

**Y E A R 2 (Semester III)**

CODE	SUBJECT	CLASSES		END SEMESTER EVALUATION		MARKS	CREDITS	EXAM HRS
		L	T/ST	WR	VV			
BARC-0301	DESIGN -III	2	6	WR	VV	100	3	6
BARC-0302	BUILDING MATERIALS & CONSTRUCTION -III	2	4	WR	VV	100	2	3
BARC-0303	GRAPHICS-III	2	4	WR	VV	100	1	3
BARC-0304	STRUCTURE- III	2	-	WR	-	100	1	3
BARC-0305	HISTORY OF ARCHITECTURE-II	2	-	WR	-	100	1	3
BARC-0306	BUILDING SERVICES-I (WATER SUPPLY & SANITATION)	2	-	WR	-	100	0.5	3
BARC-0307	THEORY OF SETTLEMENTS	1	2	WR	-	100	1	3
BARC-0308	ART APPRECIATION	1	2	-	VV	100	0.5	
<b>TOTAL</b>		<b>14</b>	<b>18</b>				<b>10</b>	

**Y E A R 2 (Semester IV)**

CODE	SUBJECT	CLASSES					CREDITS	EXAM HRS
		L	T/ST	WR	VV	TOT		
BARC-0401	DESIGN -IV	2	6	WR	VV	100	3	6
BARC-0402	BUILDING MATERIALS & CONSTRUCTION -IV	2	4	WR	VV	100	2	3
BARC-0403	THEORY OF DESIGN-II	2	1	WR	-	100	0.5	3
BARC-0404	STRUCTURE- IV	2	1	WR	-	100	1	3
BARC-0405	HISTORY OF ARCHITECTURE-II	2	-	WR	-	100	1	3
BARC-0406	BUILDING SERVICES- II (ELECTRICAL)	2	-	WR	-	100	1	3
BARC-0407	VISUAL & WRITTEN COMMUNICATION	2	1	-	VV	100	1	-
BARC-0408	CAAD LAB - I	1	2	-	VV	100	0.5	-
<b>TOTAL</b>		<b>15</b>	<b>15</b>				<b>10</b>	<b>-</b>

**Joinery**

Simple joinery details in wood.

Pipes and sleeve joints.

Metal- welded joints, nut-bolt joints. Types of welded joints.

**Architectural Modeling:**

General information about various materials and tools to be used in model making. Development of the skill to use the tools with precision to obtain desired results in model making.

**Introduction to types of model**

Block models, detailed model, construction model and interior models etc.

**Introduction to various materials**

Experimentation with these materials for different geometries and scales of models.

**BARC-0208: COMPUTER APPLICATION-II**

**INTENT:** Introduction and the use of software available for architectural applications.

**METHODOLOGY:** Integration of practical exercises along with the design studio project.

**CONTENTS:****Introduction**

Introduction of various software available for Architectural presentation such as Photoshop & Corel

**Basic commands for 2-D Graphics**

Learning of softwares like Photoshop & Corel.

Understanding the basic composition in 2D and prepare attractive compositions using software's.

<b><u>YEAR TWO SEMESTER THREE</u></b>
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**BARC- 0301: ARCHITECTURAL DESIGN – II****OBJECTIVES:**

- To foster understanding about land and landforms and the elements of built space. Experimentation with shapes and forms to evolve sensitivity to built volumes.
- Focus on studying patterns in horizontal circulation in built areas.
- Introduction to vernacular architecture, use of local materials and appreciation of the socio-economics of the users.

**METHODOLOGY:**

- Site analysis at the beginning of each design problem. This would develop sensitivity to existing site conditions and context and help students evolve design directives to guide the design process.
- Block models at every design stage for three-dimensional visualization.

## **CONTENTS:**

### **Design projects related to different climatic conditions**

The projects would address the study of built form and its relationship to the site, surroundings and climatic setting. Design proposals to address sensitivity to climatic and physical settings. The design problem would induce students to experiment with built and open spaces.

Design of a simple building for public activity in a non urban setting, or a situation without urban regulatory controls. Introduction to other role players in the Architectural process viz; the client and the user. Appreciation of the non personal view as a process resources.

Study of the social and physical environment and methods of construction in vernacular architecture, emerging out of the traditional way of life of the people in a given place including topographic survey. This may be a village or part of a small town.

## **BARC-0302 : BUILDING CONSTRUCTION & MATERIALS -III**

**OBJECTIVE:** To introduce construction principles and materials used for the basic elements of a building like doors, windows, stairs etc.

### **METHODOLOGY:**

- Lectures and Studio assignments for understanding construction details.
- Site visits and library studies to supplement the studio work regarding materials and construction methods.

## **CONTENTS:**

### **Construction**

- Doors: Types of doors, construction techniques, decorative panel doors, glazed doors, flush doors, doors with fanlight, and calculation of woodwork.
- Windows: Detail of timber frames & shutters, fixed shutters, Calculation of woodwork.
- Roofs and Trusses: Timber roofs: lean to roof, closed couple roof, collar roof for small spans. Large timber trusses (12 meter span).

### **Materials**

- Glass and glass products: Plain, sheet, plate, textured, laminated, wired and shock resistant glass. Glass blocks, glass tiles, mirrors, heat reflecting glasses and Glass wool.
- Plastics, Nylon, PVC, Bakelite, Polythene, glass fiber reinforced plastic.
- Paints and surface finishes: Composition, properties and methods of application of different types of paints: Oil, synthetic enamels, acrylic and other plastic emulsions and formulations, interior and exterior grade paints. Cement based paints.

## **BARC- 0303: GRAPHICS- III**

### **INTENT:**

- To introduce the students to graphic treatment of two-dimensional drawings.
- To develop perception and presentation of simple architectural forms and building.
- To familiarize the students with preparation of perspectives by innovative methods.
- To introduce the students with perspectives of interiors.

- To develop innovative presentation techniques.

**METHODOLOGY:** Studio assignments and lectures.

**CONTENTS:**

**Metric drawing:**

Types used & advantage  
 Isometric, Axonometric & oblique view.  
 Metric drawings, projections and their dimensions.

**Perspective Drawing:**

Difference with metric projections.  
 Anatomy of perspective: Station point, Eye level, Cone of vision, Picture plane,  
 Horizon line, Ground line, Vanishing points,  
 Types of perspectives : One point, Two point, Three point  
 Perspectives of simple and complex blocks  
 Perspectives of simple household furniture items  
 Perspectives of Residences.

**Perspective Drawing By Innovative Methods:**

Preparation of Perspective by innovative methods like approximate method, Diagonal Method, Grid Method etc.  
 Other innovative methods of perspective presentation.  
 One point and two points perspectives of interiors.  
 Introduction to shortcut methods in perspective drawing.  
 Freehand perspective drawing.

**Presentation Techniques:**

Introduction to represent different textures and finishes in plan and elevation.  
 Graphical representation of furniture, automobiles, human figures, etc. in plans and elevations and 3 dimensions

Preparation of presentation drawings of small buildings. Through planes, elevation, site plan. Etc. using various rendering techniques and media incorporating sciagraphy creating three-dimensional effects.

**BARC-0304: STRUCTURES –III**

**INTENT:** To understand the analysis of indeterminate structures and their use.

**METHODOLOGY:** Lectures and computation exercises.

**CONTENTS:**

**Determinacy and Indeterminacy** Determinate and Indeterminate structures.

**Energy Principles**

Introduction, forms of Elastic Strain Energy, Strain energy in members, Energy relation in structural theory, Virtual work, Betti's and Maxwell's laws of reciprocal deflection, Application of Virtual work, Castigliano's theorems.

**Three-moment theorem** Analysis of fixed and continuous beams

**Slope Deflection method**

Introduction, Analysis of fixed and continuous beams, yielding of supports.

**Moment Distribution**

Introduction, analysis of indeterminate beams and simple frames, Sway frames

**Approximate methods of Analysis** Substitute frame method

**Overview of construction** Cement, aggregate, Water, reinforcement, materials.

**BARC-0305: HISTORY OF ARCHITECTURE- I**

**INTENT:** Introduction to the architecture of the ancient world. To generate an understanding about the development of civilization and its architectural implications.

