To acquaint students with usage of building materials such as metals, adhesives, plastics and Rubber.
- To develop skills in understanding the complexities and constraints of Door, windows Partition and speedy construction.
- To familiarize students with the basic building construction practices on site/yard.

| | | |
|---|---|---|
| **MODULE-1** | **Metal (Ferrous & Non-Ferrous)** | Introduction to Metals (Ferrous & Non Ferrous) and its characteristics, usage. Ferrous Metals: Pig iron, cast iron, wrought iron. Mild steel sections: sheets (plain & corrugated), flats, bars (round & square), angles (equal and unequal), rolled steel sections (I beams, channels, tees). Hollow tubular sections used in building industry. Stainless steel and alloys. Non-Ferrous Metals: Copper and copper-based alloys (brass & bronze), tin, cadmium, chromium, zinc, lead, and nickel. Introduction and its application for Metal Coatings (Electroplating, anodizing) |
| **MODULE-2** | **Adhesives, Plastic and Rubber** | Introduction to types of Adhesives and Plastics - characteristics and uses. Natural adhesives: Animal, casein, bituminous. Polyvinyl acetate, Urea formaldehyde, phenol formaldehyde, melamine formaldehyde, resorcinol formaldehyde, epoxide resins, rubber adhesive, Polythene, polyvinyl chloride, polypropylene, polymethyl methacrylate, acrylonitrile butadiene styrene, melamine formaldehyde, polyurethane, silicon resin and Rubber. |
| **MODULE-3** | **Doors, Windows and Partition (Metal & UPVC)** | Introduction to Doors & Windows (Metals): Mild steel L and Z sections, pressed steel sections.Types and application of Shutters Operational Mechanisms: Rolling shutters, collapsible shutters. Complete understanding of Doors, Windows & Partitions (Aluminium &UPVC): Door frames & shutters, window frames & shutters, partition frameworks and fixing with other suitable materials. |
| **MODULE-4** | **Prefabrication, Pre-casting** | Introduction to Prefabrication and Precasting: Systems of prefabrication – open prefab system, large panel prefab system, types of joints, precasting methods, materials, on-site and off-site prefabrication, components. |

| | | |
|---|---|---|
| | | Introduction and application of Precast RCC Frames: Beams and column frames, wall frames, hollow core slabs, planks, and tee slabs resting on beam & column and wall frames. Connections (beam to column, column to column, beam to slab, wall to slab) |
| **MODULE-5** | **Modular Co-ordination** | Introduction to Modular Coordination: Aims, basis, planning, and dimensioning. Assembly of components, tolerances, positioning of functional elements such as slabs, walls, staircases. |

**APPROACH**

- Interactive lectures & seminars.
- For Material Study: Market/online surveys, & site visits.
- For Construction techniques: Preparation of models, reports, sheets/ sketches.
- Hands on activities in Workshop and Construction yard.
- Incorporate Innovative detailing in materials, techniques and recent advancements.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understand the importance of different types of metals. | L2-Understand |
| **CO2** | Understand and Analyse various adhesives, plastics, and rubber types commonly used in building construction. | L4-Analyse |
| **CO3** | Create and demonstrate the operational mechanisms of doors, windows, and partitions (metal & UPVC). | L6-Create |
| **CO4** | Understand and analyses prefabrication, precasting systems and its usage | L4-Analyse |
| **CO5** | Understand and Analyse, modular coordination for efficient building Speedy construction. | L4-Analyse |

**REFERENCE BOOKS**


- Arora, S. P., & Bindra, S. P. (2024). Building construction. Dhanpat Rai Publications Pvt. Ltd.
- Barry, R. (2014). The Construction of Buildings (Vols. I–IV). Wiley-Blackwell.
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- Rangwala, S. C. (2022). Building construction. Charotar Publishing House.
- Rangwala, S. C. (2024). Engineering materials (44th ed.). Charotar Publishing House.
- Raghuwanshi, B. S. (2012). A Course in Workshop Technology (Vols. I & II). Dhanpat Rai & Co.
- Roy Chowdhury, K. P. (2005). Engineering materials. Elsevier Butterworth-Heinemann
- Wenninger, M. J. (2014). Spherical models (Reprint edition). Courier Corporation.

## B. ARCH. SEMESTER – IV
## ZAR – 403, ARCHITECTURAL SERVICES-II (MECHANICAL)

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 2 | 1 | 0 | 15 | 35 | 50 | 50 | 0 | 50 | 100 | 3 | 3 Hrs |

**COURSE OBJECTIVES**

- Understand fundamental principles of HVAC and vertical transport systems in multi-storey buildings.
- Interpret building drawings and schematics related to these services.
- Compare system types and evaluate their suitability for different building typologies.
- Integrate services with architectural design focusing on space, comfort, and sustainability.
- Gain practical exposure through site visits and professional interactions.

| | | |
|---|---|---|
| **MODULE-1** | **Fundamentals & Design Principles** | Principles of thermal comfort and indoor environmental quality. Fundamentals of air-conditioning system design. Overview of the refrigeration cycle and psychrometric chart. |
| **MODULE-2** | **Types & Components of AC Systems** | Window, split, packaged units, evaporative coolers: working, applications. Central systems: chillers, cooling towers, pumps, plant layout. VRF/VRV, energy recovery, BMS/BAS integration. Selection criteria by space, climate, and load. |
| **MODULE-3** | **Air Distribution, Controls & Coordination** | Air distribution methods: AHU, fan coil units (FCUs), fans, filters, ducts, outlets, diffusers, and dampers. Case examples and schematic representation in multi-storey building design. |
| **MODULE-4** | **Lift Fundamentals, Types, Components & Technologies** | Types of lifts: Electric traction lifts, hydraulic lifts, machine-room-less (MRL) lifts, and pneumatic/vacuum lifts. Special lifts: hospital lifts, freight lifts, observation lifts, and firefighting lifts. Lift components: car, counterweight, hoistway, safety gear, control panel, guide rails, doors. Performance metrics: rated load/speed, RTT, handling capacity, grouping and DCS. Selection criteria, Grouping of lifts, zoning, and design standards of lift lobbies. |
| **Module-5** | **Escalators & Moving Walks** | Fundamentals and components of escalators and moving walks. Working mechanism and safety features. Design standards and spatial integration in commercial and public buildings. Selection criteria and user capacity planning. |

**APPROACH**

- Interactive lectures with visual demonstrations and short videos.
- Site visits and Case studies to observe real installations and document system integration.
- Guest lectures by industry professionals.
- Studio-based exercises: schematic layout drawings for AC and lift cores.
- Integration tasks: applying service knowledge in ongoing architectural design projects.

| COs | COURSE OUTCOMES | BL LEVEL |
|---|---|---|
| CO1 | Explain fundamental principles of air-conditioning and comfort design. | L2-Understand |
| CO2 | Compare and select appropriate AC systems based on application and sustainability. | L3- Apply |
| CO3 | Develop schematic layouts for air distribution and coordinate services. | L4-Analyse |
| CO4 | Explain and apply principles of lift systems, components, and standards. | L3- Apply |
| CO5 | Integrate escalator and moving walk systems into building design effectively. | L5-Evaluate |

**REFERENCE BOOKS**


- Burberry, P. (1997). Mitchell's building construction: Environment & services (8th ed.). Longman.
- Grondzik, W. T., Kwok, A. G., Stein, B., & Reynolds, J. S. (2019). Mechanical and electrical equipment for buildings (13th ed.). John Wiley & Sons.
- Wang, S. K. (2000). Handbook of air conditioning and refrigeration (2nd ed.). McGraw-Hill.
- Rangwala, S. C. (2014). Building services (water supply, sanitation, fire protection, HVAC, lifts & escalators). Charotar Publishing House.
- American Society of Heating, Refrigerating and Air-Conditioning Engineers. (2021). ASHRAE handbook—Fundamentals. ASHRAE.
- Bureau of Indian Standards. (2016). National building code of India 2016 – Part 8: Building services (Section 3: Air-conditioning, lifts, and escalators). BIS.

