Bachelor of Architecture
SYLLABUS

First Year

Semester I

OPBRC1101  Paper I  English Communication
OPBRC1102  Paper II  Mathematics
OPBRC1103  Paper III  Introduction to Architecture
OPBRC1104  Paper IV  Architecture Drawing
OPBRC1105  Paper V  Art and Graphics-I
OPBRC1106  Paper VI  Basic Design and Field Trip
OPBRC1107  Paper VII  Workshop Practice: Photography, carpentry and Model Making
OPBRC1110  Paper VIII  Seamless learning
OPBRC1111  Paper IX  Co-Curricular Activities

Semester II

OPBRC1201  Paper I  Ecology and Environment
OPBRC1202  Paper II  Construction Materials I
OPBRC1203  Paper III  History of Architecture I
OPBRC1204  Paper IV  Architectural Design I
OPBRC1205  Paper V  Art and Graphics II
OPBRC1206  Paper VI  Theory of Design I
OPBRC1207  Paper VII  Building Construction I
OPBRC1208  Paper VIII  Computer System and Programming
OPBRC1210  Paper IX  Seamless learning
OPBRC1211  Paper X  Co-Curricular Activities

Second Year

Semester III

OPBRC1301  Paper I  History of Architecture II
OPBRC1302  Paper II  Building Science I (Climatology)
OPBRC1303  Paper III  Construction Materials II
OPBRC1304  Paper IV  Architectural Design II
  (Including measured Drawing Camp)
OPBRC1305  Paper V  Art and Graphics III
OPBRC1306  Paper VI  Building Construction II
OPBRC1307  Paper VII  Computer Application in Architecture I
OPBRC1308  Paper VIII  Surveying
OPBRC1310  Paper IX  Seamless learning
OPBRC1311  Paper X  Co-Curricular Activities

Semester IV

OPBRC1401  Paper I  History of Architecture III
OPBRC1402  Paper II  Construction Materials IV
OPBRC1403  Paper III  Architectural Structures I
OPBRC1404  Paper IV  Architectural Design III
OPBRC1405  Paper V  Building Services
OPBRC1406  Paper VI  Building Construction III
OPBRC1407  Paper VII  Computer Application in Architecture II
OPBRC1408  Paper VIII  Remote Sensing and GIS
OPBRC1410  Paper IX  Seamless learning
OPBRC1411  Paper X  Co-Curricular Activities

Third Year

Semester V

OPBRC1501  Paper I  History of Architecture IV
OPBRC1502  Paper II  Sociology
OPBRC1503  Paper III  Construction Materials IV
OPBRC1504  Paper IV  Architectural Structures V
OPBRC1505  Paper V  Architectural Design IV (Including Educational Tour)
OPBRC1506  Paper VI  Quantity Surveying and specification
OPBRC1507  Paper VII  Building Construction IV
OPBRC1508  Paper VIII  Elective I
  a. Interior Design
  b. Conservation
OPBRC1510  Paper IX  Seamless learning
OPBRC1511  Paper X  Co-Curricular Activities

Semester VI

OPBRC1601  Paper I  Building Services II (Electrical Services)
OPBRC1602  Paper II  Construction Material V
OPBRC1603  Paper III  Architectural Structure V
OPBRC1604  Paper IV  Technical Communication
OPBRC1605  Paper V  Architectural Design V
OPBRC1606  Paper VI  Site Planning and Landscape
OPBRC1607  Paper VII  Building Construction V
<table>
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<tr>
<th>Course Code</th>
<th>Paper</th>
<th>Elective/Activity</th>
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<tr>
<td>OPBRC1608</td>
<td>Paper VIII</td>
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<tr>
<td></td>
<td></td>
<td>a. Product Design</td>
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<td>b. Design for Disabled</td>
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<td>OPBRC1610</td>
<td>Paper IX</td>
<td>Seamless learning</td>
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<td>OPBRC1611</td>
<td>Paper X</td>
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**Fourth Year**

**Semester VII**

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<tr>
<th>Course Code</th>
<th>Paper</th>
<th>Subject</th>
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<tr>
<td>OPBRC1701</td>
<td>Paper I</td>
<td>Building Services III (Mechanical Services)</td>
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<tr>
<td>OPBRC1702</td>
<td>Paper II</td>
<td>Building Science II (Acoustics and illumination)</td>
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<tr>
<td>OPBRC1703</td>
<td>Paper III</td>
<td>Architectural Structure VI</td>
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<td>OPBRC1704</td>
<td>Paper IV</td>
<td>Construction Management</td>
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<td>OPBRC1705</td>
<td>Paper V</td>
<td>Architectural Design VI (With Field Trip)</td>
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<td>OPBRC1706</td>
<td>Paper VI</td>
<td>Working Drawings</td>
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<td>OPBRC1707</td>
<td>Paper VII</td>
<td>Elective III</td>
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<td></td>
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<td>a. Alternate Energy System in Architecture</td>
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<td>b. Vernacular Architecture</td>
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<tr>
<td>OPBRC1708</td>
<td>Paper VIII</td>
<td>Introduction to planning</td>
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<td>OPBRC1710</td>
<td>Paper IX</td>
<td>Seamless learning</td>
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<tr>
<td>OPBRC1711</td>
<td>Paper X</td>
<td>Co-Curricular Activities</td>
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**Semester VIII**

