

# **Mohanlal Sukhadia University, Udaipur**



## **College of Architecture**

**B.Arch**

**TEACHING SCHEME & SYLLABUS**  
**Effective from Academic Year 2021-2022**

**COURSE MATRIX**

<b>YEAR I</b>	<b>SEMESTER I</b>							
	<b>THEORY</b>	<b>Hours</b>			<b>Marks</b>			<b>Cr</b>
<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>IM 20%</b>	<b>EM 80%</b>	<b>Total</b>	
B1AR01-CT01	Architectural Structures-I	2	0	0	20	80	100	2
B1AR02-CT02	Environmental Studies	2	0	0	20	80	100	2
B1AR03-CT03	Human Settlement & Vernacular Architecture	2	0	0	20	80	100	2
	<b>PRACTICAL/ STUDIO</b>							
<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>IM 60%</b>	<b>EM 40%</b>	<b>Total</b>	<b>Cr</b>
B1AR04-CP01	Architectural Drawing & Graphics	2	0	4	120	80	200	4
B1AR05-CP02	Visual Arts & Basic Design- I	1	0	4	90	60	150	3
B1AR06-CP03	Computer Applications- I	0	0	2	30	20	50	1
B1AR07-CP04	Building Material & Construction- I	1	0	4	90	60	150	3
B1AR08-CP05	Model Making & Workshop	1	0	2	60	40	100	2
B1AR09-CP06	Professional Communications	0	0	2		50	50	1
	<b>Total</b>	<b>11</b>	<b>0</b>	<b>18</b>	<b>450</b>	<b>550</b>	<b>1000</b>	<b>20</b>
	<b>Total Teaching Hours</b>	<b>29</b>						

**L- Lecture****T- Tutorial****P- Practical / Studio****IM- Internal Marks****EM- External Marks****Cr- Credits**

YEAR I	SEMESTER II							
	THEORY	Hours			Marks			Cr
Course Code	Course Name	L	T	P	IM 20%	EM 80%	Total	
B2AR01-CT04	Surveying & Leveling	2	0	0	20	80	100	2
B2AR02-CT05	Climatology	2	0	0	20	80	100	2
B2AR03-CT06	Architectural Structures II	2	0	0	20	80	100	2
	PRACTICAL/ STUDIO							
Course Code	Course Name	L	T	P	IM 60%	EM 40%	Total	Cr
B2AR04-CP07	Architectural Design- I	2	0	4	120	80	200	4
B2AR05-CP08	Visual Arts & Basic Design- II	1	0	4	90	60	150	3
B2AR06-CP09	Computer Applications- II	1	0	2	60	40	100	2
B2AR07-CP10	Building Material & Construction-II	1	0	4	90	60	150	3
B2AR08-CP11	Surveying Lab	0	0	2	30	20	50	1
B2AR09-CP12	Guided Study & Field Trip	0	0	2	30	20	50	1
	Total	<b>11</b>	<b>0</b>	<b>18</b>	<b>480</b>	<b>520</b>	<b>1000</b>	<b>20</b>
	Total Teaching Hours	<b>29</b>						

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credits**

YEAR 1I	SEMESTER III							
	THEORY		Hours			Marks		Cr
Course Code	Course Name	L	T	P	IM 20%	EM 80%	Total	
B3AR01-CT07	Humanities	2	0	0	20	80	100	2
B3AR02-CT08	History of Architecture-I	2	0	0	20	80	100	2
B3AR03-CT09	Architectural Structures III	2	0	0	20	80	100	2
	PRACTICAL/ STUDIO							
Course Code	Course Name	L	T	P	IM 60%	EM 40%	Total	Cr
B3AR04-CP13	Architectural Design- II	1	0	6	120	80	200	4
B3AR05-CP14	Building Material & Construction-III	1	0	4	90	60	150	3
B3AR06-CP15	Computer Applications- III	0	0	2	60	40	100	2
B3AR07-CP16	Structure Lab	0	0	4	60	40	100	2
B3AR08-CP17	Guided Study & Field Trip	0	0	2	30	20	50	1
	Total	<b>8</b>	<b>0</b>	<b>18</b>	<b>420</b>	<b>480</b>	<b>900</b>	<b>18</b>
	Total Teaching Hours	<b>26</b>						

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

YEAR II	SEMESTER IV							
	THEORY		Hours			Marks		Cr
Course Code	Course Name	L	T	P	IM 20%	EM 80%	Total	
B4AR01-CT10	Specifications & Estimation	2	0	0	20	80	100	2
B4AR02-CT11	History of Architecture-II	2	0	0	20	80	100	2
B4AR03-CT12	Architectural Structures IV	2	0	0	20	80	100	2
	PRACTICAL/ STUDIO							
Course Code	Course Name	L	T	P	IM 60%	EM 40%	Total	Cr
B4AR04-CP18	Architectural Design- III	1	0	6	120	80	200	4
B4AR05-CP19	Building Material & Construction-IV	1	0	4	90	60	150	3
B4AR06-CP20	Measured Drawing & Documentation	1	0	2	60	40	100	2
B4AR07-CP21	Computer Applications- IV	1	0	2	60	40	100	2
B4AR08-CP22	Guided Study & Field Trip	0	0	2	30	20	50	1
	Total	<b>10</b>	<b>0</b>	<b>16</b>	<b>420</b>	<b>480</b>	<b>900</b>	<b>18</b>
	Total Teaching Hours	<b>26</b>						

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

YEAR III		SEMESTER V						
	THEORY	Hours			Marks			Cr
Course Code	Course Name	L	T	P	IM 20%	EM 80%	Total	
B5AR01-CT13	Building Plumbing Services	2	0	0	20	80	100	2
B5AR02-CT14	History of Architecture-III	2	0	0	20	80	100	2
B5AR03-CT15	Architectural Structures V	2	0	0	20	80	100	2
	PRACTICAL/ STUDIO							
Course Code	Course Name	L	T	P	IM 60%	EM 40%	Total	Cr
B5AR04-CP23	Architectural Design- IV (Including Educational Tour)	1	0	6	120	80	200	4
B5AR05-CP24	Building Material & Construction-V	1	0	4	90	60	150	3
B5AR06-CP25	Interior Design	1	0	2	60	40	100	2
B5AR07-CP26	Elective-I 1. Furniture Design 2. Product Design 3. Digital Design	1	0	4	90	60	150	3
B5AR08-CP27	Guided Study & Field Trip	0	0	2	30	20	50	1
	Total	<b>10</b>	<b>0</b>	<b>18</b>	<b>450</b>	<b>500</b>	<b>950</b>	<b>19</b>
	Total Teaching Hours	<b>28</b>						

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

YEAR III	SEMESTER VI							
THEORY		Hours			Marks			Cr
Course Code	Course Name	L	T	P	IM 20%	EM 80%	Total	
B6AR01-CT16	Building Electrical Services	2	0	0	20	80	100	2
B6AR02-CT17	History of Architecture-IV	2	0	0	20	80	100	2
B6AR03-CT18	Architectural Structures VI	2	0	0	20	80	100	2
PRACTICAL/ STUDIO								
Course Code	Course Name	L	T	P	IM 60%	EM 40%	Total	Cr
B6AR04-CP28	Architectural Design- V	1	0	6	120	80	200	4
B6AR05-CP29	Building Material & Construction-VI	1	0	4	90	60	150	3
B6AR06-CP30	Landscape Design	1	0	2	60	40	100	2
B6AR07-CP31	Elective-II 1. History of Architecture of Rajasthan 2. Vernacular Architecture of Rajasthan 3. Arts & Crafts of Rajasthan	1	0	4	90	60	150	3
B6AR08-CP32	Guided Study & Field Trip	0	0	2	30	20	50	1
<b>Total</b>		<b>10</b>	<b>0</b>	<b>18</b>	<b>450</b>	<b>500</b>	<b>950</b>	<b>19</b>
<b>Total Teaching Hours</b>		<b>28</b>						

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

YEAR IV	SEMESTER VII							
	THEORY	Hours			Marks			Cr
Course Code	Course Name	L	T	P	IM 20%	EM 80%	Total	
B7AR01-CT19	Building Mechanical Services	2	0	0	20	80	100	2
B7AR02-CT20	Contract Documents & Byelaws	2	0	0	20	80	100	2
B7AR03-CT21	Acoustics & Illumination	2	0	0	20	80	100	2
	PRACTICAL/ STUDIO							
Course Code	Course Name	L	T	P	IM 60%	EM 40%	Total	Cr
B7AR04-CP33	Architectural Design- VI	1	0	6	120	80	200	4
B7AR05-CP34	Working Drawing	1	0	4	90	60	150	3
B7AR06-CP35	Settlement Planning	1	0	2	60	40	100	2
B7AR07-CP36	Elective-III 1. Universal Design 2. Research Methodology 3. Architectural Journalism	1	0	4	90	60	150	3
B7AR08-CP37	Guided Study & Field Trip	0	0	2	30	20	50	1
	<b>Total</b>	<b>10</b>	<b>0</b>	<b>18</b>	<b>450</b>	<b>500</b>	<b>950</b>	<b>19</b>
	<b>Total Teaching Hours</b>	<b>28</b>						

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**



YEAR IV	SEMESTER VIII	
Course Code	Course Name	Duration
	Practical Training 1. Presentation & Approval Drawings 2. Site Visits & Studies 3. Critical appraisal of built projects 4. Working Drawing & Details 5. Training Report	140 days

YEAR V	SEMESTER IX	Hours			Marks			Cr
Course Code	Course Name	L	T	P	IM 20%	EM 80%	Total	
B9AR01-CT22	Professional Practice & Management	2	0	0	20	80	100	2
B9AR02-CT23	Sustainable Architecture	2	0	0	20	80	100	2
B9AR03-CT24	Disaster Resistant Architecture	2	0	0	20	80	100	2
PRACTICAL/ STUDIO								
Course Code	Course Name	L	T	P	IM 60%	EM 40%	Total	Cr
B9AR04-CP38	Architectural Design- VII	1	0	6	120	80	200	4
B9AR05-CP39	Dissertation (Including Thesis Seminar)	1	0	4	90	60	150	3
B9AR06-CP40	Training Presentation	0	0	4	90	60	150	2
B9AR07-CP41	Elective-IV 1. Housing 2. Urban Design 3. Urban Conservation	1	0	4	90	60	150	3
B9AR08-CP42	Guided Study & Field Trip	0	0	2	30	20	50	1
	<b>Total</b>	<b>9</b>	<b>0</b>	<b>20</b>	<b>480</b>	<b>520</b>	<b>1000</b>	<b>19</b>
	<b>Total Teaching Hours</b>	<b>29</b>						

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

YEAR V	SEMESTER X	Hours			Marks			Cr
		L	T	P	IM 60%	EM 40%	Total	
B10AR01-CP43	Thesis Project	2	0	10	210	140	350	7
B10AR02-CP44	Elective- V: Design Elective Related to Thesis 1. Interior Design 2. Landscape Design 3. Urban design	1	0	4	90	60	150	3
B10AR03-CP45	Elective VI: Technology Elective Related to Thesis 1. Plumbing Design 2. Electrical Design 3. Mechanical Design	1	0	4	90	60	150	3
B10AR04-CP46	Guided Study & Field Trip	0	0	2	30	20	50	1
	<b>Total</b>	<b>4</b>	<b>0</b>	<b>20</b>	<b>420</b>	<b>280</b>	<b>700</b>	<b>14</b>
	<b>Total Teaching Hours</b>	<b>24</b>						

**L- Lecture**

**T- Tutorial**

**P- Practical / Studio**

**IM- Internal Marks**

**EM- External Marks**

**Cr- Credit**

**ARCHITECTURAL STRUCTURES I****B.ARCH Semester: I****Code: B1AR01-CT01****Course Objectives:** Introducing simple structural concepts and behaviour of structural elements.**Anticipated Learning Outcomes:** Understanding of concepts taught in the semester through simple numerical calculations and models

UNIT	CONTENT
1	<b>Forces:</b> Concept of Force, Graphical Presentation of Force, Coplanar and non Coplanar Forces, Concurrent and Non Concurrent Forces, Composition and Resolution of Coplanar Forces by Graphical and Analytical Methods.
2	<b>Centroids And Moment Of Inertia Of Plane Areas:</b> Built up Steel Sections, Centre of Gravity And Moments of Inertia, Parallel Axes Theorem, Product of Inertia, Radius of gyration, Perpendicular axis theorem.
3	<b>Lifting Machines:</b> Mechanical Advantage, Velocity Ratio and Efficiency, Law of Machine, Pulleys and Pulley Blocks.
4	<b>Simple Stresses and Strains:</b> Concept of stress and strain in three dimensions and generalized Hooke's law; Young's modulus; Tension test of mild steel and other materials: true and apparent stress, ultimate strength, yield stress and permissible stress; Stresses in prismatic & non prismatic members and in composite members.
5	<b>Types of Loads:</b> Requirements of good structures, safety, stability, economy, Dead, Live, Wind, Impact, Earthquake, Concentrated, Uniformly Distributed and Varying Loads, loads system, critical combination of loads, earthquake forces, and wind loads on tall building.
	<b>TOTAL</b>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	B.C.Punmia, "Strength of Materials", Laxmi Publications (P) Ltd., New Delhi	2006
2	Ashok Jhunjhunwala, "Engineering Mechanics", Tata McGraw Hills	2009
3	Singer and Patel, "Strength of Material", Harper Collins Publishers	2008
4	Timoshenko & Gere, "Mechanics of Structures", CBS Publishers and Distributers.	2009
5	S.B Junnarkar, "Mechanics of Structures Vol. I & II", Charotar Publishing House, Anand	2009

**ENVIRONMENTAL STUDIES****B.ARCH Semester 1****Code: B1AR02-CT02**

**Course Objectives:** To bring about awareness of a variety of environmental concerns and to create a pro-environment attitude and behavioural pattern in society based on sustainable lifestyles.

**Anticipated Learning Outcomes:** Awareness of a wide range of environmental concerns and ability to act at their own level to protect the environment we all live in.

UNIT	CONTENT
1	<b>Fundamentals of Ecology &amp; Environment</b> - Fundamental of Ecology, Environment, Resources, Sustainable habitats and ecological footprints of cities.
2	<b>Fundamentals of Impact of human activities on Environment</b> - Impact of human activities on ecology and our environment leading to water pollution, air pollution, noise pollution etc., overall environmental degradation, reduced quality of life, climate change and natural disaster.
3	<b>Fundamentals of environmental Planning and Design</b> - Built Environment, new urbanism and sustainable architecture leading to energy efficient, environment friendly, low waste human settlements, climate friendly, energy efficient green buildings and art in our built environment.
4	<b>Fundamentals of Environmental Legislations</b> - Introduction to salient provisions of environmental legislation in India and concerned departments / agencies for basic understanding.
5	<b>Fundamentals of Environmental Impact Assessment</b> and Environmental clearance of projects pertaining to Built Environment for basic understanding.
	<b>TOTAL</b>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Engene P. Odum and Garry W Barreit "Fundamentals of Ecology" Thomson – Brooks/ Cole	2006
2	A.K.Jain "Ecology and Nature Resource Management for Sustainable Development" Management Publishing Co.	2001
3	Goudi Andren "The human impact in Natural Environment", Basic Btackwell, Oxford	1981
4	McHarg Ian "Design with Nature" – Natural History Press, New York	1969
5	James Steele, "Ecological Architecture", Thames & Hudson	2005

**HUMAN SETTLEMENT & VERNACULAR ARCHITECTURE**  
**Code: B1AR03-CT03**
**B.ARCH Semester I**

**Course Objectives:** Introduce traditions of building structures for habitation, made without the intervention of professional architects.

**Anticipated Learning Outcomes:** Familiarity with simple ways of building and settling a community that related to local customs, social systems, climate, available materials and construction methods.

UNIT	CONTENT
1	Vernacular architecture including primitive or aboriginal architecture; indigenous architecture; ancestral or traditional architecture; folk, popular, or rural architecture;
2	Ethnic architecture or ethno-architecture; informal architecture; the so-called "anonymous architecture" or "architecture without architects;" and even "non-pedigree" architecture
3	Early human settlements — Causal factors and pattern of development. Human settlements of River valleys civilisation (e.g. Indus-valley civilisation, Egyptian civilisation, etc. Early Vedic civilisation patterns, Canonical patterns as per various Indian contexts.
4	Vernacular architecture in Indian context Definition(s) of vernacular architecture and related terminologies; Difference between vernacular architecture and traditional architecture; Relevance of vernacular architecture in present context; Typologies in different climatic regions of India.
5	Settlements and dwelling patterns Regional dwelling patterns like 'dhanis' (hamlets), villages and their overall adaptation in the said context; Settlements and their vicinity to water resource(s) as places of worship and social activity; water related architecture and typical water resources like kua, kohar, baoli/bavdi, jhalora, bera/beri.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Brunskill, R. W. Illustrated Handbook of Vernacular Architecture. Castle Rock : Faber & Faber.	1987
2	Christian Schittich (Ed.) Vernacular Architecture Atlas for living throughout the world. Birkhauser	2019
3	Lindsay Asquith & Marcel Vellinga, Vernacular Architecture in the 21st Century, Theory Education & Practice, Taylor & Francis	2020
4	Kingston Wm.Heath, Vernacular Architecture & Regional Design, Routledge	2020
5	Cooper, I and Dawson, B. Traditional buildings of India. London : Thames & Hudson.	1998

**ARCHITECTURAL DRAWING & GRAPHICS****B.ARCH Semester: I****Code: B1AR04-CP01**

**Course Objectives:** Introducing basic principles of design, space articulation and architecture and the use of drawing as a communication tool for design information.

**Anticipated Learning Outcomes:** Ability to assemble simple spatial elements in articulated constructs and visually represent them through hand-made 2D drawings and models.

UNIT	CONTENT
1	<b>Free hand &amp; Scale drawing</b> – Introduction to subject. Getting acquainted with necessary instruments of drawing. Learning to draw straight & curved lines with different qualities. Terminology & abbreviations used in architectural drawing. Learning good lettering to improve and maintain quality of presentation. Different types of lettering for titles and annotation of drawings. Introduction to various types of lines such as outline, construction line, centre line etc. Use of scale in drawings and their use in practice & construction of plain & diagonal scale. Reduction and enlarging of given drawings
2	<b>Orthographic projections</b> – Learning meaning of terms 'Plan and Elevations' and using them for drawing simple objects through orthographic projections. Orthographic projection of lines for any given condition determination of true length, traces and inclinations to the planes of projection of any given line. Traces of planes, plane figure inclined to one or both the reference planes. Simple solids like prisms, pyramids, tetrahedron cone, spheres in different position to the reference plane.
3	<b>Metric &amp; Complex Projections</b> – Different ways of presentation of solids in 3D projections like Axonometric, Isometric, oblique. Learning principles of solids, applying them to workout and drawing developed surfaces of simple geometric solids and using them to make models of some of them. Section planes in different angles, drawing of true section and introduction of slicing method. Interpenetration of solids.
4	<b>Perspective Projections</b> – Understanding basic principles of perspective drawings. Introduction of basic elements such as station point, picture plane, eye level, centre of vision, cone of vision, vanishing points etc. Drawing one point and two point perspectives through plan and elevation method, plan and vanishing points method & measuring point method. Types of perspective projections such as one point, two point, three point, worm's eye view, bird's eye view, Normal view etc.
5	<b>Sciography</b> – Introduction to sciography, understanding shade & shadow, umbra & penumbra, Principles of conventional angle of light and its rays acting as a projectors to cast shadow of simple plane. Studying sciography and methods of representing it in 2D projections. Applying sciography to 3D geometrical projections especially Isometric projections.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Philip Meggs, "A History of Graphic Design", John Wiley & Sons; 3 edition	1998
2	N.D.Bhatt, "Elementary Engineering", Charotar Publishing House, Anand	1991
3	Edward J.Muller, James G. Fausett, Philip A. Grau, "Architectural Drawing and Light Construction", Prentice hall New Jersey	1991
4	Alexander W. White, "The elements of Graphic Design Space, Unity, Page, Architecture and Types", All worth press, 1 edition.	2001
5	Francis D.K.Ching with Steven P. Juroszek, "Design Drawing", John wiley & sons, NY.	1998

**VISUAL ARTS & BASIC DESIGN- I**  
**Code: B1AR05-CP02**
**B.ARCH Semester: I**

**Course Objectives:** Introducing free-hand drawing and Two-Dimensional graphic design as a way of understanding the place of art in architecture.

**Anticipated Learning Outcome:** Ability to draw in various media and materials, to develop the power of drawing as a means of coordinating eye and hand in studio and field observation, to judge proportion, scale, and spatial relationships, understand principles of visual composition and experiment with them.

UNIT	CONTENT
1	<b>Elements of Visual Arts:</b> Brief historical review of Fine arts and interdependency of Visual arts, Architecture, painting & sculpture. Exposure to the life & works of famous artists & art forms. Theories related to visual perception –Proximity, repetition, simplest and largest figure, continuity & closure, Figure & ground relationship. Study of Line, Form, Colour, Texture, Space through Observation, Perception and Expression. Study of classification of colours with different hues , values and shades. Colour wheel and colour composition, Properties of colour.
2	<b>Principles of Art and Design:</b> Exploration of the basic principles of composition such as Balance, Proportion, Harmony, Contrast, Emphasis, character with building examples. Ordering principles such as Axis,Symmetry,Hierarchy,Datum,Rhythm & Repetition etc. and its role in architectural expression.
3	<b>Two Dimensional Explorations:</b> Introduction to Principles of Organization/ Composition. Study of Visual properties of 2-Dimensional forms both Geometrical & Non-Geometrical surfaces and visual textures, optical illusions etc. Emphasizing on Elements and Principles of Art and Design by Composing Shapes and Forms in Various Mediums.
4	<b>Indoor and Outdoor Sketching:</b> Learning to Draw by Seeing and Observing. Free hand line sketching and drawing of natural & manmade, Still and Moving Objects such as Human Figures, Vegetation, Automobiles, Historic or new built up structures etc.
5	<b>Rendering:</b> Shading Techniques using Materials such as Pencils, Pencil Colours, Water Colours, Poster Colours, Pen and Ink, charcoal & crayons for development of environmental and architectural ideas. Simple geometric objects, complex geometries and objects in nature & Architecture , shade and shading techniques.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Robert Gill, “Rendering with pen and ink”, Thames & Hudson	1990
2	Gianni A. Sarcone, “Drawing & Illustration”, Arcturus Publication	2012
3	Otto G. Ocvirk, “Art Fundamentals”, Mcgraw Hill	2006
4	Gianni A. Sarcone, “Drawing optical illusions”, Arcturus Publication	2012
5	Trudy Friend, “Landscape problem and solutions”, David & Charles	2005

**COMPUTER APPLICATIONS- I****B.ARCH Semester: I****Code: B1AR06-CP03**

**Course Objectives:** Introducing basic computer skills as relevant to the architectural profession and to bring all students from different backgrounds up to a common level of computer proficiency.

**Anticipated Learning Outcomes:**

Ability to do word and image processing to make short reports and seminar presentations and make 2D orthographic projections in CAD.