## B. ARCH. SEMESTER – IV
## ZAR – 404, STRUCTURE-III

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL / STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 2 | 1 | 0 | 15 | 35 | 50 | 50 | 0 | 50 | 100 | 3 | 3 Hrs |

**COURSE OBJECTIVES**

- To identify and explain key steel structural elements,
- To understand their architectural implications and applications in buildings.

| | | |
|---|---|---|
| **MODULE 1** | **Introduction to Steel as a Structural Material** | Properties of steel relevant to buildings: strength, ductility, recyclability Common Indian standard rolled steel sections (ISMB, ISA, etc.) Use of IS: 800 and steel tables. Architectural advantages of steel: long spans, speed of construction, lightness. |
| **MODULE 2** | **Connections in Steel Structures** | Types of connections: bolted, welded, riveted – visual and functional differences<br>Introduction to gusset plates, base plates, Failure types (basic concept – rupture, tear-off) Common architectural issues with connections (e.g., visibility, fire protection, and aesthetics). |
| **MODULE 3** | **Tensionand Compression Members** | Type of tension and compression steel members, Concept of slenderness ratio, Simple vs built-up sections (double angle, box sections), and Visual identification in real structures: trusses, frames, braces. |
| **MODULE 4** | **Steel in Large- Span Structures** | Components and function of plate girders, beams, purlins, columns, Trusses, definition of Truss, Perfect Truss, Imperfect truss, types of Trusses and suitability, analysis of simple trusses by analytical method Introduction to roof trusses: types (Fink, Pratt, Howe etc.), Use of steel in large-span buildings: auditoriums, airports, industrial sheds etc. |
| **MODULE 5** | **Steel in Architectural Foundation** | Grillage foundations: basic idea, application in steel column base, Architectural significance of exposed steel in facades, stairs, atriums, Use of steel with glass, tensile fabrics, composite structures. |

**APPROACH**

- Demonstration-based learning using steel tables and physical/visual samples of rolled sections.
- Connection details study using photographs/models of bolted, welded joints, gusset plates, and base plates.
- Study model-based activity and analytical method demo for simple trusses.
- Case-based teaching using examples

| COs | COURSE OUTCOMES | BT LEVEL |
|---|---|---|
| **CO1** | Understand properties of structural steel and identify common Indian standard sections using IS 800 and steel tables. | L2- Understand |
| **CO2** | Analyse differences between bolted and welded connections and evaluate basic connection failure types. | L4 – Analyse |
| **CO3** | Apply concepts of slenderness and identify tension/compression members in trusses, frames, and braces. | L3 – Apply |
| **CO4** | Analyse behavior of trusses and construct basic analytical diagrams of simple roof trusses. | L4 – Analyse |
| **CO5** | Describe grillage foundations and apply concept of steel integration in facades, stairs, and composite structures. | L2- Understand |

**REFERENCE BOOKS**


- Duggal, S. K. (2017). Design of steel structures. McGraw-Hill Education.
- Subramanian, N. (2018). Design of steel structures. Oxford University Press.
- Negi, L. S. (2011). Design of steel structures. Tata McGraw-Hill.
- Bresler, B., Lin, T. Y., & Scalzi, J. B. (1968). Design of steel structures. John Wiley & Sons.
- Bureau of Indian Standards (BIS). (2007). IS 800: General construction in steel — Code of practice. BIS.
- Duggal, S. K. (2017). Design of steel structures. McGraw-Hill Education.
- Negi, L. S. (2011). Design of steel structures. Tata McGraw-Hill.
- Subramanian, N. (2018). Design of steel structures. Oxford University Press.

## B. ARCH. SEMESTER – IV
## ZAR – 405, HISTORY OF ARCHITECTURE-III

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL / STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 2 | 1 | 0 | 15 | 35 | 50 | 50 | 0 | 50 | 100 | 3 | 3 Hrs |

**COURSE OBJECTIVES**

- To introduce the philosophical foundations of Islamic architecture, focusing on religious beliefs, rituals, and spatial symbolism.
- To study the evolution of early Indo-Islamic architecture under the Sultanate dynasties, emphasizing structural adaptations, hybrid techniques, and emerging building types.
- To explore provincial variations in Islamic architecture highlighting regional materials, climate responses, and stylistic identities.
- To understand the morphology of fortified cities and citadels.
- To Analyse the stylistic development of Mughal, Oudh, and early Colonial architecture

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to Islamic Architecture in India** | Introduction to Islamic philosophy and spatial symbolism; core elements (domes, arches, minarets, iwans, courtyards, water, geometry, calligraphy); Early Indo-Islamic synthesis with Hindu construction techniques. |
| **MODULE-2** | **Sultanate Architecture (Delhi Sultanate) and Provincial Islamic Architecture** | Architecture under Slave, Khalji, Tughlaq, Sayyid, Lodhi, and Sher Shah Suri; evolution of the Indo-Islamic style; structural adaptations, hybrid forms, and key monuments.<br>Regional styles of Gujarat, Bengal, Jaunpur and Deccan; local materials, climate response, ornamentation, vaulting systems; comparison with Delhi Sultanate forms. |
| **MODULE-3** | **Cities and citadels** | Morphology of Jaisalmer, Orchha, Datia, Mandu; typologies—havelis, stepwells, gateways, baradaris; landscape-led planning and defence-based urban form. |
| **MODULE-4** | **Early and Later Mughal Architecture** | Mughal architecture under Timurids in India—Babur, Humayun, Akbar, Jehangir and Shah Jahan. Evolution of planning, garden typologies, structural systems, material, scale, proportion and distinct features. Oudh architecture in Lucknow; manzils, baghs, kothis, imambaras, karbalas: their planning, materials and techniques. |
| **MODULE-5** | **Colonial Architecture** | Colonial works (Delhi, Mumbai, Kolkata, and Lucknow) emphasizing their planning criteria and architectural features. Incorporation of local motifs and materials. |

**APPROACH**

- Interactive lectures supported with visual, digital, and diagrammatic media.
- Seminars and group discussions
- Analytical sketching and case-study presentations.
- Documentation and comparative analysis of architectural styles, regional variations, and urban forms.