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<th>Paper</th>
<th>Subject</th>
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<tr>
<td>OPBRC1801</td>
<td>Paper I</td>
<td>Practical Training (140 Days)</td>
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<tr>
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<td>a. Monthly work report from architect’s office</td>
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<td>b. Critical appraisal of build projects</td>
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<td>c. Field documentation of architectural details</td>
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<td>d. Case studies of build projects</td>
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<td>e. Training report</td>
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**Fifth Year**

**Semester IX**

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<th>Paper</th>
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<tr>
<td>OPBRC1901</td>
<td>Paper I</td>
<td>Professional Practice and Management</td>
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<td>OPBRC1902</td>
<td>Paper II</td>
<td>Housing</td>
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<td>OPBRC1903</td>
<td>Paper III</td>
<td>Building Economics and Legislation</td>
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<tr>
<td>OPBRC1904</td>
<td>Paper IV</td>
<td>Architectural Design VII (With Field trip)</td>
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<td>OPBRC1905</td>
<td>Paper V</td>
<td>Practical Training and Presentation</td>
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<td>OPBRC1906</td>
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<td>OPBRC1907</td>
<td>Paper VII</td>
<td>Elective IV</td>
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<td>a. Urban Conservation</td>
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b. Urban Design and Earthquake resistance

**Semester X**

OPBRC11001 Paper I Thesis Project
OPBRC11002 Paper II Elective V Related to advanced objective in Thesis project
OPBRC11003 Paper III Elective V
  a. Disaster Resistant
  b. Structure Architecture Development and Legislation

OPBRC11010 Paper IX Seamless learning
OPBRC11011 Paper X Co-Curricular Activities
Detail Syllabus
First Year
Semester I

OPBRC1101       Paper I       English Communication

Unit I
Communication Skills in English
Introduction; The Importance of English; English as the First or Second language; Uses of English; Other Uses of English

Unit II
Listening Skills
What is listening?; Types of Listening; Objectives; Active Listening- an Effective Listening Skill; Note Taking Tips; Barriers for Good Listening; Purpose of Listening; Outlines and Signposting; Gambits; Exercise

Unit III
Reading Skills
Importance of Reading; Definition of Reading; Levels of Reading; Requirements of Reading; Types of Reading; Techniques of Reading; Academic Reading Tips; Exercise

Unit IV
Writing Skills
What is writing?; The Sentence; The Phrase; Kinds of Sentences; Parts of Sentence; Parts of Speech; Articles; Types of Sentences; Time Management Tips; Test Preparation Tips; Tips for Taking Exams; What is a Paragraph?; Construction of Paragraph; Linkage and Cohesion; Example; Exercise; Academic Essay Writing; Thesis; Procedure for Thesis Approval and Deposit; Summary; Precis Writing; Report Abstracts; Letter Writing; Memo; Cover Letter; Resume writing

Unit V
Communication Skills- Speaking Skills
Definition; Barriers of Communication; Types of Communication; Know What You Want To Say

OPBRC1102       Paper II       Mathematics

Unit I
Statistics: Mathematical expression, moments and M.G.F., probability – simple problems; Binomial, Poisson and normal distributions – simple applications.
Correlation and regression, coefficient of correlation, lines of regression - simple applications.

**Unit II**
Differential Equations: First order and first degree - variables separable, homogeneous form, reducible to homogeneous form, linear differential equation, reducible to Linear form, exact equations, second order ODE with constant coefficients.

**Unit III**
Matrices: Rank of a matrix, solution of linear simultaneous equation, inverse of matrix by elementary transformations, Eigen values, Eigen vectors, Cayley Hamilton Theorem (without proof).

**Unit IV**
Linear Programming: Standard, Augmented, Duality, Algorithms, Unknown Integers, Dynamic programming, Simplex Algorithm, Shadow Price, LP Example, Job Shop Problem

**Unit V**
Coordinate Geometry of Three Dimensions: Sphere, Cylinder, Cone, Equation of Sphere, Tangent, Plane, Line, Cylinder, Equation of Cylinder, Right Circular Cylinder ,Cone, Equation of Cone, Right Circular Cone.

**OPBRC1103 Paper III Introduction to Architecture**

**Unit I**
Role of an Architect in an Architectural Project and In Society through History;

**Unit II**
Disciplines and Skills to Be Learnt By an Architect;

**Unit III**
Factors Influencing Architecture Of A Place, Climate, Materials, Socio Cultural, Technological, Etc.;

**Unit IV**
Introduction to Old and New Architectural Works;

**Unit V**
Understanding the Terms Such As Vernacular, Traditional, Classical, Modern, Post Modern and Neo Modern Renaissance, European, Oriental.

**EXERCISES:** Presentation of Observation at the Respective Native Places of Students. During Educational Trips/ Site Visits, Visits to Buildings of Architectural Significance.

**OPBRC1104 Paper IV Architecture Drawing**

**Unit I**
Familiarization of drawing material and equipment, free hand drawings
Unit II
Lettering, Fonts and Scale and Plane geometry
Unit III
Plane, Solid section and intersection, development of Surface of solids
Unit IV
Isometric, Axonometric of solids Sciography of simple Geometric forms
Unit V
Perspective, Graphical presentation and rendering

Exercises: Studio Assignments based on above topics

OPBRC1105 Paper V Art and Graphics-I
Unit I
Sketching / Line drawing and pencil shading
Unit II
Nature Study / Shapes Textures and Characters
Unit III
Still life study (Vegetation)
Unit IV
Water color study and color wheel study
Unit V
Rendering techniques and perspective study


OPBRC1106 Paper VI Basic Design and Field Trip
Unit I
Elements of Visual Composition
Role of basic elements of visual design existing in paintings, compositions, murals, sculptures, building and in nature - Dots (points), life’s planes, patterns, shapes, forms, spaces, colour, texture, levels. Light, fenestrations

Unit II
Principles of Visual Compositions
Repetition, rhythm, radiation, focal point, symmetry, asymmetry background, foreground, sense of direction, harmony balance and proportion

Unit III
Study of Planer forms and Paper forms
To create abstract sculptures out of mount board, box board, metal foils and any other planer materials and also exploring the adoptability of these sculptures to Architectural functions.