UNIT	CONTENT
1	<b>Word processing:</b> Basic templates for creating text documents, editing, formatting, spelling/grammar check, dictionary and thesaurus, page layout, fonts, indentation, inserting tables and images, document review and annotation in software like MS Word.
2	<b>Numerical processing:</b> preparing and editing spreadsheets in software like MS Excel. Collating raw data into numbers for analytical use.
3	Slide Presentations in software like MS PowerPoint, insertion of drawings, audio/video clips.
4	Introduction to Computer Applications in Architecture. Introduction to drafting and modeling software relevant to architecture viz. AutoCAD, Proge CAD, ZWCAD, Draft sight, Google Sketchup, 3ds Max etc.
5	Simple exercises in to 2D CAD software (AutoCAD/Revit) specifically for proficiency of, drawing/editing objects, text, dimensioning, making and inserting blocks, etc. and an understanding of units settings, scale, limits, line type, line weight, layers, colours, and print commands.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Cadfolks, "Autocad 2014 for Beginners", Create Space Independent Publishing Platform	2014
2	Bill Fane, "AutoCAD 2014 For Dummies", John Wiley & Sons	2013
3	Randy H. Shih, "Exploring DraftSight" Schroff Development Corp	2009
4	Chris Grover, "Google Sketch Up", Shroff/O'Reilly	2009
5	Kelly L. Murdock, "Google SketchUp and SketchUp Pro 7 Bible"	2009



**BUILDING MATERIAL & CONSTRUCTION-I****B.ARCH Semester: I****Code: B1AR07-CP04****Course Objectives:** To introduce students to primary building materials and simple construction techniques as applicable to a low-rise building- three to four storied contemporary building.

UNIT	CONTENT
1	<b>Building Stones</b> –Classification of rocks, Quarrying of building stones, Properties of building stones, Common building stones and their uses, Qualities of good building stones, Defects in stones and their remedial measures, Physical tests on stones such as absorption test, hardness test, crushing test etc., Artificial stones, Dressing and various finishes on stones. B.I.S. specification for stones. Various building elements such as foundation, wall, roof/floor and openings using stones in load bearing construction. Classification of arches. Construction of staircase, ramp, retaining wall, columns and piers in stone. Use of stone in various building components such as door window frame, lintel, sill, etc.
2	<b>Earth, Soil and Laterite</b> –Types and Properties of Earth, Soil and Laterite. Construction systems such as adobe, rammed earth, wattle and daub, CSEB etc., Problems of Earth, Soil and Laterite construction and their remedial measures. Soil stabilizers, Physical tests on earth, soil & laterite, BIS specification. Various building elements such as foundation, wall, openings using earth, soil and laterite in load bearing construction. Construction of staircase, ramp, retaining wall, Column and Piers in earth, soil and Laterite. Adobe, rammed earth, wattle & daub construction in mud.
3	<b>Bricks</b> - Composition of good brick earth, Manufacturing of bricks, Properties of bricks, Qualities of good bricks, Classification of bricks, Market forms of bricks such as hollow brick, bullnose brick, perforated, etc. Uses of bricks in building, storage of bricks, Physical tests for bricks, Brick substitutes, BIS specifications. Various building elements such as foundation, wall, roof, floor and openings using bricks in load bearing construction. Special bonds in brick such as rat trap bond, herring bone bond, etc. Details at junctions and quoins. Construction of staircase, ramp and retaining wall in Brick.
4	<b>Clay Products &amp; Pozzolanas</b> – Types of Tiles, Characteristics of a good tile, Manufacture of tiles, Earthenware, Stoneware, Porcelain, Clay blocks. Natural & Artificial Pozzolanic materials, Advantages of addition of pozzolanas, Storing of pozzolanas, Chemical & physical characteristics of fly ash. BIS specifications. Various building elements such as roof and floor using clay products such as roof and floor tiles. Use of clay products in various building components.
5	<b>Protective finishes, Machines &amp; Equipments</b> – Protective finishes on building stones, earth laterite bricks and clay products. Protective finishes such as Damp proofing and water proofing in case of construction in stones, earth, laterite and bricks. Study of Machines & Equipments for manufacturing, transportation, preparation and laying of building stone, earth, brick and clay products. Drawings of machines and equipments used for manufacturing, transportation, preparation and lying of building stone, earth, brick and clay products.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	S.C.Rangwala, “Engineering Materials”, Charota Publishing Housing Pvt. Ltd. Anand (Gujrat)	1997
2	Sushil Kumar, “Building Construction”, M/s. Standard Publishers & Distributors, Delhi	2003
3	Robin Barry, “The construction of buildings (Vol. I-V)”, Blackwell publishing	2000
4	Francis D.K.Ching, “Building Construction Illustrated”, John Wiley	1975
5	Handbook on Building Construction Practices, BIS, New Delhi	1997

**MODEL MAKING AND WORKSHOP****B.ARCH Semester 1****Code: B1AR08-CP05****Course Objectives:** Introduce different techniques of model making in various materials and basic processes for fabrication and assembly of simple building components**Anticipated Learning Outcomes:** Ability to make true scale models of architectural designs, manually and mechanically and familiarity with carpentry, joinery, smithy and moulding with different materials and techniques.

UNIT	CONTENT
1	<b>Model Making:</b> (a) Surface Modelling: Basic geometry like cube, cuboid, cylinder, cone, pyramids by single surface development through cutting and pasting. (b) Form Modelling: basic geometry by using thermocol & various solid materials to understand the characteristics of materials.
2	<b>Model Making (Advance):</b> Study of complex figures to achieve complexity in model making, with addition & subtraction in basic geometry by using paper, mount sheet, mount boards etc.
3	<b>Photography:</b> About the Types of Camera, accessories, lenses, films their usages, setting of camera, aperture, & Shutter speed settings, compositions with respect to view finder, E.V. value colour, white balance, I.S.O. & Exposure.
4	<b>Carpentry &amp; Metal Workshop:</b> Types of joint in wood such as butt, dovetails, rebate, tongue and groove etc. how to cut and weld the metal, molding, bolting, usages of fabrication in architecture.
5	<b>Modeling &amp; Casting Techniques:</b> volumetric study using clay and Plaster of Paris, Clay Modeling, Types of Clay, Casting in Plaster of Paris and other materials

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Donald Stoltenberg, "The Artist & Built Environment", Davis Publication	1980
2	Keith Critchlow, "Order in Space", Thames & Hudson	2000
3	R.C.Gupta, "Basic Shop Theory carpentry", Dhanpat Rai publications	
4	Edward Luce Smith, Paul J Karlstroam, "Fletcher Benton", Harry N Abrams publications, First Edition	1990
5	Robert J. Lang, "Origami animals", Crescent Books Publishers	1992

**PROFESSIONAL COMMUNICATIONS****B.Arch Semester: I****Code:BIAR09-CP06**

**Course Objectives:** Introduce basis language skills for oral professional communication that enables effective conversation in the classroom and participation in conferences and seminars.

**Anticipated Learning Outcomes :** Students should be able to speak and understand spoken English to carry out a meaningful conversation on topics related to Architecture, particularly in the Studio.

UNIT	CONTENT
1	Importance of conversation, definition, process and feedback in communication, cultural influences as barriers to effective communication, features of effective communication
2	Types of professional communication, Letters, Email, short messages, reports, listening and responding, Live, Tele – and Video-conferencing as a media of modern communication, ethics related to various forms of communications.
3	Planning, composing, and writing, Guide to effective writing: Planning and conducting conversations, interviews, preparation and rehearsal of oral statements for presentations, body language, effective listening, telephonic communication.
4	Dimensions of communication (Formal and Informal, upward, downward etc.)
5	Writing a short Research Paper. This exercise is to be followed up continually in all courses throughout the program wherein students are assigned to write a paper on a particular topic related to the course as decided by the subject teacher concerned. This may include reportage of readings, site visits, field trips, conversations with experts and public, etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Raman, M. & Sharma, S., Technical Communication : Principles and Practice, 2nd Ed.	
2	Market, Mike, Technical Communication	2012
3	Rizvi, M. Ashraf, Effective Technical Communication,	
4	Anderson, Paul V., Technical Communication : A Reader- Centred Approach, 6 Ed.	

**SURVEYING & LEVELING**  
**Code: B2AR01-CT04**
**B.ARCH Semester: II**

**Course Objectives:** Introduce principles of topographical survey and their application.

**Anticipated Learning Outcomes:** Working knowledge of manual and digital surveying techniques, ability of demarcating features and setting out a simple building on site.

UNIT	CONTENT
1	<b>Introduction:</b> Principles and classification of survey, Basic measurements in surveying, Basic methods of surveying, Different types of transverse.
2	<b>Horizontal Survey:</b> Chain survey - Introduction, Instruments, Types of chains and tapes, their uses and construction details. Compass survey - Introduction, Different type of compass, Meridians, Bearings, Dip, Declination, Local attraction, Adjustment of angles, Loose needle and fast needle method, Compass transverse. Plane Table survey - Elements of plane table survey, Plane table transverse.
3	<b>Vertical survey:</b> Levelling - Basic definitions, Types of levelling, Instruments like Theodolite, Dumpy level etc., sources of errors, Computations & Permanent adjustment of levels. Theodolite survey - Introduction, Basic definitions, Construction details, Temporary adjustment, Measurement of vertical and horizontal angle, Area computations by planimeter.
4	<b>Contouring:</b> Contour – Definition, contour signature of various land forms, Contouring and Earth work calculation.
5	<b>Setting out work for buildings:</b> Introduction, Controls for setting out, horizontal control, vertical control, setting out in vertical direction, Positioning of structure, Setting out of foundation trenches.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Arora, “Surveying”, Raj Sons Publications Pvt. Ltd.	1996
2	S.C.Rangwala, “Surveying & Levelling”, Charotar Publishing House, Anand (Gujarat)	2005
3	Dr. B.C.Punmia, “Surveying”, Laxmi Publication (P) Ltd., New Delhi	2002
4	William Irvine, “Surveying for Construction”, McGraw Hill Book Co., New Delhi	1995
5	John Clancy, “Site Surveying & Levelling”, Arnold London	1991

**CLIMATOLOGY**  
**Code: B2AR02-CT05**
**B.ARCH Semester: II**

**Course Objectives:** Understanding the elements of climate and how architecture responds to them architecture in order to develop bioclimatic design in buildings. **Anticipated Learning Outcomes:** Ability to interpret climatic data for design, understanding sun path diagrams, shadow angles, daylight factors, read wind charts and assess volume of natural ventilation

UNIT	CONTENT
1	<b>Introduction to Climatology:</b> Importance of climate in Architecture, Weather & Climate, tilt of earth axis, solar radiation quantities & earth's thermal balance. Macro and Micro climate, elements of climate such as temperature, humidity, solar radiation, wind etc. Solar geometry, sun path diagram, types and design of shading devices.
2	<b>Analysis of Climate:</b> Different types of climatic zones and their characteristics. Climatological site analysis and its application in site planning and design evolution.
3	<b>Thermal Comfort:</b> Thermal comfort factors, Methods of heat transfer, Thermal comfort Indices, Application of ET, CET, Psychometric chart and Bioclimatic chart. Thermal Behaviour of Building Elements & Materials: Thermal quantities, Time lag & decrement factor, Thermal conductivity, Thermal transmittance, Thermal Resistance, Thermal bridging, Thermal behaviour of different materials, Effect of multilayered bodies.
4	<b>Day light, Ventilation &amp; Air Movement:</b> Natural light sources, daylight factors, day light contours & calculations. Air movement & ventilation, functions of ventilations, types of ventilation, Air movement standards, Effect of opening on ventilation.
5	<b>Passive means of thermal control:</b> Simple passive techniques such as orientation, form, building envelope, opening etc. Advance solar passive techniques for cooling & heating such as wind tower, solar chimney, roof ponding, Earth air tunnel, trombe wall, solarium, etc. Study of passive environmental control mechanism in traditional or modern built environment.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Milli Majumdar, "Energy Efficient Buildings in India", Teri & MNES	2001
2	Arvind Krishnan, "Climate Responsive Architecture – A design handbook for energy efficient buildings", Tata McGraw Hill, Delhi	2001
3	Koenigsberger, "Manual on tropical housing & building", Orient Longman	1975
4	Ishwarchand, P.K.Bhargava, "The Climatic Data Handbook", CBRI Roorkee & Tata McGraw Hills Delhi.	1999
5	Randall McMillan, "Environmental Science in Building", Palgrave	1983

**ARCHITECTURAL STRUCTURES-II**  
**Code: B2AR03-CT06**
**B.ARCH Semester: II**

**Course Objectives:** To understand simple structural concepts and behaviour

**Anticipated Learning Outcomes:** To demonstrate and understanding of concepts taught during the semester through simple calculations and models.

UNIT	CONTENT
1	<b>Shear Force And Bending Moment:</b> Shear Force and Bending Moment Diagrams in case of simply supported Beams, Cantilevers and beams with overhangs due to Concentrated Loads and Distributed Loads.
2	<b>Bending Stresses in Beams:</b> Theory of Simple Bending, $M/I=F/Y=E/R$ Equation and Its Derivation, Section Modulus, Distribution of Normal Stress due to Bending.
3	<b>Determinacy:</b> Definition of determinate and indeterminate structures, redundant frames, Frames and Trusses: Pre jointed Plane Frames, Determination of Forces in the members by Method of Joints and Method of Sections.
4	<b>Shearing Stresses in Beams:</b> Composite Beams, Shear Stress Distribution In Rectangular, Circular, T And I Sections
	<b>Torsion:</b> Elementary concepts of torsion, shear stress in solid and hollow circular shafts, angle of twist, power transmitted by a shaft, combined bending and torsion;

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	B.C.Punmia, "Strength of Materials", Laxmi Publications (P) Ltd., New Delhi	2006
2	R. K. Bansal, "Engineering Mechanics & Strength of Materials", Laxmi Publications (P) Ltd.	2008
3	V.S.Prasad, "Structural Mechanics & Analysis"	2005
4	Singer and Patel, "Strength of Material", Harper Collins Publishers.	2009
5	Timoshenko & Gere, "Mechanics of Structures", CBS Publishers and Distributors	2006

**ARCHITECTURAL DESIGN -I**  
**Code: B2AR04-CP07**
**B.ARCH Semester: II**

**Course Objectives:** Introducing Architectural Design as the ideation of a functional space crafted by robust elements in an aesthetic manner and exploiting 3D drawings as a medium of near-realistic representation of architectural intent.

**Anticipated Learning Outcomes:** Ability to assimilate learning from Basic Design and Visual Arts, Building Construction and Structures and apply to an Architectural Design by weighing design choices, to draw insights from personal experience of surrounding environment, extract programmatic requirements therefrom and translate into a Design Concept to be expressed through hand-made 3D drawings and models.

UNIT	CONTENT
1	<b>Space, Form &amp; Structure</b> – Interdependence of form, structure, function and space. Study of simple structural systems and behaviour under load, working model of structures like post and Lintel, Cantilever, arched, corbelled, trussed etc.
2	<b>Architectural Concept</b> – Various sources of inspiration for design. Types of concepts. Concept as a response to site and context. Design determinants.
3	<b>Circulation &amp; Space</b> – Types of circulation such as internal, external. Elements of circulation. Types of space such as public, semi public, private, served & servant spaces, etc.
4	<b>Form composition</b> – Relationship of plan, Elevation and section, organization of form, composition of built form.
5	<b>Design</b> – Application of anthropometry in design of simple living and working spaces through study of furniture placement and clearances in space.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Francis D.K.Ching, “Visual Dictionary of Architecture”, Van Nostrand Reinhold	1995
2	Ernst and Peter Neufert, “Architect Data”, Blackwell Science Ltd.	2000
3	V.S.Pramar, “Design Fundamentals in Architecture”, Somya Publication Pvt. Ltd.	1973
4	Lorraine Farrelly, “The fundamentals of Architecture”, Ava Publications	2007
5	Fil Hearn “Ideas that shaped buildings”, The MIT Press Cambridge.	2003

**VISUAL ARTS & BASIC DESIGN -II**  
**Code: B2AR06-CP08**
**B.ARCH Semester: II**

**Course Objectives:** Introducing design elements in three-dimensional forms and space leading to classical methods of architectural form development, theory and application of colours,

**Anticipated Learning Outcomes:** Ability to identify and analyse the elements, principles and vocabulary of three-dimensional design; Identify and apply colour properties and concepts

UNIT	CONTENT
1	<b>Form</b> – Form and nature, Visual and emotional effects of geometric forms and their derivatives – sphere, cube, pyramid, cylinder, cone etc. Properties of forms. Transformation of forms such as dimensional, subtractive, additive forms. Articulation of forms.
2	<b>Space</b> – Space defining elements – horizontal and vertical elements, Openings in space defining elements, spatial relationship, spatial organization.
3	<b>Anthropometry</b> –Space and human activity. Average measurements of human body in different postures, its proportion and graphic presentation. Basic human functions and their implications for space requirement. Minimum and optimum areas for various functions.
4	<b>Proportion and Scale</b> – Visual and Human scale, Theories of proportions – Modular theory, golden section, Ken, etc. Application of these theories in Nature, Art & Architecture.
5	<b>3D Explorations</b> - Study of 3D Forms using principles of Design like repetition, symmetry, rotation, rhythm etc. for making murals, sculptures, installations using different materials like clay, plaster of Paris, wood, paper, metal etc. Abstraction used as basis of development of ideas.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Francis D.K. Ching, “Architecture Form, Space & Order”, John Wiley & Sons, Incorporated	2007
2	Simon Unwin, “Analysing Architecture”, Routledge	2003
3	Debkumar Chakrabarti, “Indian Anthropometric Dimensions”, NID	1997
4	Alvin R. Tilly, “The measures of man & woman human factors in design”, Whitney library of design, NY.	1993
5	K.W.Smithies, “Principles of Design in Architecture”, Van Nostrand Reinhold company.	1981



**COMPUTER APPLICATION -II**  
**Code: B2AR07-CP09**
**B.ARCH Semester: II**

**Course Objectives:** Empowering students to use computers as 2D drafting and 3D modelling tool and to familiarise realistic rendering and architectural presentation techniques using computers

UNIT	CONTENT
1	<b>Introduction to Advanced CAD commands</b> – Creating and insertion of blocks, External reference, raster image ,Attributes etc.
2	<b>Layout and print setting</b> – Create layouts by using Layout Wizard, view ports. paper size, plot scale, style table, paper space and model space etc.
3	<b>Introduction to BIM</b> –Introduction and its advantage over CAD. User Interface, Intro to real building elements i.e. walls, door, window, floor, slab etc.
4	<b>Customization</b> – changing element properties, applying material. Insertion of components from library. Using BIM to create the simple building form.
5	<b>Site</b> – Creating site, contours, applying material, etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Cadfolks, “Autocad 2014 for Beginners”, Create Space Independent Publishing Platform	2014
2	Bill Fane, “AutoCAD 2014 For Dummies”, John Wiley & Sons	2013
3	George Omura , Brian C. Benton, “Mastering AutoCAD 2014 and AutoCAD LT 2014”, John Wiley & Sons	2013
4	Chuck Eastman, Paul Teicholz , Rafael Sacks, Kathleen Liston, “BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors”, John Wiley & Sons	2008
5	Scott MacKenzie, “Learning ArchiCAD 17”, Packt Publishing	2014

**BUILDING MATERIAL & CONSTRUCTION -II****B.ARCH Semester: II****Code: B2AR05-CP10****Course Objectives:** To introduce students to design elements, materials and methods of construction for simple buildings.**Anticipated Learning Outcomes:** Understanding construction materials and techniques for simple building elements.

