

YEAR 3 (Semester V)

CODE	SUBJECT	CLASSES					CREDITS	EXAM HRS
		L	T/ST	WR	VV	TOT		
BARC-0501	DESIGN –V	2	6	WR	VV	100	3	6
BARC-0502	BUILDING MATERIALS & CONSTRUCTION –V	2	4	WR	VV	100	2	3
BARC-0503	WORKING DRAWINGS	1	4	-	VV	100	1	-
BARC-0504	STRUCTURE- V	2	-	WR	-	100	1	3
BARC-0505	HISTORY OF ARCHITECTURE-IV	2	-	WR	-	100	1	3
BARC-0506	BUILDING SERVICES- III (ACOUSTICS & HVAC)	2	-	WR	-	100	0.5	3
BARC-0507	ESTIMATING & COSTING	1	2	WR	-	100	1	3
BARC-0508	CAAD LAB- II	1	2	-	VV	100	0.5	-
TOTAL		13	18				10	-

Y E A R 3 (Semester VI)

CODE	SUBJECT	CLASSES					CREDITS	EXAM HOURS
		L	T/ST	WR	VV	TOT		
BARC-0601	DESIGN –VI	2	6	WR	VV	100	3	6
BARC-0602	BUILDING MATERIALS & CONSTRUCTION –VI	2	4	WR	VV	100	2	3
BARC-0603	TOWN PLANNING	1	3	WR	VV	100	1	3
BARC-0604	STRUCTURE- VI	2	-	WR	-	100	1	3
BARC-0605	HOUSING	1	3	WR	VV	100	1	3
BARC-0606	BUILDING ECONOMICS	2	-	WR	-	100	1	3
BARC-0607	CAAD LAB - III	1	2	-	VV	100	0.5	-
BARC-0608	SEMINAR-I	-	2	-	VV	100	0.5	-
TOTAL		11	20				10	-

YEAR THREE SEMESTER FIVE

BARC- 0501: ARCHITECTURAL DESIGN – V

INTENT:

- Exploring and designing structural spanning systems for different requirements.
- To develop sensitivity to building by laws. To understand varied structural building systems
- To develop understanding about how to design in an urban setting.

METHODOLOGY:

- Case studies to be clubbed with library research and live surveys
- Site restrictions should be imposed in framing design problems.
- Detailed models to be generated with key submissions to communicate details of parking, landscaping and elevation features. Perspectives and sketches to be included in all key submissions for the development of communication skills.

CONTENTS:

Design exercise related to structural design

The project would focus on exploring structural spanning systems for large covered areas (temporary or permanent) and their integration with form. Design exercises could be sports area, exhibition hall, temporary canopy etc. The design should be formulated to increase awareness and application about advanced structural systems and latest building material.

- Arcuated- corbelled, radiating arch, vault and dome, squinch and pendentives.
- Vector structures- trusses and space frames, slabs, one way and two-way coffers.
- Form structures- folded slabs, shells, hyperbola and parabola.
- Tensile- tents, cables and pneumatic vis-à-vis materials and plan shapes.

Emphasis of the problems would be on the design parameters and graphical presentation rather than detailed structural analysis.

BARC-0502 : BUILDING CONSTRUCTION & MATERIALS -V

OBJECTIVE: Introduction to a wide range of modern building construction systems incorporating the use of metals like steel and aluminium and composite materials.

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: Different types of doors in steel, Aluminium and Glass. Sliding, Sliding and folding, revolving doors. Fire proof and Sound proof doors. Types of Rolling Shutters.
- Windows: Different types of windows in Steel, Aluminium and Glass. Sliding windows in Steel and Aluminium.
- Staircases: Special staircases in steel. Fire Escape Stair Cases.

Materials

- Composite materials: R.C.C. and R.B.W. Use of Bamboo for Reinforcement.
- Water proofing materials and systems for basement.