Unit IV
Building Appraisal
Analytical study of the sculptural building forms and its critical appraisal of visual character

Unit V
Application of Basic Design in Architecture
Compositions, murals and sculptures for semi recreational and semi functional architectural spaces

OPBRC1107   Paper VII   Workshop Practice:
Photography, carpentry and Model Making

Photography
To Provide Technical Know How About Cameras, Its Accessories And Their Applications Including The Following: Camera- Definition, History, Types And Usage, Aperture, Shutter Speed, Types Of Lenses And Accessories. Film Rolls, Types and Usages. Flash, Types And Usage. Film Processing Description and Method (Colour and B/W). Composition-Settings With Respect To View Finder, Weather, Place, Colour, Mood And Purpose. Architectural-Exteriors And Interiors With Respect To Scale, Composition, Texture, Colour, Skyline, Light And Shade, Exploration And

Carpentry and Model Making
Usage of Various Materials Used In Building Construction and Model Making, Types of joints in wood and metals; Tee shaped joint, L shaped joint, overlap joint, halved joint, cogged joint, housed. Cube with thermocoal pyramid with hardboard, square with ply board, Cylinder with paper and wire, stare with handmade sheet or soft board, hexagonal cylinder having inside a square with plyboard and paper


OPBRC1201   PAPER I   ECOLOGY AND ENVIRONMENT
Unit I
Fundamentals of Ecosystem, Our Earth’s Environment,
Unit II
Resource and Environment, Management of Environment,
Unit III
Environmental Legislation, Environmental Quality and Indicators,

Unit IV
Environmental Planning and Design Guidelines,

Unit V
Human Impact on Environment, Environmental pollution

EXERCISES: Study of Relevant Ecosystems, Botanical & Zoological Specimens at Both Micro & Macro Levels, Effects of Pollution and Prevention and Control of both Natural & Manmade Hazards.

OPBRC1202 Paper II Construction Materials I

In the context of materials like Stone, Brick and Timber, study of

Unit I
The Nature Of Materials,
Unit II
The Manufacturing Process,
Unit III
Structural, Visual And Textural Properties,
Unit IV
Identification And Selection,
Unit V
Their Application in Buildings

EXERCISES: Identification and Study of Relevant I.S. Codes. Seminars and Preparation of Reports, Visits to Manufacturing Units Are Desirable. Field Studies Should Preferably Form an Integral Part of Tutorial work

OPBRC1203 Paper III History of Architecture I

Architecture of:
Unit I
Indus valley,
Unit II
Buddhist era,
Unit III
Hindu empires,
Unit IV
Islamic rule,
Unit V
Moghul era –
In terms of design parameters such as cross cultural theories relating to art and architecture construction methods etc.

**Exercises:** Analytical and illustrative exercises related to above topics such as papers seminars etc.

### OPBRC1204 Paper IV Architectural Design I

Analysis of activities and spaces in a given predominant function; Its representation in graphic form. Design exercise evolving out of single functions such as ticket counters/reception offices, security offices, Kiosks, booths, Information cells etc. Multiple function such as primary health centers, convenient shopping etc.

At least one design problem to concentrate on comprehensive graphic representation to form a prelude to measure drawing.

Measure drawing camp to include study of a building/group of buildings/settlements of architectural importance, involving detailed drawings, constructional details, material used giving due importance to the given context.

### OPBRC1205 Paper V Art and Graphics II

- Unit I Element of Design
- Unit II Principle of Design
- Unit III Development of surfaces
- Unit IV 3 D Compositions
- 3 D Compositions in Different Mediums.
- Unit V History of Arts
- Introduction to History of Art, Artistic Tradition and Theories

**EXERCISES:** 2 D Compositions In Various Colour Mediums, Textures. 3 D Compositions in Plaster Of Paris, Clay, Paper, Cardboard, Etc.

### OPBRC1206 Paper VI Theory of Design I

- Unit I Organization of form Study of space usage and its implications
- Unit II Architecture design process
Unit III
Application of principles of design and design philosophies

Unit IV
Study of time, life, works and philosophies and Chicago School

Unit V
Concept and individual work of Architects

OPBRC1207 Paper VII Building Construction I

Unit I
Bricks – Types; bonds; single one and half and two brick, thick wall, cavity wall, jointing and pointing and bonding of bricks, stainless steel types.

Unit II
Stone – Random rubble un-coursed, random rubble coursed, square rubble brought to course, square rubble course, polygon walling, chisel craft surface.