UNIT	CONTENT
1	<b>Lime and Sand:</b> Sources of lime, Classification of lime & their characteristics, Manufacturing of lime, uses of lime in building elements and components, Building limes according to BIS. Natural sources of sand, classification of sand, properties of sand, classification of Mortars, proportion of lime mortar. Various building elements such as foundation, wall, openings using lime products. Construction of staircase, ramp and retaining wall in lime products.
2	<b>Cement:</b> Introduction to Indian cement industry, Composition and properties of cement, Setting action of cement, Manufacturing of Cement, Tests and storage of cement, Varieties of cement and its application in various building elements and components. BIS Specifications. Various building elements such as foundation, wall, openings using cement products. Construction of staircase, ramp and retaining wall in cement products such as hollow and perforated cement blocks.
3	<b>Timber:</b> Classification of tree, Structure of tree, Defects in timber, Qualities of good timber, Preservation of timber, Seasoning of timber, Market forms of timber, Uses of timber, Indian timber trees. BIS Specifications. Details of carpentry joints in timber, wall construction in timber. Study of timber fasteners. Columns & Piers in timber. Roofs in timber. Terms used for sloped timber roofs, wooden roof truss and its types, covering of sloped roof in timber with various roof covering materials. Timber flooring like woodblock and parquet floor. Doors in timber such as braced and battened, paneled, glazed and sliding. Windows in timber such as paneled, battened, glazed, top hung, pivoted, gable window, dormer window, bay window, French window, etc.
4	<b>Industrial Timber:</b> Properties of veneers, ply woods, Block board, fibre boards, Impreg timber, Compreg timber etc. Application of Industrial timber. BIS Specifications. Various building elements such as walls, roof, floor and openings in industrial timber. Wall paneling and flooring construction using industrial timber. Door, windows in industrial timber.
5	<b>Protective finishes, Machines &amp; Equipments:</b> Protective finishes on lime, cement, timber and timber products. Study of machines & equipments for manufacturing, transportation, preparation and lying of lime, cement and timber & industrial timber. Drawings of machines and equipments used for manufacturing, transportation, preparation and laying of building timber and timber products. Stairs and ramps in timber.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	S.C.Rangwala, "Engineering Materials", Charotar Publishing Housing Pvt. Ltd. Anand (Gujrat)	1997
2	Sushil Kumar, "Building Construction", M/s. Standard Publishers & Distributors, Delhi	2003
3	Robin Barry, "The construction of buildings (Vol. I-V)", Blackwell publishing	2000
4	Francis D.K.Ching, "Building Construction Illustrated", John Wiley	1975
5	Handbook on Building Construction Practices, BIS, New Delhi	1997

**SURVEYING LAB**  
**Code: B2AR08-CP11****B.ARCH Semester: II**

UNIT	CONTENT
1	Chain Surveying: a. Ranging and Fixing of Survey Station. b. Plotting Building Block by offset with the help of cross staff
2	Compass: To determine the magnetic bearing of a line a. Using surveyor's compass b. Using prismatic compass
3	Dumpy leveling : To determine the reduce levels in closed circuit using Dumpy Level. Plane Table Survey: To determine the horizontal levels
4	Theodolite: To carryout temporary adjustment of Theodolite & Measurement of horizontal angle. a. By method of repetition. b. By method of Reiteration
5	Trigonometric Leveling: To determine the Height of an object by trigonometric leveling a. Instruments in same vertical plane b. Instruments in different vertical planes c. Survey Camp (including exercise on triangulation, Theodolite and dumpy level) with minimum duration of 3 days.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Arora, "Surveying", Rajsons Publications Pvt. Ltd.	1996
2	S.C.Rangwala, "Surveying & Levelling", Charotar Publishing House, Anand (Gujarat)	2005
3	Dr. B.C.Punmia, "Surveying", Laxmi Publication (P) Ltd., New Delhi	2002
4	William Irvine, "Surveying for Construction", McGraw Hills Book Co., New Delhi	1995
5	John Clancy, "Site Surveying & Levelling", Arnold London	1991

**HUMANITIES**  
**Code: B3AR01-CT07**
**B.ARCH Semester: III**

UNIT	CONTENT
1	<b>Introduction to Sociology:</b> Relationship between Sociology and Architecture and its relevance: Society and its types, Family as the basic Unit of 'Society'. Man, Environment and Society, Sociological aspects in the history of the evolution of housing/ shelter forms. Human as resource. Maslow theory of hierarchy
2	<b>Power Structure in Society:</b> Social stratification – Concept and Theories (Davis and Moore and Marx). Institutions of Local self government in the Rural and Urban Areas – Gram Panchayat and Municipality.
3	<b>Social Problems:</b> Urbanisation, Overcrowding, Slums, Issues in Housing, Developmental programmes related to urban and rural society. Problems of interaction, Isolation, privacy, accessibility, conflict, and alienation related to the planning and design of different buildings with the references to the people of different age group/Population groups. <b>Socio-Spatial Problems:</b> Migrants, slums high density, high-rise living.
4	<b>General Economics Concepts:</b> Demand and Supply, Elasticity of Demand, , Market and its types, competition, price determination, cardinal and Ordinal utility, Factors of production <b>Elementary Idea of Economic Planning:</b> Broad features of the ongoing five year plan with special references to social and economic factors effecting location, construction and financing of the building industry and housing in particular. <b>Agencies/Institution/Organisations:</b> Directly or indirectly influencing economic aspects of architectural projects.
5	<b>Land Economics:</b> Land as limited resource, demand for land acquisition. <b>Economics of regional Development:</b> Economic development in relation to the regional planning, regional economics theories, problems and prospects of balanced regional development. <b>Building Economics:</b> sources of finance (public or private), interests, rents, taxes, insurance, recurring costs, disposable income and expenditure patterns.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Wallis, Wilson D and Willey M.M, "Text book of Sociology", 1st edition, Khel sahitya Kendra, New Delhi.	2001
2	Schaefer, Richard T. "Sociology: A brief introduction", 4th edition McGraw hill, Boston.	2002
3	Stone P.A. "Building Economy: Design production and organisation a synoptic view", 2nd edition, Pergamon Press, Oxford	1976
4	Giddens Anthony, "Sociology", Polity Press, Cambridge (UK)	2006
5	Porteous, John Douglas; "Environment Behaviour: Planning and Everyday Urban Life", Addison, Wesley	1977

**HISTORY OF ARCHITECTURE****B.ARCH Semester: III****Code: B3AR02-CT08**

UNIT	CONTENT
1	<p><b>Indus Valley Civilization, the Vedic Period &amp; Buddhist architecture</b>  <b>INDUS VALLEY CIVILIZATION:</b>            Introduction to the origins and spread of the Indus Valley Civilization. Nature of growth and salient features of the socio-economic, political, cultural and religious facets that influenced the emergence of an architectural style. Focus on the Town Planning, i.e zoning, road networks, drainage system, clusters and individual residences, the Great Bath and granaries.  <b>Examples:</b> The major cities of Harappa and Mohenjo-Daro.</p> <p><b>VEDIC PERIOD:</b>            Origins of new settlers, area where they settled, individual residences, clusters and village layouts, forms and materials. Socio-political, economic, cultural and religious aspects of the society, evolution of towns and city planning.  <b>Examples:</b> A typical Vedic village, including individual residences, clusters, fencing &amp; gate</p> <p><b>BUDDHIST ARCHITECTURE:</b>            Factors leading to the formation of the religion. Salient features of the religion, its philosophy and methods of worship. Evolution of religious structures like the stupa and the stambha covering their religious symbolism. Evolution of the Chaitya and rock-cut architecture.  <b>Examples:</b> Great Stupa at Sanchi in detail with the Ashok stambha, Chaitya at Karla, near Lonavla</p>
2	<p><b>North-Indian (Nagara) &amp; Jain temple architecture</b>  <b>NAGARA STYLE ARCHITECTURE:</b>            Factors that led to the need for a temple as a built-form. Salient features of the religion, its philosophy and methods of worship. Evolution and growth of North-Indian or Nagara style temple architecture.  <b>Examples:</b> Udaigiri, near Sanchi, Gupta temple at Tigawa, , Lingaraj temple at Bhubhaneshwar, Sun temple at Modhera, Sun temple at Konark, Kandheriya Mahadev temple at Khajuraho, Chenna Keshava temple at Belur &amp; Somnathpur, Chaumukh temple at Ranakpur, Dilwara temple at Mount Abu</p> <p><b>JAIN TEMPLE ARCHITECTURE:</b>            Evolution of Jain temple architecture and its distinct architectural language and growth with reference to socio-economic, political and religious factors.  <b>Examples:</b> Chaumukh temple at Ranakpur, Dilwara temple at Mount Abu</p>
3	<p><b>South Indian (Dravida) temple architecture</b>            Evolution and growth of the South Indian or Dravida architectural language, its religious, socio-economic, cultural, political influences. Evolution of the gopuram and growth of temple cities. Fusion of Nagara and Dravida styles and the reasons for the evolution of Star-shaped temples. Focus on construction materials and techniques, symbolic and religious association of forms in the architectural style.  <b>Examples:</b> Ladkhan temple &amp; Durga temple at Aihole, The rathas and shore temple at Mahabalipuram, Kailasa temple at Ellora, Temple cities of Srirangam &amp; Meenakshipuram, Chenna Keshava temple at Belur &amp; Somnathpur</p>
4	<p><b>Islamic Architecture in India – Pre Mughal period</b>  <b>DELHI REGION</b>            Salient features of the religion, its philosophy and methods of worship.            Evolution of Islamic architecture in India and its development, covering mosques, tombs, forts &amp; other structures. Focus on new construction techniques like arch, dome, squinch, surface decorations, etc  <b>Examples:</b> Qutb Complex, including Quwwat-ul-Islam, Qutb Minar, Extensions by the Khaljis, Alai Darwaza, Alai Minar, Tughlaqabad, Tomb of Ghiyas-ud-din Tughlaq, Khirki Masjid, Ferozshah Kotla &amp; Hauz Khas</p> <p><b>REGIONAL SULTANATES</b>            Growth and development of Indo-Islamic architecture in areas outside Delhi. Focus on Gujarat, Gulbarga &amp; Bijapur. To study the influences of local traditional architecture and fusion with Islamic architecture, both religious and non-religious.  <b>Examples:</b> Jami Masjid, Ahmedabad, Dada Hari's way, Jami Masjid, Gulbarga, Sayyad Usman's Rauza, Ahmedabad, Ibrahim Rouza &amp; Gol Gumbaz, Bijapur</p>

UNIT	CONTENT
5	<p><b>Islamic Architecture in India –Mughal period</b>            Growth and development of Indo Islamic architecture during the Mughal period. Focus on newer construction technology, material and architectural influences in tomb and palace architecture  <b>Examples:</b> Tombs of Mubarak Shah, Sikandar Lodi, Shershah Suri, Humayun, Itmad-ud-Daula, Akbar &amp; Taj Mahal. Palace complex at Fatehpur Sikri</p>

#### REFERENCE BOOKS

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Indian Architecture (Hindu and Buddhist), Percy Brown – D.B.Taraporvala Sons & Co.,	
2	Indian Architecture (Islamic Period), Percy Brown - D.B.Taraporvala Sons & Co., Mumbai	1997
3	Buddhist and Hindu Architecture, Satish Grover – Taschen London 1998	
4	Islamic Architecture in India, Satish Grover – CBS Publisers & Distributors New Delhi	2002-03

**ARCHITECTURAL STRUCTURES-III****B.ARCH Semester: III****Code: B3AR03-CT09**

UNIT	CONTENT
1	<b>Slope and Deflection:</b> Relations between load, shear force & bending moment, slopes and deflections of indeterminate beams using double integration method, moment area method and Macaulay's method
2	<b>The long and short columns or struts;</b> buckling load, Euler's theory, limitations, various end- conditions, equivalent length of a strut, Rankine's theory, Slenderness ratio, strut with eccentric load.
3	<b>Arches and Folded plates:</b> analysis of three hinged, two hinged and fixed type parabolic arches with supports at the same level and at different levels, Introduction to folded plates <b>Shells and Domes:</b> Introduction to Shells and domes
4	<b>Beams:</b> Slope-deflection method and Kani's method for analysis of continuous beams.
5	<b>Design concepts:</b> Design concept of factor of safety and limit state; failure modes of a structure, Elastic theory of R.C.C. Design, permissible stresses and permissible deflections for R.C.C. and Steel structures. Introduction and use of Design codes. IS456 and IS 800.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	B.C.Punmia, Strength of Materials of Structure, Laxmi Publications © Ltd., New Delhi	2006
2	R.K. Bansal, Strength of materials	2008
3	Timoshenko & Gere, Mechanics of Structures, CBS Publishers and Distributors	2006
4	K.R. Arora, Soil Mech. & Foundation Engineering, Standard Publishers and Distributors, Delhi.	2007
5	Terzaghi & Peck, Soil Mechanics in Engineering Practices, John Wiley & Co	2010

**ARCHITECTURAL DESIGN-II**  
**Code: B3AR04-CP13**
**B.ARCH Semester: III**

UNIT	CONTENT
1	<b>Theme:</b> Understanding the nature of built environment as a resultant of the determinants of Built Form, such as climate. Introduction of determinants of built form.
2	<b>Parameter:</b> Form & Space: Understanding user and its surroundings and devising requirements with the help of space & materials standards. Form & Function: Exposure to building elements & components and their effects on Air circulation, Day lighting, Thermal Comfort etc. Study of the human considerations like comfort, privacy, security etc.
3	<b>Expected Skills:</b> To develop the ability to translate abstract principles of design into architectural solutions for small problem. 3D visualization and presentation through models. Theoretical inputs from History & Sociology. To enhance & develop skills with respect to site analysis and application.
4	<b>Design Outlines:</b> Application of climate in design of simple function and simple program. Building scale project on a site area of approx. 100-200 sq. mt. Location of site can be in Urban or Rural setting and in any climatic zones and can be an annexure building of any existing setup. At least two major exercises and one time problem should be given.
5	<b>Projects:</b> List of suggested topics to be covered as design problem keeping in mind the following categories: the Educational institutes - Kindergarten, Balwadi, etc. Public facilities – Post office, police station, etc., Health Facilities – Dispensary, clinic, etc. Commercial facilities – General store, Boutique etc. Hospitality – Café, canteen etc. Residential – Farm house, Cottage etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Koenigsberger O., “Manual of Tropical housing and building”, Orient Longman, New Delhi	2003
2	Rasmussen, Steen, Eiler, “Experiencing Architecture”, MIT Press, Cambridge, Massachusetts	1977
3	Chiara Joseph de and others, “Time, Savers & Standards of building types”, McGraw Hills	1980
4	Pevsner, Nikolaus, “A History of Building Types”, Thames & Hudson, London	1976
5	V.S.Parmar, “Design Fundamentals in Architecture”, Somaiya Publications Pvt. Ltd., New Delhi	1997



**BUILDING MATERIAL & CONSTRUCTION-III**  
**Code: B3AR05-CP14****B.ARCH Semester: III**

UNIT	CONTENT
1	<p>Cement Concrete:            MATERIAL: Brief history of development of concrete, ingredients of concrete, properties of concrete like strength, durability, workability etc. BIS specification for concrete, Methods of proportioning concrete mixes, Factors effecting strength of concrete, Important operations in concreting like mixing ,transporting, placing, compacting, curing &amp; removal of form work.            Tests on fresh concrete like slump test, flow test etc &amp; on hardened concrete like compression test, tension test etc. Strength &amp; failure of concrete, Chemicals used in concrete construction ex. Admixtures, mould releasing agents, Concrete curing compounds etc. Concreting under special condition, Guniting and Shotcrete work for repair of concrete.            CONSTRUCTION: Application of cement concrete in foundation, Cement concrete flooring on ground level, cement concrete floor tiles, Paver Blocks in flooring ; Cement Concrete Blocks Such as hollow, solid and cellular in wall construction along with steel bars at the junction. Application of cement concrete products</p>
2	<p>Special Structural Concrete:            MATERIAL: Basic introduction to special concrete used for structural work ex reinforced concrete, Fiber reinforced concrete, Light weight concrete, fly ash concrete, High strength-high performance concrete, No-fines concrete, ready mix concrete. Introduction to theory of reinforcing concrete, Properties and advantage of reinforced concrete, types &amp; grades of steel bars as per BIS specification, Bending and placing of reinforcement in RCC Work.            CONSTRUCTION: Application of RCC in various building elements such as shallow foundation for isolated column, RCC wall, DPC / Plinth &amp; floor / roof beam. One way &amp; two way slab in RCC. Arches &amp; Lintels in RCC. Door, window, frames in RCC. Construction of different types of RCC stairs.</p>
3	<p>Plastics &amp; Polymer:            MATERIAL: Brief history of plastics, polymerisation of plastics, Classification &amp; Properties of plastics, fabrication of plastic articles, Application of plastics in building services &amp; building construction Geo-synthetics and its classification, Properties &amp; uses of geo-textiles. Natural &amp; synthetic rubber, Uses of rubber in building construction, Vulcanisation of rubber.            CONSTRUCTION: Application of PVC &amp; Rubber in various building elements &amp; components, Vinyl, Linoleum &amp; rubber flooring, plastic doors &amp; windows, PVC roofing, Glass fibre reinforced plastic sheets for roofing.</p>
4	<p>Asbestos, Asphalt, Bitumin &amp; Tar            MATERIAL: Introduction and history of Asbestos, Asphalt, Bitumen &amp; Tar. Asbestos &amp; its forms, properties, uses and harmful effects of asbestos. Asphalt &amp; its types such as natural asphalt &amp; residual asphalt. Bitumen &amp; its forms in the market, Modified Bitumen, tar and its types. Uses of these materials in building construction.</p>
5	<p>Protective Finishes, Machines &amp; Equipments            MATERIAL: Brief introduction of adhesives, Sealants &amp; joint fillers and protective finishes for cements concrete, RCC, Plastic, Asbestos, Asphalt, bitumen &amp; tar. Study of machines &amp; equipments for manufacturing, transportation, preparation, laying/Casting, Compaction, repairing of these materials.            CONSTRUCTION: Drawing of machines &amp; Equipments used.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	S.P.Arora, S.P. Bindra, "Building Construction Including Engineering Material". Dhanpat Rai Publications (P) Ltd., New Delhi	2010
2	Handbook on Concrete Reinforcement and Detailing, SP 34:1987, BIS New Delhi	2002
3	CPWD specifications (Vol.1), Director General of Works, New Delhi	2009
4	P. Kumar Mehta "Concrete Technology for Sustainable Development in the twenty-first century", Cement Manufacturers Association, New Delhi	1999
5	Hegger,Auch-schwelk,Fuchs,Rosenkranz:"Construction material manual";Birkhauser,Munich.	2006

**COMPUTER APPLICATION-III**  
**Code: B3AR06-CP15**
**B.ARCH Semester: III**

UNIT	CONTENT
1	<p><b>Advance BIM commands:</b> Complex modeling: Creating complex building forms by using massing i.e. blend mass, mass by extrusion, creating voids in them. Roofs: Creating various type of roofs i.e. flat roof, sloped roof designing roof in elevation views, defining slope and creating openings in roof slab, insertion of layers in roof slab.</p> <p>Staircase: Creation of various types of staircase and ramp i.e. straight, deg legged, spiral etc. Designing and customization of staircase as per requirement.</p> <p>Exercise: Designing of a complex building form using massing and insert walls, doors, windows, slab, staircase.</p>
2	<p><b>Scheduling:</b> Creating various schedule for documentation purpose. Type of schedule i.e. door, window, wall etc. Insertion of various fields in schedule i.e. type, width, cost etc. Formatting and calculating totals. Extracting information to external utilities like MS Excel.</p> <p>Exercise: Creation of door window schedule which includes total number of doors, windows, total cost and export it to excel format.</p>
3	<p><b>Light and Energy Analysis:</b> Using BIM for simple lighting and energy analysis. Insertion of various interior and exterior lights and its customization. Creating sun path and animation of solar study of a whole day.</p>
4	<p><b>Import and Export Options</b> - import and export the file into other file formats i.e. JPEG, PDF, CAD etc. for printing, rendering and documentation purpose. Advance print options for setting paper size, orientation.</p>
5	<p><b>Rendering</b>–Applying various materials, scale, render quality, setting backgrounds etc. Creating moving animations and saving it in various formats.</p> <p>Exercise: Hard copy submission of rendered views .</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Chuck Eastman, Paul Teicholz , Rafael Sacks, Kathleen Liston, “BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors”, John Wiley & Sons	2008
2	Scott MacKenzie, “Learning ArchiCAD 17”, Packt Publishing	2014
3	Ryan Duell, Tobias Hathorn, Tessa Reist Hathorn,“Autodesk revit Architecture 2014 Essentials”, John Wiley & Sons	2013
4	Tatjana Dzambazova , Eddy Krygiel , Greg Demchak; “Introducing Revit® Architecture 2010: BIM for Beginners”; John Wiley & Sons	2009
5	Ken Good’, “Discover Smart Bim : An Interactive Guide to Archicad”; Author house	2009

**STRUCTURE LAB**  
**Code: B3AR07-CP16**
**B.ARCH Semester: III**

UNIT	CONTENT
1	<b>Physical Test of Construction Materials:</b> Cement, Bricks, Aggregates
2	<b>Laboratory Tests of Cement:</b> Normal Consistency Test, Initial & Final Setting Time, Soundness Test
3	<b>Laboratory Tests of Aggregates:</b> Sieve Analysis Test, Fineness Modulus, Water Absorption Test
4	<b>Compressive Strength Tests of Concrete:</b> Cube Test, Cylindrical Test
5	<b>Workability Tests of Concrete :</b> Slump Test, Compaction Factor Test

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	M.S.Shetty, "Concrete Technology", S. Chand & Co.	2005
2	M.L.Ghambir, "Building Materials: Products, Properties and Systems", Tata Mc Graw Hill, Delhi	2011
3	S.C.Rangwala, "Engineering Materials, Material Science", Charter Publishing House, Anand	2007
4	Gurucharan Singh, "Building Construction and Material", M/s. Standard Publications & Distribution, Delhi	2007
5	S.C. & K.S.Rangwala, "Engineering Materials", Charter Publishing House, Anand	2007

**SPECIFICATION & ESTIMATION**  
**Code: B4AR01-CT10**
**B.ARCH Semester: IV**

UNIT	CONTENT
1	<b>Specification:</b> Introduction, Main items of work, Importance of specification, Types of specifications - General and detailed specifications - Method of preparation of specifications
2	<b>Estimate:</b> Introduction, Types of Estimate, Detailed Estimate - Units of Measurements, Details of measurement and calculation of quantities of various items of work, Methods of Building Estimate - separate or individual wall method, Centre line method.
3	<b>Rate Analysis:</b> Analysis of rates for main items of work in buildings, considering current market rates for building materials, labor wages, plants and tools, transportation, handling, storage and contractor's profit.
4	<b>Detailed Estimation:</b> Preparation of Detailed estimate (Details of Measurements and Calculation of quantities & Abstract of - Estimated cost) for different types of buildings including R.C.C. framed buildings.
5	<b>Cost &amp; Valuation:</b> Cost price and value. Factors controlling the cost of Urban real properties, Valuation, Depreciation, Rent and its implications

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Carol A. Sampson, "Techniques for Estimating Materials Cost", Watson Guptil Publication New York	2001
2	S.C.Rangwala, "Estimating, Costing & Valuation", Charotar Book Stall, Anand	2006
3	B.N.Dutta, "Estimating & Costing in Civil Engineering", UBS Publication, New Delhi	2005
4	M. Chakroborty, Bhakti Vedanta, "Estimating Costing Specification & Valuation in Civil Engg.", Book Trust, Delhi	2010
5	Central Public Department, "CPWD Specification, Vol.I & 2", Nirman Bhawan, Delhi.	2004

**HISTORY OF ARCHITECTURE-II**  
**Code: B4AR02-CT11**
**B.ARCH Semester: IV**

UNIT	CONTENT
1	<p><b>Egyptian &amp; West Asiatic</b> Socio-economic, political, cultural and religious character of the ancient civilizations. The evolution of architectural form and character from the these factors, available materials and construction technology.</p> <p><b>EGYPTIAN:</b> Examples: Mastaba at Beit Khallaf, Pyramid of Zoser at Sakkara, Great Pyramid of Cheops at Gizeh, Temple of Khons at Karnak</p> <p><b>WEST ASIATIC:</b> Examples: Ziggurats: White temple at Warka, Urnamu at Ur. Palaces: Palace of Sargon at Khorsabad</p>
2	<p><b>Greek:</b> To study the development and formation of the classical orders in chronological sequence, namely the Doric, Ionic &amp; Corinthian orders, The use of optical correction, illusions, proportions, scale and other designing techniques in evolution of a distinct architectural language architecture</p> <p>Examples: Temples and temple complexes: Acropolis, which includes the Parthenon &amp; Erichtheon. Urban architecture: The Agora at Athens</p>
3	<p><b>Roman:</b> To study the development in architectural style with new construction technology; such as arches, domes, vaults, etc. To study the influence of socioeconomic prosperity in architecture, with public &amp; private, religious and nonreligious examples.</p> <p>Examples: Residential: House of Pansa at Pompeii. Temple: Pantheon at Rome. Forum: Forum of Trajan with Basilica and Column. Recreational: Thermae of Caracalla. Sports: Coliseum &amp; Circus Maximus.</p>
4	<p><b>Early Christian, Byzantine &amp; Romanesque</b> <b>EARLY CHRISTIAN &amp; BYZANTINE</b> To study all aspects of the evolution of a new religion; Christianity, and its influence on the Architectural style. Evolution of church architecture through functions and construction technology</p> <p>Examples: St Peter's Basilica (old), Santa Sophia (Hagia Sophia) at Istanbul</p> <p><b>ROMANESQUE:</b> To study the influence of the growing power of religion and inter-religious conflicts on architecture. To study the influence of improvements in construction techniques like rib-and-panel vaulting, etc.</p> <p>Examples: Italy: Pisa complex including Cathedral, Campanile (Leaning tower) and Baptistry. Central Europe: Worm's Cathedral &amp; S.Michel, Pavia</p>
5	<p><b>Gothic</b> To study significant improvements in construction technology like flying buttresses and its effect on the architectural character. To compare the varied development of architectural forms in France &amp; England in religious and nonreligious structures.</p> <p>Examples: Cathedrals: Reims cathedral, Salisbury cathedral. Parish churches: St Andrews, Heckington. Manor houses: Penshurst place, Kent, Oxburgh Hall, Norfolk, Compton Wynyates, Warwickshire</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Traditions in Architecture, Dora Crouch – Oxford University Press, N. York	2001
2	History of Architecture, Bamister Fletcher – SBS Publishers & Distributors, Delhi	1997
3	History of Architecture, Spiro Kostof – Oxford University Press, N. York	1995
4	History of western architecture, David Watkin – Lawrance King Publishing London	2005
5	High Gothic, Guthor Binding – Taschen London	1999