- Sections of doors and windows (I.S. 1038 etc)

BARC- 0503: WORKING DRAWING

INTENT: To Familiarize the students with the drawings which are prepared for the actual construction/ execution of the buildings.

METHODOLOGY:

- Lectures and Studio assignments for understanding working drawings.
- Site visits and to understand the practical applications of working drawings.

CONTENTS:

Building drawings are to be prepared as part of the contract documents with proper labeling and dimensioning techniques. The drawings shall be based on building design prepared as design studio assignment. Drawings shall include: Plan/s, foundation plan/s, layout plan showing different buildings, internal roads, water supply, sewerage including area drainage plan. Elevations: Elevations of all sides (front, back and both sides). Sections: Transverse and longitudinal sections, sections through staircase, lift and sanitary units.

Architectural details:

Scheduling of different finishes, doors, windows including hardware fixtures. Preparation of roof drainage system layout, layout of sanitary and plumbing lines and scheduling the fixtures in toilets and kitchen etc. Layout of electrical lines and fixtures.

BARC-0504: STRUCTURES –V

OBJECTIVE: To understand the design elements of Reinforced Cement Concrete, Steel structures along with soil mechanics and foundation engineering

METHODOLOGY: Lectures and exercises in independent design of structural elements.

CONTENTS:

Design of Column

Detail of axially and eccentrically loaded short and long columns by working stress and the limit state methods.

Design for direct and uni-axial bending, use of design aids

Elements of Soil Mechanics

Properties of Soil, Safe bearing capacity, active and passive earth pressures

Foundation Engineering and types of foundation

Design of footing; strip footing for walls, isolated column footing, combined rectangular and trapezoidal footing

Raft foundation

Deep foundation

Pile & well foundation.

Complete Design of continuous beams & Portal Frames

Requirement of joints in RC.C. Construction

Construction joints

Expansion joints.

BARC-0505 : HISTORY OF ARCHITECTURE-IV

INTENT: To study the architecture of the medieval and modern world with a focus on India. The architectural styles and buildings would be discussed in context of their period, geographical/climatic conditions, economic and political conditions, social and religious customs, construction and technology, building material and structure.

METHODOLOGY: Lectures and site visits to acquaint students with historic sites and buildings of Delhi.

CONTENTS:

Architecture of Medieval & Modern Western World

- Islamic architecture: Islam and its philosophy, its implementation in various building types such as mosque, tomb, fort and their elements like domes, minarets, arch etc.

- **Renaissance, Mannerism (Monumentality and spatial effects of forms, use of orders), Post Renaissance: Baroque & Neo-classicism in parts of Europe.**

- Modern architecture: Various modern movements in different parts of the Western world and their role in defining Modern architecture such as Post Impressionism, Expressionism, Art Nouveau, Surrealism, Abstract Expressionism, Cubism etc.

BARC-0506: BUILDING SERVICES – III (HVAC)

OBJECTIVES:

- To understand the schematic layout of simple air conditioning system for domestic and office buildings.
- Understanding of intelligent buildings and devices used in them.

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

CONTENTS:

Air Conditioning

Principles of air conditioning.
Psychometric chart, comfort zone.
Refrigeration cycle and air cycle.
Methods of cooling and heating
Evaporative cooling systems of air conditioning.
Unit air conditioners and central air conditioning plants.
Standards and prescribed locations for various parts.
Descriptive details of plants and duct layout.
Air distribution system- fans, filters, ductwork, outlets, dampers.
Natural and artificial ventilation.
Cooling load for AC.
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-0507: ESTIMATING AND COSTING

INTENT: To equip students with the necessary technical knowledge for calculating estimates and detailed costing for small to medium scale projects.

METHODOLOGY: Small-scale projects to be undertaken to understand costing principles and terms. Final costing exercise to be carried out where students can undertake the costing of their studio design project.

CONTENTS:

Systems

Systems of taking quantities and estimating for all trades involved in construction of medium complexity project.

Specification

Writing of Specification for Quantities.
Items of work and Materials.