**METHODOLOGY:** Visually intensive lectures using power point presentations to acquaint students with historic sites and buildings. Site visits and seminar presentations and model making

**CONTENTS:****Civilizations of the Ancient Western World**

- Growth of early civilizations from Stone Age to Neolithic settlements in Europe. Examples – Carnec, Stonehenge etc.
- Egyptian: Early tomb architecture and later temple architecture, great pyramids of Giza, Mastabas, Funerary temples and later temples like Khons etc.
- Mesopotamia: Cities of Mesopotamia like Ninveh, Khorsabad and Babylon.
- Greek: Hellenistic period, classical orders, temples and public buildings, geometry and symmetry in their buildings, Acropolis, Agora, temples, tombs and house forms.
- Roman: Construction systems using vaults and domes. Building types like temples, forums, basilica, theatres, aqua ducts, bridges, roads, sewage system and fountains.
- Early Christian: Basilican churches, centralized and longitudinal churches, interiors and articulation of the churches, pictures and biblical scenes.
- Byzantine: Development of dome over square or polygonal plans.
- Romanesque: New construction methods, massiveness, verticality and ornamentation of churches, integration of centralized and longitudinal plans.
- Gothic: Continued integration of centralized and longitudinal plans, flying buttress, ribbed vault, sensitivity towards light, use of stained glass. Cathedrals and churches.
- Central Asia: cities of Bukhara, Samarkand etc.

**BARC-0306: BUILDING SERVICES-I (WATER SUPPLY AND SANITATION)**

**INTENT:** Introduction to elementary building services of water supply, sanitation and roads.

**METHODOLOGY:** Exercises in layout of simple drainage systems for small buildings. Planning of bathrooms and lavatory blocks in domestic and multi-storied buildings. Exercises can also be clubbed with design studio project.

**CONTENTS:**

## **Water supply**

Sources of water supply. Impurities of water and systems of water supply. Various kinds of water meters. Water storage tanks, their capacity and location. Calculation of water consumption. Domestic hot and cold water supply systems. Size of pipes and their joining details. Connections of different sanitary fittings like ferrule, stopcocks, bibcocks etc.

## **Sanitation**

Basic principles of sanitation and disposal of waste matter from buildings.

Dry and wet carriage systems.

Sanitary fittings- washbasins, WC's, bathtubs, sink, urinals, bidets, flushing cistern, traps etc.

Various types of joints, manholes and septic tanks.

Proper location and ventilation of intercepting chambers and inspection chambers.

Drainage systems- separate, combined and partially combined systems.

Single stack system.

One pipe and two pipe systems.

Testing of house drains.

Gradients used in laying drains and sewers.

Self-cleaning and non-scouring velocities for drain pipes.

Size of drainpipes and materials used.

## **Roads**

Description and suitability of roads and comparative cost analysis.

WBM (water bound macadam) road, tar, bitumen, asphalt and RCC roads.

Soil stabilized, brick and stone paving.

Drainage- sub drains, culverts, ditches, gutters , drop inlets and catch basins.

## **BARC-0307: HUMAN SETTLEMENTS**

**INTENT:** To study the patterns of human settlements and their relevance to architecture.

**METHODOLOGY:** Lectures, assignments and library studies.

### **CONTENTS:**

#### **Man and Environment**

Biological and behavioral responses to human settlements.

Design for living, natural and built- environment.

#### **History of human settlements**

Origin and growth of human settlement.

Role of River Banks in growth of human settlement.

Historical survey of the city as an expression of the vitality of a civilization.

Western world: River valley settlements, Greek, Roman, Medieval, Renaissance and modern.

Ancient texts and treatises on settlement and area planning in India.

Human settlements during ancient medieval and modern periods India, Europe and other parts of the world.

Characteristics of human settlements built by Hindu and Islamic Rulers in India.

Study of ancient Indian settlements like Mohenjodaro, Taxila, Nalanda.

Study of ancient Indian cave settlements of Ajanta, Ellora, Elephanta.

Comparative study of Indus Valley and town planning in ancient and medieval India.

## **BARC-0308: ART APPRECIATION**

**INTENT:** The course is considered as a medium of understanding architecture as one of the principal art in the pantheon of human creativity. The flowering of aesthetic sensibilities and a taste for the visual and sensory appeal of physical form. The emphasis is to make students into connoisseurs of art rather than consummate artists themselves.

**METHODOLOGY:** Lectures and library studies and assignments to understand and appreciate art.

**Content:**

History of Art:

Art through ages, architecture as art, milestones in art from the Prehistoric, Paleolithic, Neolithic, Classical, Medieval, Renaissance and modern periods. Indian art heritage, Indus valley to present day.

Art consciousness; Aesthetics, perception, symbolism, expression, style, fashion, appropriateness and values. Critical appraisal of examples from the visual as well as performing arts.

## **YEAR TWO SEMESTER FOUR**

### **BARC- 0401: ARCHITECTURAL DESIGN – IV**

**INTENT:**

- To foster understanding about land and landforms and the elements of built space. Experimentation with shapes and forms to evolve sensitivity to built volumes.
- Focus on studying patterns in horizontal circulation in built areas.
- Introduction to vernacular architecture, use of local materials and appreciation of the socio-economics of the users.

**METHODOLOGY:**

- Site analysis at the beginning of each design problem. This would develop sensitivity to existing site conditions and context and help students evolve design directives to guide the design process.
- Block models at every design stage for three-dimensional visualization.

**CONTENTS:**

**Design projects related to different climatic conditions**

The projects would address the study of built form and its relationship to the site, surroundings and climatic setting. Design proposals to address sensitivity to climatic and physical settings. The design problem would induce students to experiment with built and open spaces.

**One complex design problem**

The project would involve the study of simple repetitive type of spaces like schools, hostels, shops and offices. The focus would be on the evolution of form through a detailed site analysis. Other design issues that the problem must address are:

- Detailing of selected areas to introduce a working understanding of services.
- Integration of design ideas with structural feasibility.
- Evolving working solutions for parking and circulation patterns.

### **BARC-0402 : BUILDING CONSTRUCTION & MATERIALS -IV**

**INTENT:** To introduce construction principles and materials used for the basic elements of a building like doors, windows, stairs etc.

**METHODOLOGY:**

- Lectures and Studio assignments for understanding construction details.
- Site visits and library studies to supplement the studio work regarding materials and construction methods.

**CONTENTS:****Construction**

- Pitched bamboo & timber roofs.
- Staircases: Design and details of construction of staircases in timber, stone and RCC. Different types of staircases-Dog legged, Circular, Open Well, Spiral etc.
- Lift well details.
- Partitions: Construction of partition in timber and timber products, gypsum boards etc. for use in offices and restaurants.

**Materials**

- Varnishes: Natural and synthetic clear varnishes, French polish.
- Floor finishes: PCC, terrazzo, stone slabs, brick and terracotta tiles, Synthetic materials (PVC, Timber). Floors of industrial buildings & warehouses. Ceramic wall & floor tiles
- Roofing materials: Burnt clay tiles, slates, AC sheets, GI and Aluminium sheets.

**BARC- 0403: THEORY OF DESIGN****INTENT:**

The courses in Design theory aims to evolve a conceptual framework for intelligent appreciation of Architecture and to develop a vocabulary for discussing design ideas.

**METHODOLOGY:**

The structure of courses consists of set of lecturers and prescribed reading followed by group discussions and seminars.

**CONTENTS:****Design methodology:**

Design as a multi-variety problem solving process. Theories of program and function, thinking techniques, information processing and research methods, generators of creativity, design metrics and system integration.

**Design Evaluation and Criticism:**

Value judgments in design. Appreciation of designer skills, theories of perception and variability of perception. Theoretical issues in contemporary architecture, Seminars on the works of selected Indian and International Architects and related topics.

**BARC-0404: STRUCTURES –IV****INTENT:**

To understand the basic principles of structural mechanics that would be pertinent to simple design elements. To also understand the structural behavior of building elements.

**METHODOLOGY:**



Lectures and computation exercises.

**CONTENTS:**

**Design philosophies**

Strength and serviceability requirements, design methods, working stress , ultimate strength and limit state.

**Analysis and Design**

Analysis and design of sections for flexure by working stress and limit state method- singly and doubly reinforced sections, T and L sections, introduction and used of design aids (SP: 16 to 456)

**Shear bond**

Introduction. Shear stress, Diagonal tension, shear reinforcement Development Length, Anchorage Bond, Flexural bond.

**Detailing of Reinforcement**

Introduction, Requirement or good detailing, Cover to reinforcement. spacing or reinforcement, reinforcement requirements, Reinforcement splicing.

**Slabs** Introduction. Design of One-Way slab. Two way slab.

**BARC-0405 : HISTORY OF ARCHITECTURE-II**

**INTENT:** Introduction to the architecture of the ancient world. To generate an understanding about the development of civilization and its architectural implications.

**METHODOLOGY:** Visually intensive lectures using power point presentations to acquaint students with historic sites and buildings. Site visits and seminar presentations and model making

**Civilizations and Architecture of Ancient India**

- Indus Valley Civilization: Town planning principles, typical building layouts, sewage system, public buildings, the Great Bath etc. Examples from Harappa and Mohenjodaro
- Aryan Civilization: Vedic culture, town planning, its motifs and patterns.
- Buddhist Architecture: Pillars, edicts, stupas, viharas and chaityas.
- North Indian Temple forms: Three Schools -Gujarat, Khajuraho & Orissa.
- South Indian temple forms: Chalukya, Pallava, Pandya and Chola Rulers.
- Jain architecture: Jain temples and temple cities such as Palitana and Girnar.

**BARC-0406: BUILDING SERVICES – II (ELECTRICAL)**

**INTENT:** To teach the schematic layout of simple electrical, illumination, lift and fire fighting system for domestic and office buildings.

**METHODOLOGY:** Lectures and studio exercises. Exercises can be clubbed with design studio project

## **CONTENTS:**

### **Electrical Services**

Laws of electrical circuit- Ohm's and Kirchoff's laws and basic principles.

Circuits- series and parallel.

Common domestic installations- water heater, radiator etc.

Wires- specifications and carrying capacity and calculation of electrical loads.

Types of switches, sockets and fixtures.

Distribution boards, circuit breakers, fuses, electrical meters and their layout.

Design considerations for electrical installations.

Protection against overload, short circuit, earth fault, lightning conductors and other safety measures for buildings.

Wiring systems- methods of wiring, joint and loop in.

Types of electrical wiring- batten, capping & casing, concealed conduits etc.

Wiring material- types, sizes and specifications, main switch, MCB, DB meter.

### **Fire fighting**

Causes and spread of fire. Combustibility of materials and safety norms.

Fire detection and fire fighting equipment- smoke detectors, monitoring devices, alarm systems. Etc.

Design of Fire escapes for high-rise buildings.

### **Illumination**

Light and its propagation, reflection, radiation, transmission and absorption.

Definitions and units of flux, solid angles, luminous intensity, brightness.

Laws of illumination, types of illumination schemes – direct, semi direct, indirect and diffused lighting and their design considerations.

Light flux method for calculation of number of lamps for illumination.

Incandescent, sodium vapor, mercury vapor, fluorescent and neon lamps etc.

Types of Luminaries for interior and exterior lighting.

Residential, commercial, industry, flood and street lighting.

Tests before commissioning of electrical services.

### **Lifts**

Types of lifts, their control and operation.

Definition of average lift carrying capacity, rated load, rated speed, RTT etc.

Details of lift section, machine room, equipment, lift well and lift pit.

Design standards for lifts lobby, lift cars size etc from building codes.

Escalators and conveyors.

## **BARC-0407: VISUAL AND WRITTEN COMMUNICATION**

### **INTENT:**

- Attuning students to a pictorial understanding of spaces.
- Exploring methods of presentation for design through photographs.
- Understanding the language and aesthetics of photography, as an inter-disciplinary art form and its relevance in architectural communication.
- Brainstorming on ideas of representing spaces through photographs.
- To develop skills of written communication.

### **METHODOLOGY:**

- Lecture and post lecture discussions.
- Practical assignments and student presentations.
- Presentation by students on different themes.

## **CONTENTS:**

### **Introduction to Devices**

Introduction to devices used for visual communication.

Introduction to different types of cameras, (still and moving), optical and magnetic, their parts and their use.

### **Communication Graphics**

Introduction to the elements, principles, and techniques that underlie and inform the analysis, creation, and evaluation of visual organizations and are crucial to the process and product of form- making.

Translation of concept into form using word, image, and layout.

Presentation of Designs through photographs, understanding the language and aesthetics of photography, as an inter-disciplinary art form and its relevance in modern architecture.

### **Photographic studies:**

A practical introduction to the theory and application of cameras, metering devices and lighting

Studio and darkroom techniques, developing a print and processing.

Using digital cameras.

Mounting of photographs.

Slide presentation.

### **Written communication**

## **BARC 0408: CAAD LAB**

**OBJECTIVE:** Introduction and the use of software available for architectural applications.

**METHODOLOGY:** Integration of practical exercises along with the design studio project.

## **CONTENTS:**

### **Introduction**

Introduction of various software available for Architectural application, like Auto CAD, Architectural desktop, Revit, Micro station etc. Stress should be given on Auto CAD.

### **Basic commands for 2-D AutoCAD**

Learning basic 2D commands their function and application.

Working on layers and colors.

Understanding of Text, and dimension styles etc, supported with suitable exercise. Understanding complex commands like Pline, spline, x-refs, Attributes, Model space & Paper space etc.

At least one working plan, elevation and section should be completed.

### **Basic commands for 3D**

Introduction of basic 3D commands.

Different types of modeling in Auto CAD.

Exercise on wire mesh modeling.