**ARCHITECTURAL STRUCTURES-IV**  
**Code: B4AR03-CT12**
**B.ARCH Semester: IV**

UNIT	CONTENT
1	<b>Soil and soil mass constituents;</b> water content, specific gravity, voids ratio, porosity, degree of saturation, air voids and air content; unit weights, density index etc., inter-relationships of the above
2	<b>Plasticity Characteristics of Soils:</b> Determination of water content, specific gravity; particle size distribution sieve and sedimentation analysis; consistency limits; voids ratio and density index Soil Classification: classification of soil for general engineering purposes; particle size textural, H.R.B and Unified and I.S. classification systems.
3	<b>Earth Pressure:</b> Active, passive and earth pressure at rest. Rankine's theories of earth Pressure, Earth pressure on cantilever sheet piles Stability analysis of retaining walls
4	<b>Bearing capacity of soils;</b> shallow foundation; Terzaghi's and Meyerhoff's formula for bearing capacity; plate loading test, standard penetration test.
5	<b>Foundation:</b> Basic concept of Pile and Raft foundation.
	<b>TOTAL</b>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Dr. B.C. Punmia, "Strength of Materials & Mechanics of Structures": Vol. I, Laxmi Publications (P) Ltd.	2006
2	Reinforced Concrete : Limit State Design by Nemi Chand and Brothers, Roorkee	2009
3	Singer and Patel, "Strength of Material", Harper Collins Publishers	2008
4	Wang & Salmon; "Reinforced Concrete Design", Harper & Row.	2009
5	S.B Junarkar, "Mechanics of Structures Vol. I & II", Charotar Publishing House, Anand	2009

**ARCHITECTURAL DESIGN-III**  
**Code: B4AR04-CP18**
**B.ARCH Semester: IV**

UNIT	CONTENT
1	<b>Theme:</b> Understanding the Design of built spaces as a resultant of sociocultural influences of the place.
2	<b>Parameter:</b> Organization of functional activities in relation to user requirements and the site, considering materials and structure in relation to the design proposal. Influence of humanities and culture in a design project. Response to socio-economic factors such as income level, privacy, territoriality, interaction etc.
3	<b>Expected Skills:</b> To develop the ability to understand the cultural frame work of meaning and symbolism in architecture and incorporation of climate strategies and constructional systems appropriate to social and economical context.
4	<b>Design Outlines:</b> Application of vernacular style in design of simple function and simple programme. Site scale project on a site area of approx. 250-500 sq.mt. Location of site can be in Urban or Rural setting and in any climatic zones. At least two major exercises and one time problem should be given.
5	<b>Projects:</b> List of suggested topics to be covered as design problem keeping in mind the following categories: Educational Institutes – Primary Schools etc., Public facilities – Neighborhood Library, Bank Local Branch etc., Health Facilities – Primary health centre etc., Commercial facilities – Neighborhood shopping centre etc., Recreation & Hospitality – Restaurant, etc., Residential – Row house, bungalow, etc.
	TOTAL

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Kingston Wm. Heath, “Vernacular Architecture and Regional Design; Cultural Process and Environmental Design”, Elsevier UK	2009
2	Jonathan A. Hale, “Building Ideas an introduction to architectural theory”, Johnwiley and sons ltd. New York	2000
3	Yatin Pandya, “Concepts of space in traditional Indian architecture”, Mapin Publishing	2013
4	A. Peter Fawcett, “Architecture : Design Notebook”, Architectural Press, London	2003
5	Kulbhushan & Minakshi Jain, “Architecture of the Indian Desert”, Aadi Centre Ahmedabad	2000

**BUILDING MATERIALS & CONSTRUCTION-IV**  
**Code: B4AR05-CP19**
**B.ARCH Semester: IV**

UNIT	CONTENT
1	<p><b>Iron &amp; Steel:</b>            MATERIAL: Brief history of Iron, Study of Iron ores its varieties, Manufacturing of Pig-Iron and wrought iron, Properties of iron, composition and Types of cast iron &amp; wrought iron, Properties &amp; uses of cast &amp; wrought iron, types of casting techniques. Brief history of steel, manufacturing of steel, Properties of Steel, market forms of steel, Mechanical treatment of steel such as hot working &amp; cold working of steel, Heat Treatment of steel. CONSTRUCTION: Application of iron and steel in various building elements such as steel grillage foundation, pad foundation, Steel column &amp; beams, Trusses in steel, North light truss, Monitor Roof, Structural Floor/roof industrial flooring, Door/Window openings in iron &amp; steel, Metal stair case, Methods of connecting steel work.</p>
2	<p><b>Aluminium &amp; their alloys:</b>            MATERIAL: Brief history of Aluminium, Manufacturing &amp; properties of Aluminium, market forms of aluminium, Uses of Aluminium and Its alloys in building industries. CONSTRUCTION: Application of aluminium in various building elements such as aluminium door &amp; window, Structural glazing, curtain wall.</p>
3	<p><b>Other metals &amp; their alloys:</b>            MATERIAL: Introduction to copper and its alloys such as Brass, bronze, Zinc &amp; its alloys. Study of other Metals such as Cobalt, Lead, nickel, Titanium, magnesium, tin and their alloys. Properties and uses of these metals. CONSTRUCTION: Application of metals in various building elements &amp; Components such as metal roofing system, wall system.</p>
4	<p><b>Glass &amp; Glass products:</b>            MATERIAL: Brief introduction of history of glass, composition of glass, manufacturing &amp; classification of glass, Properties of glass, Types of glasses &amp; their performances, Treatments of glass, Glass industry, Glass as a green building material. Uses of glass in building industry. CONSTRUCTION: Application of glass in various building elements and components. Glass Floor, wall &amp; partitions systems, Skylight, Glass staircase.</p>
5	<p><b>Protective Finishes, Machines &amp; Equipment</b>            Brief introduction of adhesives, sealants, joint filler &amp; protective finishes for ferrous, non ferrous materials &amp; Glass. Machines &amp; equipment for applications of these materials. CONSTRUCTION: Drawings of tools, machines &amp; equipments for fabrication, erecting &amp; maintenance.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	CPWD specifications (Vol.1 & 2), Director general of works New Delhi	2009
2	S.P.Arora, S.P. Bindra, "Building construction including engineering material".Dhanpat Rai publications (P) ltd. New Delhi	2010
3	Schittich, Staib, Balkow, Schuler, Sobek, Glass Construction Manual, 2nd revised and expanded addition, Birkhauser	2007
4	Robin Barry, "The construction of buildings (Vol. I-V)", Blackwell publishing	2000
5	Handbook on Building Construction Practices, SP62:1997, BIS New Delhi	1997



**MEASURED DRAWING & DOCUMENTATION**  
**Code: B4AR06-CP20**
**B.ARCH Semester: IV**

UNIT	CONTENT
1	<b>Introduction:</b> Reading and interpreting documented work to understand the constituents of Measured Drawing. To understand its importance. Difference between measured and working drawing. Application of conventional, Modern and Digital Techniques of measurement used at settlement, Building, Building Element & Component level exercise such as measuring height of building from ground, Height of Dome, etc.
2	<b>Exercises for learning:</b> Colloquial techniques of measurement such as furlong, Footsteps, open hand, etc. And application of Sketching and photography as a tool for documentation.
3	<b>Study, Measure and Document:</b> Elements of style / period such as wall, Roof, Door, window, furniture, etc. building elements and components of renaissance, Gothic, Colonial, Art Deco, Modern, style/ Period. Study, Measure and Document: Individual architect's style of designing wall, Roof, Door, Window, etc. such as works of Le-Corbusier, Louis I Khan, Lauri Baker, Charles Correa, Raj Rewal etc.
4	<b>Study, Measure and Document:</b> Historical precincts / Building of Art, Culture and heritage Value. Preparation of Graphical Documentation consisting of site plan, building plan, sections, elevations and details on Suitable architectural scale.
5	<b>Documentation techniques:</b> Graphical and Descriptive. Documenting art, architecture, social, economic, cultural, or structural data in soft as well as hard format.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Feildon B. M., "An introduction to conservation", UNESCO Press	1982
2	Anuradha V. Kumar, "Conservation of Building Stones", INTACH Publication, New Delhi	
3	ARCHIFUNDA, "Heritage Conservation & Cultural Continuity", Archifunda	2002
4	Colonel S.S.Jacob, "Jeypore Portfolio of Architecture Details", Idological Book House, Varanasi India	1977
5	P.K Mishra, "Researches in Archeology and Conservation"	1999

**COMPUTER APPLICATION-IV**  
**Code: B4AR07-CP21**
**B.ARCH Semester: IV**

UNIT	CONTENT
1	<p><b>Rendering-</b> To introduce 2D and 3D rendering and visualization softwares. Basic setup including page size, resolution, colour scheme i.e. CMYK/RGB, units etc. Introduction to basic rendering tools: Selection tools i.e. lasso tool, marquee tool, magic wand tool, brush and its customization using option bar, paint bucket tool, gradient tool, text tool. Layers: Creation of new layers, arranging/merging layers applying effects using layers i.e. colour, shadow, gradient, patterns, emboss, opacity etc. Importing/ Creating patterns for hatching.</p> <p><b>Exercise:</b> To prepare portfolio cover page by using above tools.</p>
2	<p><b>Layers:</b> Creation of new layers, arranging / merging layers applying effects using layers i.e. color, shadow, gradient, patterns, emboss, opacity etc. Importing / Creating patterns for hatching.</p> <p><b>Exercise:</b> To prepare portfolio cover page by using above tools.</p>
3	<p><b>Import and Export options:</b> Importing and exporting 2D and 3D models to and from various softwares in jpeg, eps, pdf etc. Packaging and Saving high resolution images and videos.</p> <p><b>Exercise:</b> import plan, section, elevation in supported format i.e. EPS, JPEG and render it</p>
4	<p><b>Creating rendered images</b> – Exporting files into JPEG, pdf and other format.</p>
5	<p><b>Print Options</b> – Page setup, Page Layout, image resolution, etc.</p> <p>Exercise: Hard copy submission of rendered views.</p>
	<b>TOTAL</b>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Lisa Danae Dayley, Brad Dayley, “The Essential Photoshop Book” Adobe Photoshop CS5 Bible, Wiley India Pvt. Ltd	2010
2	Eileen Mullin, “The Essential Photoshop Book”, Prima Publishing US	1998
3	Olivier Lecarme , Karine Delvare, “The Book of GIMP - A Complete Guide to Nearly Everything”, No Starch Press	2013
4	Kogent, “Photoshop CS6 in Simple Steps”, Dreamtech Press	2012
5	Davinder Singh Minhas, “Photoshop” New Dawn Press	2005

**BUILDING PLUMBING SERVICES**  
**Code: B5AR01-CT13**
**B.ARCH Semester: V**

UNIT	CONTENT
1	<p><b>Water Supply: sources, demand, treatment and distribution of water.</b>            Sources of water supply, Plumbing system types for various buildings. Quality of potable water. Calculation of water requirements for various building types based on Indian standards (BIS). Water treatment methods– Screening, Aeration, Sedimentation, Filtration, Disinfection, Softening. Storage and distribution of water. Choice of pipe materials, types of fixtures and fittings.</p>
2	<p><b>Sanitation: Sanitary pipes, fittings and fixtures- Layout and design</b>            Principles of sanitation, Study of Indian standards and plumbing by-laws (NBC). Introduction to various sanitary pipes, joints, fittings and fixtures, their function, placement and constructional details.            Study of internal &amp; external drainage system of various buildings including small residences, apartments, public buildings etc. Single stack system, one pipe and two pipe systems, testing of house drains, Gradients used in laying drains and sewers, Self-cleaning and non-scoring velocities for drain pipes,</p>
3	<p><b>Sanitation: Waste water treatment and disposal methods</b>            Study of Traps, Inspection chambers, Manholes, Septic tanks, Soak pits, and Public sewage line. Study of Disposal systems for domestic effluent from fitting to sewer line. Study of low cost sanitary systems (sulabh complexes) and other CBRI details. Waste water – Sewage disposal, primary treatment, secondary treatment and tertiary treatment. Modern types of Sewage Treatment Plants.</p>
4	<p><b>Storm water drainage &amp; Rain water harvesting</b>            Principles of storm water drainage. Types of drain pipes. Storm water gutter / Storage sumps. Study of storm water disposal at site and settlement level. Rain water harvesting system. Recycling of water.  <b>Solid waste, collections, treatments and disposal</b>            Prevalent SWM practices and deficiencies: Storage of waste at source, collection, segregation, transportation of waste. Disposal of solid wastes: Sanitary land filling, Composting, Incineration, Pyrolysis – advantages and limitations. Biogas system and Modern renewable energy system.</p>
5	<p><b>Application: Layout design and construction</b>            Layout design and details of water supply distribution system in a Campus. Layout design and details of sewage and drainage system for different building types. Storm water drainage and rain water harvesting system design for a building project. Course may be integrated with concurrent architectural design.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	B.C. Punmia, "Waste Water Engineering", Laxmi Publications.	2009
2	S.J. Arceivala, "Waste Water Treatment for Pollution Control", Tata McGraw Hills Publication.	2008
3	K.N. Duggal, "Elements of Environmental Engineering", Chand & Co.	2010
4	"Uniform Illustrated Plumbing Code – India (UIPC-I)", Indian Plumbing Association	2014
5	Charanjeet S. Shah; Water Supply and Sanitation; Galgotia Publication	2015
6	H.S. Bhatia; Environmental Services (Plumbing); Galgotia Publication	

**HISTORY OF ARCHITECTURE-III****B.ARCH Semester: V****Code: B5AR02-CT14**

UNIT	CONTENT
1	<p><b>RENAISSANCE &amp; BAROQUE ARCHITECTURE</b>  <b>Renaissance Architecture:</b> Characteristic features of the Renaissance Architecture. Famous designers and Works of the period Brunelleschi : Florence Cathedral, S. Maria Novella, S. Andrea Alberti: Palazzo Rucellai, S. Maria Novella; Bernanate: Tempietto, Plan of St. Peter's; Michelangelo: Laurentian Library, Campidoglio, St. Peter's Palladio: Villa Barbaro, Villa Americo Capra, S. Giorgio Maggiore  <b>Baroque Architecture:</b> Characteristic features of the Baroque Architecture. Famous Designers and works of the period Bernini: St. Peter's- Plaza, S. Andrea.; Borromini: S. Carlo alle Quattro Fontane, S. Ivo Della Sapienza; Christopher Wren: St. Stephen, Walbrook ; St. Paul's Cathedral</p>
2	<p><b>NEOCLASSICAL &amp; INDUSTRIAL ARCHITECTURE</b>  <b>Neoclassical Architecture:</b> Characteristic features of Neoclassical Architecture. Famous Designers and works of the period. Robert Adam: Kedleston Hall, Syon House; William Chambers: Somerset House; Louis Boullee: Cenotaph for Sir Issac Newton, Library of the King Claude Nicolas Ledoux: Salt works of Arc and Senans  Karl Friedrich Schinkel: Royal Guard House, Altes Museum Sir John Soane: Bank of England; Thomas Jefferson: Monticello House, Virginia State Capitol.  <b>Industrial Architecture:</b> Characteristic features of Industrial Architecture. Famous Designers and works of the period. Joseph Paxton: Crystal Palace; Henri Labrouste: Bibliotheque Ste.-Genevieve, Bibliotheque Nationale; Gustave Eiffel: Eiffel Tower, Statue of Liberty Emanuele Rocco: Galleria Umberto; George Gilbert Scott: St Pancras Station Charles Garnier: Paris Opera House</p>
3	<p><b>LATE 19TH CENTURY MOVEMENTS</b>  Characteristic features of Art and Architectural movements of late 19thCentury. People and places associated with the movements. Famous Designers and works of the period.  <b>Art &amp; Crafts Movement:</b>  John Ruskin &amp; William Morris; Philip Webb: Red House; Richard Norman Shaw: New Zealand Chambers; Greene &amp; Greene: Gamble House  <b>Art Nouveau:</b> Victor Horta: Tussel House, Hotel Van Etevelde; Hector Guimard: Paris Metro Entrances; Antonio Gaudi: Casa Mila, Casa Batllo and Church of Sagrada Familia; Charles Rennie Mackintosh: Glasgow School of Art, Hill House  <b>Viennese Secession:</b> Otto Wegner: Postal Savings Bank; Josef Maria Olbrich: Secession Building; Adolf Loos: The essay "Architecture and Ornament", Steiner House, Moller House and Goldman &amp; Salatsch Store.</p>
4	<p><b>EARLY 20TH CENTURY MOVEMENTS</b>  Characteristic features of Art and Architectural movements of early 20thCentury. Famous Designers and works of the period. People and places associated with the movements.  <b>Deutscher Werkbund:</b> 1st and 3d Exhibition  Peter Behrens: AEG Turbine Factory; Bruno Taut: Glass house  <b>Futurism:</b> Filippo Marinetti: Futuristic Manifesto; Antonio Sant' Elia: La Cita Nuova  <b>Constructivism:</b> Vladimir Tatlin: Monument to the Third International; Konstantin Melnikov: Soviet Pavilion, Rusakov Workers' Club  <b>Expressionism:</b> Erich Mendelsohn: Einstein Tower; Rudolph Steiner: Goetheanum  <b>De Stijl:</b> Theo Van Doesburg&amp; Piet Mondrian; Gerrit Rietveld: Schroeder House; J.J.P. Oud: Seaside Houses, Café de Unie.  <b>Art Deco:</b> William Van Alen: Chrysler Building; Shreve, Lamb &amp; Harmon: Empire State Building; B. Marcus Priteca: Pantages Theatre</p>
5	<p><b>British Colonial India</b>  In search of appropriate style; development of hybrid styles; Indo Sarcenic, Indo Gothic and Indo Deco styles. Famous Designers and works in the major cities namely Madras, Calcutta, Bombay and Delhi.  <b>Madras</b>  Caldwell &amp; Havilland: St Andrews Church; Robert F. Chisholm: Senate House and National Art Gallery; Henry Irwin: Madras high court, Chennai Central Railway Terminus  <b>Calcutta</b>  Thomas Lyon: Writer's Building; Charles Wyatt: Government Building; William Emerson: Victoria Memorial  <b>Bombay</b>  George Gilbert Scott: Rajbai Tower-Bombay University Library; Fredrick William Stevens: Victoria Terminus, Municipal Hall; George Wittet: Gateway Of India and Prince of Wales Museum  <b>Delhi</b>  Sir Edwin Lutyens: India Gate. Viceroy's House; Herbert Baker: Parliament House, Secretariat Buildings</p>

**REFERENCE BOOKS**

<b>S.NO</b>	<b>NAME OF AUTHORS / BOOKS/ PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	Marian Moffett, Michael Fazio, Lawrence Wodehouse; Buildings Across Time; McGraw Hill	2004
2	Francis D. K. Ching, Mark M. Jarzombek, Vikramaditya Prakash; A Global History of Architecture, John Wiley & Sons	2007
3	William J. R. Curtis, Modern Architecture since 1900, Phaidon Press ltd.	1996
4	Vikram Bhatt & Peter Scriver; Contemporary Indian Architecture, After the Masters;Mapin Publishing Pvt. Ltd.	1990
5	Kenneth Frampton; World Architecture 1900-2000: A critical Mosaic, Volume 8 South Asia; Springer-Verlag Wien New York	2000

**ARCHITECTURAL STRUCTURES-V**  
**Code: B5AR03-CT15**
**B.ARCH Semester: V**

UNIT	CONTENT
1	<b>RCC Beams Design:</b> Introduction to different types of beams, Design of rectangular beams; design of singly reinforced beams, design of doubly reinforced beam, design of T-beam, design of L-beam
2	<b>RCC Columns Design:</b> Introduction to RCC column, Design of square column, Design of rectangular column, Design of circular column
3	<b>RCC Slabs Design:</b> Introduction to RCC slab, Difference between one way slab and two way slab, Design of one way slab, Design of two way slab, Design of cantilever slab
4	<b>RCC Footing Design:</b> Introduction, Pressure distribution beneath footing, Design of Rectangular footing, Design of square footing, Design of circular footing, Design of combined rectangular footing
5	<b>Retaining Wall Design:</b> Introduction, Types of retaining walls, Design of T-shaped retaining wall

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	S Unnikrishnapillai & Devdasmenon, Reinforced concrete design; Third Edition, "Mcgraw hill publication education"	2002
2	B C Punmia, Design of R.C.C. Structures; "Laxmi Publication"	2006
3	P.C. Varghese, Limit state design of Reinforced concrete; Second Edition, "PHI learning private limited"	2011
4	Ramanutham, Design of reinforced concrete design; "Dhanpat Rai Publication"	2011
5	Kenneth M.leet & Dionisiobernal, Reinforced concrete design; "The McGraw Hills Companies"	2000

**ARCHITECTURAL DESIGN-IV**  
**Code: B5AR04-CP23**
**B.ARCH Semester: V**

UNIT	CONTENT
1	<b>Theme:</b> Understanding the integration of structure and construction systems in design of Built Spaces.
2	<b>Parameters:</b> Structure and construction as disciplines that evolve making of a space. Structural systems as choices based on program, space and form character. Structure as a space maker and structure as order.
3	<b>Expected Skills:</b> To develop ability to study and analyze natural and man-made structural systems, co-relation between function, structure, space and form. Different structural models in building systems. Models as analytical tools of decision making. Understanding of Gravity loads transfer, structural grid and Framing systems. Co-relation between Structural Grid, Design Grid and Parking Grid.
4	<b>Design Outline:</b> Integration of structure and construction in the design of a Multi-functional simple programmatic Building Project at Neighborhood level in Urban or Rural context, ideally on a Building Site for a built-up area of 501-1000 sq. m. The Course may be integrated with Structures, Building materials & construction and Interior Design.
5	<b>Projects:</b> A minimum of two Design Projects to be given in the semester from the list of suggested topics in various categories of Building types: Residential: Apartments, Students Hostel etc.; Educational: Primary, Secondary school, etc.; Commercial: Neighborhood shopping Centre, bank etc.; Recreational: Health clubs, Gymkhana etc.; Public: Neighborhood Centre, Marriage halls, etc.; Religious: Temple, Mosque, Gurudwara, Church etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Richard Weston; Materials Form and Architecture; Laurence king Publishing, Singapore	2003
2	Gunter Pfeifer, Antje M. Liebers, Per Brauneck; Exposed Concrete Technology & Design; BirkHauser, Switzerland	2005
3	Catherine Croft; Concrete Architecture; McGraw Hill, New Delhi	2004
4	Donald Watson & Michael J. Crosbie; Time Saver Standards for Architectural Design, McGraw Hill	2004
5	Francis D.K. Ching, Building Construction Illustrated, John Wiley & Sons 2001	2001