Classification of areas

Plinth area, Covered area, Floor area, Carpet area and Projection area.

Types of Estimates

Preliminary, Detailed.

Methods of taking out quantities for building works.

Preparation of Bill of Quantities (BOQ).
Mode of measurements of quantities.
Market rates of labor and building materials.
Labor turnout and norms for consumption of basic materials.

Schedule of rates

CPWD, PWD, Cost Index.
Analysis of rates for common items of work like Cement concrete, Brick work, Painting etc.
Methods for preparation and submission of preliminary estimates and detailed estimates.

Tender

Tender notices and tender documents.
Types of tendering in practice. Process of tendering. Preparation of tender notes/ documents and comparative statements
Award of Tenders

BARC- 0508: CAAD LAB

OBJECTIVE: Advanced learning of software available for architectural applications.

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

CONTENTS:

AutoCAD 3D

Understanding Co-ordinate systems.
Introduction of solid modeling.
Learning solid modeling commands, editing solid modeling.
Working on different planes.
At least one exercise should be completed in 3D modeling.

Revit

Introduction of Revit.
Advantages of Revit over Auto CAD.
Learning various 2D & 3D Commands supported with suitable exercise.
Basic working commands for Adobe Photoshop, Adobe Pagemaker and Corel Draw as applications helpful in Architectural presentations.

YEAR THREE SEMESTER SIX

BARC- 0601: ARCHITECTURAL DESIGN – VI

OBJECTIVES:

- Exploring and designing structural spanning systems for different requirements.
- To develop sensitivity to building by laws. To understand varied structural building systems
- To develop understanding about how to design in an urban setting.

METHODOLOGY:

- Case studies to be clubbed with library research and live surveys
- Site restrictions should be imposed in framing design problems.
- Detailed models to be generated with key submissions to communicate details of parking, landscaping and elevation features. Perspectives and sketches to be included in all key submissions for the development of communication skills.

CONTENTS:**One complex design problem**

The project would involve the study and design of a multi-storied building like office building, shopping mall, hotel, college and hostel, commercial complex, small hospital etc. The focus would be on understanding how to design for an urban setting. Other design issues are:

- Detailing of circulation areas like lifts, staircases etc. to develop sensitivity to horizontal as well as vertical circulation requirements in a multi story building.
- Integration of design with structural and construction details. For this, the project should be integrated with the structures and building construction classes. One set of detailed working drawings must be generated at the end of the design process.

BARC-0602 : BUILDING CONSTRUCTION & MATERIALS -VI

INTENT: Introduction to a wide range of modern building construction systems incorporating the use of metals like steel and aluminium and composite materials.

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**

- Roofs and Trusses: Steel Trusses.
- Detail of terracing for flat roofs.
- Water proofing and rain water disposal.

Materials

- Metals used in buildings: Properties constituents and uses of cast iron, Wrought iron, Steel, Stainless Steel, Bronze, Aluminium and Copper.
- Hot rolled sections, cold forming of sheets into sections.
- Materials for Terracing: Mud- phaska and Brick Tiles and other new systems for terracing.
- Common sections in Brass and Aluminium.
- Pipes in Mild Steel, Stainless steel, cast iron, brass and copper.

BARC- 0603: TOWN PLANNING

OBJECTIVE: Introduction to settlement and town planning.

METHODOLOGY: Lectures and seminar presentations.

CONTENTS:

Pioneers of modern town planning

Patrick Geddes
Kevin Lynch
Clarence Perry
Frank Lloyd Wright
Ebenezer Howard
Le Corbusier
Soria Y Mata

City plan patterns

Linear, Radial and Grid Iron layout patterns.
Planning theories of the twentieth century.
Industrial revolution and modern city.
Garden City, Satellite town.
Democratic city.

Case studies of some recent planned cities like New Delhi, Canberra, Brazillia, Chandigarh.

Current theories on physical planning.
Socio-economic dynamics of urbanization.