Unit III
Foundation – Types of foundation, Strip footing, Simple lintels, Introduction to simple brick arch, opening

Unit IV
Opening
Jambs of opening, head of openings, steel lintels, Introduction of simple brick arch, opening

Unit V
Roofing and Flooring
Types of roofs, pitched roof (roof slopes), Flat roofs, Parapet walls, Solid ground floor, Suspended timer ground floor, Brick flooring

OPBRC1208 Paper VIII Computer System and Programming

Computer as a Tool for Architects-

Introduction to Computer and Its Peripherals, Hardware Brief (Useful For Architects) Viz. CPU, Keyboard, Mouse, Printer, Plotter, Scanner, Digitizer, Etc.
Introduction to Various Software’s Relevant To Architects Viz. Ms Word, Excel, Power-point, Introduction to Basic Internet Applications,

EXERCISES: Assignments Related to Various Applications of These Software’s.
Second Year  
Semester III

**OPBRC1301**  
**Paper I**  
**History of Architecture II**

Study of evolution of design concepts, philosophy construction techniques, materials and structural solutions with the help of selected examples, with reference to social, cultural, geographical political and intellectual climate of the place and period, as styles of Architecture like:

Unit I  
Egyptian,  
Unit II  
West Asiatic,  
Unit III  
Greek, Roman,  
Unit IV  
Early Christian, Romanesque,  
Unit V  
Byzantine and Gothic

Assignments: Analytical and illustrative exercises, as tests, seminars or papers.

**OPBRC1302**  
**Paper II**  
**Building Science I (Climatology)**

Unit I  

Unit II  
Effect of climate on man: body heat balances, thermal indices, thermal comfort, solar chart, psychometric chart and its application.

Unit III  
Analysis of climate data, climatological site analysis and its application in site planning and design evolution.

Unit IV  
Effect of climate on building envelope: heat flow, heat transfer, heat storage and time lag of various building materials and elements. Day lighting, air movement and ventilation

Unit V  
Passive means of thermal control; Solar movement and sun shading devices

**Exercises:** Analytical and illustrative exercises, related to above topics.
OPBRC1303 Paper III Construction Materials II
In the context of materials like Mud, Lime and Cement, study of

Unit I
The Nature of Materials,
Unit II
The Manufacturing Process,
Unit III
Structural, Visual and Textural Properties,
Unit IV
Identification and Selection,
Unit V
Their Application in Buildings
EXERCISES: Identification and Study of Relevant I.S. Codes; Seminars and Preparation of Reports. Visits to Manufacturing Units Are Desirable. Field Studies Should Preferably Form an Integral Part of Tutorial Work.

OPBRC1304 Paper IV Architectural Design II
(Including measured Drawing Camp)
Development of surfaces of solids, Isometric, axonometric of solids. Sciography of Simple Geometric; Forms Leading to Sciography of Architectural Forms.

Perspective-One Point, Two Point And Three; Points. Exercises from Simple Geometrical Forms Leading To Perspective of Building Forms. Plotting of Sciography on Perspective Drawings. Graphical Presentation and Rendering in Pen and Ink of Architectural Drawings and Materials.

EXERCISES: Studio Assignments Based On Above Topics.

OPBRC1305 Paper V Art and Graphics III
Emphasis is to be laid on graphic skills/presentation techniques/model making etc. Indoors and outdoors sketching in pencil/crayons/color/charcoal/ink of objects/buildings/ automobiles/vegetation/human figures etc.

Sculpture/mural exercises in clay/POP/ceramics/metal/junk & scrap materials etc. Study of 3D forms and spaces with basic principles of design like repetition, symmetry, rotation and rhythm. Study of various color scales.
OPBRC1306       Paper VI  Building Construction II
Details of Joinery in Timber and study of various basic elements like foundation, walls, roofs/floors and openings along with their principles of construction and Architectural details. Introduction to Construction, Machinery and Equipments. Site Visits Should Form An Integral Part Of The Studio Work.

Unit I
Foundation
Unit II
Structure
Unit III
Roof and Flooring
Unit IV
Staircases
Unit V
Simple timber roofs

EXERCISES: Preparation of Drawings, Site Reports and Other Exercises Covering the Above.

OPBRC1307       Paper VII  Computer Application in Architecture I

CONTENTS:
Computer as a Tool For Architects. Introduction to Various Software’s Relevant to Architects Viz. AutoCAD, 3DS Max, Corel draw, Adobe Photoshop, Pagemaker, Etc. Advanced Internet Applications.
Exercises: Assignments Related To Various Applications Of These Softwares

OPBRC1308       Paper VIII  Surveying

Unit I
Introduction - principles and classification of survey, basic measurements in surveying, basic methods of surveying. Different types of transverse
Unit II
Chain survey - Introduction, instruments, types of chains and tapes, their uses and construction details
Unit III
Compass survey; Theodolite survey
Unit IV
Leveling; Contouring
Unit V
Setting out work for buildings
Semester IV

OPBRC1401  Paper I  History of Architecture III
Unit I
Renaissance and Baroque Architecture – The works of Brunelleschi, Bermini, Michel Angelo, Raphael, Andrea Palladio and Christopher Wren.
Unit II
Unit III
Unit IV
Development of various Movements, Thoughts and Philosophies during 19th Century such as Neoclassicism, Arts & Crafts movement, Art Nouveau and The Viennese Secession.
Unit V
Development of various Movements, Thoughts and Philosophies during 20th Century such as Deutscher Werkbund, Futurism, Constructivism, Expressionism, Art Deco, Cubism and De Stijl.
Exercises: Analytical and illustrative exercises of above topics in the form of papers and seminars.

OPBRC1402  Paper II  Construction Materials IV
Contents: of physical, chemical, visual and textural properties of metals and alloys;
Unit I
Application of metals and alloys in buildings, structural and non-structural applications;
Unit II
Metals like iron, aluminium, copper and
Unit III
Alloys like steel, brass, and are to be studied;
Unit IV
Protective finishes on metals;
Unit V
Study of metal applications in hardwares
OPBRC1403  Paper III  Architectural Structures I

Unit I
Concept of Force, Graphical Presentation of Force, Coplanar and Ten Coplanar Forces, Concurrent and Non Concurrent Forces, Composition and Resolution of Coplanar Forces by Graphical and Analytical Methods.

Unit II
Built Up Steel Sections, Centre Of Gravity and Moments of Inertia, Parallel Axes Theorems, Product Of Inertia, And Use Of Steel Tables.

Unit III
Stress And Strain, Concept Units, Tensile, Compressive And Shear Stresses, Modulii of Elasticity And Their Relationship, Linear And Lateral Strains, Poisson’s Ratio, Stress Strain Curve, Elastic Limit, Yield Point, Breaking Stress, Factor Of Safety, Safe Stress Values For Timber, Cast Iron, Mild Steel And For Steel In Tension Compression, Shear And Bending As Per Isi Code.

Unit IV
Types of Loads- Dead, Live, Wind, Impact, Earthquake, Concentrated, Uniformly Distributed And Varying Loads, Moment of a Force,

Unit V
Couple And Its Moment, Conditions of Statistical Equilibrium of Forces, Concept of Beams and Various Support Conditions, Determination of Support Reactions, Both Analytically And Graphically.

OPBRC1404  Paper IV  Architectural Design III

Design of an Institution or public building at the community scale of infill scale, Understanding essential Character of an Institution or Public building. Influence of culture, land, climate, technology and finance on the Building design, Part details of the project to understand design resolution.

Projects: Community Hall, Neighborhood school, Bank building, Religious Institution, Shopping Plaza.

OPBRC1405  Paper V  Building Services

Unit I
Supply of water to different types of buildings; Sources of water, modes and methods of conveyance of water, fixtures and appliances.

Unit II
Distribution of water, methods of distribution, different distribution systems, and their principles of layout, Design of water distribution system in a campus, and in a building, overhead and underground water storage tanks.
Unit III
Refuse; different forms of refuse, garbage, sludge, toilet waste and storm water collection and disposal system, Requirements for various building types.

Unit IV
Sanitation; manholes, grease chambers, etc. Traps, ventilation of drains and sewers, Principles of design of drainage lines, drainage layouts for building premises, Longitudinal sections of drains. Drainage in non municipal area - soak wells, septic tanks.

Unit V
Sanitation, Fittings & Fixtures; water closets, flushing valves, flushing tanks, basins and its accessories, rain water, drainage pipes, spouts, sizing of rain water pipes, disposal system of rain water at ground level, storm water drainage.

Exercises: Study of IS Codes. Preparation of reports, visit to construction site and documentation. Market survey to study water supply and drainage products.

OPBRC1406 Paper VI Building Construction III

Emphasis should be laid on understanding of constructions in R.C.C. in different parts of building through basic building elements.

Foundation: R.C.C. footings, isolated, with their connections with superstructure along with Damp proof course.

Structure: Simple R.C.C. frame with beams and columns.

Roof: Flat R.C.C. roof with water proofing details study of different R.C.C. roof forms and its connection with structure.

Flooring: R.C.C. flooring, mosaic flooring & cement tile flooring, interlocking paving blocks in ground and upper floors.

Staircases: Staircases in R.C.C. with different types.

OPBRC1407 Paper VII Computer Application in Architecture II

2D drafting in any popular architectural software e.g. ACAD (latest version).
Management of Data Processing

Software e.g. MS Excel, Tools related to Bar Charts, Pie Charts and Tables to be introduced. Simple calculation functions like addition, average and sorting to be learnt.

Exercises: Drafting simple geometrical object in 2 dimensions. Creation of double lime Plans of simple building types.
Creation of Data tables, Pie charts and Bar charts, Simple mathematical exercises using the same data.

OPBRC1408 Paper VIII Remote Sensing and GIS

Remote Sensing
- Fundamentals of RS
- Electromagnetic energy and remote sensing
- Sensors, platforms and RS data acquisition system
- Multispectral, hyper spectral and thermal sensors
- Image enhancement and visualization
- Image interpretation and classification
- Microwave thermal remote sensing
- Radar and laser altimetry

Geographical Information System (GIS)
- Theory of GIS supported by extensive practical exercises
- Geographic information and spatial data types
- Hardware and software; GIS; Steps of spatial data handling
- Spatial referencing
- Spatial data input, data preparation
- Data visualization
Third Year
Semester V

OPBRC1501  Paper I  History of Architecture IV

Unit I
Modern Architecture after the great masters: Alvar Aalto, Eero Saarinen, Jorn Utzon and Louis I Kahn.

Unit II

Unit III
High Tech Architecture: James Sterling, Renzo Piano, Richard Rogers and Norman Foster.

Unit IV
Deconstruction Architecture: Peter Eisenman, Frank Gehry, Bernard Sthumi and Zaha Hadid.

Unit V

Exercises: Analytical and Illustrative exercises of above topics in the form of papers and seminars.

OPBRC1502  Paper II  Sociology

To develop a sociological base for Architecture

Unit I
Man, environment and society. Rural society, traditional patterns and trends of change. The concept of social

Unit II
Stratification, urbanization and modernization. Concept of social structure, cultural and social institutions,

Unit III
Relation between social structure and special structure, Social aspects of housing and problems of slums.

Unit IV
Social theories of Gandhi and Nehru and Contemporary India.

Unit V
Community development and panchayati Raj.

Exercises: Seminars and preparing paper.
OPBRC1503   Paper III   Construction Materials IV

Unit I
Application of metals and alloys in buildings, structural and non-structural applications;
Unit II
Metals like iron, aluminium, copper and
Unit III
Alloys like steel, brass, and are to be studied;
Unit IV
Protective finishes on metals;
Unit V
Study of metal applications in hardwares.

OPBRC1504   Paper IV   Architectural Structures V

Unit I
Design of spread footing, combined footing, simple raft foundation.
Unit II
R.C.C. design – T beams, L beams, Columns and Isolated column footing,
Unit III
RCC wall, retaining wall.
Unit IV
Design of one way and two way slabs.
Unit V
Design of RCC cantilevers.

OPBRC1505   Paper V   Architectural Design IV
(Including Educational Tour)

Understanding correlation between function, structure, material, construction and services.

Design of a building to understand the relation between function and structure. The idea of form follows function and vice versa.

The structural system as a design element. This design concept is to be constructed with the understanding of materials and construction techniques and various services needed for the functions of the building.

Project: Design of public buildings such as multistory apartment, commercial building, multiplex, etc.
OPBRC1506    Paper VI    Quantity Surveying and specification

Unit I
Introduction to procedure of estimating, date require for framing an estimate, type of estimates. Approximate and detailed estimate, Abstract of Estimates, bills of quantities, Contingencies, taking of quantities for principal building works, electrical works.

Unit II
Analysis of rate for Principal civil works, item rate considering, current market rate for building materials and labor wages as well as P.W.D. scheduled of rates. Composition of rate - percentage distribution for materials, labor, tools plant and Contractor's Profit.

Unit III
Preparation of Tender Document, notice inviting tender and advising the client regarding selection of contractor.

Unit IV
Mode of measurement. Signification of specification in building construction. General and detailed specification for all kind of principal building works and building materials.

Unit V
Contract Documents & Byelaws
a) Nature of building contracts; types; Condition of contract; obligations and responsibilities of clients, contractors and architects.
b) Tenders - calling, scrutiny and recommendations, open and selective tender systems; two stages tender, scrutiny process, Pre-tender qualifications and registrations of contractors.
c) Deposits, labor laws and obligations: disputes and settlement of disputes.
d) Building bylaws: ground coverage, Set Backs, FAR calculations, building height regulations, building use regulation, NA - NOC,BU certificate.
e) Buildings services approvals and completion certificate procedure.


OPBRC1507    Paper VII    Building Construction IV

Unit I

Unit II
Staircase: Metal staircase, Terrace water proofing, Basement damp proof construction,

Unit III
Paneling :Wood Paneling, Stone paneling, Advanced Doors and Windows - Heavy paneled and moulded doors in timber, fully
Unit IV
Glazed sliding & folding doors and windows and bay windows, rolling shutters. 
Curtain Walls - Curtain walls in glass, aluminum, precast concrete units etc. for buildings Like laboratories, offices, cinemas etc.
Unit V
R. C. C. Construction - Frame construction, advantages over load bearing construction, study of column grid, detailing of R. C. C. work with reinforcement for slabs, beams, Columns, footing, staircases (ordinary and spiral).

Exercises: Preparing Construction drawings bases on above topics. Preparing report of a building selected from site and presentation.

OPBRC1508 Paper VIII Elective I

a. Interior Design

   • History of interiors and traditional trends, Study of interiors of different nature like homes, restaurants, offices, hotels etc. covering aspects like furniture, lighting, flooring, ceiling etc.
   • Market survey of different materials used in interiors like wood, veneers, laminates, metals, lighting fixtures etc. Construction details of furniture, wood joinery, metal fabrication, false ceiling, flooring etc.
   • Designing for human comfort and ergonomics. Design exercises will consist of designing of interiors of residences, offices, hotels etc.

b. Conservation
Semester VI

OPBRC1601  Paper I  Building Services II (Electrical Services)

Unit I
Electrical distribution systems in buildings,
Unit II
Main and sub distribution, switches and controls,
Unit III
Layout system for lighting, fans, telephones. Electric drawings with symbols
Unit IV
Service systems: Lifts, pumps, air-conditioning system, computer systems, etc.
Unit V
Earthing and lightening protection in building.

Exercises: Preparation of reports, visit to construction site and documentation. Market survey to study electrical products;

OPBRC1602  Paper II  Construction Material V

Unit I
Ferro cement,
Unit II
Precast construction,
Unit III
Pre-stressed construction,
Unit IV
Structural steel roofing and steel construction,
Unit V
Cost effective building material

Exercise: Study of IS codes, seminars and preparation of reports and visit to construction site.

OPBRC1603  Paper III  Architectural Structure V

Unit I
Properties of cement, coarse aggregate and fine aggregates, properties of concrete in fresh and hardened state. Durability of concrete and introduction to concrete mix design procedures.
Unit II
Unit III
Design of beams, singly and doubly reinforced rectangular beams and T-Beams subjected to flexure, shear and torsion.
Design of slabs, one-way slab, and two-way slab with corners free to lift and held down condition using 8.I.S. codes; Design of doglegged staircase.

**Unit IV**
Design of Column; short column and long columns with lateral ties and helical reinforcement.

**Unit V**
Design of footing. Isolated column footings, concept of combined footing, raft and pile foundation. 
Pre-stressing: Methods and losses in pre-stressing.

### OPBRC1604 Paper IV Technical Communication

a. Effective writing and Reading
   - Enriching vocabulary
   - Reading Comprehension
   - Paragraph development
   - Job application and Resume writing
   - Report writing
b. Oral communication (Including language lab)
   - Interview skills
   - Introduction type of interviews, Job interview, Building Personality traits
c. Group discussion
d. Effective presentation: Strategies and Skills

### OPBRC1605 Paper V Architectural Design V

Design of a building to understand the relation between function and structure; The idea is to form follows:

- Function and vice versa.
- The structural system as a design element.

Note: This design concept is to be constructed with the understanding of materials and construction techniques and various services needed for the functions of the building.
Project: Design of public buildings such as multistory apartment, commercial building, multiplex, etc.

### OPBRC1606 Paper VI Site Planning and Landscape

**Unit I**
- Introduction to landscape architecture.
- Elements of landscape design and their relation to build environment.

**Unit II**
- Plant characteristics - The structure, color, form and foliage of various trees and shrubs and climbers and ground covers.
• Study and identification of Indian plants and trees etc. Plant propagation.

Unit III
• Study of landscape in historical perspective Indian, Persian, Mughal, Japanese, Chinese etc.
• Landscape designing - site analysis and development.

Unit IV
• Designing and presentation of landscape schemes for building projects, gardens/parks,
• Historical monuments and places of tourist Interest etc.

Unit V
• Contemporary attitudes to landscape design.
• Design of road layouts, parking and campus planning. Exercises: Design of landscape for building projects and public spaces.

OPBRC1607 Paper VII Building Construction V
• Sky light,
• North light,
• Curtain wall, structural glazing, ,
• Section windows,
• Aluminum windows and
• Pre-cast construction
• Metal cladding

Exercises: Preparing construction drawings based on above topics. Preparing report of a building selected from site and presentation.

OPBRC1608 Paper VIII Elective II
a. Product Design
b. Design for Disabled

a. Product Design
Introduction to product design, history of product design, design concepts and methodologies, design Process, current trends and case studies of various products.
Economics, introduction to various manufacturing processes and materials.

Exercise: Study of various products in market. Design of small hand held products like mobiles, watches, cameras etc. Design of home appliances.

b. Design for Disabled
Fourth Year
Semester VII

OPBRC1701 Paper I  Building Services III (Mechanical Services)

Unit I
Basic principles of refrigeration, refrigeration cycle and system components
Unit II
Air cooling and air conditioning, planning and design considerations, psychometric chart and its use.
Unit III
lifts, grouping of lifts, return time, design of lift banks for carrying capacity and travel time, installation requirements, escalators.
Unit IV
Fire extinguishing systems, warning systems, fire resistant doors, planning of buildings for fire escapes,
Unit V
Solar Energy: water heating systems

Exercises: Preparation of reports, visit to construction site and documentation. Market survey to study mechanical products

OPBRC1702 Paper II Building Science II (Acoustics and illumination)

Unit I
Basic Terminology and definitions, Physics of sound, Behavior of sound in an enclosed space, Criteria for acoustic environment: location of building, geometry and shape, echo, reverberation time, sound absorption coefficient, noise rating curves.
Unit II
Predictions of acoustical conditions and approach to designing enclosure for predetermined acoustical responses, corrective of existing deficient enclosures. Introduction to sound reinforcing system-amplification and distribution, Selection of acoustic materials, construction details and fixing;
Unit III
Noise - physiological and psychological effects, transmission loss, flanking of sound, structure borne sound and noise from different mechanical equipment's. Noise control techniques and their applications;
Unit IV
Introduction to illumination, Laws of illumination,
Unit V
Design for lighting, classification of lighting system - direct, diffused, indirect etc.
Artificial light sources, types and their use limitations. Use of artificial lighting as an element in architectural scheme particularly exhibitions, theatres, offices and stores etc., lighting for road traffic, decorative and floodlighting.

Exercises: Medium size acoustical design supplemented with drawing and calculations. Qualitative and quantitative aspects of lighting supported by actual exercises;

**OPBRC1703 Paper III Architectural Structure VI**

Unit I
Connection: riveted and bolted joints; design of fillet, butt, plug and slot welds; design of riveted, bolted and welded joints for axially loaded member, eccentric connection

Unit II
Design of tension member Design of compression member; built up column, design of lacing and battering.

Unit III
Column base; introduction to grillage foundation

Unit IV
Design of laterally restrained beams; simple and built up sections.

Unit V
Roof trusses; generally arrangement of trusses, spacing of trusses, design loads, design of purlin and simple roof trusses.

**OPBRC1704 Paper IV Construction Management**

Unit I
Role of Architect in Construction Management; CPM, PERT

Unit II
Scheduling of construction.

Unit III
Planning of construction site.

Unit IV
Inventory, liaising with different authority,

Unit V
Arbitration, payment, legal implications, etc.-

**OPBRC1705 Paper V Architectural Design VI (With Field Trip)**

Resolution of project to integrate complexity of urban dimensions and architectural language

Design of complex and large scale projects in urban context; Design must establish linkages with urban structure, urban continuity, movement structure, landscaping, people and vehicular movements’ system design, economics, architectural aesthetics and details.
Project: Railway Station, Inter State Bus Terminus, Airport or Sports Stadium.

OPBRC1706       Paper VI       Working Drawings

Understanding of scale, dimensioning, texture and symbols for making constructions drawings

Preparation of working drawings - plan, elevations, section, foundation layout and section, shuttering plan, electrical and sanitary details

Detail drawings of toilets, kitchen & staircase

Preparation of drawings for municipal approval showing area statement, FAR calculations using local Bye-laws

Exercises: Drawings based on above topics of simple buildings

OPBRC1707       Paper VII       Elective III

a. Alternate Energy System in Architecture
b. Vernacular Architecture

Contents:
1. Alternate Energy Systems in Architecture:

2. Vernacular Architecture:

Exercise: Class work on above, detailed study of one community with reference to architecture, settlement pattern, techniques, materials, symbolism and rituals.
OPBRC1708 Paper VIII Introduction to planning

Unit I
Definition, planning as an architectural expression and form of developing a human settlement; History of city planning.

Unit II
Theories of city planning, new towns and cities, urban and rural housing;

Unit III
Concepts of urban space, survey, techniques;

Unit IV
Zoning and land use, neighborhood concepts, central business district, site planning;

Unit V
Urban transportation, urban renewal and redevelopment, present day planning in India

Exercises: Paper presentation; Site visit to various areas of the city.

Semester VIII

OPBRC1801 Paper I Practical Training (140 Days)

a. Monthly work report from architect’s office
b. Critical appraisal of build projects
c. Field documentation of architectural details
d. Case studies of build projects
e. Training report in beginning of IX semester
Fifth Year  
Semester IX

OPBRC1901  Paper I  Professional Practice and Management

Unit I
The architect and his office, relationship with clients, consultants, contractors, legal responsibilities of Architects, code of professional practice, fees

Unit II
Architectural Competitions And Architects Registration Act 1972.

Unit III
Tender and tendering procedures, principle of contract and agreements. Control of constructional operations. Arbitration and its proceedings and awards.

Unit IV
Introduction to principles of business management, project programming and monitoring PERT and CPM network and their analysis.

Unit V
Human relation and personnel management. Brief idea about accounting and book keeping, business correspondence, information storage and retrieval systems.

Exercises: *Preparing a report of a study of an Architect’s office.*

OPBRC1902  Paper II  Housing

Unit I
Housing systems - housing need and options available, National Housing

Unit II
Policy, Housing Agencies and their contribution to housing development, housing finance.

Unit III
Social factors influencing design, affordability, economics factors and housing concepts, slum up-gradation, site and services, housing surveys and neighborhood analysis.

Unit IV
Different type of housing and housing standards, methodology of formulation standards, relevance of standard in housing development, services efficiency and user satisfaction.

Unit V
Housing Design process - different stages in project development layout design including utilities and common facilities, design as a result of bye-laws. Development of technology and community interest.

Exercise: *Paper presentation. Site visit to housing areas*
OPBRC1903 Paper III Building Economics and Legislation

Building economics in general as relevant to Architects;

Creative economics as relevant to creative design and creative building

Emerging concepts in building economics e.g. life Cycle Costing (LCC), Net Benefit (NB), Net Saving (NS), Benefit-to-Cost Ratio (BCR), Saving-to Investment Ratio (SIR), Internal Rate of Return (IRR), Overall Rate of Return (ORR), Payback (PB), using interest and discounting tables.

Formulating Projects, Estimating Costs and Benefits, Selecting a discount rate of Minimum Acceptable Rate of Return (MARR)

Exercise: Presentation and report preparation on the above topic

OPBRC1904 Paper IV Architectural Design VII (With Field trip)

Design of complex and large scale projects in urban context; Design must establish linkages with urban structure, urban continuity, movement structure, landscaping, people and vehicular movement system design, economics, architectural aesthetics and details.

Project: Railway Station, Inter State Bus Terminus, Airport or Sports Stadium.

OPBRC1905 Paper V Practical Training and Presentation

To review the skills and knowledge acquired during practical training on VIII semester

Exercise: Students need to present the work done during their practical training and submission of Report

OPBRC1906 Paper VI Dissertation

Each student is required to conduct a non-design study on topic selected by the student and approved by the department. The study shall be conducted under the guidance of teacher or external expert in the department. This Dissertation should lead to a design problem to be taken up as a Thesis Topic.

OPBRC1907 Paper VII Elective IV

a. Urban Conservation
b. Urban Design and Earth Quake resistance
a. Urban Conservation
Values, Ethics and Theories of Conservation, preparatory procedures for Consolidation, Restoration, Rehabilitation, Reproduction, Reconstruction etc.

Role of Conservation Architects

Introduction to various charters like: Venice Charter, Burra Charter, COMOS Charter.

Urban Conservation: Planning & Management.


b. Urban Design
Historical perspective on civic design, Forces/Factors governing city design
Elements and principles of city design, Urban Services

Exercises: Urban 'Space Activity' studies and seminars / reports on seminars

**OPBRC11001 Paper I Thesis Project**

Large scale project having complexity of urban and architectural resolutions. Culmination of all the skills acquired in architecture. Individual understanding of architectural theory, philosophy and architectural style.

Note: Student shall engage in study, documentation, analysis and design process of the project. The theoretical part to be put together in the form of a report and the design solution to be presented in hard/soft copy with a model.

Project: Selected by student and approved by department.

**OPBRC11002 Paper II Elective V Related to advanced objective in Thesis project**

The student will undertake study guided by thesis guide in subject area of the topic selected for the thesis project.
Paper III  Elective V

a. Disaster Resistant
b. Structure Architecture Development and Legislation

a. Architectural development and legislation.
   - Significance of law and its relationship to the profession of Architecture & allied fields, Sources of law constitution, Acts of Central/state legislature, procedures, Law jurisprudence & Sources of law.
   - An overview of laws related to the profession of Architecture and Physical Development

b. Disaster Resistant structures
   - Comprehension of technical term, related to seismic design.
   - Seismic zones in India.
   - Seismic forces, behavior of structure under seismic forces, failure patterns.
   - Design Considerations: form, materials, and structural system and construction techniques.
   - Study of IS codes and local building by laws related to seismic design.