**BUILDING MATERIALS & CONSTRUCTION-V**  
**Code: B5AR05-CP24**
**B.ARCH Semester: V**

UNIT	CONTENT
1	<p><b>Damp Proofing</b>            MATERIALS: Causes and effect of dampness, techniques and methods of damp prevention, materials used for damp proofing– flexible, semi-rigid and rigid materials. Damp proofing treatments in buildings.            CONSTRUCTION: General preparatory work for damp proofing. Treatment of foundations, dampness from adjacent ground, treatment of foundation on poor soil, treatment above ground level. External and internal tanking, in-situ damp proofing treatment, cavity wall construction.</p>
2	<p><b>Water Proofing</b>            MATERIALS: Difference in water proofing and damp proofing, various systems of water proofing, materials for water proofing such as bitumen felt and paints, epoxy formulations, lime concrete, slurry coats, polyethylene film, glass fiber tissue reinforced bitumen, etc.            CONSTRUCTION: Preparatory work for water proofing. Water proofing for different roof types such as concrete and masonry flat or sloping roofs, timber sloping roof, shell roofs etc. Parapet and coping details, water proofing of underground reservoirs &amp; swimming pools. Covering of expansion joints, water proofing techniques for roof gardens, etc.</p>
3	<p><b>Fire &amp; Pest Resistance</b>            MATERIALS: Important considerations in fire protection, Non-combustible and combustible materials. Properties of some common materials such as timber, stone, bricks, terracotta, steel, wrought iron, cast iron, Aluminium, glass, asbestos, cement, mortar etc. Classification of pests, effects of pests in buildings, pest control methods such as Biological, Environmental, Mechanical &amp; Chemical. Laws &amp; Regulations for pest control.            CONSTRUCTION: General measures of fire safety in buildings such as smoke detectors, alarm systems, etc. Fire extinguishing arrangements, escape routes, etc.            Pest control measures by design and constructional means for new and existing buildings. Design criteria internal &amp; external anti-termite measures at foundation level &amp; masonry level.</p>
4	<p><b>Thermal Insulation</b>            MATERIALS: Effects of heat transfer and thermal insulation behavior of the material and building components, General principles of thermal insulation, materials of heat insulation such as slab or block insulations, blanket insulations, loose fills, insulating boards, reflective sheet materials etc.            CONSTRUCTION: Methods of heat insulation of roofs, exposed walls and exposed windows, doors and ventilators.</p>
5	<p><b>Protective &amp; Decorative finishes and Machines &amp; Equipment:</b>            MATERIALS: Objectives of building finishes, characteristics and ingredients of a good paint. Paints: classification and types. Covering capacity of paints, preparation of paints. Varnishes &amp; Varnishing; Objectives and characteristics of a good varnish, ingredients of varnish, types of varnishes, process of varnishing. Polishes &amp; polishing. Distempers &amp; distempering, properties of distempers. Miscellaneous finishes such as wall filling, papering, whitening, coal tarring, wax polishing, wood oiling, glazing etc.            CONSTRUCTION: Application of paints on different surfaces such as wood, metal, plastered concrete surfaces etc. in detail. Application of varnishes, distempers in various building elements, components &amp; furniture. Tools and equipment for various protective and decorative finishes.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Handbook on Building Construction Practices, BIS, New Delhi	1997
2	S.P. Arora, S.P. Bindra, Building Construction, Dhanpat Rai Publications.	2012
3	Hegger, Auch-Schwelt, Fuchs, Rosenkranz, Construction Materials Manual; Brkhauser Boston	2006
4	Francis D.K. Ching; Building Construction Illustrated, John Wiley & Sons 2001	2001
5	Barry R; Construction of Building, Vol.2; Affiliated East West Press Pvt. Ltd.	1999



**INTERIOR DESIGN**  
**Code: B5AR06-CP25**
**B.ARCH Semester: V**

UNIT	CONTENT
1	The profession of Interior Design; Role of an Interior designer– past & present. Interior Space: Space as raw material; quantitative and qualitative study such as types of spaces; size of a space; organization of spaces, etc. Light as an animator of space, direct & indirect lighting. Interior Elements: Floor; Floor finishes, their functional and aesthetical criteria; floor coverings, etc. Wall; Wall finishes and their functional and aesthetical criteria; wall coverings, Ceiling; types; finishes and their functional & aesthetical criteria. Openings; such as Doors and Windows; their types and treatments. Inclined elements such as stairs; ramps; their types and finishes
2	Perception of Interiors: Surface & Visual characteristics of Interior elements and their effect on the perception of space. Principal of Visual composition, Principle on where and how to perceive shapes & forms, the primary six principles such as figure-ground, closure, symmetry, proximity, similarity and continuance. Study of proxemics, behavioural settings.
3	Furniture & Accessories: An overview of historical perspective of furniture and styles. Interior styles such as Italian, English, French, Japanese, etc. Modern trends and contemporary attitudes to Interior Design i.e. Modular furniture. Utilitarian, Incidental and Decorative accessories in public and private interiors.
4	Interior Environmental System: Understanding thermal, visual, auditory and sanitary condition necessary for comfort and convenience of occupants. Coordination of heating and air conditioning system, water supply, sanitary drainage system, electrical & lighting system and acoustics with a building's structural system.
5	Design: Interior Design process, Interior design concepts, Interior space planning & human dimensions. Two interior schemes of different functional types; Residential/ Commercial/ Institutional etc. at different scales will form the major design assignments. The course may be integrated with the concurrent architecture design.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Elizabeth Wilhide, The Interior Design Directory, Quadrille London	2009
2	Francis D.K. Ching, Interior Design Illustrated, NY Van Nastrand Reinhold	1987
3	Time Saver Standards for Interior Design & Space Planning, McGraw Hill	1992
4	The Fundamentals of Interior Design, AVA Academic, Switzerland	2009
5	Karla J. Nielson, David A. Taylor, Interiors an introduction, McGraw Hill	2002

**ELECTIVE I (FURNITURE DESIGN)**  
**Code: B5AR07-CP26**
**B.ARCH Semester: V**

UNIT	CONTENT
1	Introduction: Furniture design and its types based on; function (sit, surface, storage etc.), state (movable, built-in, modular, stack etc.) and forms. Role of furniture design in interiors.
2	Historical & Cultural Context of Furniture Design: Industrial Revolution, Great Reform Movements: 1850-1914, Modernism to Pre-World War: 1900-1945, Post World War: 1945-1970s, Post Modernism: 1970-2000, Emerging design trends: 21st century.
3	Materials: types of materials, market forms, construction or assembly techniques such as bending, molding, casting etc. Joinery details, fabrication, tools and machinery involved.
4	Design & Production: Concept generation methods and design, Developing design and drawing techniques, skills (analog and digital), Technical drawings (design and details) and Model on scale.
5	Design: The subject may be integrated with the concurrent course of Interior Design. At the term of the course, the students will formulate, develop and resolve design solutions for furniture and present it in a form of a portfolio made in appropriate scale. The portfolio must present all drawings and details with respect to ergonomics, aesthetics, materials and construction, on an appropriate scale.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Juli Capella & Quim Larrea, Designed by Architects in the 1980's, Mitchell London	1988
2	Karla J. Nielson, David A. Taylor, Interiors an Introduction 3d Edition, McGraw Hill New York	2002
3	Joint & Connection: Ideas in Furniture Design and their background, Birkhauser Verlag Basel.Boston.Berlin	1992
4	Charles D. Gandy & Susan Z. Stidham, Contemporary Classics, furniture of the masters, McGraw Hill Book Company	1981
5	Francis D.K. Ching, Interior Design Illustrated, NY Van Nastrand Reinhold	1987

**ELECTIVE I (FURNITURE DESIGN)**  
**Code: B5AR07-CP26**
**B.ARCH Semester: V**

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1	Juli Capella & Quim Larrea, Designed by Architects in the 1980's, Mitchell London	1988
2	Karla J. Nielson, David A. Taylor, Interiors an Introduction 3d Edition, McGraw Hill New York	2002
3	Joint & Connection: Ideas in Furniture Design and their background, Birkhauser Verlag Basel.Boston.Berlin	1992
4	Charles D. Gandy & Susan Z. Stidham, Contemporary Classics, furniture of the masters, McGraw Hill Book Company	1981
5	Francis D.K. Ching, Interior Design Illustrated, NY Van Nastrand Reinhold	1987

**ELECTIVE I (PRODUCT DESIGN)**  
**Code: B5AR07-CP26****B.ARCH Semester: V**

UNIT	CONTENT
1	Introduction: Product design and its types and need. Role of a product designer, product design process- research, development, production and marketing. Difference between Industrial and Product Design.
2	Historical & Cultural Context of Product Design: Industrial Revolution, Great Reform Movements: 1850-1914, Modernism to Pre-World War: 1900-1945, Post World War: 1945-1970s, Post Modernism: 1970-2000, Emerging design trends of 21st century.
3	Common Materials and their application. Hard Materials: Stone, Wood & Metals.
4	Design and production: Concept generation methods and design, Developing design via sketching, on scale drawing techniques, skills (analog and digital), Technical drawings (design and detail) and Model on scale. Emphasis on ergonomics, material and aesthetics and user experience.
5	Design: The subject may be integrated with the concurrent course of Interior Design. A portfolio comprising of design for a product, presented in an appropriate scale. The design must fulfil the requirements such as ergonomics, aesthetics and construction technique.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Juli Capella & Quim Larrea, Designed by Architects in the 1980's, Mitchell London	1988
2	Roland Knauer, Transformation: Basic Principles & Methodology of Design, Birkhauser Basel.Boston.Berlin	2008
3	European Masters/ 3 vol. 10 Industrial Design, EDICIONES ATRIUM S.A.	1991
4	Drawing for 3-Dimensional Design, Concept. Illustration. Presentation, Thames & Hudson.	1990
5	Robert W. Gill; Rendering with pen & ink; Thames & Hudson	2003

**ELECTIVE I (DIGITAL DESIGN)**  
**Code: B5AR07-CP26****B.ARCH Semester: V**

UNIT	CONTENT
1	Introduction: Digital design and its practices. Digital or computational Designs such as Parametric, Isomorphic, Metamorphic etc. and their techniques. Inter-relationships of geometric and architectural parameters.
2	History & Evolution of Digital Architecture: Works of Gehry Partners, Zaha Hadid, Morphosis, SOM, KPF, Foster & Partners, Greg Lynn, etc. with respect to computational designs and contemporary practices.
3	Computational Design Thinking & Fundamentals of Software: Basic concept formulation, computational thinking and lexicon, visualization. Rhino+ Grasshopper (exploring new NURB systems, using generative algorithms and 3D modeling tools and required plug-ins).
4	Digital fabrication & Scaled Models : Creation of shop drawings (drawing issued for fabrication or production) Coordination of Autodesk software with Rhino, Grasshopper and similar files formats. Introduction to 3D printing, laser cutting and fabrication techniques.
5	Design Portfolio: At the end of the term, a portfolio will be made containing process documentation (sketches, diagrams both 2D and 3D)by setting up a layout or a scheme (composition of information on paper), using Adobe Illustration & In-design.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Jane Burry+ Mark Burry; The New Mathematics of Architecture, Thames & Hudson	2010
2	Helmut Pottman, Andrea Asperl, Michael Hofer & Axel Kilian; Architectural Geometry, 1st Edition, Bentley Institute Press, Eton Pennsylvania USA	2007
3	Roland Knauer,Transformation: Basic Principles & Methodology of Design, Birkhauser Basel.Boston.Berlin	2008

**BUILDING ELECTRICAL SERVICES****B.ARCH Semester: VI****Code: B6AR01-CT16**

UNIT	CONTENT
1	<b>Building Energy</b> Significance, Scope, Building Energy Sources-Conventional – Hydro, Fossil Fuels, Nuclear, etc. & Non-Conventional - Bio-Gas, Photo Voltaic, Wind, Wave Energy, etc. Building Energy Scenario - Trends in Consumption, Impact of user behaviour and Energy Conservation. Terminology used – Electric Charge, Current, Voltage, Power, Resistance, AC & DC etc. Basics of electrical circuit- Ohm's Law & Kirchoff's Law- Series and Parallel Circuits.
2	<b>Electrical Transmission &amp; Distribution</b> Transmission of electricity - Transmission Voltages, Power Factor and Power Losses. Electrical Distribution Systems- Demand, Tariff Legislation and Code of practice. Rules- National Electrical Code. Single Phase and Three Phase Supply Electrical Sub-Station – Transformer, Metering & Monitoring, HT & LT Panels, Switch Gears, Power Backup & Emergency Supply.
3	<b>Electrical Wiring and Installations</b> Types of wiring systems, Methods of Wiring, Joint and Loop-In. Types of electrical Wires and their choice in planning electrical wiring in Building Switch boards, Distribution boards, Sockets, junction boxes, control equipment, and other fittings and fixtures. Protection against overload, short circuit, earth faults, lightning Conductors and other safety measures. Special systems- Bus Way, Bus Bar Trunk, Race Way, lighting Tracks
4	<b>Building Automation and Control Systems</b> Building Automations, Significance and Scope. Electronic and Communication Systems- Telecom, Intercom, Computer Systems and Data Networking- Wired & Wireless. Electronic Security System- Security and Surveillance Systems. Automatic Control Systems- Elementary Local Loop and complete control systems
5	<b>Electrical Layout Design</b> Single Line Diagram & Electrical layouts. Calculation of load for small project like Shop, Showroom, Office, Residence etc. Designing Basic Electrical layout to be integrated with concurrent Design Studio.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	S.L. Uppal- G.C. Garg; Electrical Wiring Estimation and Costing; Khanna Publication	2010 – 6th Edition
2	Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann	2011 – 6th Edition
3	Raina K.B. & Bhattacharya S.K.; Electrical Design, Estimation and Costing; New Age International Publishers, New Delhi	2007
4	Steve Doty & Wayne C. Turner; Energy Management Handbook; The Fourmount Press, USA	2009 – 7th Edition
5	B. Mazumdaar; Textbook of Energy Technology; APH Publishing Corporation	2005

**HISTORY OF ARCHITECTURE-IV**  
**Code: B6AR02-CT17**
**B.ARCH Semester: VI**

UNIT	CONTENT
1	<p><b>MODERN ARCHITECTURE: The Great Masters</b>            Factors contributing to the development of the style. The life, Philosophy and contribution of the Great Masters to Architecture            Luis Sullivan: The Chicago School Of Architects, Auditorium Building, Wainwright and Guaranty Building, Carson Pirie Scott Store.            Frank Llyod Wright: Prarie School Houses such as Winslow, Ward Willits and Robie House. Early Public buildings such as Larkin &amp; Unity Temple. Usonian Homes such as Hanna House. The culmination of the idea of the Organic Architecture- Falling Waters.            Later Public buildings such as Johnson Wax and Guggenheim Museum.            Walter Gropius: Fagus Shoe factory &amp; Bauhaus School.            Mies Van der Rohe: Weissenhoff Housing Estate, German Pavilion at Barcelona, Farnsworth House, Illinois; Lake Shore Drive Apartments, Chicago; Crown Hall and Seagram Building, New York.            Le Corbusier: Towards a new Architecture- the Five Points. Villa Savoye, Swiss Pavilion, Unite d’Habitation, Notre Dame du Haut. City Planning and Design of buildings of Capitol Complex at Chandigarh. Sanskar Kendra, Mill Owner’s Association, Shodhan and Sarabhai houses at Ahmedabad.</p>
2	<p><b>MODERN ARCHITECTURE: After The Masters</b>            Life, Philosophy and Contribution of Modern Period Architects after the great masters.            Alvar Aalto: Paimio Sanatorium, Viipuri Library, Villa Mairea, Saynatsalo Town Hall            Louis Isadore Kahn: Salk Institute, California; Kimbell Art Museum, Texas; IIM Ahmedabad; Bangladesh National Assembly, Dhaka            Eero Saarinen: TWA Terminal J.F. Kennedy Airport, New York; Dulles International Airport ; Kresge Auditorium and Chapel at MIT            Kenzo Tange: Hiroshima Peace Memorial, Yoyogi Olympic Gymnasiums, Tokyo; Tokyo City Hall.            John Utzon: Sydney Opera House, Kuwait National Assembly, Bagsverd Church, Denmark</p>
3	<p><b>POST MODERN ARCHITECTURE: Classicism &amp; High-Tech</b>            Post Modern architecture as a counter proposal to Modern architecture. Different Trends and Meanings of Post Modern Architecture. The Life, Philosophy and Contribution of Post Modern Architects.            Robert Venturi: Vanna Venturi House and Guild House, Philadelphia and Sainsbury Wing National Gallery London.            Philip Johnson: The Glass House, Connecticut; AT&amp;T Building, Manhattan; National Centre for Performing Arts, Mumbai.            Micheal Graves: Public Service and Humana Corporation Buildings, Walt Disney World Swan &amp; Dolphin Resort            Richard Rogers: Georges Centre Pompidou, Llyods Building, Millennium Dome.            Renzo Piano: Tjibaou Cultural Centre, California Academy of Sciences.            Norman Foster: HSBC Hong Kong, Sainsbury Centre for Visual Arts, Swiss Re Tower, Santiago Calatrava: Lyon Airport Railway Station, The Turning Torso.</p>
4	<p><b>POST MODERN ARCHITECTURE: Deconstructivism &amp; Regionalism</b>            The other flavors of Post Modern Architecture in the Developed and Developing World.            Peter Eisenman: House VI, Wexner Centre for Visual Art, Bio Centrum            Frank Owen Gehry: Walt Disney Concert Hall, Nationale Nederlander, Prague; Guggenheim Museum, Bilbao.            Daniel Libeskind: Jewish Museum, Berlin; Imperial War Museum, Manchester ; Denver Art Museum Extension &amp; Residences, Colorado.            Zaha Hadid: Vitra Fire Station, Weil Am Rhein Germany; Phaeno Science Centre, Wolfsburg ; London Aquatics Centre.            Hassan Fathy: Mosque, New Gournaa; Ministerli House, Cairo; Hassan Rashad House, Ibiar Tanta, Egypt.            Geoffrey Bawa: Parliamentary Complex, Sri Jayawardenapura; University of Ruhunu, Matara ; Kandalama Hotel, Dambulla; Sri Lanka.            Laurie Baker: Loyola Graduate Women’s Hostel, Centre for Development Studies, Indian Coffee House, Trivandrum.</p>

UNIT	CONTENT
5	<p><b>INDIAN ARCHITECTURE – Post Independence</b>            Post Independence Indian Architects after Le Corbusier and Louis Kahn.            Achyut P. Kanvinde: Campus Architecture, IIT Kanpur ; Dudhsagar dairy Complex, Mehsana ; National Insurance Academy, Pune; Nehru Science Centre, Mumbai.            Joseph A. Stein: India International Centre ; Triveni Kala Sangam and India Habitat Centre, Delhi            B. V. Doshi : Gandhi Labour Institute, CEPT, Institute of Indology, Ahmedabad ; Aranya Township, Indore; Vidyadhar Nagar, Jaipur; IIM Bangalore.            Anant D. Raje : Indian Statistical Institute, Delhi ; Indian Institute of Forest Management, Bhopal; Farmers Training Institute, Palampur.            Charles Correa: Gandhi Samarak Sangrahalaya, Ahmedabad; Kala Academy, Panjim; Jawahar Kala Kendra, Jaipur; British Council Headquarters, Delhi; Artist's Village, Belapur ; Chamapulimaud Centre for Unknown, Lisbon.            Raj Rewal : Asiad Games Village, National Institute of Immunology and Scope Office Building, Delhi.            Uttam C. Jain : Jodhpur University Campus Extension ; Indira Gandhi Institute of Development Research, Mumbai ; Nagar Nigam, Jaipur.</p>

#### REFERENCE BOOKS

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Marian Moffett, Michael Fazio, Lawrence Wodehouse; Buildings Across Time; McGraw Hill	2004
2	Francis D. K. Ching, Mark M. Jarzombek, Vikramaditya Prakash; A Global History of Architecture, John Wiley & Sons	2007
3	William J. R. Curtis, Modern Architecture since 1900, Phaidon Press Ltd.	1996
4	Vikram Bhatt & Peter Scriver; Contemporary Indian Architecture, After the Masters;Mapin Publishing Pvt. Ltd.	1990
5	Kenneth Frampton; World Architecture 1900-2000: A critical Mosaic, Volume 8 South Asia; Springer-Verlag Wien New York	2000



**ARCHITECTURAL STRUCTURE -VI**  
**Code: B6AR03-CT18**
**B.ARCH Semester: VI**

UNIT	CONTENT
1	Introduction Introduction to steel members, Uses of steel over RCC, Introduction to Rivet connections, Introduction to bolted connections, Introduction to welded connections
2	Design of Tension members Introduction to tension plates, Introduction to tie members in trusses, Designing of tension plates, Designing of tie members
3	Design of Compression members Introduction to steel columns and struts, Designing of steel columns, Designing of steel struts and uses of steel columns
4	Design of Beams Introduction to steel beams, Designing of laterally supported beams, Designing of laterally unsupported beams, Uses of built up sections and steel beams.
5	Design of Foundations Introduction of grillage foundation, Theory of column bases, Designing of grillage foundation and Designing of column bases
	<b>TOTAL</b>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Prof. R. Chandra, Design of Steel Structure (Vol.I); “Standard Publisher & Distributors”	2005
2	Negi, Design of Steel Structure; “Tata McGraw Hills Publishing Co. Ltd.”	2004
3	S. Subramaniam, Design of Steel Structure; “Oxford university press”	2008
4	B.C.Punmia& A K Jain, Design of Steel Structure; “Laxmi publication”	2006
5	S.K.Duggal, Design of Steel Structure; “Tata McGraw Hills Publishing Co. Ltd.”	2004

**ARCHITECTURAL DESIGN -V**  
**Code: B6AR04-CP28**
**B.ARCH Semester: VI**

UNIT	CONTENT
1	<b>Theme:</b> Understanding the integration of Building services in the design of built spaces. Introduction to various Building services as functional enhancer of space.
2	<b>Parameters:</b> Environmental concerns in design such as light, ventilation, water, waste and Energy. Integration of structural, constructional and spatial systems with Building Services systems.
3	<b>Expected Skills:</b> To develop ability to study and analyze natural and man-made, ancient and Modern Building services systems. Co-relation between structural, constructional, spatial and Building plumbing and Electrical systems. Requirement of services as per Building codes, Basic layout and Design of Plumbing and Electrical services in Buildings.
4	<b>Design Outline:</b> Integration of services with structure, construction and function in the design of Multifunctional Simple Programmatic Building Project at community level in Urban or Rural context ideally on a Building site for a built-up area of 1001- 2500 sq.m. Course to be integrated with Plumbing and Electrical services and landscape Design courses.
5	<b>Projects:</b> A minimum of two Design Projects to be given in the semester from the list of suggested projects in various categories of Building types: Residential: Community Hostel, Youth, Hostel, etc. Educational: Higher Secondary School, Special school, etc. Health: Community Health Centre, Hospital, etc. Hospitality: Hostels, Motels, Resorts, etc. Commercial: Community shopping centre, commercial complex, offices, etc. Industrial: Industry, Laboratories etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Smith Lee; Plumbing Technology- Design & Installation; Delman Publishers Inc.	2007
2	Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann	2011- Sixth Edition
3	Ralph Hammann, “ Creative Engineering, Architecture, and Technology; DOM publishers	2010
4	Pierre Loze, “Art & Build” Images Publishing	2009
5	Joseph De Chiara, Micheal J. Crosbie; Time Saver Standards for Building Types; McGraw Hill	2001-Fourth Edition

**BUILDING MATERIAL & CONSTRUCTION -VI**  
**Code: B6AR05-CP29****B.ARCH Semester: VI**

UNIT	CONTENT
1	<p><b>Pre-cast, Prefabricated &amp; Pre-stressed Construction:</b>  <b>MATERIALS:</b> Pre-stressing, prefabrication and precast and their present scenario in country. Standardization &amp; modular coordination, jointing, tolerances, mass production storage and handling of materials. Types of pre-stressing techniques such as pre-tensioning &amp; post tensioning. Advantage &amp; disadvantages of Pre-stressing, Post-tensioning systems such as Freyssinet system, Gifford-Udall-cct system etc.  <b>CONSTRUCTION:</b> Prefabrication technology – column &amp; beam system, panel system, box system, Prefabrication techniques and various building components, Comparison between RCC and Pre-stressed concrete.</p>
2	<p><b>Long span structures:</b>  <b>MATERIALS:</b> Structural, Design &amp; constructional issues of long span structures, long span structure system such as one way systems: Beams in timber, steel &amp; concrete; Trusses in timber &amp; Steel; Arches in timber, steel and concrete; Cable Structures in Steel. Plate structures in timber &amp; concrete; shell structures in wood &amp; concrete. Two way systems: Plate structures in steel &amp; concrete; shell structures in steel &amp; concrete. Principles of pneumatic structures. Machines and equipments for long span structures.  <b>CONSTRUCTION:</b> Constructional details of various structures in steel, concrete – portal frames, folded plate, domes, space frame, tensile structure etc.. Foundations for long span structures.</p>
3	<p><b>High Rise Structures:</b>  <b>MATERIALS:</b> Different types of forces on high rise structures, Types of High Rise structures – Exterior structures such as Braced Frames, tube structures, tube in tube structure, Diagrid structures, trussed tubes, bundled tubes, space truss etc. Interior structures such as Rigid frame structures, Braced frame cores, shear wall cores etc. Machines &amp; equipments for high rise construction.  <b>CONSTRUCTION:</b> Deep foundations such as piles, caissons, diaphragm walls. Foundations under special conditions etc.</p>
4	<p><b>Appropriate Construction Technology:</b>  <b>MATERIALS:</b> Appropriate construction technologies used as an alternative for conventional practices. Selection Criteria and objectives for using such technologies.  Application of Building Materials processed from Agricultural and Industrial waste. Introduction about agencies involved in promotion of such materials and technologies like BMTPC, CBRI, etc.  Appropriate construction techniques, spanning systems, building components and Building Materials. Ferrocement its constituents &amp; characteristics, comparison with RCC, various applications of Ferrocement.  <b>CONSTRUCTION:</b> Appropriate construction techniques such as precast channel unit, RCC plant &amp; joist, waffle unit, concrete L panel, Doubly curved shell, Ferrocement roofing channels, spanning systems such as corbelling, arch etc.</p>
5	<p><b>Advance Materials &amp; Construction Technologies:</b>  <b>MATERIALS:</b> Introduction and brief history of smart materials, classification such as smart, Intelligent, Repurposed, Transformational, nano etc. Innovation in materials such as Translucent concrete, LED tiles, ECO glass, Electroluminescent fabric, Reaction glass etc. Processing and conversion of materials. New technologies of construction.  <b>CONSTRUCTION:</b> Lift slab construction, slip form construction.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Francis D.k. Ching, Barry S. Onoye, Douglas Zuberbuhler; Building Structures Illustrated; John Wiley & Sons	2009
2	Michael Barnes, Michae Dickson, Thomas Telford; Widespan Roof Structures	2000
3	Johann Eisele, Ellen Kloft, High Rise Manual; Birkhauser Boston	2003
4	M.J. Tomlison; Foundation, Design & Construction; Longman Group Ltd.	1995
5	Barry R.; Construction of Buildings, Volume 1, Foundation and on-site Concrete Walls, Floors and Roofs; Affiliated East West Press	1996

**LANDSCAPE DESIGN -V**  
**Code: B6AR06-CP30**
**B.ARCH Semester: VI**

UNIT	CONTENTS
1	<b>Introduction to Landscape Architecture</b> Definitions, Hierarchy and Scope in Architecture. Landscape Design in History – Persian, Spanish, Italian, French, Mughal, English and Japanese Gardens. Contemporary concepts and concerns in Landscape such as living green roof, terrace, wall, etc. and Modifying micro climate w.r.t. Temperature, humidity, precipitation and percolation.
2	<b>Elements of Landscape Architectural Design</b> Landform: Significance, Expression, types and uses of Landform. Plant material: Significance, Types Characteristics and uses of plant material. Planting Design process and Principles. Plant Material in local context. Botanical & Common names, Characteristics and uses. Selection of Plants. Water: Characteristics and uses of water in Landscape, Materials & Design of water features such as fountains and pools. Pavement: Types, Characteristics &. Uses of pavements in Landscape. Basic Pavement, Materials and Design. Site Structures: Steps, Ramps, walls, fences, seating, etc., their materials & design.
3	<b>Site Studies, Planning &amp; Development</b> Site survey to study site characteristics such as Access, Topography, Vegetation, Hydrology, Views and Context. Site planning issues. Such as siting individual buildings and relating Buildings to a site. Building clusters and Types of spaces, Site circulation and zoning of Activities & spaces on site.
4	<b>Landscape Architectural Design Process &amp; Services:</b> Basic Design Process: Research, Analysis, Design & Construction Drawings such as Master Plan, Grading Plan, Section and Planting Plan. Drainage & Irrigation System Layout plan, Outdoor Lighting System layout plan.
5	<b>Landscape Architectural Design Project</b> Design and Presentation of landscape scheme for Building Projects from the previous or concurrent, Architectural Design Studio, Small exercise to test application through design of parks, play grounds, road layouts, parking etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Michael Laurie; An Introduction to Landscape Architecture; Elevation Publications	1986
2	Sylvia Crowe; Garden Design	1994
3	Geoffrey & Susan Jellicoe, Landscape of Man	1975
4	Kevin Lynch, Site Planning	1984
5	PradeepKrishan, Trees Of Delhi, Penguin India	2006

**ELECTIVE-II - HISTORY OF ARCHITECTURE OF RAJASTHAN****B.ARCH Semester: VI****Code: B6AR07-CP31**

UNIT	CONTENT
1	<b>Background &amp; Historical context</b> Context and Physical Characteristics; Forces responsible for architectural development of Rajasthan like social, political and economic factors, culture and building resources, building techniques & processes characteristic to Rajasthan.
2	<b>Development and Evolution of architecture</b> Earliest archeological evidences – Mauryan & Post Mauryan period, Gupta & Post Gupta period, Pratihara period, Rajput period, Rajput-Mughal period, Rajput-British period; Buildings for the expression of power like Hill Forts & Citadels - Amber, Mehrangarh, Kumbhalgarh, Jaisalmer and Chittorgarh and palaces like City Palace Jaipur and City Palace Udaipur.
3	<b>The organic and the planned cities</b> Settlement patterns- Common planning principles & articulation of built form and the factors influencing their spatial organization; cultural values that shaped the overall architectural language; Brief understanding of planning of early cities with an organic character like Jaisalmer, Shekhawati towns and of planned cities like Jaipur.
4	<b>History of building craft</b> Traditional treatise - Rajvallabh, Devtamurtiprakaran, Prasadmandana, Rupavatra, Rupamandana, Vastushastra; Visual records - Manuscripts, miniature paintings, Mughal paintings; Local traditions of artisanship – artisans, temple builders, sculptors, stone carvers, inlayers, etc.
5	<b>Building types and their uses</b> Havelis and houses, temples and other religious buildings, bazaars and public buildings, buildings for water and gardens - examples from cities like Jaipur, Jodhpur, Udaipur, Jaisalmer, etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Bannister Fletcher, History of Architecture, Twentieth Edition, CBS Publishers, Delhi	1999
2	Shikha Jain, Havelis: a living tradition of Rajasthan, Shubhi Publications	2004
3	The Stone Crafts of Rajasthan, CDOS, Jaipur	2011
4	G.H.R. Tillotson, The Rajput Palaces: the development of architectural style, Oxford University Press, New York	1999
5	G.H.R.Tillotson, Paradigms of Indian Architecture, Routledge	1997
6	Rima Hooja, History of Rajasthan, Rupa Co., New Delhi	2006

**ELECTIVE-II -VERNACULAR ARCHITECTURE OF RAJASTHAN****B.ARCH Semester: VI****Code: B6AR07-CP31**

UNIT	CONTENT
1	<b>Vernacular architecture in Indian context</b> Definition(s) of vernacular architecture and related terminologies; Difference between vernacular architecture and traditional architecture; Relevance of vernacular architecture in present context; Typologies in different climatic regions of India.
2	<b>Regional context and corresponding built form in Rajasthan:</b> Factors influencing the development of vernacular architecture like climate, topography, availability of building materials, resources, building skills and techniques. Conception of space and evolution of a generic form.
3	<b>Settlements and dwelling patterns</b> Regional dwelling patterns like 'dhanis' (hamlets), villages and their overall adaptation in the said context; Settlements and their vicinity to water resource(s) as places of worship and social activity; water related architecture and typical water resources like kua, kohar, baoli/bavdi, jhalora, bera/beri.
4	<b>Typical built typologies</b> Study of relative built typologies for residential, religious and public use of cities like Jaisalmer, Jaipur, Jodhpur, Bikaner and Udaipur in terms of context, physical characteristics and culture.
5	<b>Characteristic spaces and thematic elements</b> Spaces like courtyards, platforms, jharokhas (balconies) etc.; Embellishments & Architectural expressions– Symbolism and Ornamentation, compound walls, patterns on doors and windows, mirror work and motifs, flooring patterns, etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Amos Rapoport; House Form & Culture; Prentice Hall	
2	Dora P. Crouch & June G. Johnson, Traditions in Architecture – Africa, America, Asia and Oceania, Oxford University Press, Inc., USA, 1st edition	2001
3	J. Tod, Annals and Antiquities of Rajasthan; Volume-II, KMN Publishers, New Delhi	1983
4	Minakshi Jain & Kulbhushan Jain; Architecture of the Indian Desert; AADI Centre, Ahmedabad, India	2000
5	Minakshi Jain & Kulbhushan Jain; Indian City in the Arid West; AADI Centre, Paldi, Ahmedabad, India	

**ELECTIVE-II - ARTS & CRAFTS OF RAJASTHAN****B.ARCH Semester: VI****Code: B6AR07-CP31**

UNIT	CONTENT
1	<b>Background &amp; Regional formation of Rajasthan.</b> Traditional geographical, political and cultural divisions; Pre-and proto history of Rajasthan focusing on various prehistoric cultures; Inter-religious interactions- Aspects of arts and crafts, literature and cultural relations with neighboring states during respective historical eras.
2	<b>Classification of Arts &amp; Crafts based on nature and material used</b> The Chhatiskarkhana of Jaipur; Crafts - Jewelry, metal, wood, lac-based crafts, textiles, paper crafts, miscellaneous arts – Miniature painting, frescoes, etc.; Tribal crafts; Influence of arts and crafts on built form.
3	<b>Building stone craft tradition in Rajasthan</b> Rock formations in Rajasthan and stone types; Shaping the stone – quarrying, selection, dressing, finishing, carving and patterning; Stone craft clusters in Rajasthan; Stone Masonry (walls; dry and with lime mortar / cladding and finishes).
4	<b>Building elements in stone</b> Structural elements in stone (foundations, columns, beams, brackets and roofs – flat and domed); Architectural elements in stone (jharokhas, copings, railings, jaalis); Landscape elements in stone (fountains, water bodies, benches, signage, lamps); Interior elements/ sculptures/artifacts of various sorts; Maintenance of Stone Buildings.
5	<b>Reinterpretation of stone craftsmanship</b> The new generation artisan; Innovations and adaptations to new tools and applications in stone; contemporary use of stone while studying works of Raj Rewal, Charles Correa, Ashok B Lall and Nimish Patel,

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Rima Hooja, History of Rajasthan, Rupa Co., New Delhi	2006
2	The Stone Crafts of Rajasthan- A Manual, CDOS, Jaipur	2011
3	V.S. Bhatnagar, Life and times of Sawai Jai Singh, Impex India, New Delhi	1979
4	Rajasthan Sate Gazetteers, Volume – 2, History and culture, Directorate District Gazetteers, GoR& Volume-3, Economic Structure and Activities	
5	Jadunath Sarkar, History of Rajasthan	

**BUILDING MECHANICAL SERVICES****B.ARCH Semester: VII****Code: B7AR01-CT19**

UNIT	CONTENT
1	<p><b>Principles of Refrigeration and HVAC</b>  Basics of Thermodynamics: Heat, Transfer of heat, Change of state, Temperature, Specific Heat, Latent Heat, Saturation Temperature, Evaporation, Condensation, Enthalpy, Entropy, Pressure-Temperature Relationship for liquids, Refrigerants, Refrigeration Cycle.  Human Comfort: Humidity, Absolute Humidity, Relative Humidity, Specific Humidity, Temperature Range, Air Quality Parameters, Air Movement, Need of HVAC.  Principles of Air-Conditioning: Psychometric Process, Air Cycle, Summer and Winter air conditioning, evaporative cooling, Constituents of Heat Load Estimation- Material, Orientation, Heat, Light, Occupancy, Building Use (Mathematical calculations are excluded).  Air Conditioning Zoning: Purpose &amp; advantages, Air distribution systems- Non Duct &amp; Duct Systems, Air outlets, Compressors, Evaporators, Condensers, etc.</p>
2	<p><b>HVAC System Components and Equipment</b>  Window &amp; Split units; Variable air-volume, water volume, vapor absorption system (Variable refrigerant Flow).  Central Air conditioning systems: AC Plant Room, Direct Expansion and chilled water system, Types of compressors (air cooled and water cooled), Cooling Towers, Air handling units, Fan Coil Unit, Fresh air-sick building syndrome.</p>
3	<p><b>Fire Prevention, Protection &amp; Life Safety</b>  Causes of building fire: Triangle of fire  Prevention: Materials for different building components and their fire rating,  Considerations for: Building Heights, F.A.R. &amp; Open Space, service ducts and shafts, refuse chutes, electrical installations &amp; emergency power supply, lightening protection, escape lighting and escape signage, fire and smoke dampers, opening and glazing (façade fire prevention)  Life Safety: Fire exits- numbers and arrangement, fire escape staircase and its pressurization, ramps, Compartmentation, Fire detection and alarm systems, safety drills.  Fire Protection: Fire extinguishing and fire fighting installations- types of extinguishers, dry and wet riser system, automatic sprinkler system, fire tank and pump house.</p>
4	<p><b>Elevators and Escalators</b>  Types of Elevator and escalator mechanism, Design considerations: location in a building, serving floor, grouping, lift size, lift car dimensions, door arrangements, waiting time analysis, sky lobby.  Types &amp; installation provisions of elevators &amp; escalators: passenger lift, hospital (stretcher lift), goods lift, car lifts, dumbwaiters, travelators, step type escalator, belt type escalators, cleat type escalator, levytator etc.</p>
5	<p><b>Mechanical Layout Design</b>  Application of air conditioning system in hotels hospital and commercial building.  Ventilation System design for basement, car park, toilet and kitchen ventilation (air washer and scrubbers), air cooling systems.  Schematic layout for fire protection in building showing exits, escape routes, fire extinguishers (sprinkler systems), tanks and pump room.  All designs to be integrated with concurrent Design Studio.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	John W. Mitchell, James E. Braun; Heating, Ventilation, and Air Conditioning in Buildings ; John Wiley & Sons Inc.	2012
2	William K.Y. Tao , Richards R. Janis; Mechanical and electrical Systems in Buildings; Pearson Education Inc.	2014
3	M.Y.H. Bangash, T. Bangash; Lifts, Elevators, Escalators and Moving Walkways; Travelators/Taylor & Francis/Balkema	2007
4	Bureau of Indian Standards; National building code of India-2016; Bureau of Indian Standards	2016
5	William H. Severns and Julian R Fellows; Air conditioning and Refrigeration; John Wiley & sons, London	1987



**CONTRACT DOCUMENTS & BYELAWS****B.ARCH Semester: VII****Code: B7AR02-CT20**

UNIT	CONTENT
1	<p><b>Building Contracts</b> Type of contracts and contract documents, detailed knowledge about various conditions of contract as published by the Indian Institute of Architects, interim certificates defect, liability period, retention amount and virtual completion.</p> <p>Articles of agreement, execution of work payment and Arbitration, arbitrators, umpire and nature of arbitration, Appointment, conduct, powers and duties of arbitrators and umpires, Procedure for arbitration, preparation and publication of awards and impeachment.</p>
2	<p><b>Tenders</b> Types of tender documents, tender draft notices and invitation of tenders. Procedure for opening and selection of tenders &amp; award of contract. Analysis and report to owner. Work order.</p>
3	<p><b>Building Byelaws:</b> Brief history of Town planning Act 1954 with reference to Building Projects. Various factors for formalization of Bye Laws &amp; its implications. Comprehensive study of Jaipur Building Bye-laws relating to Ground coverage, FSI Calculation, Building Height &amp; Building use regulation. Study of special provisions in bye-laws in respect of Special category of Buildings Role of Approving authorities, special rules governing hill area development &amp; coastal area management.</p>
4	<p><b>Approval &amp; Clearance:</b> Preparation and procedure of approval drawings. Methods of enforcement &amp; monitoring. Fire clearance, Structure safety approval, Environment clearance, consent to establishment, Occupancy &amp; completion certificate, Indemnity Bond, other special clearances.</p>
5	<p><b>Other Laws:</b> An overview of laws related to the profession of Architecture and Physical Development. Introduction to Labour Act, Building construction worker act &amp; Real estate Bill 2017.</p>
	<b>TOTAL</b>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	V.S.Apte; Architectural Practice & Procedure	2008
2	Roshal Namavati; Professional Practice	2008
3	Dr. K.G.Krishnamurthy; Construction Management	2005
4	Ministry of Urban Development; Model Building Byelaws	2016
5	Bureau of Indian Standards; National Building Code (NBC)	2016

**ACOUSTICS & ILLUMINATION**  
**Code: B7AR03-CT21**
**B.ARCH Semester: VII**

UNIT	CONTENT
1	<b>Fundamentals &amp; Behavior of sound:</b> Acoustics-need & scope, pioneers and their works, Acoustics examples from past .Basic Theory: Generation, Propagation, Transmission, Reception of sound, Human ear and hearing, loudness perception, subjective effects. Basic terminology - Frequency, pitch, tone, timbre, sound pressure, sound intensity, loudness, threshold of audibility & pain, wavelength and velocity of sound. Properties & Characteristics of Sound. Reflection and absorption of sound. Inverse Square law, Decibel scale & decibel addition. Behavior of sound in an enclosed space. Ray Diagrams, Sound paths, Effect of geometry and shapes. Sound Absorption coefficient, Reverberation, Calculation of reverberation time-Sabine formula. Acoustical defects in an enclosed space and their remedial measures.
2	<b>Noise Control:</b> Physiological and psychological effects of noise. Types of noises- Structure borne & Air borne noise, flanking of sound. Noise classification Outdoor and indoor noises. Transmission of noise & Transmission loss, Noise control and sound insulation & absorption. Sound leaks through openings. Acceptable noise levels for building types and indoor noise levels. Noise criteria curve & noise reduction coefficient. Noise reduction through landscaping and design techniques. Land use planning for Noise control. Noise reduction from mechanical equipment their mounting details and insulation.
3	<b>Design &amp; construction for sound:</b> Introduction to sound amplification and Distribution system. Selection of Acoustic materials like porous materials, membrane absorbers, cavity resonators, space absorbers, variable absorbers and their construction details and fixing. Environmental aspects of acoustical materials. Construction details of walls, partitions, floors, ceiling doors & windows for Noise reduction. Acoustic design process in different types of buildings like Auditoriums, concert halls, lecture halls. Site selection, noise survey, room zoning and shape. Acoustical privacy in open plan offices. Halls for speech & music .Raking of seats, stage forms etc.
4	<b>Illumination:</b> Introduction to illumination and Terms- lux, candle power , lumen, luminance, illuminance, luminous flux, luminous intensity ,glare etc. Evolution of lighting technologies. Light and vision . Photometry and measurement .Laws of Illumination such as inverse square law, cosine law, lamberts cosine law. Methods of lighting-ambient, task and accent. Classification of lighting systems-direct, diffused, indirect. Key technical terms such as CRI, CCT etc. Artificial light sources, types-incandescent, fluorescent, HID & LID, LED and their application, advantages & limitations.
5	<b>Lighting Design:</b> Functional & aesthetic uses of lighting. Characteristics of good lighting. Architectural lighting methods. Use of Artificial lighting as an element in Architectural scheme for Exhibitions, Museum, office, Residences, Outdoor Lighting road, façade & landscape . Lighting techniques -Spot, Flood, Light beams etc. Lighting Design: Lumen method, Point by Point Method, Graphical representation of general Lighting scheme. Energy efficient lighting Design strategies.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Egan David; Architectural Acoustics; Mcgraw-Hills Book Co. New York	1988
2	Leslie I. Doelle; Environmental Acoustics; MC graw-Hill book company, New York	
3	Norbert Lachner; Heating, Cooling, Lighting - Design methods for Architects; Johnwiley & Sons New York	2001
4	BIS; Handbook on Functional requirement of Buildings, (Part 1-4) ; BIS	
5	Christina Augustesen; Lighting Design Principles, implementation case studies; Birkhauser, Boston	2006

**ARCHITECTURE DESIGN -VI**  
**B7AR04-CP33**
**B.ARCH Semester: VII**

UNIT	CONTENT
1	<b>Theme:</b> Understanding the co-relation between the sight and the building / buildings through the integration of various site and landscape elements.
2	<b>Expected Sills:</b> To develop ability to locate a building / buildings on site as per local building regulations, climate and site conditions in order to achieve mutually beneficial relation between built and open spaces using various available natural & man made elements such as land form, plant material, water bodies, pavements, buildings and site structures. To develop ability to plan and design access, circulation and parking at site level
3	<b>Building Byelaws:</b> Brief history of Town planning Act 1954 with reference to Building Projects. Various factors for formalization of Bye Laws & its implications. Comprehensive study of Jaipur Building Bye-laws relating to Ground coverage, FSI Calculation, Building Height & Building use regulation. Study of special provisions in bye-laws in respect of Special category of Buildings Role of Approving authorities, special rules governing hill area development & coastal area management.
4	<b>Design Outline:</b> Integration of built & open spaces in the design of multi-functional complex programmatic building project at District level in Urban or Rural context ideally on a building site required for a built up area of 2500 – 5000 Sqm. Course to be integrated with building mechanical services, acoustics & illumination, settlement planning & universal design.
5	<b>Projects:</b> A minimum of two design projects to be given in the semester from the list of suggested projects in various categories of building types : Residential: Group, Spatial Housing, etc. Educational: Diploma, Degree, Professional colleges, Science centre, etc. Public: Law courts, Art & Cultural Centre, etc. Health: Naturopathy & Yoga Centre, Hospice, Drug De-addiction centre, etc. Hospitality: Holiday, Beach, Hill, Dessert Resort, etc. Entertainment: Sports / Social Club, Water Park, etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	John Ormsbee Simonds,; “Landscape Architecture”; McGraw Hill	2008
2	Charles W. Harris, Nicholas T. Dines; “Time-Saver Standards for Landscape Architecture”; McGraw Hill	2008
3	Joseph De Chiara, Micheal J. Crosbie; Time-Saver Standards for Building Types; McGraw Hill	2005
4	Ernest & Peter Neufert; “Architect’s Data Part-I & II”; Black Well Science	2016
5	Achyut P. Kanvinde & H. James Miller; “Campus Design in India”; United States Agency for International Development	2016

**WORKING DRAWING**  
**Code: B7AR05-CP34**
**B.ARCH Semester: VII**

UNIT	CONTENT
1	<p><b>Introduction:</b>            Understanding of working drawing, their co-relation in various technical projections like plans, elevations, sections, detailing etc. Estimation &amp; Specifications, Standards, guidelines for execution of works, Units of measurements, various graphic, numeric, text components and their precise function in a set of working drawing. Method of representing various contents &amp; specific information in working drawings.            Study of a set of working Drawings and its understanding</p>
2	<p><b>Building Plans:</b>            Demarcation of building envelop using diagonal and coordinate method; Locating vertical structural member; Detailing of sub Structure-Excavations and layouts; External and partition wall and scheduling of fenestration.            Building Location Plan, Centre line Plan, Column location plan, Excavation drawing, Foundation Layout, Plinth Beam Layout, Site Plan, Brick work of all floor plan, Roof plan with parapet and Mumty brick work, Stair room plan, Door Window Detail with schedule, Suspended floor and roof framing.</p>
3	<p><b>Building Sections and Elevations</b>            Sectional representation of different material in different building components; Wall Sections; Detailing of building façade; vertical circulation-planning and detailing.            Building Sections: Whole and part, Building elevations, External Finishing schedule, Staircase and ramp Details.</p>
4	<p><b>Building Services</b>            Building plumbing network – Water supply lines &amp; sewer lines, their gradation, drains &amp; traps, Details for rain water harvesting &amp; septic tanks. Building electrical network – Space allocation for various components (panels, vertical stacks, etc.) and provisions for their connections.            Plumbing Drawings: Site Level - Water supply, Sewer, Storm water Layouts and Invert Level schedules. Building Level - Kitchen and toilet Detail-Water supply, Sewer, Rain water; Roof Drain plan.            Electrical Drawings: Site Level – Electrical layout, Building Level - Reflected ceiling Plan, Power layout, Low voltage layout, lighting and circuit layout.</p>
5	<p><b>Building Component Detail</b>            Building internal finishing schedule – color schemes, flooring patterns, wall elevations, dado, fixtures &amp; fittings. Sectional details for various building components as per standard specification &amp; site conditions.            Toilet and kitchen wall elevations, Flooring detail, under floor treatment, Terracing detail, water proofing detail, Lintel Detail, Coping &amp; Parapet Detail etc.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Ralph W. Liebing, Mimi Ford, Raul; Architectural Working Drawings; Wiley	1990
2	Director General of Works; CPWD Specifications; CPWD Nirman Bhawan, Delhi	2014
3	M.G.Shah, CM Kale, S.Y. Paoul; Building Drawing; Tata McGraw Hills	2011
4	Director General of works; Delhi Schedule of Rates; CPWD, Delhi	2016
5	Barry R; Construction of Building; Affiliated East West Press Pvt. Ltd.	1999

**SETTLEMENT PLANNING****B.ARCH Semester: VII****Code:B7AR06-CP35**

UNIT	CONTENT
1	<p><b>Introduction and History of Human Settlement</b>            Definition and vocabulary of urban and regional planning. Definitions of town planning. Early human settlements — Causal factors and pattern of development.            Human settlements of River valleys civilization (e.g. Indus-valley civilization, Egyptian civilization, etc. Early Vedic civilization patterns, Canonical patterns as per various Indian contexts.            Human settlements during ancient Greek period, ancient Roman period, Medieval period (Western and Indian), Renaissance period, India during Islamic period, India during colonial period.            Effects of Industrial Revolution on planning of cities (history and present scenario). Ancient System of Town Planning In India -Extracts from Chanakya's Arthashastra, Manasara's Vastushastra, planning thought behind Fatehpur Sikri, Shahjahanabad, Jaipur and Delhi. Basic Skill Development exercise: Introduction to graphic representation reading of drawing.</p>
2	<p><b>Forms of Human Settlements</b>            Structure and form of Human settlements: Linear, non-linear and circular, Combinations. Reasons for development, advantages and disadvantages, case studies, factors influencing the growth and decay of human settlements. Documentation of case study/ Literature reference study of suitable scale for understanding of the urban context.</p>
3	<p><b>Planning Theories and Techniques:</b>            Planning concepts related to garden city, geddesian triad, neighbourhood planning, radburn layout, ekistics, satellite towns and ribbon development. Various theories of planning like landuse theory, exploratory theories, speculative theories etc. Principles of Planning, Zoning, zoning regulations, Site planning. Types of plans-development plans, action plans, structure plans. Planning process of Master plan/Development plan preparation and its components, Approaches to physical and social planning, stake holders in planning process. Planning laws, legislation and amendments i.e. ULCAR, LAA, 73rd and 74th constitutional amendments, etc. Special Economic Zones (SEZs), UDRPFI recommendations.            Levels of planning and steps for preparation of a town plan, survey techniques in planning, concepts, functions, components and preparation of a development plan. Defining characteristics of identified area. Planning project implementation techniques i.e. BOOT, BOT, BOLT, etc</p>
4	<p><b>Urban Planning and Urban Renewal</b>            Post-independence Planned cities in India i.e. Chandigarh, Gandhinagar, Vidhyadhar Nagar, etc. Globalization and its impact on cities, Urbanisation, emergence of new forms of developments, self-sustained communities, SEZ, transit oriented development, integrated townships, case studies. Urban Renewal: Meaning, Redevelopment, Rehabilitation and Conservation. Urban renewal schemes i.e. JNNURM, etc. Case study and literature review of planning concepts and norms for selected area.</p>
5	<p><b>Transport Planning</b>            Introduction to transport planning: Network characteristics, Analysis and interpretations Intersections, Hierarchy and their design of roads, survey methods i.e. Trip generation, trip distribution, Modal Split Origin Destination survey, etc. Traffic signs. Level of services. Transport modes, technology and selection Planning Studio: Selection of site, data collection, data analysis and presentation.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	C.A.Doxiadis, Ekistics; "An Introduction to the Science of Human Settlements"; Hutchinson, London.	1968
2	Arthur B. Gallion & Simon Eisner; "Urban Pattern"; D. Van Nostrand Co., New York	1963
3	Ministry of Urban Development; "Urban Development Plans: Formulation & Implementation Guidelines"	1996
4	A.K.Jain; "Urban Transport Planning and Management"; APH New Delhi	2009
5	Sandhu. R. S.; "Sustainable Human Settlements"; Asian Experience, Rawat publications.	2001

**ELECTIVE-III UNIVERSAL DESIGN****B.ARCH Semester: VII****Code: B7AR07-CP36**

UNIT	CONTENT
1	<p><b>Introduction:</b> Universal design and its significance, need and role in various design fields in current context for people with different abilities. Universal Design awareness and education at national and international level.</p> <p>Seven International principles: Equitable Use, Flexibility in Use, Simple &amp; Intuitive Use, Perceptible Information, Tolerance for Error, Low Physical Effort, and Size &amp; Space for Approach &amp; Use.</p> <p>Five Indian Principles of Universal Design: Equitable, Usable, Cultural, Economic and Aesthetic.</p>
2	<p><b>Understanding Disability:</b> Types of disabilities based on mental, physical, function, age and extreme physical proportions. Study of groups comprising of people with disabilities and the necessary design requirements with respect to aspects of anthropometrics i.e. visibility, access and usage.</p>
3	<p><b>Universal Design: Guidelines &amp; Legal Provisions:</b> United Nations Convention on the Rights of Persons with Disabilities; UNCPRD, 2008. Acts, Bills, Policies, and Building guidelines in India: Disability Act 1995, Rights of Persons with Disabilities Bill 2012, CPWD Guidelines for Barrier Free Built Environment for Disabled and Elderly and Standard Emergency Evacuation Guidelines for Disabled by National Building Code.</p>
4	<p><b>Universal Design:</b> Building Level: Design Standards for accessibility and usage in various building typologies both constructed as well as existing buildings: Residential, Institutional, Commercial, Hospitals &amp; Health facilities, Public Transit Buildings, Recreational Buildings and Hospitality Buildings. Design and Construction Strategies with respect to all kinds of disability at Building Interior: floor, walls, doors, windows, counters, railings, sanitary fixtures and signage. Building Exterior: pathways, parking, signage, levels and grooves, main entrance/exit and approach to plinth. Building Circulation: vertical and horizontal elements such as corridors, staircases, lifts, elevators, ramps.</p> <p>Materials and surface finishes available, their types and construction techniques.</p>
5	<p><b>Universal Design:</b> Urban Level; For Streets, Pathways, Pedestrian Crossings, Foot over Bridges, Curb Ramps, Parking, Public Toilets, Parks, Bus Stops, Street Furniture, Signage. Materials available and their types and construction techniques.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Preiser Wolfgang, Universal Design Handbook	2001
2	Adrian B. Robbins, Margaret A. Wylde, Building for a life time, The design for fully accessible homes	1994
3	Steven Winner, Accessible Home Design,	
4	Accessibility for the Disabled: A Design Manual for a Barrier Free Environment, UNCPRD	2008
5	CPWD, Guidelines and space standards for barrier free built environment for Disabled and Elderly Persons	1998

**ELECTIVE-III RESEARCH METHODOLOGY****B.ARCH Semester: VII****Code: B7AR07-CP36**

UNIT	CONTENT
1	<b>Research – Introduction &amp; Design:</b> Research meaning and its significance in Architecture, Relationship between Design & Research, Areas of Research in Architecture, Qualitative and Quantitative Paradigms, Characteristics of Scientific research, Levels of Research, Components of research design, Identification of area of research, Defining the problem, formulation of hypothesis, collection of data through different primary and secondary sources. Analyzing the data and inferring from the data, concepts of dependent and independent variables. Defining the scope and limitations of a Research plan, Significance of the research outcome.
2	<b>Research – Types &amp; Techniques:</b> Historical research, comparative Research, Qualitative Research, Co-relational research, Experimental Research, Normative Research, Case study Research, Simulation & Modeling Research Pilot studies, Educational Research. Descriptive technique, pictorial technique, analytical technique, statistical technique semantic technique etc.
3	<b>Research Tools:</b> Interview techniques – Questionnaires, face to face interviews, internet survey, Designing a questionnaire, interview schedule. Visual Techniques – Observation (Participant / non-participant), Activity mapping, accretion & erosion trace observation, cognitive maps etc. Sampling techniques such as systematic, stratified, random etc.
4	<b>Research Analysis</b> Understanding the relative advantage, disadvantages and application of various methods and choosing a method appropriate for a research to achieve its objectives, understanding the nature of data collected and methods of analysis suitable for that data i.e. graphical, numerical, descriptive. Introduction to the simple statistical methods of analyzing numerical data – frequencies / percentages, mean, median, mode, correlation, chi square test etc.
5	<b>Research writing</b> Different sections of a Research report, Technical writing and language. Abstract, synopsis, Executive summary. Writing Bibliography & References.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Groat L, Wang D.; Architectural Research Methods; John Wiley & Sons, Inc.	2002
2	Kaplan A.; The Conduct of Inquiry; Chandler, San Francisco	1964
3	Zumthor P.; Thinking Architecture; Birkhauser, Basel, Switzerland	2010
4	Shinde S.P. (Dr.); Methodology of Research and issues in Education; Surabhi Educational Society, Hyderabad	2008
5	Creswell J.W.; “Research Design : Qualitative & Quantitative Approaches”; Thousand Oaks : Sage	1994

**ELECTIVE-III ARCHITECTURAL JOURNALISM****B.ARCH Semester: VII****Code: B7AR07-CP36**

UNIT	CONTENT
1	Introduction: Architectural Journalism as a career and as an occupation of documenting, reporting, validating, writing, editing, photographing and forming opinion and criticism of a project or an architect's work. Role of Architectural Journalism in promoting architectural design theory and developing critical thinking.
2	Architectural Journalism: Emergence & Evolution Global as well as Indian scenario. Emergence of Printed material such as Architectural Magazines and Journals such as Domus, Mimar, Indian Architect & Builder and Research Papers, Monographs, Biographies, Conference Proceedings, Articles and Coverage in national newspapers, as well as online Media.
3	Tools of Architectural Journalism: Resource finding, Writing content and verifying it through various sources like books, articles, papers, surveys, videos. Use of graphics like sketches, drawings, graphs, pie charts and photographs etc.
4	Critical Discourse: appreciating or criticizing through project Documentations, Essays and Critical Writings with respect to architecture by Ada Louise Huxtable, Paul Goldberger, Robert Campbell, Reyner Banham, Peter Blundell Jones, Robert A. M. Stern, Lewis Mumford, Kenneth Frampton, Gautam Bhatia, Kaiwan Mehta, Rahul Mehrotra etc.
5	Design & Writing: The student will use tools specific to architecture and construction to access, manage, integrate, and create information. The student is expected to create info-graphics, articles which document a project and critically analyze the pros and cons of one's work.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Kenneth Frampton; World Architecture 1900-2000: A Critical Mosaic; Vol.8 South Asia, China Architecture & Building Press	2000
2	Rahul Mehrotra; Architecture in India since 1990; Pictor	2011
3	Stern Robert A.M.; Architecture on the edge of Postmodernism, Collected Essays 1964-1988; Yale University Press, New Haven & London	2009
4	Mohammad Al-Asad with Majid Musa; "Architectural Criticism & Journalism : Global Perspectives"; Umberto Allemandi & Co.	2005
5	Groat L, Wang D.; Architectural Research Methods; John Wiley & Sons, Inc.	2002



**PROFESSIONAL PRACTICE & MGMT.**  
**Code: B9AR01-CT22**
**B.ARCH Semester: IX**

UNIT	CONTENT
1	<b>Architect's Office &amp; Its administration:</b> Nature of profession, difference between trade, business and profession, Office setup and administration. Office organization, proprietorship, partnership, company etc.; Registration as Firm / Company etc.
2	<b>Architectural Professional Association &amp; Architect Act 1972:</b> Practice Procedure and conduct, Introduction to the importance of professional organisations like IIA, COA & their Membership & their role in future developments. Architectural Competition – Types, procedures, as per guidelines of the Council of Architecture
3	<b>Architectural Services:</b> Conditions of agreement – scope of work, comprehensive architectural services and conditions of engagement, remuneration, professional fees and charges as per norms. Responsibilities and Liabilities of an architect towards the client. Professional charges of various jobs. Stages of Architectural design and the specific task in each of such stage
4	<b>Project Management:</b> Role of an architect in construction management, Scientific methods of construction management, Objectives and functions of project management, stages of project management (planning, scheduling and organizing). Introduction of PERT (Project Evaluation & Review Technique), Fundamentals of CPM (Critical Path Method) activity, event, float, network construction, time computation, project completion period, resource allocation. Relationship of work, Time & Cost, Cost Analysis in network planning, construction site practices, Inspection and Quality Control.
5	<b>Business Management &amp; Ethics:</b> Architect's role in society & Human Values. Use of Ethical theories – Kohlberg's theory, Gilligan theory Consensus and controversy, Environment ethics. Business management, sales promotion, human relations and personnel management. Efficiency studies and performance appraisal, billing, accounting, correspondence, information storage and retrieval. Manpower management, safety and labor laws.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	V.S.Apte ; Architectural Practice & Procedure	2008
2	Roshan Namavati; Professional Practice	2008
3	Council of Architecture; Handbook of Professional Documents	
4	Dr. P.N.Modi, Sanjeev Modi; PERT and CPM	2009
5	Dr. B.C.Punmia; Project planning and control with PERT and CPM; Laxmi Publications, New Delhi	

**SUSTAINABLE ARCHITECTURE**  
**Code: B9AR02-CT23**
**B.ARCH Semester: IX**

UNIT	CONTENT
1	<b>Introduction:</b> Introduction to Sustainability and its various dimensions (economic, social and ecological); Sustainable development of built environment; Global Warming and Climate Change; Concepts in sustainable architecture; sustainable buildings, green buildings, climate responsive buildings, ecological responsive buildings, Energy efficient buildings; Energy policy of India and world.
2	<b>Strategies and Technologies:</b> Solar Passive Design; Recycling/Reuse strategies, optimization techniques, advances in HVAC, Electrical, Lighting and Plumbing technologies; integration of Active energy efficient systems with buildings – PV cells, wind towers, geothermal heat pump, bio-mass energy etc. Study of non conventional energy sources.
3	<b>Rating systems:</b> Benchmark: Study of rating systems across globe in general introduction – BREEAM, CASBEE, LEED, detail study of IGBC, GRIHA. Study of energy conservation building codes. Study of LEED/GRIHA rated buildings
4	<b>Materials and Technology:</b> Emphasis on traditional building systems, methodologies and on the use of alternate/substitute and environment friendly materials, to make the students aware of local and / or low cost building materials which are cost effective, environment friendly and appropriate to the context of the site, climate and culture.
5	<b>Energy Assessment:</b> Energy calculations through whole building performance method. General introduction about Building information modeling, Introduction to concept and basic software. REVIT at advance level, ArchiCAD, energy plus, green building studio, IEs.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Sustainable Building Design Manual; Tata Energy Research Institute	2012
2	Green Building Materials; Ross Spiengle & Dru Meadows	2004
3	Understanding Green Building Guidelines; Traci Rose Rider	2009
4	Milli Majumdar; Energy Efficient Buildings in India; TERI	2001
5	Francis D.K.Ching; Green Building Illustrated; John Wille & Sons.	2014

**DISASTER RESISTANT ARCHITECTURE**  
**Code: B9AR03-CT24**
**B.ARCH Semester: IX**

UNIT	CONTENT
1	<b>Introduction to Disasters</b> Hazard, Risk, Disaster, Vulnerability, Classification of disaster, Man Made & Natural Disasters, High, Medium & Low Impact. Disasters and Factor Causing Disasters, Earthquakes, Tsunami, Landslides, Cyclone, Floods, Fire etc.
2	<b>Impact of Disasters</b> Effects of natural and Man-made Disaster, Behaviour of structural and nonstructural members during and after disaster, Standards and Norms for risk reduction for various disasters i.e. Earthquakes, Tsunami, Landslides, Cyclone, Floods & Fire.
3	<b>Pre-Disaster and Mitigation Measures in Disasters</b> Disaster Management Plan, Natural Crisis Management Committee, NDMA (national disaster management authority) Management Guideline, Emergency Support Function, Role of Building information systems in Disaster Management.
4	<b>Design &amp; Planning Solution</b> Design Guideline and Construction Techniques for disaster resistant structure in RCC, Steel, Stone, Brick & wood; Engineering, Architectural, Landscape and site planning solutions for various disasters, Details for foundation, soil stabilization, retaining wall, plinth, plinth fill, flooring, walls, opening, fenestration and other building components. Study of non engineered Building practices.
5	<b>Case Studies- Disasters in India</b> Damaged Caused, Disaster management, Mitigation, post disaster structural up gradation in Earthquakes, cyclones, landslides, floods, droughts and tsunami in India.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Sharma V.K.; Disaster Management; Indian Institute of Public Administration, United Press, New Delhi	1995
2	Dutta Shekhar Chandra, Mukhopadhyay Parthasarathi ; Improving Earthquake And Cyclone Resistant Structures ; The Energy Resource Institute, New Delhi	2012
3	Tarnath B.S. ; Wind and Earthquake Resistant Buildings Structural Analysis and Design; Marcel Dekkar	2005
4	National Disaster Management Authority; National Disaster Management Guidelines; National Disaster Management Authority Government of India	2009
5	IAEE; Guidelines for Earthquake Resistant non-engineered construction; NPEEE 2004.	2005

**ARCHITECTURAL DESIGN-VII**  
**Code: B9AR04-CP38**
**B.ARCH Semester: IX**

UNIT	CONTENT
1	Theme: Understanding design to integrate complexities of urban dimensions, Architectural language & expression.
2	Parameters: Urban Networks such as Urban greens, Pedestrian connections, Traffic & Transportation, Local and regional architectural language & expression. Socio- Economic, Cultural and Physical context. Congregation of large number of diverse and unknown people.
3	Expected Skills: To develop ability and skill to design building as a urban insert by understanding the influence of the building on and of the immediate & distant surrounding. Handle circulation of large member of people and various modes of Transport.
4	Design Outline: Design of a multi-functional complex programmatic building as an insert at a settlement level ideally on a building site required for a built up area of 5000 – 7500 sqm., Course to be integrated with concurrent courses such as Housing, Urban Design, Conservation, Sustainable Architecture & Disaster Resistance Architecture.
5	Projects: At least one sufficiently large project to be given in a semester from the list of suggested projects in various categories of building types. Housing: Mix Group Housing, Townships, etc. Educational: Large scale educational campus, University, etc. Commercial: District Centre, Technology Parks, etc. Transportation: Bus Terminal, Railway Station, Metro Rail Station, Airport Terminal. Recreation: Multipurpose Indoor / Outdoor Sports complex. Hospitality: Hotel with convention / Exposition facilities, etc.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	T.S.S. for Urban Design; Mc Graw Hill	2003
2	Darek Thomas; Architecture and the Urban Environment; Architectural Press	2002
3	The Phaidon Atlas of 21st Century; World Architecture; Phaidon Publication	2008
4	The 20th Century World Architecture; Phaidon	2012
5	Kevin Lynch; Site planning 3rd Edition	2012

**DISSERTATION & THESIS SEMINAR**  
**Code: B9AR05-CP39**
**B.ARCH Semester: IX**

UNIT	CONTENT
1	<p>Research Formulation: The students of the final year are required to undertake research on a topic related to the field of spatial planning on issues emerging out of the present trends and future prospects of the Thesis Project selected.</p> <p>The Thesis Project should be sufficiently large and complex so that student can demonstrate the Skills and Knowledge acquired during the course.</p> <p>The site selected for the Thesis project should be large enough for a built up area more than 7500 Sqm. The project program can be hypothetical however the site selected should be real. Students may select live projects that have real program and objective.</p>
2	<p>Research Design: Once the problem is formulated the student has to undertake extensive literature survey and state in clear terms the working hypothesis.</p> <p>Students are required to state the conceptual structure within which research would be conducted by defining the aim, objectives, scope &amp; limitations of work.</p>
3	<p>Research Data: Data shall be collected keeping in mind the cost, time and other resources. Primary data can be collected either through experiment, through survey or by observation such as personal interviews, telephonic interview, mailing of questionnaire or through schedules. Secondary data such as census data, literature studies, unpublished or published thesis or dissertation can be collected.</p>
4	<p>Research Analysis &amp; Report: The analysis of data requires a number of closely related operations such as establishment of categories. The application of these categories to see data through coding, tabulation and then drawing statistical inference. Draw conclusions and identify architectural issues involved in the project design and construction. Define strategy to address these issues in the design proposal.</p> <p>Prepare a report of what has been done. The layout of the report should be as follows: the preliminary pages, the main text and end matter. The preliminary pages carry title, declaration, certificate, acknowledgement, list of illustration &amp; tables. The main text of the report should have introduction, review of literature &amp; methodology. The end matter will include glossary and annexure.</p>
5	<p>Thesis Seminar: Criteria of selection of the site for the thesis project and justification for how the proposed site will support the conceptual idea for the project. Bylaws, zoning regulators &amp; standards applicable to the project.</p> <p>Analytical studies of building prototypes as a whole or in part comparable to the selected project. Formulation of programme of requirements. Conceptual Site analysis and zoning of activities on site.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Groat L, Wang D.; Architectural Research Methods; John Wiley & Sons, Inc.	2002
2	Kaplan A.; The Conduct of Inquiry; Chandler, San Francisco	1964
3	Zumthor P.; Thinking Architecture; Birkhauser, Basel, Switzerland	2010
4	Shinde S.P. (Dr.); Methodology of Research and issues in Education; Surabhi Educational Society, Hyderabad	2008
5	Creswell J.W.; "Research Design : Qualitative & Quantitative Approaches"; Thousand Oaks : Sage	1994

**TRAINING PRESENTATION**
**B.ARCH Semester: IX**

**Code: B9AR06-CP40**

UNIT	CONTENT
1	Office Administration: Understanding the basic working system of an Architect's office. Duties & Responsibilities of an Architect. Hierarchy of office staff in various types of Architectural practices. Log-Book with recordings of daily activities of the trainee involved in the office. Preparation of project / presentation reports, Bill of quantities and minutes of meetings with clients / consultants / contractors for the ongoing projects undertaken by the office.
2	Presentation & Submission Drawings: At least one set of presentation drawings of a project prepared for the approval of the client and one set of sanction drawings of a project prepared for approval of the Local authority by the student in Architect's office.
3	Site Visits and Studies: Visits to construction sites of the on-going projects in the Architect's office for the purpose of checking the accuracy of work or to record progress of work on site and related studies undertaken as per the directions of the supervising architect.
4	Critical Appraisal: Critical appraisal of a completed building project designed by the Architect / Firm or on-going project on which the student has worked in the office. The appraisal may be done on the design issues such as functional efficiency, visual appeal, climatic response, Green rating, etc. either one of the parameter or combination there off.
5	Working drawings & details: Preparation of good for construction building drawings such as plans, sections, elevation etc., space details such as stair case, toilets, lifts, etc., fixing details such as wall cladding, balcony railing, structural glazing, etc., construction details such as plinth, sill, lintel, parapet, etc., and Fabrication details such as door, windows, grills, etc. under the guidance of supervising architect.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Osamu A. Wakita, Nagy R. Bakhoun, Richard Mlinde; The Professional Practice of Architectural Working Drawings 4th Edition; John Wiley & Sons	2012
2	Dr. Roshan H. Namavati; Professional Practice 9th Edition; Lakhani Book Depot 2009	2009
3	CPWD; CPWD Specifications Vol. 1 & 2; CPWD	

**ELECTIVE-IV- HOUSING**  
**Code: B9AR07-CP41**
**B.ARCH Semester: IX**

UNIT	CONTENT
1	<b>Introduction:</b> Introduction to House, Home, Household, Apartments, Condominium, Multistoried Buildings, Special Buildings. Neighborhoods- Plotted land development programs, Open Development Plots, Apartments, Gated communities, Townships, Rental Housing, Co-operative Housing.
2	<b>Housing Policies &amp; Programs:</b> National Housing Policies including Housing for all, housing for Urban poor, Housing institutions at National, State and Local levels. Sites and Services. Slum Housing Program – Slum improvement – Slum redevelopment and Relocation.
3	<b>Housing Planning and Design:</b> Criteria for site selection : Design principles, norms and standards for infrastructure, land subdivision, housing layout and buildings: Built form, socio-economic and physical implications of various types of housing Building Byelaws, Rules and Development Control Regulations – Site Analysis, Layout Design, Design of Housing Units (Design Problems) – Housing Project Formulation; Concept , criteria and determinants of affordable, low income and informal housing; Design, planning and strategy issues for affordable housing; characteristics and type of low income and informal housing.
4	<b>Construction Materials &amp; Technologies:</b> Energy efficient, Cost effective Materials and construction technology; innovative and emerging new materials; Prefabricated housing; Materials and techniques for rural housing.
5	<b>Housing Finance:</b> Housing Finance at various levels, NHB, HDFC, Subsidy and Cross Subsidy- Various models of Public Private Partnership Projects – Viability Gap Funding – Pricing of Housing Units (Problems).

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Charles Corea / Housing and Urbanization / Urban Research Insitute	1999
2	Appropriate Roofing Material for Low Cost Housing / NBO	1985
3	A.K.Jain / Building System for Low Cost Housing / Management Publishing Co.	1992
4	Sorgi Costa / High Density Housing in Architecture / Duran Loft Publication	2009
5	John F.C. Turner / Housing by people / Marison Boyars, London	1976

**ELECTIVE-IV- URBAN DESIGN****B.ARCH Semester: IX****Code: B9AR07-CP41**

UNIT	CONTENT
1	<b>Introduction</b> Introduction to Urban Design, its principles and techniques; History of Urban Design; Inter-relationship between Architecture, Urban Design and Urban Planning in terms of scale, time and scope; Introduction to urban legislation and policies.
2	<b>Terminologies and Theories</b> Urban Design Vocabulary; Elements of Urban Design; Theories introduced by various urbanists - Kevin Lynch, Jane Jacobs, Gordon Cullen, Aldo Rossi; Concept of Urban Redevelopment, Renewal and Regeneration
3	<b>Methods and Techniques</b> Importance of context in Urban Design-Context analysis, Regional study and Project understanding; Impact of factors such as economy, politics, religion and region on urban design; Mapping and analytical tool- Figure-ground mapping, Activity mapping and Cognitive mapping.
4	<b>Urban Issues and Theories of New Urbanism</b> Urban sprawl , Gentrification, Social exclusion in terms of age, gender, class caste etc.; Concepts of New Urbanism – Sustainable Urbanism, Inclusive City, Neighbourhood Planning, Futuristic City, Walkable Neighbourhood, Smart city etc.
5	<b>Urban Design Responses</b> Study of urban projects by eminent urban designers; Urban design exercise.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Lynch K. /Image of the city/ The MIT Press	1960
2	Jacob J./Death and Life of Great American Cities/ Random House, New York	1961
3	Rossi A./Architecture of the city/ The MIT Press	1966
4	Cullen G./The Concise Townscape/Architectural Press	1961
5	Moughtin C./ Urban Design- Method and Techniques/ Architectural Press	1999



**ELECTIVE-IV- URBAN CONSERVATION**  
**Code: B9AR07-CP41**
**B.ARCH Semester: IX**

UNIT	CONTENT
1	<b>Urban Conservation understanding</b> Definition, types, need; principles, ethics & value; tangible & intangible components, Degree of Intervention; Concepts & prevailing practices in conservation, restoration, retrofitting, rehabilitation, consolidation, protection, adaptive reuse.
2	<b>Philosophies of Urban Conservation</b> Preservation & conservation philosophies; Pioneers & societies in field of conservation; International Charters; International approaches from UNESCO, ICCROM, GETTY foundation, etc.; National approaches: A.S.I., State Archeology, INTACH, Urban Art Commission, Heritage Commissions, local bodies, etc.; Techno legal provisions, codes & byelaws for interventions.
3	<b>Assessment &amp; analysing</b> Understanding of original building conditions; Documentation and assessment of current conditions-Physical, contextual, political, social, cultural, economic, ecological; non-destructive survey methods, environmental monitoring, simple & sophisticated analytical methods; Types & causes of damages; Damage-building components & structural systems - superstructure & substructure
4	<b>Preservation &amp; Prevention</b> Preservation strategies in Urban Conservation: Analysis of problem; types, degree & limitations for intervention; Levels of intervention- Structure, building complex, precinct; Heritage zones; Conservation strategies- documentation, analysis, techniques, interventions & outcomes; models of preservation, reconstruction & adaptive reuse; Influences & benefits of urban conservation; Sequence & phasing; Materials & methods; Detailing & finishing; Preventive maintenance of historical buildings
5	<b>Adaptation and Application</b> <b>Case Studies in Urban Conservation:</b> Examples of iconic urban conservation projects like Jaipur walled city bazaars, Sambhar Conservation initiative, Gambhiri riverfront etc; <b>Conservation strategies</b> for heritage areas along with revitalisation techniques – projects undertaken as group work will have to ultimately contribute ideas for the improvement of the quality of the urban environment.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Philip Jodido; The Aga Khan Historic Cities Programme – Strategies for Urban Regeneration; Prestel	2011
2	Dr. Alok Tripathi; The Ancient Monuments and Archaeological sites and Remains Act, 1958; Sundeep Prakashan Delhi	2007
3	Rama P. B. Singh; Heritagescapes & cultural landscapes; Shubhi Publication Gurgaon	2010
4	Sachindra Sekhar Biswas; Protecting the Cultural Heritage – National Legislations and International Conventions; Aryan Book International	1999
5	Gautam Sen Gupta, Kaushik G.; Archaeology in India Individuals, ideas & institutions; M M Publishers Pvt. Ltd.	2007

**THESIS PROJECT**  
**Code: B10AR01-CP43**
**B.ARCH Semester: X**

UNIT	CONTENT
1	<p><b>Analysis and Concept:</b> In this stage students shall analyze their site to arrive at a zoning of Activities on site.</p> <p>Student is required to Analyze the characteristic features and context of the site including Climatic analysis at both micro and macro level. Drawings, sketches, and physical models necessary to explain circulation, Organization of spaces and form composition shown in Preliminary drawings and study models.</p>
2	<p><b>Philosophies of Urban Conservation</b>            Preservation &amp; conservation philosophies; Pioneers &amp; societies in field of conservation; International Charters; International approaches from UNESCO, ICCROM, GETTY foundation, etc.; National approaches: A.S.I., State Archeology, INTACH, Urban Art Commission, Heritage Commissions, local bodies, etc.; Techno legal provisions, codes &amp; bye-laws for interventions.</p>
3	<p><b>Assessment &amp; analyzing</b>            Understanding of original building conditions; Documentation and assessment of current conditions-Physical, contextual, political, social, cultural, economic, ecological; non-destructive survey methods, environmental monitoring, simple &amp; sophisticated analytical methods; Types&amp; causes of damages; Damagebuilding components &amp; structural systems - superstructure &amp; substructure</p>
4	<p><b>Preservation &amp; Prevention</b>            Preservation strategies in Urban Conservation: Analysis of problem; types, degree &amp; limitations for intervention; Levels of intervention- Structure, building complex, precinct; Heritage zones; Conservation strategies- documentation, analysis, techniques, interventions &amp; outcomes; models of preservation, reconstruction &amp; adaptive reuse; Influences &amp; benefits of urban conservation; Sequence &amp; phasing; Materials &amp; methods; Detailing &amp; finishing; Preventive maintenance of historical buildings</p>
5	<p><b>Adaptation and Application</b>  <b>Case Studies in Urban Conservation:</b> Examples of iconic urban conservation projects like Jaipur walled city bazaars, Sambhar Conservation initiative, Gambhiri riverfront etc;  <b>Conservation strategies</b> for heritage areas along with revitalization techniques – projects undertaken as group work will have to ultimately contribute ideas for the improvement of the quality of the urban environment.</p>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	BIS; National Building Code of India, SP7:2016; BIS	2016
2	NIASA; Archiving Architectural Thesis; Council of Architecture	
3	Naresh Shah with Pramod Anaokar; An Introduction to Predesign; Council of Architecture	2015
4	The Phaidon Atlas of 21st Century World Architecture; Phaidon	2008
5	T.S.S. for Building Types; Mc Graw Hill	2001

**ELECTIVE-V : Design Elective Related to Thesis\_ INTERIOR DESIGN****B.ARCH Semester: X****Code: B10AR02-CP44**

UNIT	CONTENT
1	<b>Identification:</b> Identify most important interior space / group of spaces from Thesis Project having carpet area greater than 1000 Sqm. Find type, size, organization and activity in space. Define scope of work and methodology
2	<b>Data Collection:</b> Find out various theories and concept for designing space / area selected. Find out role of interior elements, their function and aesthetically criteria. Study of similar cases, conduct physical surveys, stakeholders' interviews, study standards and bye laws applicable.
3	<b>Concept &amp; Analysis:</b> Analysis of thermal, visual, auditory and sanitary conditions necessary for comfort and convenience of occupants through case studies. Drawings showing conceptual layout of the interior space with all elements of interior design and their effect on the perception of the space.
4	<b>Design Synthesis:</b> Coordination of proposed interior space layout with heating and air conditioning system, water supply, sanitary drainage, electrical layout, lighting system, acoustics and structural system.
5	<b>Design Presentation:</b> Final set of drawings showing significance of space selected and Interior design concept. Sectional elevations showing walls, wall elevations and other elements of interior design in section. Furniture details in plan and section to an appropriate scale. Recommended material color and finishes for furniture and all surfaces. Flooring and inverted ceiling plan showing coordination with other systems.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	T.S.S. for Interior Design and Space Planning; McGraw Hill	2001
2	Elizabeth Wilhide; The Interior Design Directory; Quadrille	2009
3	Drew Plunkett; Drawing for Interior Design; Laurence King Publishing	2009
4	Maureen Mitton; Interior Design Visual Presentation; John Willey & Sons	1999
5	Henry Wilson; India-Contemporary; Thames & Hudson	2007

**ELECTIVE-V : Design Elective Related to Thesis\_LANDSCAPE DESIGN****B.ARCH Semester: X****Code: B10AR03-CP44**

UNIT	CONTENT
1	<b>Identification:</b> Identify outdoor activity spaces for design requiring landscape and site planning intervention in area not less than 1 hectare or the entire site area whichever is lesser. Find out type, size, organization and activity in space. Define scope of work & methodology.
2	<b>Data Collection:</b> Study theories and concepts of the space, area selected. Study topography, geology & soil, hydrology at site level. Study climate, existing vegetation, views & context of site. Study of similar cases for the issues selected for landscape intervention. Effect of standards and bye laws.
3	<b>Concept &amp; Analysis:</b> Analysis of identified issues and challenges by comparing various cases. Drawing showing conceptual layout with landscape elements such as land form, plant material, water, pavement, site structures & buildings with their significance & characteristics.
4	<b>Design Synthesis:</b> Coordination of various services such as water supply, water collection, sewage, electrical, lighting with the landscape proposal.
5	<b>Design Presentation:</b> Final set of drawings showing Research & Analysis. Design & Construction drawings such as comprehensive landscape development plan, Grading plan, planting plan, material plan, Drawing & irrigation system layout plan & outdoor lighting system layout plan

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	T.S.S. for Landscape Architecture; McGraw Hills	1998
2	Sabrina Wilk; Construction and Design Manual Drawing for Landscape Architects; DOM Publishers	2014
3	Mohd. Shaheen et.al.; Landscape Architecture in India; LA, Journal of Landscape Architecture	2013
4	Leonard J. Hopper; Landscape Architectural Graphic Standards; John Wiley & Sons	2007
5	Grant W. Reid; Landscape Graphics; Whitney Library of Design	1987

**ELECTIVE-V : Design Elective Related to Thesis\_URBAN DESIGN****B.ARCH Semester: X****Code: B10AR03-CP44**

UNIT	CONTENT
1	<b>Identification:</b> Identify the area for urban design intervention either a linear stretch approx. 1 Km. in length or area approx. 10 Hectare or a campus whichever is applicable to the thesis project. Find out scope of work and methodology
2	<b>Data Collection:</b> Study of context of the site location, accessibility, networks, surrounding land use, surrounding activities, views & vistas to and from site. Study of human responses by conducting interviews, survey, cognitive mapping etc. standards & byelaws.
3	<b>Concept &amp; Analysis:</b> Find out various theories & concepts, study of similar cases of urban design intervention. Analysis of contextual issues.
4	<b>Design Synthesis:</b> Study of Green & Communication networks, built fabric and architectural language. Determine issues thereof and suggest strategies or remedial measures.
5	<b>Design Responses:</b> Drawing showing site context, urban form, urban character, urban networks, urban activities, built fabric, architectural language and its constituents and propose urban design measures & interventions.
	<b>TOTAL</b>

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	T.S.S. for Urban Design; McGraw Hill	2003
2	Cliff Moughtin; Urban Design Green Dimensions; Architectural Press	1996
3	Francesca Z. Mola; The Sourcebook of Contemporary Urban Design; Harper Design	2012
4	Cliff Moughtin; Urban Design Streets & Squares; Routledge	2016
5	Gordon Cullen; The Concise Townscape; Architectural Press	1977

**ELECTIVE-V : Design Elective Related to Thesis\_PLUMBING DESIGN****B.ARCH Semester: X****Code: B10AR03-CP45**

UNIT	CONTENT
1	<b>Identification:</b> Identify plumbing services for different spaces and activities. Identify sources of supply & quality of water in an area selected for project. Find out existing physical infrastructure.
2	<b>Design Calculation:</b> Identify water demand & quality for various spaces & uses. Find out water required for Fire-fighting system for type of building by studying standards & codes.
3	<b>Concept &amp; Analysis:</b> Conceptual layout showing water supply system to and from OHT / UGT to individual spaces. Conceptual layout of drainage and disposal system conceptual layout of fire fighting system.
4	<b>Design Synthesis:</b> Plumbing services design in coordination of various services such as water supply, sewage, electrical, lighting, heating & cooling along with landscape planting plan.
5	<b>Design Presentation:</b> Final drawing showing distribution of water from OHT / UGT to individual spaces along with specifications. Drawing showing storage of water, water tanks then type, numbers location & capacity. Drawings showing water harvesting / recycling system as per need of individual project. Drawing showing water supply systems, pressure system. Drawings showing drainage system from single toilet, vertical and horizontal drainage line system with their number, location, size, slopes, interval etc. Drawings showing disposal system to municipal drain, or septic tank or soak pit, their details

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann	2011
2	S.J. Arceivala, "Waste Water Treatment for Pollution Control", Tata McGraw Hills Publication.	2008
3	K.N. Duggal,"Elements of Environmental Engineering", Chand & Co.	2010
4	"Uniform Illustrated Plumbing Code – India (UIPC-I)", Indian Plumbing Association	2014
5	Charanjeet S. Shah; Water Supply and Sanitation; Galgotia Publication	2015

**ELECTIVE-V : Design Elective Related to Thesis \_ELECTRICAL DESIGN****B.ARCH Semester: X****Code: B10AR03-CP45**

UNIT	CONTENT
1	<b>Identification:</b> Identify electrical services for outdoor and indoor spaces. Identify the type of building & electrical supply sources & components and mandatory provisions.
2	<b>Design Calculation:</b> Evaluate power requirements for all services like lighting, HVAC, Fire, Lifts, Escalators and other building equipments.
3	<b>Concept &amp; Analysis:</b> Identify Electrical system requirement on the basis of load calculations by studying similar cases. Study of National Electrical Code and ECBC. Identification and provision of alternative energy sources for specific requirement. Determine requirement of lighting as per National lighting code for various activities. Drawings showing light zoning diagrams, single line diagram showing distribution system and its components at site and building level.
4	<b>Design Synthesis:</b> Electrical services design in coordination with various services such as water supply, sewage, lighting, heating & cooling along with landscape planting plan.
5	<b>Design Presentation:</b> Drawing showing electrical layout – Power and LV layouts, Wall electrical layouts, Electrical reflected ceiling layout, IBMS provisions. Drawing showing light fixtures, layout & connections in plan and section with specifications such as Type and Number of lamp / luminaries, their lux level and lighting system.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	S.L. Uppal- G.C. Garg; Electrical Wiring Estimation and Costing; Khanna Publication	2010
2	Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann	2011
3	Raina K.B. & Bhattacharya S.K.; Electrical Design, Estimation and Costing; New Age International Publishers, New Delhi	2007
4	Steve Doty & Wayne C. Turner; Energy Management Handbook; The Fourmount Press, USA	2009
5	B. Mazumdaar; Textbook of Energy Technology; APH Publishing Corporation	2005

**ELECTIVE-V : Design Elective Related to Thesis\_MECHANICAL DESIGN****B.ARCH Semester: X****Code: B10AR03-CP45**

UNIT	CONTENT
1	<b>Identification:</b> Identify Mechanical Services for different spaces and activities. Find out area of conditioned spaces and non conditioned spaces.
2	<b>Design Calculation:</b> Identify system requirements for various mechanical services (HVAC, Fire, Vertical Circulation) and evaluate the requirement through heat load calculation, waiting time calculation etc.
3	<b>Concept &amp; Analysis:</b> Identify mechanical system through analysis of similar cases and manuals such as ECBC, NBC and ASHRAE.
4	<b>Design Synthesis:</b> Preparing Mechanical System Design in Coordination with interior furniture, water supply, sewage, electrical, lighting & sound reinforcement system.
5	<b>Design Presentation:</b> Drawing showing concept of minimizing various loads. Design showing HVAC, Fire, Vertical Circulation showing all its components, their capacity, number, location, size, etc in plans & sections with specifications at site & building level.

**REFERENCE BOOKS**

S.NO	NAME OF AUTHORS / BOOKS/ PUBLISHER	YEAR OF PUBLICATION
1	John W. Mitchell, James E. Braun; Heating, Ventilation, and Air Conditioning in Buildings ; John Wiley & Sons Inc.	2012
2	Norbert Lencher; Heating Cooling Lighting; John Wiley & sons, London	2014
3	M.Y.H. Bangash, T. Bangash; Lifts, Elevators, Escalators and Moving Walkways; Travelators/Taylor & Francis/Balkema	2007
4	Fred Hall & Rager Greeno; Building Services Handbook; Butterworth-Heinmann	2011
5	William H. Severns and Julian R. Fellows; Air conditioning and Refrigeration; John Wiley & sons, London	1987