| COs | COURSE OUTCOMES | BL LEVEL |
|---|---|---|
| **CO1** | Understand the philosophical and symbolic foundations of Islamic architecture and their influence on spatial forms. | L2-Understand |
| **CO2** | Understand architectural features of the Sultanate period and compare regional (provincial) Islamic styles in Jaunpur, Gujarat, Bengal, and the Deccan. | L2-Understand |
| **CO3** | Understand the planning principles and architectural components of fortified cities and citadels. | L2-Understand |
| **CO4** | Analyse the stylistic evolution of Early and Later Mughal architectural styles | L4-Analyse |
| **CO5** | Analyse the stylistic evolution of Colonial architecture in terms of form, planning, and cultural fusion. | L4-Analyse |

**REFERENCE BOOKS**


- Brown, P. (1942). Indian architecture (Islamic period). D. B. Taraporevala Sons.
- Hoag, J. D. (1977). Islamic architecture (History of World Architecture). Harry N. Abrams.
- Hillenbrand, R. (2000). Islamic architecture: Form, function and meaning (rev. ed.). Edinburgh University Press.
- Barkman, A. Making sense of Islamic art and architecture.
- Koch, E. (1991). Mughal architecture: An outline of its history and development (1526–1858).
- Burton-Page, J., & Michell, G. (Eds.). (2008). Indian Islamic architecture: Forms and typologies, sites and monuments.
- Tandan, B. (2008). The architecture of Lucknow and Oudh, 1722-1856: Its evolution in an aesthetic and social context.
- Alamgir, K. (2024). Architectural heritage of West Bengal: Early Muslim period.
- Michell, G., Philon, H., & Martinelli, A. (2018). Islamic architecture of Deccan India: 14th to 18th centuries.
- Tadgell, C. (n.d.). World architecture.

## B. ARCH. SEMESTER – IV
## ZAR – 406, CYBER SECURITY

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MT | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 1 | 0 | 15 | 35 | 50 | - | - | - | 50 | 2 | - |

**COURSE OBJECTIVES**

- To understand the basics of artificial intelligence and cyber security in architecture.
- To learn use of AI in design, smart spaces, and building management.
- To identify cyber threats and know basic security solutions for architecture.
- To explore how AI can improve security in smart buildings and the ethical issues involved.
- To know the basics of cyber laws, digital rights, and professional ethics in architecture.

| | | |
|---|---|---|
| **MODULE -1** | **Introduction to Artificial Intelligence (AI) and Cyber Security** | Definition and history of AI & Cyber Security<br>Branches and applications of AI in architecture<br>Principles of Cyber Security (CIA triad: Confidentiality, Integrity, Availability) Need for cyber awareness in architecture |
| **MODULE-2** | **AI Technologies in Design and Built Environment** | Overview of AI in building design, simulation, and smart spaces<br>Tools leveraging AI in architectural workflows (BIM, generative design) Case studies of AI-enhanced architectural projects |
| **MODULE-3** | **Fundamentals of Cyber Security for Built Environments** | Common cyber threats: malware, phishing, social engineering<br>Digital device security (IoT in smart buildings/campuses)<br>Importance of secure digital workflows in design and data management. |
| **MODULE-4** | **AI for Security Enhancement in Smart Architecture** | AI systems for surveillance, anomaly detection, and facility management. Integration of AI with building automation and IoT<br>Ethical considerations in deploying AI-driven security measures |
| **MODULE-5** | **Cyber Laws, Ethics, and Best Practices** | Overview of cyber laws, digital rights, and data privacy in India<br>Digital design copyrights and ethical use of AI<br>Social media and professional digital presence security |

**APPROACH**

- Introduce core concepts of AI and cyber security, emphasizing their importance in architectural design, smart environments, and digital workflows.
- Teach practical AI technologies in building design and management and raise awareness of common cyber threats and safety measures relevant to architecture.

- Cover ethical use of AI, data privacy, cyber laws, and professional conduct to prepare students for responsible digital practice in architecture.

| COs | COURSE OUTCOMES | BT LEVEL |
|---|---|---|
| **CO1** | Explain the basic concepts, relevance, and implications of AI and Cyber Security in the architectural context. | L2-Understand |
| **CO2** | Identify and describe applications of AI technologies in modern architectural practice. | L2-Understand |
| **CO3** | Recognize and recommend basic security measures relevant to architectural practice and smart spaces. | L3-Apply |
| **CO4** | Assess the benefits and challenges of using AI to enhance security in architectural environments. | L5-Evaluate |
| **CO5** | Summarize ethical, legal, and professional responsibilities regarding digital and cyber practices in architecture. | L4-Analyse |

**REFERENCE BOOKS**


- Coombs, T. (2022). Artificial intelligence & cyber security.
- Goutam, R. K. (2021). Cybersecurity fundamentals.
- Kaushal, P. (Ed.). (2025). Cyber security techniques architecture and design: Cyber-attacks detection and prevention.
- Kucharavy, A. (2024). Large language models in cybersecurity: Threats, exposure and mitigation.
- Lazo, M., & Ryan, J. (2024). AI data privacy and protection: The complete guide to ethical AI, data privacy, and security.
- Priyadarshini, I., & Sharma, R. (2022). Artificial intelligence and cybersecurity: Advances and innovations.
- Sharma, D., Tomar, G. S., & Jha, A. (2025). Artificial intelligence for cyber security and Industry 4.0.

**B. ARCH. SEMESTER – IV**
**ZAR 407, COMPUTER APPLICATION-III**

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 0 | 2 | 15 | 35 | 50 | 0 | 50 | 50 | 100 | 3 | - |

**COURSE OBJECTIVES**

- To introduce advanced digital modelling through parametric modelling software (like Rhinoceros or similar) for architectural form, space, and visualization.
- To build competency in curve-based modelling, solid modelling, and NURBS geometry for design development.
- To enable students to prepare architectural diagrams, render compositions, and presentation sheets using vector-based software (like Adobe Illustrator or similar)
- To integrate digital workflows for architectural design, from concept to presentation.
- To encourage computational thinking and precision modelling for design problem-solving.

**SECTION – A: RHINOCEROS**

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to parametric modelling software** | Introduction to the software interface, viewports, layers, units. Concept of NURBS geometry, control points, surfaces & solids. Importing CAD drawings and setting up architectural templates. |
| **MODULE-2** | **2D Drafting & 3D Modelling** | Creating 2D plans, sections & diagrams using curves. 3D form-generation techniques: extrude, loft, sweep, revolve, Boolean operations. Architectural modelling workflows: walls, slabs, openings, stairs, site elements. Advanced surfacing & organic form exploration for conceptual design. Working with blocks and components for repetitive architectural elements. |
| **MODULE-3** | **Visualization, Rendering & Documentation** | Applying materials, textures, and lighting. Camera views, rendering settings, export formats. Creating exploded views, axonometric drawings, shadows & ambient occlusion. Exporting 2D linework and 3D views. |

**SECTION – B: ILLUSTRATOR**

| | | |
|---|---|---|
| **MODULE-4** | **Interface & Drawing Essentials using vector-based software** | Introduction to workspace, artboards, layers. Vector drawing fundamentals: paths, strokes, fills, anchor points. Working with shapes, pen tool, gradient tool, image trace. Typography, iconography & architectural graphic standards. |
| **MODULE-5** | **Architectural Presentation using vector-based software** | Converting 3D model outputs to clean architectural drawing. Layout of presentation sheets, posters & competition boards. Exporting print-ready and digital-ready files. |

**Note:** MJ in this course refers to 'Practical', preferably conducted in computer lab(s).

**APPROACH**

- Hands-on studio sessions using system-based modeling and visualization.
- Demonstrations of modeling workflows for real architectural projects.
- Assignments based on modeling small architectural elements, pavilion forms, and building components.

| COs | COURSE OUTCOMES | BT LEVEL |
|---|---|---|
| **CO1** | Understand digital modeling principles and NURBS-based geometry. | L2-Understand |
| **CO2** | Create architectural 2D and 3D models using parametric modeling software with precision. | L4-Analyse |
| **CO3** | Generate visualizations and architectural drawings through digital tools. | L6-Create |
| **CO4** | Develop architectural diagrams and presentation graphics. | L3-Apply |
| **CO5** | Integrate workflows across software for professional-quality presentations. | L6-Create |

**REFERENCE BOOKS**


- Burley, C. (2019). Inside Rhinoceros 6. CADCIM Technologies.
- Adobe Creative Team. (2022). Adobe Illustrator classroom in a book (2022 release). Adobe Press.
- Kolarevic, B. (Ed.). (2003). Architecture in the digital age: Design and manufacturing. Taylor & Francis.
- Maestri, G. (2020). Rhino 3D modeling for architecture and design. Independently Published.
- Peters, B. (2013). Computation works: The building of algorithmic thought in architecture. Routledge.
- Robert McNeel & Associates. (2023). Rhino 3D: Official user guide (Version 7). McNeel.

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (A), ADVANCED MODEL MAKING AND FABRICATION

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- To familiarize students with all the tools and machinery available for model making
- To develop understanding of modern machinery like laser cutters, CNC routers, and 3D printers.
- To enhance skills in precision, detailing, and material handling for architectural models.
- To enable students to explore multiple fabrication techniques for complex model making.

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to Advanced Model Making Machines** | Introduction to model types, scales, materials, and finishes. Overview of traditional and advanced tools used in fabrication workshops. Familiarisation with various model making tools including laser cutting machine, CNC router, 3D printer, vacuum press machine, and others. Safety guidelines, workflow processes, and material handling techniques. |
| **MODULE-2** | **$CO_2$ Laser Cutting Machine and its Applications** | Working principles of $CO_2$ laser cutting machine. Types of materials suitable for laser cutting (acrylic, MDF, cardboard, plywood, etc.). File preparation, vector settings, power-speed parameters, and cutting techniques. Applications in model making including detailing, joinery systems, and intricate pattern making. |
| **MODULE-3** | **CNC Router and its Applications** | Introduction to CNC routing technology and its components. Understanding relevant software interface and material compatibility. Hands-on experience with CNC router for cutting, engraving, and shaping materials like wood and boards. Applications in topography models, contour models, and complex surface fabrication. |
| **MODULE-4** | **3D Printing Machine and its Applications** | Introduction to 3D printing technologies, Understanding slicing software, file formats, and print settings. Materials used in 3D printing (PLA, ABS, etc.). Applications in model making/product designing such as conceptual massing, complex geometries, and component-based fabrication. |
| **MODULE-5** | **Integrated Model Making using Multiple Machinery** | Development of a comprehensive model/product using a combination of available machinery. Emphasis on design integration, detailing, assembly techniques, and finishing. Preparation of fabrication drawings and final presentation model. |

**APPROACH**

- Hands-on training and demonstration with digital fabrication machinery.
- Integration of traditional and modern model making techniques.
- Emphasis on precision, detailing, and material exploration.
- Project-based learning for real-world application.
- Guest lectures from fabrication labs and industry experts.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understand the fundamentals of architectural model making, materials, tools, and workshop machinery with proper safety practices. | L2 – Understand |
| **CO2** | Apply $CO_2$ laser cutting techniques for precise fabrication of architectural components and detailing. | L3 – Apply |
| **CO3** | Develop models using CNC router by generating tool paths and executing machining processes for complex forms. | L6 – Create |
| **CO4** | Create elements using 3D printing technology by preparing digital models and optimizing print settings. | L6 – Create |
| **CO5** | Design and fabricate a comprehensive model by integrating multiple fabrication techniques and machinery. | L6 – Create |

**REFERENCE BOOKS**


- Beorkrem, C. (2013). Material strategies in digital fabrication. Routledge.
- Burry, M. (2011). Scripting cultures: Architectural design and programming. Wiley.
- Ching, F. D. K. (2014). Building construction illustrated (5th ed.). Wiley.
- Chua, C. K., Leong, K. F., & Lim, C. S. (2010). Rapid prototyping: Principles and applications (3rd ed.). World Scientific Publishing.
- Dunn, N. (2012). Digital fabrication in architecture. Laurence King Publishing.
- Glymph, J., Shelden, D., Ceccato, C., Mussel, J., & Schober, H. (2004). A parametric strategy for free-form glass structures using digital fabrication. Automation in Construction, 13(2), 187–202.
- Iwamoto, L. (2009). Digital fabrications: Architectural and material techniques. Princeton Architectural Press.
- Kestelier, H., & Peters, B. (2013). Fabricate: Making digital architecture. Riverside Architectural Press.
- Kolarevic, B. (2005). Architecture in the digital age: Design and manufacturing. Taylor & Francis.
- Pottmann, H., Asperl, A., Hofer, M., & Kilian, A. (2007). Architectural geometry. Bentley Institute Press.
- Rael, R., & San Fratello, V. (2018). Printing architecture: Innovative recipes for 3D printing. Princeton Architectural Press.
- Redwood, B., Schöffer, F., & Garret, B. (2017). The 3D printing handbook: Technologies, design and applications. 3D Hubs.
- Sass, L., & Oxman, R. (2006). Materializing design: The implications of rapid prototyping in digital design. Design Studies, 27(3), 325–355.
- Schodek, D., Bechthold, M., Griggs, J. K., Kao, K. M., & Steinberg, M. (2014). Digital design and manufacturing: CAD/CAM applications in architecture and design. Wiley.
- Sheilds, M. (2010). Advanced model making. Crowood Press.

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (B), CARPENTRY

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- Develop skills in handling carpentry tools and understanding different wood materials.
- Understand timber processing techniques including seasoning, cutting, and finishing.
- Understand and execute various carpentry joints and connections.
- Introduce modern fabrication technologies such as laser cutting and CNC routing.
- Design and fabricate functional carpentry products integrating learned skills.

| | | |
|---|---|---|
| **MODULE-1** | **Tools and Materials** | Introduction to carpentry and workshop practices. Study of hand tools such as saws, chisels, planes, hammers, and measuring tools, along with basic power tools. Types of wood (hardwood and softwood), properties, defects, and applications. Safety procedures, tool handling, and maintenance practices. |
| **MODULE-2** | **Timber Preparation and Seasoning** | Methods of timber conversion, measuring, marking, cutting, and shaping. Natural and artificial seasoning techniques and their importance in durability. Practical skills in shaping, squaring, sizing, and surface finishing. Introduction to polishing and protective coatings |
| **MODULE-3** | **Joints and Connections** | Classification and application of carpentry joints including butt, lap, mortise and tenon, dovetail, housing, and mitre joints. Use of fasteners such as nails, screws, bolts, adhesives, and modern connectors. Fabrication and assembly techniques for basic wooden structures and components. Introduction to hardware fittings and structural stability considerations. |
| **MODULE-4** | **Digital Fabrication – Laser Cutting and CNC Routing** | Introduction to modern carpentry technologies. Working principles, components, and operation of $CO_2$ laser cutting machines and CNC routers. Preparation of digital drawings (CAD files) for machine use. Applications in precise cutting, engraving, and shaping of wood and sheet materials. Advantages, limitations, safety precautions, and real-world applications in furniture and product design. |
| **MODULE-5** | **Product Design and Fabrication** | Design and fabrication of complete carpentry products such as furniture, utility items, or decorative objects. Integration of traditional joinery and modern fabrication techniques (laser/CNC where applicable). Emphasis on designing, material selection, joinery, finishing, and functionality. |

**APPROACH**

- Combination of theory and hands-on workshop practice.
- Progressive learning from tools to materials to joints to digital fabrication to product making.
- Emphasis on skill development, safety, and creativity.
- Continuous assessment through practical work, demonstrations, and final product.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Demonstrate safe use of carpentry tools and identify wood types and properties | L2 – Understand |
| **CO2** | Understand timber preparation, seasoning, and finishing techniques | L2- Understand |
| **CO3** | Construct and analyse different carpentry joints and connections | L3 – Analyse |
| **CO4** | Understand and apply laser cutting and CNC routing in fabrication | L3 – Apply |
| **CO5** | Design and create a finished carpentry product using acquired skills | L6 – Create |

**REFERENCE BOOKS**


- Arora, S. P., & Bindra, S. P. (2010). Building construction (Vols. 1–5). Dhanpat Rai Publications.
- Beorkrem, C. (2013). Material strategies in digital fabrication. Routledge.
- City & Guilds. (2016). The City & Guilds textbook: Carpentry and joinery (3rd ed.). Hodder Education.
- Dunn, N. (2012). Digital fabrication in architecture. Laurence King Publishing.
- Feirer, J. L., & Lindbeck, J. R. (2016). Wood technology and processes. Goodheart-Willcox.
- Hoadley, R. B. (2000). Understanding wood: A craftsman's guide to wood technology. Taunton Press.
- Institution of Railway Civil Engineers (IRICEN). (2013). Carpentry and woodwork. Indian Railways Institute of Civil Engineering.
- Iwamoto, L. (2009). Digital fabrications: Architectural and material techniques. Princeton Architectural Press.
- Jackson, A., & Day, D. (2005). Collins Complete Woodworking Manual. HarperCollins.

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (C), CERAMICS

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- To familiarize the students with the basic concepts of Ceramics,
- Understanding possibilities and limitation of different mediums.
- To develop skill of creating various 3D forms and pottery.
- To understand the Aesthetics of ceramics, while focusing on designing them.
- To familiarize with various utilities of Ceramics as medium of expression.

| | | |
|---|---|---|
| **MODULE-1** | **Introduction** | Basic introduction,<br>Types of clay and their preparation<br>Creating forms. |
| **MODULE-2** | **Types of Ceramics. Coil and slab process** | Terracotta and stoneware<br>Creating forms by Coil and slab Process.<br>Freehand modelling on the painter's wheel |
| **MODULE-3** | **Moulding & Casting process.** | Creating forms by Molding and casting process.<br>Types of Molds<br>Creating tiles by modelling and carving process. |
| **MODULE-4** | **Throwing on wheel and application of glaze** | Process of throwing forms on traditional/electric wheel.<br>Preparation and application of simple glazes. |
| **MODULE-5** | **Firing Techniques and Kilns** | Understanding Indigenous (traditional) firing process and modern firing methods.<br>Process of baking primary body and glazed Firing techniques |

**APPROACH**

- Hands-on experimentation, material understanding, and creative expression.
- Basic concepts of ceramics, including its history, types, and relevance in art and
- Understanding the practical applications of ceramics in everyday life and design fields.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understanding types of clay used in ceramics | L2-Understand |
| **CO2** | Understanding process used in ceramics . | L2-Understand |

| | | |
|---|---|---|
| **CO3** | Applying moulding and casting process | L3-Apply |
| **CO4** | Applying glazing on the product | L3-Apply |
| **CO5** | Understanding process of firing in kilns | L2-Understand |

**REFERENCE BOOKS**


- Bose, S., & Das, C. (2024). Introduction to ceramics: Fabrication, characterizations, and applications. CRC Press.
- Carter, B. (2024). The complete guide to low-fire glazes for potters and sculptors: Techniques, recipes, and inspiration for low-temperature firing with big results. Quarry Books.
- Gigi Unique Guides. (2023). Art of glazing: A comprehensive guide to techniques, recipes, and firing in ceramics (Kindle ed.). Amazon Digital Services.
- Latka, T., & Latka, J. (2001). Ceramic extruding: Inspiration & technique. Krause Publications.
- Peterson, S., & Peterson, J. (2003). The craft and art of clay: A complete potter's handbook (4th ed.). Laurence King Publishing.
- Introduction To Ceramics Fabrication Characterizations and Applications -Sujoy Bose and Chandon Das.
- Art of Glazing: A Comprehensive Guide to Techniques, Recipes, and Firing in Ceramics-Gigi Uniqu Guides (Kindle edition available on amazon.)
- The Complete Guide to Low-Fire Glazes for Potters and Sculptors: Techniques, Recipes, and Inspiration for Low-Temperature Firing with Big Results- Ben Carter
- Ceramic Extruding: Inspiration & Technique- Tom Latka
- The Craft and Art of Clay: A Complete Potter's Handbook- Jan Peterson

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (D), CODING

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- Develop computational thinking and problem-solving skills.
- Understand Python as a tool for design, analysis, and automation.
- Learn to manipulate data relevant to architectural contexts.
- Introduce visualization and generative logic for design workflows.
- Build small-scale applications project to solve a problem.

| | | |
|---|---|---|
| **MODULE-1** | **Computational Thinking & Coding Fundamentals** | Definition of programming and its role in architecture and design. Algorithms, logic, and step-by-step problem solving. Flowcharts and pseudocode. Overview of programming languages (focus on Python), Interpreter vs compiler (conceptual clarity). |
| **MODULE-2** | **Python Basics** | Setting up Python environment (Anaconda / VS Code), Variables, data types (int, float, string, Boolean) Input/output operations, Basic operators (arithmetic, logical, comparison) |
| **MODULE-3** | **Logic Building & Control Flow** | Conditional statements (if, elif, else), Loops (for, while), Logical operators like and, or, not. and nested conditions |
| **MODULE-4** | **Data Structures & Functional Thinking** | Lists, tuples and sets, dictionaries, string manipulation techniques, basic algorithms (searching, sorting concepts) defining functions, arguments & parameters, return values. Using libraries like NumPy, Pandas, Matplotlib. |
| **MODULE-5** | **Data Handling, Visualization & Mini Project** | File handling (CSV, text files), Exception handling (robust coding), Data visualization basics (graphs, charts). Mini Project. |

**APPROACH**

- Basic coding exercises (calculator, unit converter, number guessing)
- Problem-based learning (ATM system, quiz app, grading system)
- Weekly labs progressing from basics to loops to data structures
- Incremental mini project (to-do list, expense tracker, chatbot, library system).

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understand basic concepts of programming and computational thinking | L2 – Understand |
| **CO2** | Apply fundamental Python concepts | L3 – Apply |
| **CO3** | Develop logical solutions using control structures | L3 – Apply |
| **CO4** | Organize and manipulate data using basic data structures and functions. | L4 - Analyse |
| **CO5** | Create simple programs/projects to solve real-world problems. | L6 - Create |

**REFERENCE BOOKS**


- Barry, P. (2016). Headfirst Python: A brain-friendly guide (2nd ed.). O'Reilly Media.
- Downey, A. B. (2015). Think Python: How to think like a computer scientist (2nd ed.). O'Reilly Media.
- Lutz, M. (2013). Learning Python (5th ed.). O'Reilly Media.
- Matthes, E. (2019). Python crash course: A hands-on, project-based introduction to programming (2nd ed.). No Starch Press.
- Sweigart, A. (2019). Automate the boring stuff with Python: Practical programming for total beginners (2nd ed.). No Starch Press.
- Zelle, J. (2010). Python programming: An introduction to computer science (2nd ed.). Franklin, Beedle & Associates.

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (E), FILM MAKING

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- To explore filmmaking as a medium of visual storytelling and spatial representation.
- To understand the relationship between architecture, space, light, movement, and cinematic expression.
- To develop skills in scriptwriting, storyboarding, cinematography, and sound recording.
- To learn editing and post-production techniques for creating meaningful visual narratives.
- To produce a short architectural film and develop digital content for presentation and outreach.

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to Film and Visual Storytelling** | Film as spatial narrative. Architectural representation in cinema- Visual perception & framing of spaces- short analysis of film clips |
| **MODULE-2** | **Story Development and Scriptwriting** | Idea development. Storyboarding & scripting. Narrative structures in documentary and fiction. Develop concept and storyboard for a short architectural film |
| **MODULE-3** | **Cinematography and Sound for Architecture** | Camera types and settings. Composition, lighting, movement. Capturing space, texture, and human interaction. Practice shooting exercises: light studies, movement in space, time-lapse |
| **MODULE-4** | **Editing, Post-Production, and Digital Content Creation** | Basics of sound recording and ambient sound. Editing principles, rhythm, and pacing. Introduction to software (e.g., DaVinci Resolve / Premiere Pro or similar open-source software etc.) Produce and edit a short visual piece (1–2 min) on an architectural theme |
| **MODULE-5** | **Film Project** | Preparation of a short film preferably based on built environment, design project, urban condition, or heritage site. Emphasis on creating a coherent visual narrative |

**APPROACH**

- Interactive lectures and seminars.
- Screening and analysis of selected film clips and documentaries.
- Hands-on workshops on scripting, shooting, sound recording, and editing.
- Field-based practical exercises in documenting architecture and urban spaces.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understand the fundamentals of filmmaking, visual storytelling, and cinematic language | L2 – Understand |
| **CO2** | Analyse architecture and urban spaces through filmic representation and narrative structure | L4 – Analyse |
| **CO3** | Apply cinematographic techniques for documenting built environments | L3 – Apply |
| **CO4** | Apply editing and post-production tools to create coherent and engaging visual content | L3 – Apply |
| **CO5** | Create a short film | L6 – Create |

**REFERENCE BOOKS**


- Block, Bruce. (2020). The Visual Story: Creating the Visual Structure of Film, TV and Digital Media (3rd ed.). Routledge.
- Brown, Blain. (2021). Cinematography: Theory and Practice (4th ed.). Routledge.
- Mamer, Bruce. (2020). Film Production Technique: Creating the Accomplished Image (7th ed.). Wadsworth/Cengage Learning.
- Rabiger, Michael, and Courtney Hermann. (2020). Directing: Film Techniques and Aesthetics (6th ed.). Routledge.
- Millerson, Gerald, and Jim Owens. (2008). Video Production Handbook (4th ed.). Focal Press.
- Dancyger, Ken. (2018). The Technique of Film and Video Editing: History, Theory, and Practice (6th ed.). Routledge.
- Mascelli, Joseph V. (1998). The Five C's of Cinematography: Motion Picture Filming Techniques. Silman-James Press.
- Mercado, Gustavo. (2011). The Filmmaker's Eye: Learning (and Breaking) the Rules of Cinematic Composition. Focal Press.arry, P. (2016). Headfirst Python: A brain-friendly guide (2nd ed.). O'Reilly Media.
- Downey, A. B. (2015). Think Python: How to think like a computer scientist (2nd ed.). O'Reilly Media.
- Lutz, M. (2013). Learning Python (5th ed.). O'Reilly Media.
- Matthes, E. (2019). Python crash course: A hands-on, project-based introduction to programming (2nd ed.). No Starch Press.
- Sweigart, A. (2019). Automate the boring stuff with Python: Practical programming for total beginners (2nd ed.). No Starch Press.
- Zelle, J. (2010). Python programming: An introduction to computer science (2nd ed.). Franklin, Beedle & Associates.

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (F), INSTALLATION ART

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- To introduce the concepts, and evolution of installation art.
- To understand spatial composition, sensory experience, and temporality in installations.
- To explore materials, technology, and construction methods relevant to installations.
- To develop the ability to conceptualize and execute site-specific installations.

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to Installation Art** | Meaning, definition, evolution, and types of installation art. Differences between sculpture, environmental art, and installation art. |
| **MODULE-2** | **Relationship between concept, site, and audience** | Idea generation process and conceptual thinking in installation art. Relationship between concept, site, and audience interaction. Site specific design processes and decisions in installation art. Understanding space, scale, and movement in installations. |
| **MODULE-3** | **Materials and Techniques** | Exploration of materials: natural, industrial, digital, waste and others. Light, sound, and motion as design elements. Role of technology in contemporary installation art. Use of digital tools such as projections, sensors, and interactive media. Introduction to AR/VR and kinetic installations. |
| **MODULE-4** | **Installation Art and Architecture** | Fabrication techniques using laser cutting, CNC routing, and 3D printing for precision in installation components. Structural understanding through lightweight frameworks (tension, suspension, modular joints) for temporary installations. Development of joinery and assembly detailing for quick installation and dismantling. Analyze and reinterpret case studies like The Weather Project, Rain Room, Cloud Gate, and Kinetic Rain, and others. |
| **MODULE-5** | **Installation Project** | Design and develop a physical installation based on a selected theme and materials. |

**APPROACH**

- Interactive lectures and seminars.
- Conduct concept-to-site workshops to develop installation ideas through quick sketches and site mapping to understand user interaction and spatial behavior.
- Facilitate material and technology labs to experiment hands-on with different materials, lighting, and basic digital tools
- Implement design–build exercises and live site interventions to test them in public spaces.
- Studio-based final project involving complete process from concept to full-scale installation with jury-based evaluation.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Explain the basic concepts, and characteristics of installation art and identify the works of major installation artists. | L2 – Understand |
| **CO2** | Understand the relationship between concept, space, site, and user interaction in installation art through sketches and spatial diagrams. | L2 – Understand |
| **CO3** | Apply knowledge of materials, construction techniques, light, sound, and movement to develop small-scale installation models. | L3 – Apply |
| **CO4** | Analyse various fabrication techniques, and structural components to execute installations. | L4 – Analyse |
| **CO5** | Create an installation | L6 – Create |

**REFERENCE BOOKS**


- Bishop, C. (2005). Installation art: A critical history. Tate Publishing.
- Reiss, J. H. (1999). From margin to center: The spaces of installation art. MIT Press.
- De Oliveira, N., Oxley, N., & Petry, M. (2003). Installation art in the new millennium: The empire of the senses. Thames & Hudson.
- Kwon, M. (2002). One place after another: Site-specific art and locational identity. MIT Press.
- Petry, M. (2010). Installation art: The A–Z guide. Thames & Hudson.

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (G), ORIGAMI AND PAPER CRAFTS

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- Introduction to origami and paper crafting techniques as design exploration tools.
- Develop skills in material manipulation, folding geometry, and three-dimensional form generation.
- Foster creativity, patience, and craftsmanship through hands-on model-making.
- Apply principles of folding, patterning, and modularity to architectural design and structures.

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to Origami and paper Crafts** | Evolution of origami and paper crafts. Understanding folding, creasing, and pattern logic. Traditional paper crafts and their architectural relevance. |
| **MODULE-2** | **Geometry and Folding Systems** | Basic folds, tessellations, and modular origami. Understanding paper behaviour and material limitations. principles and parametric logic in folding. |
| **MODULE-3** | **Material Exploration and Craft Techniques** | Hands-on workshops: Understanding texture, color, and tactile quality of paper, cloth, bamboo, leather, wood veneer, metal foil and others. |
| **MODULE-4** | **Origami in Architecture** | Application of folding principles in space structures, facades, shelters, deployable systems and others. Case Study of designs using origami. Digital origami and computational folding design. |
| **MODULE-5** | **Design Exploration** | Development of small-scale architectural or product design prototypes inspired by origami/crafts integrating structure, material, and aesthetics. |

**APPROACH**

- Lectures, Field visits and demonstrations
- Hands-on workshops and model making
- Digital folding exercises using Rhino/Grasshopper etc. (optional)Implement design–build exercises and live site interventions to test them in public spaces.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understand the principles and parametric logics behind folding and paper geometry. | L2 -Understand |
| **CO2** | Demonstrate hands-on skills in origami and paper crafting techniques using different materials. | L3-Apply |
| **CO3** | Analyse form, structure, and function through folding systems and material behaviour. | L4 -Analyse |
| **CO4** | Integrate origami-inspired methods in conceptual, structural, and façade design explorations. | L5 – Evaluate |
| **CO5** | Create innovative architectural forms or models using origami and paper crafts. | L6 -Create |

**REFERENCE BOOKS**


- Ban, S. (1997). Shigeru Ban: Paper architecture. Princeton Architectural Press.
- Indian National Steel Development and Growth Council (INSDAG). (n.d.). Folded plate and shell structures in architecture.
- Jackson, P. (2011). Folding techniques for designers: From sheet to form. Laurence King Publishing.
- Lang, R. J. (2012). Origami design secrets: Mathematical methods for an ancient art (2nd ed.). CRC Press.
- Mitani, J. (2012). 3D origami art: Folding paper sculpture design. CRC Press.
- World Crafts Council. (n.d.). Crafts of India publications.

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (H), PAINTING

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- To introduce painting as a means of visual expression and architectural communication.
- To develop aesthetic sensitivity, observation, and composition skills.
- To understand color theory, texture, light, and shade as design tools.
- To explore diverse painting techniques.

| | | |
|---|---|---|
| **MODULE-1** | **Fundamentals of Painting and Visual Composition** | Painting as means of visual expressions, elements and principles of composition and balance, spatial perception and expression through painting. colour theory; Primary, secondary, tertiary colors; Munsell and Ostwald color systems; color wheel; warm and cool palettes; contrast, harmony, and saturation; symbolic use of color in art and architecture |
| **MODULE-2** | **Wet Mediums and Techniques** | Use of watercolor, acrylic, oil, gouache, tempera, encaustic, fresco, mixed media and others; tools and surfaces; layering, blending, and texturing methods; |
| **MODULE-3** | **Dry Mediums and Techniques** | Use of pastels (soft, hard, oil), charcoal (vine, compressed), pencils (graphite, colored), conte crayons, chalks and others; layering, blending, and texturing methods; |
| **MODULE-4** | **Digital Mediums and Techniques** | Introduction to various digital mediums like raster (pixel-based) painting, vector (formula-based) art, AI-assisted art and others. layering, blending, and texturing methods; |
| **MODULE-5** | **Thematic Painting Project** | Thematic project: painting based on architectural concepts, spaces, or emotions using diverse media; experimentation with scale, material, and narrative; |

**APPROACH**

- Lectures and Live demonstrations of techniques
- Hands-on painting sessions
- Thematic projects
- Portfolio development, sketchbook journaling.

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understand principles of color theory, composition, and visual balance. | L2 -Understand |
| **CO2** | Application of techniques in wet mediums. | L3-Apply |
| **CO3** | Apply techniques in dry mediums. | L3-Apply |
| **CO4** | Experiment with varied digital media | L3-Apply |
| **CO5** | Create paintings expressing architectural ideas, moods, or narratives. | L6 -Create |

**REFERENCE BOOKS**


- 3DTotal Publishing. (2015). Digital painting techniques: Practical techniques of digital art masters (Vol. 7). 3DTotal Publishing.
- Albers, J. (2013). Interaction of color (50th anniversary ed.). Yale University Press.
- Bayles, D., & Orland, T. (2023). Art & fear: Observations on the perils (and rewards) of artmaking (New ed.). Souvenir Press.
- Creevy, B. (1999). The oil painting book: Materials and techniques for today's artist. Watson-Guptill.
- Dodson, B. (2003). Keys to drawing (Reprint ed.). North Light Books.
- Edwards, B. (2012). Drawing on the right side of the brain: The definitive 4th edition. TarcherPerigee.
- Fletcher, M. (2013). The artist's guide to portfolio development: A step-by-step guide to building a successful art portfolio. Routledge.
- Glitschka, V. (2016). Vector basic training: A systematic creative process for building precision vector artwork (2nd ed.). Peachpit Press.
- Itten, J. (2019). The art of color: The subjective experience and objective rationale of color (New ed.). Wiley.
- MacKenzie, G. (2010). The watercolorist's essential notebook: Landscapes. North Light Books.
- Mayer, R. (1991). The artist's handbook of materials and techniques (5th ed., Revised and updated). Viking.
- Nicolaides, K. (1990). The natural way to draw. Houghton Mifflin Harcourt. (Original work published 1941)
- Ocvirk, O. G., Stinson, R. E., Wigg, P. R., Bone, R. O., & Cayton, D. L. (2012). Art fundamentals: Theory and practice (12th ed.). McGraw-Hill.
- Paglen, T., & Crawford, K. (2019). Excavating AI: The politics of training sets for machine learning. AI Now Institute.
- Pallasmaa, J. (2009). The thinking hand: Existential and embodied wisdom in architecture. Wiley.
- Tharp, T. (2009). The creative habit: Learn it and use it for life (Illustrated ed.). Simon & Schuster.

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (I), PHOTOGRAPHY

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- To introduce the evolution and fundamentals of photography
- To develop technical proficiency in handling cameras and lenses and enhance visual composition and storytelling skills
- To impart knowledge of architectural and thematic photography
- To apply various post-processing tools for enhancement
- To understand the process of organizing photography exhibition

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to Photography** | Evolution of photography (analog to digital), types of cameras, types of lenses, camera settings, exposure triangle, basics of lighting, accessories |
| **MODULE-2** | **Framing and Composition** | Principles of composition, framing techniques and perspective, depth of field and focus control, types of photography: portrait, landscape, street, wildlife, product, visual storytelling through images |
| **MODULE-3** | **Theme-Based & Architectural Photography** | Concept development and thematic photography, architectural photography: exterior and interior photography, light and shadow in built environment, scale, proportion, and texture representation, site documentation techniques |
| **MODULE-4** | **Post-Processing & Editing of photographs** | Introduction to editing software/application, image correction: exposure, contrast, color balance, cropping, retouching, filters, file formats and export settings |
| **MODULE-5** | **Photography Exhibition & Curation** | Selection and presentation of photographs, printing techniques and mounting, exhibition design and layout, lighting and display strategies, public exhibition organization, portfolio development. |

**APPROACH**

- Lectures and Demonstrations
- Field Visits / Site Photography
- Hands-on Practical Sessions
- Workshops and Guest Lectures
- Peer Review and Critiques

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understand fundamentals of photography, camera systems, and technical settings | L2 -Understand |
| **CO2** | Apply composition techniques and framing principles in various photography genres | L3-Apply |
| **CO3** | Analyze and produce theme-based and architectural photographs | L4 - Analyse |
| **CO4** | Use relevant digital tools for post-processing and enhance photographic outputs | L3-Apply |
| **CO5** | Create and curate a professional photography exhibition and portfolio | L6 -Create |

**REFERENCE BOOKS**


- Barnbaum, B. (2017). The art of photography: A personal approach to artistic expression (2nd ed.). Rocky Nook.
- Carroll, H. (2014). Read this if you want to take great photographs. Laurence King Publishing.
- DK. (2020). Digital photography complete course: Everything you need to know in 20 weeks. Dorling Kindersley.
- Diprose, G., & Robins, J. (2012). Photography: The new basics: Principles, techniques and practice. Thames & Hudson.
- Freeman, M. (2017). Fifty paths to creative photography. Ilex Press.
- Freeman, M. (2007). The photographer's eye: Composition and design for better digital photos. Focal Press.
- Horenstein, H., & Carroll, A. (2012). Digital photography: A basic manual. Little, Brown and Company.
- Hunter, F., Fuqua, P., & Biver, S. (2015). Light science & magic: An introduction to photographic lighting (5th ed.). Focal Press.
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- Langford, M., Fox, A., & Smith, R. S. (2015). Langford's basic photography: The guide for serious photographers (10th ed.). Focal Press.
- Leibovitz, A. (2024). At work. Phaidon Press.
- Peterson, B. (2021). Understanding exposure: How to shoot great photographs with any camera (4th ed.). Amphoto Books.
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- National Geographic. (n.d.). National Geographic Photography. nationalgeographic.com
- PetaPixel. (n.d.). PetaPixel. https://petapixel.com
- Photography Life. (n.d.). Photography Life. https://photographylife.com

## B. ARCH. SEMESTER – IV/VI
## ZEL– 101 (J), SCULPTING

| PERIODS | | | EVALUATION SCHEME | | | | | | COURSE TOTAL | CREDITS | DURATION OF THEORY PAPER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LECTURE | TUTORIAL | PRACTICAL/ STUDIO | SESSIONAL ASSESSMENT | | | ESE | | | | | |
| | | | MJ | TA | TOTAL | THEORY | VIVA | TOTAL | | | |
| 1 | 2 | 0 | 15 | 35 | 50 | - | 50 | - | 100 | 3 | - |

**COURSE OBJECTIVES**

- To introduce students to the fundamental principles of sculpture through hands-on exploration of different materials, tools, and techniques, while developing spatial understanding and creative expression.

| | | |
|---|---|---|
| **MODULE-1** | **Introduction to Sculpture & Clay Modeling** | Understanding sculpture: form, volume, mass, and space<br>Types of sculpture: relief and round<br>Introduction to clay as a medium<br>Basic hand-building techniques: pinching, coiling, slab work<br>Simple forms: different types shapes<br>Surface texture exploration |
| **MODULE-2** | **Plaster of Paris (POP) & Casting Techniques** | Introduction to mold-making<br>Properties of Plaster of Paris<br>Direct casting and waste molds<br>Relief sculpture using POP as material<br>Finishing techniques: sanding, polishing |
| **MODULE-3** | **Wood Sculpture (Basic Carving)** | Introduction to wood as a sculptural material<br>Types of wood<br>Basic tools: chisel, mallet, carving knives<br>Safety practices<br>Simple carving exercises: geometric and organic forms |
| **MODULE-4** | **Metal & Wire Sculpture** | Introduction to different metals as a medium<br>Welding and iron bars bending and assembling techniques.<br>Making basic armatures.<br>Using ready (scrap) metals.<br>Introduction to balance and structure |
| **MODULE-5** | **Mixed Media, e-wastes & Assemblage** | Combining materials: clay, wood, metal, found objects<br>Concept of assemblage art<br>Creative expression and storytelling through sculpture<br>Surface treatments: paint, texture, patina (basic level)<br>Final project development |

**APPROACH**

- Introduction to basic concepts of sculpting and its relevance in art and design.
- Development of design sense, proportion, balance, and visual harmony.
- Understanding 3D forms, their language, and ability to express ideas and emotions.
- Study of different materials with their possibilities and limitations.

- Training in carving, modelling, moulding, and casting to build technical skills.
- Encouraging experimentation and original sculptural compositions.
- Focus on detailing, finishing, and effective presentation of work

| COs | COURSE OUTCOMES | BL Level |
|---|---|---|
| **CO1** | Understanding clay as material for sculpting forms. | L2 -Understand |
| **CO2** | Understanding POP (Plaster of Paris) material and technique for sculpting forms | L2 -Understand |
| **CO3** | Applying basic wood carving skill in sculptures. | L3 - Apply |
| **CO4** | Exploring metal parts, wires in making of sculptures | L5-Evaluate |
| **CO5** | Creation and storytelling using combination of materials for making sculptures. | L6 -Create |

**REFERENCE BOOKS**


- Goswamy, B. N. (2016). The spirit of Indian painting: Close encounters with 101 great works, 1100–1900 (Reprint ed.). Penguin Books.
- Insight Editions. (2011). The great tradition: Indian bronze masterpieces. Insight Editions.
- Kracun, D., & Boyd, C. (2012). Contemporary sculptors: 84 international artists. Schiffer Publishing.
- Singhania, N. (2024). Indian art and culture (5th ed.). McGraw-Hill.
- Sthapati, V. G. (2002). Indian sculpture and iconography: Forms and measurements (Reprint ed.). Sri Ramakrishna Math.