Methodology of conducting town planning, surveys and analysis of data collected, use of G.I.S.
Preparation of Master plans.
Zoning and development controls.

Traffic Characteristics

Composition, speed, volume and direction of movement.
Urban road systems and geometry.
Capacity of roads and intersections.

BARC-0604: STRUCTURES –VI

OBJECTIVE: To understand the design elements of Reinforced Cement Concrete, Steel structures along with soil mechanics and foundation engineering

METHODOLOGY: Lectures and exercises in independent design of structural elements.

CONTENTS:

Theory & Design of Cantilever Retaining walls.

Design of stairs
Effective span of stairs

Distribution of Loading on stairs
Simple case of design of stairs.

Steel Structures

Design of Riveted & welded connections (Simple cases only).
Tension & Compression members.
Beam & Plate, Girder
Introduction to grillage foundation.
Trusses

BARC-0605 : HOUSING

INTENT: To understand the fundamentals of housing design

METHODOLOGY: Lectures and exercises

Content:

Introduction to Housing

Definition of house and housing. Housing and its importance in Architecture; Housing and its relationship with neighborhood and city plan.

Housing Design and Site Planning;

Type of new dwelling structures

House detached, semidetached.

Flats and multistoried classification according to the type of access-corridor, gallery, direct grouped, combination of these access types. Definition of each of the above types, their suitability, advantages, disadvantages and social, economic and aesthetic implications.

Selection of site for the housing.

Considerations of physical characteristics of site, location factors, legal and financial factors, community and neighborhood factors.

Importance of orientation and topography in housing design.

Orientation: definition, choice of direction and factors to be considered, sunlight, spacing of blocks.

Topography: Problems inherent in steeply sloping sites economic and aesthetic implications of the building along and against the contours, silhouette problems on a sloping site.

Landscaping and topography; effects of plantation in the background and front of buildings on a sloping site

Sub- division techniques; proportions of plots and need of roads. Garages and parking areas, conservation of beauty spots. Access to the residence and residential colony from roads. Road sections. Roads in residential areas.

BARC-0606: BUILDING ECONOMICS

INTENT: To understand the economic principles associated with building design

METHODOLOGY: Lectures and exercises

CONTENTS:

Building Economics:

1. Elements of Economics: An idea of fundamental concepts of economics Science and their application in industry.
2. Micro Economics: Factor of production-Characteristics and importance, demand supply analysis, competitive market and determination.

3. Micro Economics: National income and its distribution, inequalities of income distribution, its causes and measures,
4. Money and Banking: Meaning and function of money, value of money and its functions. Types and functions of banks in India, Central Banking in India, Bank financing and industry, Foreign Trade Implication of currency devaluation.
5. Economic development of India: Characteristics of Indian Economy, industrial resources in India, poverty and the measures to overcome it, Economic planning in India, Board features of India's Five Year plans.

BARC- 0607: CAAD LAB

OBJECTIVE: Advanced learning of software available for architectural applications.

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

CONTENTS:

MAX

Understanding Co-ordinate systems.
 Introduction of solid modeling.
 Learning solid modeling commands, editing solid modeling.
 Working on different planes.
 At least one exercise should be completed in 3D modeling.

ARCHICAD

Introduction of ARCHICAD
 Advantages of ARCHICAD.
 Learning various 2D & 3D Commands supported with suitable exercise.

BARC- 0608: SEMINAR-I

INTENT: To equip the students with the art of paper presentations and preparation of report.

METHODOLOGY: The students will be preparing paper presentations with guidance under a faculty for the paper presentation.

CONTENTS:

Independent study and documentation of architectural and allied subjects by individual student alongwith oral and visual presentation.

The seminar shall be a research paper on a current topic related to Architecture. The overall supervision shall be done by the seminar coordinator and the individual guidance may be provided by the experts in the subject.

<u>YEAR FOUR SEMESTER SEVEN</u>
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BARC- 0701: ARCHITECTURAL DESIGN – VI

INTENT: