

ANNA UNIVERSITY, CHENNAI

AFFILIATED INSTITUTIONS

R - 2013

B.ARCH. DEGREE PROGRAMME

I TO X SEMESTERS CURRICULUM AND SYLLABUS

SEMESTER I

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
THEORY						
1.	MA6153	Mathematics	3	0	0	3
2.	AR6101	History of Architecture and Culture - I	3	0	0	3
3.	AR6102	Theory of Architecture - I	3	0	0	3
4.	AR6103	Building Materials - I	3	0	0	3
STUDIO						
5.	AR6111	Architectural Drawing - I	0	0	5	3
6.	AR6112	Art Studio	0	0	5	3
7.	AR6113	Basic Design	0	0	12	6
TOTAL			12	0	22	24

SEMESTER II

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
THEORY						
1.	AR6201	Mechanics of Structures – I	3	0	0	3
2.	AR6202	History of Architecture and Culture - II	3	0	0	3
3.	AR6203	Theory of Architecture - II	3	0	0	3
4.	AR6204	Building Materials - II	3	0	0	3
STUDIO						
5.	AR6211	Building Construction - I	0	0	5	3
6.	AR6212	Architectural Drawing - II	0	0	5	3
7.	AR6213	Architectural Design – I	0	0	12	6
TOTAL			12	0	22	24

SEMESTER III

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
THEORY						
1.	AR6301	Mechanics of Structures - II	3	0	0	3
2.	AR6302	History of Architecture and Culture - III	3	0	0	3
3.	AR6303	Climate and Built Environment	3	0	0	3
4.	AR6304	Building Materials - III	3	0	0	3
STUDIO						
5.	AR6311	Computer Aided Visualisation	0	0	6	3
6.	AR6312	Building Construction - II	0	0	5	3
7.	AR6313	Architectural Design - II	0	0	14	7
TOTAL			12	0	25	25

SEMESTER IV

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
THEORY						
1.	AR6401	Design of Structures - I	3	0	0	3
2.	AR6402	History of Architecture and Culture - IV	3	0	0	3
3.	AR6403	Environmental Science	3	0	0	3
4.	AR6404	Building Materials - IV	3	0	0	3
THEORY CUM STUDIO						
5.	AR6411	Building Services - I	2	0	2	3
STUDIO						
6.	AR6412	Building Construction - III	0	0	5	3
7.	AR6413	Architectural Design - III	0	0	14	7
TOTAL			14	0	21	25

SEMESTER V

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
THEORY						
1.	AR6501	Design of Structures - II	3	0	0	3
2.	AR6502	History of Architecture and Culture - V	3	0	0	3
3.		Elective - I	3	0	0	3
THEORY CUM STUDIO						
4.	AR6511	Building Services - II	2	0	2	3
5.	AR6512	Site Analysis and Planning	2	0	2	3
STUDIO						
6.	AR6513	Building Construction - IV	0	0	5	3
7.	AR6514	Architectural Design - IV	0	0	14	7
TOTAL			13	0	23	25

SEMESTER VI

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
THEORY						
1.	AR6601	Design of Structures - III	3	0	0	3
2.	AR6602	History of Architecture and Culture - VI	3	0	0	3
3.		Elective - II	3	0	0	3
4.		Elective - III	3	0	0	3
THEORY CUM STUDIO						
5.	AR6611	Building Services - III	2	0	2	3
STUDIO						
6.	AR6612	Architectural Design Development	0	0	6	3
7.	AR6613	Architectural Design - V	0	0	14	7
TOTAL			14	0	22	25

SEMESTER VII

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
THEORY						
1.	AR6701	Specifications and Estimation	3	0	0	3
2.	AR6702	Human Settlements Planning	3	0	0	3
3.	AR6703	Professional Practice and Ethics	3	0	0	3
4.		Elective IV	3	0	0	3
5.		Elective V	3	0	0	3
THEORY CUM STUDIO						
6..	AR6711	Urban Design	2	0	2	3
STUDIO						
7.	AR6712	Architectural Design - VI	0	0	16	8
TOTAL			17	0	18	26

SEMESTER VIII

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
1.		Elective VI	3	0	0	3
2.	AR6811	Thesis	0	0	34	17
TOTAL			3	0	34	20

SEMESTER IX

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
1.	AR6081	Practical Training - I	0	0	20	10
TOTAL			0	0	20	10

SEMESTER X

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
1.	AR6082	Practical Training - II	0	0	20	10
TOTAL			0	0	20	10

TOTAL NO OF CREDITS FOR COMPLETION OF DEGREE : 214

LIST OF ELECTIVES**SEMESTER V****Elective I**

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
1.	AR6001	Art Appreciation	3	0	0	3
2.	AR6002	Energy Efficient Architecture	3	0	0	3
3.	AR6003	Theory of Design	3	0	0	3

SEMESTER VI**Elective II & Elective III**

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
1.	AR6004	Evolution of Human Settlements	3	0	0	3
2.	AR6005	Interior Design	3	0	0	3
3.	AR6006	Structure and Architecture	3	0	0	3
4.	AR6007	Vernacular Architecture	3	0	0	3
5.	AR6008	Earthquake Resistant Architecture	3	0	0	3
6.	AR6009	Landscape and Ecology	3	0	0	3

**SEMESTER VII
Elective IV & V**

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
1.	AR6010	Advanced Structures	3	0	0	3
2.	AR6011	Architectural Journalism and Photography	3	0	0	3
3.	AR6012	Construction and Project Management	3	0	0	3
4.	AR6013	Construction Technology	3	0	0	3
5.	AR6014	Contemporary Processes in Architecture	3	0	0	3
6.	AR6015	Sustainable Planning and Architecture	3	0	0	3

**SEMESTER VIII
Elective VI**

SL. NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
1.	AR6016	Architectural Conservation	3	0	0	3
2.	AR6017	Urban Housing	3	0	0	3

Note: L – Lecture period T- Tutorial Period P- Practical period / S –Studio period C – Credits

1. Elective cannot be taken twice by a student.

**B.Arch. Degree Programme – Regulations R 2013
Consolidated statement of Total Credits in each Semester**

Semester	L	T	P/S	C
I	12	0	22	24
II	12	0	22	24
III	13	0	22	25
IV	14	0	21	25
V	13	0	23	25
VI	14	0	22	25
VII	17	0	18	26
VIII	3	0	34	20
IX	-	-	-	10
X	-	-	-	10
Total				214

OBJECTIVES

- Identifying practical problems to obtain solutions involving trigonometric and exponential functions.
- Studying the properties of lines and planes in space, along with sphere and providing a tool to understand 3D material.
- Understand functions of more than one variable, along with differentiation under integral sign.
- Solving differential equation of certain type.
- Analysing data collection and interpretation of results using statistical tools.

UNIT I TRIGONOMETRY AND MENSURATION 9

Trigonometric (sine, cosine and tan functions) and exponential functions, De-Moiver's theorem. Area of plane figures, computation of volume of solid figures.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 9

Direction cosines and ratio's – Angle between two lines – Equations of a plane – Equations of a straight line – Coplanar lines – Shortest distance between skew lines – Sphere – Tangent plane – Plane section of a sphere.

UNIT III INTEGRATION AND FUNCTIONS OF TWO VARIABLES 9

Integration of rational, trigonometric and irrational functions, properties of definite integrals, Reductions formulae for trigonometric functions, Taylor's Theorem - Maxima and Minima (Simple Problems).

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS 9

Linear equations of second order with constant coefficients – Simultaneous first order linear equations with constant coefficients – Homogeneous equation of Euler type – Equations reducible to homogeneous form.

UNIT V BASIC STATISTICS AND PROBABILITY 9

The arithmetic mean, median, mode, standard deviation and variance - Regression and correlation - Elementary probability - Laws of addition and multiplication of probabilities - Conditional probability – Independent events.

TOTAL: 45 PERIODS**OUTCOMES**

The aim of the course is to develop the skills of the students in architectural drawing. The students will be trained on the basis of the topics of Mathematics necessary for effective understanding of architecture subjects. At the end of the course, the students would have an understanding of the appropriate role of the mathematical concepts learnt.

TEXT BOOK:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 41st Edition, 2011.

REFERENCES:

1. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.) 7th Edition, New Delhi, 2009.
2. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co.Ltd., New Delhi, 11th Reprint, 2010.
3. Greenberg M.D., "Advanced Engineering Mathematics", Pearson Education, 2nd Edition, New Delhi, 5th Reprint, 2009.
4. Gupta S.C and Kapoor V.K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, 9th Edition, New Delhi, 1996.

REFERENCES

1. Pier Luigi Nervi, General Editor, "History of World Architecture – Series", Harry N. Abrams, Inc. Pub., New York, 1972.
2. Lloyd S. and Muller H.W., "History of World Architecture – Series", Faber and Faber Ltd., London, 1986.
3. Gosta, E. Samdstrp, "Man the Builder", Mc.Graw Hill Book Company, New York, 1970.
4. Webb and Schaeffer; "Western Civilisation", Volume I; VNR: NY: 1962.
5. Vincent Scully, "Architecture – The Natural and the Manmade", Harper Collins Pub: 1991.

AR6102

THEORY OF ARCHITECTURE - I

L T P/S C
3 0 0 3

OBJECTIVES :

- To introduce the various facets of architecture and its influencing factors.
- To introduce the formal vocabulary of architecture as one of the ways to experience the built environment.
- To understand and appreciate the universals of architectural form and space in terms of elements and principles within particular historical, cultural and geographic contexts.

UNIT I INTRODUCTION TO ARCHITECTURE

8

Definitions of Architecture – Origin of Architecture – architecture as a discipline – context for architecture as satisfying human needs: functional, aesthetic and psychological-outline of components and aspects of architectural form-site, structure, skin, materials, services, use, circulation, expression, character, experience – Introduction to the formal vocabulary of architecture and Gestalt ideas of visual perception.

UNIT II ELEMENTS OF ARCHITECTURE

7

Understanding fundamental elements such as point, line, plane, form and space, shape, pattern, light, colour, surface and texture with reference to the evolution of architectural form and space.

UNIT III ELEMENTS OF ARCHITECTURE – FORM

9

Understanding perceptual effects of specific geometric forms such as sphere, cube, pyramid, cylinder and cone and its sections as well as their derivatives with respect to the evolution of architectural form and space.

UNIT IV ELEMENTS OF ARCHITECTURE – SPACE

9

Understanding perceptual effects of specific configuration of architectural spaces – Enclosure – Internal and External, Continuous spaces – Spatial relationship and its types, Spatial organisation: Centralized, Linear, Radial Clustered, Grid – built form and open space relationships.

UNIT V PRINCIPLES OF ARCHITECTURE

12

Understanding fundamental principles such as proportion, scale, balance, symmetry/asymmetry, rhythm, axis, hierarchy, datum, unity, harmony, dominance, climax – Movement with reference to the architectural form and space – detailed study of relationship between architectural form and circulation – Types of circulation – Building approach and entrance, path configuration and form, path space relationship, orientation.

TOTAL : 45 PERIODS

OUTCOMES

- A thorough understanding on the definition of architecture; elements of architectures of form and space.
- An exposure to the principles of architecture and applications of the same in buildings.

REQUIRED READINGS:

1. Francis D.K. Ching, "Architecture-Form, Space and Order", Van Nostrand Reinhold Company, New York, 2007.
2. Simon Unwin, "Analysing Architecture", Roulledge, London, 2003.
3. Pramara V.S., "Design Fundamentals in Architecture", Somaiya Publications Private Ltd., New Delhi, 1973.
4. Yatin Pandya, "Elements of Space making", Mapin 2007.

REFERENCES:

1. Leland M.Roth, "Understanding Architecture: Its Experience History and Meaning", Craftsman house, 1994.
2. Peter von Meiss, "Elements of architecture – from form to place", Spon Press 1977.
3. Rudolf Arnheim, "The dynamics of architectural form", University of California Press, 1977.
4. Neils Prak, "The language of Architecture", Mouton & Co., 1968.
5. Paul Alan Johnson, "The Theory of Architecture – Concepts and themes", Van Nostrand Reinhold Co., New York, 1994.
6. Helen Marie Evans and Carla David Dunneshil, "An invitation to design", Macmillan Publishing Co. Inc., New York, 1982.

AR6103**BUILDING MATERIALS - I****L T P/S C
3 0 0 3****OBJECTIVES:**

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as soil, lime, rocks and stones.
- To inform the properties, characteristics and use of bamboo, palm, straw, etc. and methods of preservation and treatment.
- To sensitize the students to the use of these naturally occurring materials in the context of creating a green architecture.

UNIT I**SOILS****9**

Fundamentals of Soil Science, Types of soils, Principles of Soil Stabilization, Characteristics of core, Types of Stabilizers, Requirements and Types of mudwall building and surface protection.

UNIT II**LIME****8**

Types of lime, Classification of lime, comparison between fat lime and hydraulic lime, Manufacturing process slaking, Hardening – Testing and Storage, Lime putty, Precautions in handling and uses of lime.

UNIT III**BAMBOO AND OTHER MATERIALS****10**

Bamboo – Bamboo as plant classification, species, geographical distribution, Anatomy of Bamboo, Properties, strength, processing, harvesting, working of Bamboo tools – Treatment and preservation of Bamboo and uses of Bamboo.

Cane, gate, coir, coconut - Growth, Form, Shape, Leaves, Flowering, Propagation Roofing materials – Thatch, grass, Bamboo, reeds – Basics – Case studies and applications.

UNIT IV**STRAW BALES****6**

Straw as a building material-physical aspects - Basics, Fire, moisture, insects and pests proof. Plastering straw bale walls, straw bale roof.

UNIT V**ROCKS AND STONES****12**

Classification of rocks, Sources, Seasoning, Quarrying of stones, Dressing, Characteristics of stones, Testing of stones, Common building stones and their uses. Masonary and paving. Stone veneering, preservation of stones Deterioration of stones, Durability, Preservation, Selection of stones, Artificial stones.

TOTAL: 45 PERIODS

OUTCOMES:

- Students get sensitized about the need for using ecological materials to create a green architecture which will adapt itself to the surrounding environment. In this process students learn about materials, properties characteristics, methods of preservation, treatment and methods of construction and uses of materials.

REQUIRED READINGS:

1. Varghese P.C., "Building Materials", Prentice Hall of India put Ltd New Delhi, 2005.
2. Dunkelberg (K), "Bambus – Bamboo, Bamboo as a Building Material", Karl Kramer Verlag Stuttgart, 2000.
3. Gernot Minke and Friedemann Mahlke "Building with straw: Design and Technology of a Sustainable Architecture", Birkhauser, Publisher for Architecture Berlin, Boston, 2005.

REFERENCES:

1. Duggal S.K., "Building materials", Oxford and IBH publishing Co, put, Ltd, New Delhi, 1997.
2. Spencke R. F. and Cook D.J., "Building Materials in Developing Countries", John Wiley and sons 1983.

AR6111**ARCHITECTURAL DRAWING - I****L T P/S C
0 0 5 3****OBJECTIVES**

- To introduce the concepts and fundamentals of architectural drawing, to develop representation skills and to nurture the understanding of the nature of geometrical forms and simple building forms and to teach the language of architectural and building representation in two- and three-dimensions; To introduce the basics of measured drawing.

UNIT I GEOMETRICAL DRAWING: INTRODUCTION 15

Introduction to fundamentals of drawing/ drafting: Construction of lines, line value, line types, lettering, dimensioning, representation, format for presentation, etc.; Construction of angles, use of scales;

Construction of circles, tangents, curves and conic sections.

UNIT II GEOMETRICAL DRAWING: PLANE GEOMETRY 20

Construction and development of planar surface – square, rectangle, polygon etc Introduction of multi- view projection – projection of points, lines and planes.

UNIT III GEOMETRICAL DRAWING: SOLID GEOMETRY 10

Multi- view projection of solids – cube, prism, pyramids, cones, cylinders etc.; Sections of solids, true shape of solids.

UNIT IV GEOMETRICAL DRAWING: AXONOMETRIC PROJECTION 10

Isometric, plan oblique and elevation oblique projection of planes, solids and combination of solid etc.

UNIT V MEASURED DRAWING 20

Introduction to fundamentals of measured drawing, line value, lettering, drawing representation, format for presentation methods and technique of measuring buildings and their details. Measured drawing of simple objects like furniture, detailing in terms of construction, ornamentation, measured drawing of building components like column, door, window, cornice, etc.

TOTAL : 75 PERIODS**OUTCOMES**

- An understanding on the concepts of architectural drawing as well as representation skills are imparted.
- An understanding on the building representation in 2D and 3D among students in addition to preparation of measured drawing.

REQUIRED READINGS

1. Morris IH., "Geometrical Drawing for Art Students", Orient Longman, Madras, 2004.
2. Francis D. K. Ching, "Architectural Graphics", John Wiley and Sons, 2009.
3. Fraser Reekie, Reekie's, "Architectural Drawing", Edward Arnold, 1995

REFERENCES:

1. Leslie Martin C., "Architectural Graphics", The Macmillan Company, New York, 1978.

AR6112

ART STUDIO

L T P/S C
0 0 5 3

OBJECTIVES:

- To develop presentation skills, visual expression and representation, imaginative thinking and creativity through a hands on working with various mediums and materials.
- To familiarize the students with the various mediums and techniques of art through which artistic expression can be achieved
- To familiarize students with the grammar of art by involving them in a series of free hand exercises both indoor and outdoor to understand form, proportion, scale, etc
- Involving them in a series of exercises which will help them experiment with form and volume.
- To involve students in a series of exercises which will look at graphic and abstract representations of art.

UNIT I DRAWING

24

Introduction to art – Elements and principles of drawing – Types of drawing – Visual effects of drawing – Scale drawing – Composition – Approach to sketching – Study of light, shade and shadow.

Exercise involving Indoor and out door sketching – Spot sketching - Drawing from imagination – Study of 3 D effects through light and shade from nature – Tools and materials – Illustration – Study of human being and mobiles.

UNIT II PAINTING I

12

Introduction of painting – Colour – Properties of colour – Colour schemes – Types of colours - Application and visual effects of colour. Exercise involving Study of colour – Properties of paper, brush and other tools – Basic washes – 3D effects from still-life, nature and built environment using mono chromatic and multi colour.

UNIT III PAINTING II

15

Indoor and out door painting – Rendering techniques Exercise involving Water colour – Water soluble colour pencil – Tempra – Acarali – Water soluble oil colour – Oil colour – Pen and ink – Brush – Air brush – Mixed mediums – Study of multi colour and 3D effects from nature and built environment.

UNIT IV SCULPTURE

12

Introduction of sculpture –Sculpture using various materials such as clay, plaster of Paris, paper mache, and wire.

UNIT V APPLIED ART

12

Graphic representations – Visual composition and Abstraction- Exercises involving Logo design, collage, calligraphy and printing.

TOTAL: 75 PERIODS

OUTCOMES

- The students are exposed to various mediums and techniques.
- Bold enough to handle to the colours for the presentation sheets.
- The students are mastery in sketching and expression through forms.
- The skill and knowledge gained through the subject is most useful to their profession

REQUIRED READINGS

1. Webb, Frank, "The Artist guide to Composition", David & Charles, U.K., 1994.
2. Ching Francis, "Drawing a Creative Process", Van Nostrand Reinhold, New York, 1990.
3. Alan Swann, "Graphic Design School", Harper Collins, 1991.

REFERENCES:

1. Moivahuntly, "The artist drawing book", David & Charles, U.K., 1994.
2. Arundell (Jan) Exploring sculpture, Mills and Boon, London/Charles, T. Brand Ford Company, U.S.A.
3. The art of drawing trees, heads, colours, mixing, drawing, landscape and painting, water colour, oil colour, etc. – The Grumbacher Library Books, New York, 1996.
4. Caldwell peter, "Pen and Ink Sketching", B.T. Bats ford Ltd., London, 1995.

AR6113

BASIC DESIGN

L T P/S C
0 0 12 6

OBJECTIVES:

- To understand the elements and principles of Basic Design as the building blocks of creative design through exercises that will develop the originality, expression, skill and creative thinking.
- To involve students in a number of exercises to understand the grammar of design and visual composition.
- To enable the understanding of 3 D Composition by involving students in a number of exercises which will help generation of a form from a two dimensional / abstract idea.
- To enable the understanding of the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.

Contents:

Introduction to Architectural Design through Basic Design – Elements of Design :

Properties, qualities and characteristics of point, line, direction shape, form, colour and texture – Principles of Design: Scale, Proportion, Balance, Harmony, Rhythm and Contrast.

The course shall be conducted by giving a number of exercises in the form of design studios, seminars and creative workshops that are aimed at teaching the following:

- i) Elements and Principles of Visual Composition using point, line, shape.
- ii) Exploring colour schemes and their application in a visual composition and in Architectural forms and spaces.
- iii) Study of texture and schemes of texture both applied and stimulated and their application.
- iv) Study of linear and Planar forms using simple material like Mount Board, metal foil, box boards, wire string, thermocol etc.
- v) Study of Solids and voids to evolve sculptural forms and spaces and explore the play of light and shade and application of color.
- vi) Study of fluid and plastic forms using easily mouldable materials like clay, plaster of paris etc.
- vii) Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.
- viii) Application of Basic design in Architectural Design through the manipulation of line, plane, solid and voids and application of texture colour, proportion etc.

TOTAL: 180 PERIODS

OUTCOMES

- An understanding of the qualities of different elements as well as their composite fusions.
- An ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects.

REQUIRED READINGS:

1. Owen Capplemann & Michael Jack Jordon, Foundations in Architecture : An Annotated Anthology of Beginning Design Project, Van Nostrand Reinhold New York, 1993.
2. Charles Wallschlagger & Cynthia Busic-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers, Mc Graw Hill, New York 1992.

REFERENCES:

1. Pramod V.S., Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.
2. Francis D.K.Ching, "Architecture: Form, Space and Order, Van Nostrand Reinhold Co., (Canada), 1979.
3. Elda Fezei, Henry Moore, Hamlyn, London, New York, Sydney, Toronto, 1972.
4. Lawrence Bunchy C.Acrylic for Sculpture and Design, 450, West 33rd Street, New York, N.Y.10001, 1972.
5. Exner V., Pressel D., "Basics Spatial Design", Birkhauser, 2009.

AR6201**MECHANICS OF STRUCTURES - I****L T P/S C
3 0 0 3****OBJECTIVES:**

- To enable a student to understand the effect of action of forces on a body and the concept of equilibrium of the body through exercises.
- To determine the internal forces induced in truss members due to external loads by working out problems.
- To calculate the sectional properties (centroid, moment of inertia, section modulus and radius of gyration) for various sections by working out problems.
- To study the stress – strain behaviors of steel and concrete due to axial loads and to determine the stresses and strains developed in solids due to external action through select problems.
- To derive the relationship between elastic constants and solving problems.

UNIT I FORCES AND STRUCTURAL SYSTEMS**8**

Types of force systems - Resultant of forces-Lami's theorem- principle of moments Varignon's theorem - principle of equilibrium (no reaction problems) - simple problems

UNIT II ANALYSIS OF PLANE TRUSSES**10**

Introduction to Determinate and Indeterminate plane trusses - Analysis of simply supported and cantilevered trusses by method of joints.

UNIT III PROPERTIES OF SECTION**10**

Centroid- Moment of Inertia - Section modulus – Radius of gyration - Theorem of perpendicular axis - Theorem of parallel axis –simple problems.

UNIT IV ELASTIC PROPERTIES OF SOLIDS**10**

Stress strain diagram for mild steel, High tensile steel and concrete - Concept of axial and volumetric stresses and strains. (excluding composite bar)

UNIT V ELASTIC CONSTANTS**7**

Elastic constants - Relation between elastic constants - Application to problems.

TOTAL: 45 PERIODS**OUTCOMES:****At the end of the course, the student should be able to:**

- Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
- Analyze any type of determinate trusses with different end conditions.
- To solve the sectional properties for any geometrical shapes.
- The concepts of elastic constants and its applications for various types of problems with a thorough understanding of stresses and strain.

REQUIRED READINGS

1. Bansal R.K.– A text book on Engineering Mechanics, Laxmi Publications, Delhi, 2005.
2. Bansal R.K. – A textbook on Strength of Materials, Lakshmi Publications, Delhi 2007.

REFERENCES:

1. Punmia P.C., “Strength of Materials and Theory of Structures”; Vol. I, Lakmi Publications, Delhi 1994.
2. Ramamrutham S., “Strength of Materials”, Dhanpatrai & Sons, Delhi, 1990.
3. Nash W.A., “Strength of Materials” – Schaums Series, McGraw Hill Book Company, 1989.
4. Rajput R.K., “Strength of Materials”, S. Chand & Company Ltd., New Delhi, 1996.

AR6202

HISTORY OF ARCHITECTURE AND CULTURE - II

L T P/S C
3 0 0 3

OBJECTIVES:

- To understand Indian architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Indus valley Civilization, Vedic period and manifestation of Buddhist and Hindu architecture in various parts of the country.

UNIT I ANCIENT INDIA

6

Indus Valley Civilization: culture and pattern of settlement.- Aryan civilization – theories and debates of origin- origins of early Hinduism - Vedic culture - Vedic village and rudimentary forms of bamboo and wooden construction - origins of Buddhism and Jainism.

UNIT II BUDDHIST ARCHITECTURE

10

Evolution of Buddhism, Buddhist thought, art and culture - Hinayana and Mahayana Buddhism - interaction of Hellenic & Indian Ideas in Northern India - evolution of building typologies- the stupa, vihara and the chaitya hall - symbolism of the stupa - architectural production during Ashoka's rule Ashokan Pillar, Sarnath - rock cut caves at Barabar - Sanchi Stupa- rock cut architecture in Ajanta and Ellora - Karli - viharas at Nasik - Rani gumph, Udaigiri - Takti Bahai, Gandhara.

UNIT III EVOLUTION OF HINDU TEMPLE ARCHITECTURE

10

Hindu forms of worship – evolution of temple form - meaning, symbolism, ritual and social importance of temple - categories of temple - elements of temple architecture - early shrines of the Gupta and Chalukyan periods
Tigawa temple - Ladh Khan and Durga temple, Aihole - Papanatha, Virupaksha temples, Pattadakal - Kailasanatha temple, Ellora.

UNIT IV TEMPLE ARCHITECTURE - SOUTHERN INDIA

12

Brief history of South India - relation between Bhakti period and temple architecture - of temple towns - Dravidian Order - evolution and form of gopuram

Rock cut productions under Pallavas: Shore temple, Mahabalipuram and Kailasanatha temple, Kanchipuram - Chola Architecture: Nartamalai, Brihadeeswara, Gangaikonda Cholapuram and Darasuram temples — temple gateways of Madurai and Chidambaram - temple towns: Madurai, Srirangam and Kanchipuram Hoysala architecture: Belur and Halebid.

UNIT V TEMPLE ARCHITECTURE -NORTHERN INDIA

7

Temple architecture of Gujarat, Orissa, Madhyapradesh and Rajasthan - their salient features Lingaraja Temple, Bhuvanewar - Sun temple, Konarak. - Somnatha temple, Gujarat, Surya kund, Modhera Khajuraho, Madhyapradesh - Dilwara temple, Mt. Abu

TOTAL: 45 PERIODS

OUTCOMES

- The students understood Indian architecture as a response to the political and socio cultural conditions present in India at different points of time.
- The architectural responses were understood with respect to technology style and character

REQUIRED READINGS:

1. Percy Brown, "Indian Architecture (Buddhist and Hindu Period)", Taraporevala and Sons, Bombay, 1983.
2. Satish Grover, "The Architecture of India (Buddhist and Hindu Period)", Vikas Publishing Housing Pvt. Ltd., New Delhi, 2003.
3. Christopher Tadgell, "The History of Architecture in India from the Dawn of civilization to the End of the Raj", Longman Group U.K.Ltd., London, 1990.

REFERENCES:

1. George Michell, "The Hindu Temple", BI Pub., Bombay, 1977.
2. Stella Kramrisch, "The Hindu Temple", Motilal Banarsidass, 1976.
3. Parameswaranpillai V.R., "Temple culture of south India", Inter India Publications,
4. George Michell Ed, "Temple Towns of Tamil Nadu", Marg Pubs, 1995.
5. Raphael D., "Temples of Tamil Nadu Works of Art", Fast Print Service Pvt Ltd., 1996.

AR6203

THEORY OF ARCHITECTURE - II

L T P/S C
3 0 0 3

OBJECTIVES:

- To introduce factors that lending meaning to architecture, expression, communication.
- To understand architecture as a product of historical context through introduction to aspects of style, character and architectural movements
- To understand the generation of individual meaning in architecture through study of philosophies/theories and exemplary works of architects
- To introduce thorough case studies, tools for representing, analyzing and interpreting architecture.
- To actually learn to represent, analyze and interpret the architectural experience holistically through live case studies

UNIT I MEANING IN ARCHITECTURE 6
Architecture as a vehicle of expressing, symbolism and communication- Illustrative examples

UNIT II ARCHITECTURAL CHARACTER 9
Ideas of character, style, architectural movement: Illustrative examples across various periods in history.

UNIT III WORKS OF ARCHITECTS 12
Role of individual architects in the generation of architectural form, through study of exemplary works, architectural inspirations, philosophies, ideologies and theories of architects.

UNIT IV ANALYZING ARCHITECTURE 9
Introduction to modes of understanding architecture in totality in terms of the various aspects studied before in the subject – understanding how case studies have used representational, analytic and interpretational tools

UNIT V EXPERIENCING ARCHITECTURE 9
Understanding architecture in totality in terms of the various aspects studied in this course firsthand experience, analysis and interpretation of building

TOTAL :45 PERIODS

OUTCOMES

- An understanding the meaning of character and style of buildings with examples
- An exposure to students on ideologies and philosophies of architectures of contemporary architects through examples.
- An exposure to analysis and experience of architecture through case studies

REQUIRED READING

1. Yatin Pandya, "Elements of Space making", Mapin 2007
2. SimonUnwin, "Analyzing Architecture", Routledge 2003
3. Francis D.K.Ching, "Architecture, Form, Space and Order"; III Edition, John Wiley, 2007
4. Leland M.- Roth, "Understanding Architecture: Its Elements- History, and Meaning", Icon Editions, 1993
5. Haze J Conway, Rowan Roenisch, "Understanding Architecture", Routledge 2005

REFERENCES

1. Anthony Antoniades, "Poetics of architecture: Theory of design, Wiley 2008
2. Steen Eiler Rasmussen, "Experiencing Architecture", MIT Press 1964
3. Peter von Meiss, "Elements of Architecture - From Form to Place", Span Press, 1992
4. Bryan Lawson, "How Designers Think", Architectural Press Ltd" London, 1980.
5. Hanno Rauterberg, "Talking Architecture, Interview with Architects", Prestel 12008 The A-Z of Modern Architecture-Taschen 2007.

AR6204

BUILDING MATERIALS - II

L T P/S C
3 0 0 3

OBJECTIVES:

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as brick and other clay products.
- To inform the properties and characteristics of timber, its conversion, preservation and uses.
- To inform of the various market forms of timber, their production, properties and application in the building industry.

UNIT I BRICKS 10

Classification of bricks including bricks substitutes like fly ash bricks, characteristics, ingredients of bricks – Manufacture of bricks – Forms of bricks – Testing of bricks – Storing – Light weight bricks – Case studies and application. Light weight bricks.

UNIT II CLAY PRODUCTS 12

Manufacture of burnt clay bricks, paving bricks, hollow bricks – terracotta, porcelain, stoneware, earthenware Glazing and their uses – Glazed ceramic tiles, Fully vitrified tiles, Ceramic sanitary appliances, Stoneware pipes and fittings.

Roofing materials - Manufacture of Mangalore tiles, pot tiles, pan tiles – Case studies and application.

UNIT III TIMBER 8

Classification of trees, structure of trees, Defects in timber, Storage of timber, Uses of timber, characteristics, seasoning of timber, Defects and diseases, Decay of timber, Preservation, Fire resistance, Conservation of timber.

UNIT IV TIMBER PRODUCTS 8

Market forms of timber, Industrial timber, - Veneers and Veneer Plywoods, Particle board, Hard board, Fibre board, Block board and Lamin boards, Laminates, advantages and Blockboard uses.

UNIT V PAINTING AND VARNISHING IN TIMBER 7
 Composition, characteristics, preparation, Primer, Painting different surfaces. Enamels, Paint, Varnishing – types of varnishing Miscellaneous paints, defects, uses and cost of materials.

TOTAL: 45 PERIODS

OUTCOMES

- Students get sensitized about the use of Brick, Timber, Timber products, painting and application in building industry students learn about making and manufacturing process of brick, properties, methods of preservation and treatment, methods of construction and uses of brick, timber, timber products and constituents of paints, preparation and surface application of paints.

REQUIRED READINGS

1. Rangwala S. C., “Engineering Materials”, Charotar, Publishing House, Anand–388 001, India, 2007.
2. Duggal S.K., “Building materials”, New Age International, New Delhi, 2009.
3. Reshpande B., “Materials and Construction”, Oriental Watchman Publishing House, Poona-2.

REFERENCES:

1. Varghese P.C., “Building Materials”, Prentice Hall of India put Ltd, New Delhi 110001, 2005.
2. Spencke R.J. and Cook S.J., “Building materials in developing countries”, John Wiley and sons 1983.

AR6211 BUILDING CONSTRUCTION - I L T P/S C
0 0 5 3

OBJECTIVES

- To involve students in a number of drawing exercises that will analyze the various building components in a simple load bearing structure.
- To involve students in a number of drawing exercises that will look at the design and detail of simple structures using naturally occurring materials such as mud, bamboo, straw, etc.
- To involve students in a number of drawing exercises that will look at the design and detail of various building components in a simple load bearing structure using stone.

UNIT I INTRODUCTION 10
 Functional requirements of building and its components, introduction to concept of load bearing and framed structures. Exercises – involving the same.

UNIT II SOILS 20
 Detailing of walls, roofs, flooring and foundations using soils (rammed earth, compressed blocks). Design exercises using soil for building components in small scale buildings like laborer’s house, art centre, snack bar including detailing of arches, walls, door and window openings and understanding of the same through case studies.

UNIT III BAMBOO 13
 Design and Construction Techniques using bamboo for building components for small scale buildings like snack bar, tree house including detailing of doors and windows, arches, barrel walls, weave structures and understanding of the same through case studies

UNIT IV STRAW BALES 12
 Design Exercises : using straw bales for building components for Load bearing, Post and Beam systems, Foundations systems, Roofing options, plastering, door and window detailing for small scale buildings and understanding of the same through case studies

UNIT V STONE**20**

Design Exercises – Using stone (Ashlar, rubble etc.) for building components including detailing of arches, corbels, coping, sills, lintels, corbels, arches, cladding in small scale buildings like classrooms, library and community hall and understanding the same through case studies

TOTAL: 75 PERIODS**OUTCOMES**

Students learn about making of the building using mind, Bamboo, Straw bale, stone through drawing as well as doing a literature or live case study. It is required that students submit a case study example to understand materials used in the building, method of construction etc. After this stage students are requested to submit drawing plates constructing of plan, Elevation and section along with sketches and details showing method of construction.

REQUIRED READINGS:

1. Arora S.P. and Bindra S.P., "Text book of Building Construction", Dhanpat Rai & Sons, New Delhi, 2012
2. Klans Dukeeberg, Bambus – Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000.

REFERENCES:

1. Don A. Watson Construction Materials and Processes McGraw Hill 1972, WB Mckey Building construction, Vol 1,2, Longman UK 1981.
2. Barry, The Construction of Buildings Affiliated East West press put Ltd New Delhi 1999.
3. Francisa D.K. Ching, Building Construction Illustrated John Wiley & Sons 2000.

AR6212**ARCHITECTURAL DRAWING - II****L T P/S C
0 0 5 3****OBJECTIVES:**

- To involve students in a number of exercises that will help them develop the skill of representation in advance drawing techniques involving perspective and sciography.
- To involve students in a number of exercises that will help to understand the measured drawing method to document buildings of architectural interest using simple and advance techniques of representation.

UNIT I SCIOGRAPHY**10**

Principles of shade and shadow – construction of shadow of simple geometrical shapes – construction of sciography on building, shadows of architectural elements.

UNIT II PERSPECTIVE: SCIENTIFIC METHOD**25**

Characteristic of perspective drawing. Concepts and methods of perspective drawing. One point and two point perspective of simple geometrical shapes like cube, prism, combination of shapes, simple one, two and three-point perspective of building interiors and exteriors. Adding of figures, trees furniture etc., shade and shadows and applying rendering techniques.

UNIT III PERSPECTIVE: SHORT CUT METHOD**15**

Introduction to short cut perspective method. Adding of figures, trees furniture etc., shade and shadows and applying rendering techniques.

UNIT IV MEASURED DRAWING: HISTORIC DOCUMENT STUDY**10**

Combined study of historic document along with small building by using simple measuring tools like tapes, photograph etc.

UNIT V MEASURED DRAWING: DOCUMENTATION**15**

Documentation of a complete building of a special interest in terms of history, building construction, architectural excellence or technology.

TOTAL: 75 PERIODS

OUTCOMES

- The techniques and skills gained learned through this subject Architectural drawing II is very useful to their profession
- Able to construct the perspective drawings of the buildings and 3d views as well the documentation of buildings through drawings.

REQUIRED READINGS:

1. John M.Holmes, Applied Perspective, Sir Isaac, Piotman and Sons Ltd., London 1954.
2. Robert W.Gill, Basic Perspective, Thames and Hudson, London, 1974.
3. Leslie Martin C., Architectural Graphics, The Macmillan Company, New York, 1964.
4. Francis Ching, Architectural Graphics, Van Nostrand and Reinhold Company, NY 1975.

REFERENCES:

I. MEASURED DRAWING

1. Claude Batley, Indian Architecture, D.B.Taraporevale Sons and Co., Ltd., Bombay
2. William Kirby Lockard, Drawing as a Means to Architecture, Van Nostrand, Reinhold Company, New York.
3. George A Dinsmore, Analytical Graphics – D.Van Nostrand, Company Inc., Canada.

II.PERSPECTIVE

4. Interiors: Perspective in Architectural Design Graphic - SMA Publishing Co. Ltd., Japan, 1967.

III. SCIOGRAPHY

5. Ernest Norling, Perspective drawing, Walter Fostor Art Books, California, 1986.
6. Bernard Alkins - 147, Architectural Rendering, Walter Foster Art Books, 1986.
7. Rober W.Gill, Advanced Perspective, Thames and Hudson, London, 1974.

AR6213

ARCHITECTURAL DESIGN - I

L T P/S C
0 0 12 6

OBJECTIVES:

- To enable the conceptualization of form, space and structure through creative thinking and to initiate architectural design process deriving from first principles.
- To involve students in a design project(s) that will involve simple space planning and the understanding of the functional aspects of good design.
- To involve students in a small scale building project(s) which will sensitize them to intelligent planning that is responsive to the environmental context.
- To involve students in building case study by choosing appropriate examples to enable them to formulate and concretize their concepts and architectural program.
- To engage in discussion and analytical thinking by the conduct of seminars/ workshops.
- To enable the presentation of concepts through various modes and techniques that will move constantly between 2D representation and 3D modeling.

Scale and Complexity: projects involving small span, single space, single use spaces with simple movement, predominantly horizontal, as well as simple function public buildings of small scale; passive energy

Areas of focus/ concern:

- architectural form and space
- aesthetic and psychological experience of form and space in terms of scale, colour, light, texture, etc.,
- function and need: user requirements, anthropometrics, space standards, circulation
- image and symbolism

UNIT IV COLUMNS 10
 Short and long columns – Concept of Elastic stability – Euler’s theory – Assumptions and Load carrying capacity of Columns with different end conditions – Concept of Effective length – Slenderness ratio – Limitations of Euler’s theory – Rankine’s formula.

UNIT V STATICALLY INDETERMINATE BEAMS 5
 Introduction – Determination of degree of statically indeterminacy for beams and frames – Concept of Analysis (No Problems)

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course, the student should be able to:

- Apply the concepts of determining the techniques of finding the stresses.
- Use the theory of simple bending theory to find the deflection in beams.
- Analyze and solve the different types of columns.
- Analyze the different types of indeterminate beams.

REQUIRED READING:

1. R.K. Bansal, “A Text Book on Strength of Materials”, Laxmi Publications, New Delhi, 2006.
2. B.C. Punmia, “SMTS-I, Strength of Materials”, Laxmi Publications, New Delhi, 1994.

REFERENCES :

1. M.M. Ratwani & V.N. Vazirani, “Analysis of Structures”, Vol. 1, Khanna Publishers, Delhi, 2012.
2. Timoshenko, S.P. and D.H. Young, “Elements of Strength of Materials”, Fifth edition, East West Press, 1993.
3. A.R. Jain and B.K.Jain, “Theory and analysis of structures”, Vol. 1, Nemchand and Bros, Roorkee, 1987.
4. R.K. Rajput “Strength of Materials”, S.Chand, 2006.

AR6302 HISTORY OF ARCHITECTURE AND CULTURE - III L T P/S C
3 0 0 3

OBJECTIVES:

- To understand Church architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Western World through the evolution of the church from early Christian times up to the Renaissance period.

UNIT I EARLY CHRISTIAN 6
 Birth and spread of Christianity – transformation of the Roman Empire – early Christian worship and burial.

Church planning – basilican concept: St. Clement, Rome; St. Peters Rome, - Centralized plan concept: S. Vitale, Ravenna; S. Hagia Sophia, Constantinople; St. Marks, Venice.

UNIT II EARLY MEDIEVAL PERIOD 9
 The Carolingian Renaissance – Feudalism and rural manorial life – Papacy – Monasticism – Craft and merchant guilds.

Medieval domestic architecture – Medieval monasteries- Monastery of Cluny III, Cluny - Romanesque churches – Development of vaulting – Pisa Group – Abbaye aux Hommes – Durnham cathedral.

UNIT III LATE MEDIEVAL PERIOD 9
 Political and social changes: Re-emergence of the city – Crusades - Scholasticism. Development of Gothic architecture Church plan, structural developments in France and England – Notre Dame, Amiens; Notre Dame, Paris; Salisbury Cathedral; Westminster Abbey – wooden roofed churches – domestic architecture.

UNIT IV RENAISSANCE AND MANNERIST 12

Idea of rebirth and revival – Humanism – Development of thought – the Renaissance patron – Urbanism Renaissance architecture: Brunelleschi and rationally ordered space – ideal form and the centrally planned church: Alberti and Donato Bramante – Merchant Prince palaces: Palazzo Ricardi – Villas of Palladio : Villa Capra Vicenza – Mannerist architecture : The Renaissance in transition – Michaelangelo : Library at S. Lorenzo, Florence, Capitoline Hill – Inigo Jones.

UNIT V BAROQUE AND ROCOCO 9

Protestantism – Counter Reformation – French Revolution – Monarchy and growth of nations.

Roman Baroque churches: The central plan modified – St. Peters, Rome; French Baroque: Versailles – English baroque – Sir Christopher Wren; St. Paul's London – Domestic Architecture in England. Rococo Architecture – Interiors – hotels.

TOTAL: 45 PERIODS

OUTCOMES:

- A detailed understanding of Western (Christian) architecture.
- An understanding about the spatial and stylistic qualities associated with church architecture
- An idea about Chennai Christian Architecture with the help of assignments.
- An Understanding of the architecture as an outcome of various social, political and economic upheavals, and as a response to the cultural and climate conditions.

REQUIRED READINGS:

1. Sir Banister Fletcher, "A History of Architecture", CBS Publishers, 1996.
2. Spiro Kostof, "A History of Architecture - Setting and Rituals", Oxford University Press, London, 1995.

REFERENCES:

1. Pier Luigi Nervi, General Editor, "History of World Architecture" - Series, Harry N. Abrams, Inc. Pub., New York, 1972.
2. S. Lloyd and H.W. Muller, "History of World Architecture" - Series, Faber and Faber Ltd., London, 1986.
3. Leland M Roth; "Understanding Architecture": Its elements, history and meaning; Craftsman House, 1994.
4. White J.F, White S.J., "Church Architecture: Building and Renovating for Christian worship", OSL Publications, 2008

**AR6303 CLIMATE AND BUILT ENVIRONMENT L T P/S C
3 0 0 3**

OBJECTIVES:

- To study human heat balance and comfort.
- To familiarize students with the design and settings for buildings for daylight and factors that influence temperature
- To inform about the air pattern around buildings and the effect of wind on design and siting of buildings
- To expose the students to the various design strategies for building in different types of climatic zones.

UNIT I CLIMATE AND HUMAN COMFORT 10

Factors that determine climate of a place – Components of Climate – Climate classifications for building designers in tropics – Climate characteristics. Human body heat balance – Human body heat loss – Effects of climatic factors on human body heat loss – Effective temperature – Human thermal comfort – Use of C. Mahony's tables.

UNIT II DESIGN OF SOLAR SHADING DEVICES 8

Movement of sun – Locating the position of sun – Sun path diagram – Overhead period – Solar shading – Shadow angles – Design of appropriate shading devices

UNIT III HEAT FLOW THROUGH BUILDING ENVELOPE CONCEPTS 9

The transfer of heat through solids – Definitions – Conductivity, Resistivity, Specific heat, Conductance, Resistance and Thermal capacity – Surface resistance and air cavities – Air to air transmittance (U value) – Time lag and decrement – Types of envelopes with focus on glass.

UNIT IV AIR MOVEMENT DUE TO NATURAL AND BUILT FORMS 9

The wind – The effects of topography on wind patterns – Air currents around the building – Air movement through the buildings – The use of fans – Thermally induced air currents – Stack effect, Venturi effect – Use of court yard.

UNIT V CLIMATE AND DESIGN OF BUILDINGS 9

Design strategies in warm humid climates, hot humid climates, hot and dry climates and cold climates – Climate responsive design exercises

TOTAL: 45 PERIODS

OUTCOMES

- Understanding of Thermal balance in Human beings
- Designing Climate responsive structure
- Conceptual understanding of Air flow in Buildings

REQUIRED READINGS:

1. O.H. Koenigsberger and Others, “Manual of Tropical Housing and Building” – Part I - Climate design, Orient Longman, Madras, India, 2010.
2. Bureau of Indian Standards IS 3792, “Hand book on Functional requirements of buildings other than industrial buildings”, 1987.

REFERENCES:

1. Martin Evans, “Housing Climate and Comfort”, Architectural Press, London, 1980
2. B. Givoni, “Man, Climate and Architecture”, Architectural Sciences Series – Applied Science Publishers Ltd., London, 1981.
3. B. Givoni, “Passive and Low Energy Cooling of building”, Van Nortrand Reinhold New York, USA, 1994.
4. Galloe, Salam and Sayigh A.M.M., “Architecture, Comfort and Energy”, Elsevier Science Ltd., Oxford, U.K., 1998.

AR6304

BUILDING MATERIALS - III

**L T P/S C
3 0 0 3**

OBJECTIVES:

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as cement, glass, paints and other finishing materials.
- To inform about the properties, characteristics and use of concrete in construction including its manufacture
- To inform about the properties, characteristics and manufacture of various type of concrete using aggregates.

UNIT I REQUIREMENTS OF INGREDIENTS FOR MORTAR/ CONCRETE 6

Cement: definition, composition, strength, properties, manufacture, test for cement, types of cement

Sand : sources, impurities, classification, tests for bulking of sand, quality of sand Coarse aggregate : Sources, shape, size, grading, sampling and analysis, impurities Water: sources, requirements, water quality, tests

UNIT II CEMENT CONCRETE AND ITS MANUFACTURE 6

Definition, properties, specification, proportioning, water-cement ratio, workability, curing, water-proofing, guniting, special concretes.

Manufacture, construction of formwork, placing, quality assurance testing, fabrication, incorporation of steel in concrete.

UNIT III TYPES OF CONCRETE AGGREGATES AND CONCRETE 9

Lightweight aggregates, aerated concrete, no-fines concrete, polymer concrete, RCC, pre-stressed concrete, fibre-reinforced concrete, ready-mixed concrete

UNIT IV SURFACE FINISHING, FLOORING AND DAMP-PROOFING 12

Surface finishing: Smooth finishes, textured finishes, ribbed, etched, exposed aggregate finish- weathering of finishes- external renderings- roughcast, dry dash, textured, stucco, gypsum and POP applications, protective and decorative coatings.

Paints- properties and defects in paints, enamels, distemper, plastic emulsion, special paints-fire retardant, luminous and bituminous paints.

Materials for damp-proofing and water-proofing concrete structures: Hot and cold applications, emulsified asphalt, vinyl, epoxy resins, chemical admixtures, bentonite clay etc.- properties, uses and cost of materials.

Types of flooring- laying methods for marble, mosaic, and terrazzo, plain cement flooring, flooring stones & tiles.

UNIT V GLASS 12

Composition of glass, brief study on manufacture, treatment, properties and uses of glass. Types of glass - float glass, cast glass, glass blocks, foamed glass. Decorative glass, solar control, toughened glass, wired glass, laminated glass, fire-resistant glass, glass blocks, structural glass - properties and application in building industry, glazing and energy conservation measures.

TOTAL: 45 PERIODS

OUTCOMES:

This subject helps the students to understand the properties characteristics. Strength, manufacturing process of various construction materials. Which in turn help them to choose the suitable materials according to the contact – In response to the surroundings.

REQUIRED READING:

1. M.S.Shetty, "Concrete Technology", S.Chand, 2005.
2. S.C.Rangwala, "Engineering Materials", Charotar Publishing House, India, 1997.
3. S.K Duggal, "Building Materials", Oxford and IBM Publishing Co, Pvt Ltd, 1997.

REFERENCES:

1. Arthur Lyons, "Materials for Architects and Builders", An introduction Arnold, London, 1997.
2. Don A.Watson, "Construction Materials and Processes", McGraw Hill Co., 1986.
3. S.N Sinha, "Reinforced Concrete Design", Tata-McGraw Hill, New Delhi, 2002
4. Howard Kent Preston, "Prestressed concrete for Architects and Engineers", McGraw Hill, New York, 1964

**AR6311 COMPUTER AIDED VISUALISATION L T P/S C
0 0 6 3**

OBJECTIVES:

- To introduce Computer operation principles and explore image editing through a visual composition using graphics.
- To impart training in Computer aided 2D drafting and 3D Modeling through projects
- To enable the rendering of a building so as to create a photo realistic image.

UNIT I INTRODUCTION TO COMPUTER AND IMAGE EDITING 10

Technology of small computer system, computer terminology operation principles of P.C, introduction to application software, and graphic system, and use of printers, scanner, plotter, File management, etc. Understanding Bitmap images and Vector Graphics, Image size and Resolution. Basic Tools for Editing and Creating Graphics.

UNIT II THE BASICS OF BUILDING MODELLING 15

Creating a basic floor plan, About Temporary Dimensions, Adding and Modifying Walls, Working with Compound Walls, Using Editing Tools, Adding and Modifying Doors, Adding and Modifying Windows

UNIT II VIEWING THE BUILDING MODEL 15

Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, and text, dimensioning. Transparent overlays, hatching utilities, line type, line weight and colour. Multiline, Polyline, etc. Styles, blocks and symbol library.

UNIT IV INTRODUCTION TO 3D MODELLING 15

Project: Create 3D sculpture using 3D primitives (cubes, spheres etc.)

Tools: Slide facilities script attributes, V-port, editing session. Introduction to 3D-modelling technique and construction planes, drawing objects, 3D surfaces setting up elevation thickness and use of dynamic projections. Solid modeling with primitive command and Boolean operation.

UNIT V 3D RENDERING AND SETTING 20

Project: Visualize a building. Explore the potential of lights and camera and use the same in the model created for the final submission.

Tools: Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filling. Exercise to identify and visualize a building using the above said utilities. 3D modelling softwares like sketch up, Autocad rivet, etc

TOTAL: 75 PERIODS

OUTCOMES:

- The students benefit by learning software which helps them to better visualize complicated forms and also helps in producing photo realistic images of those 3D forms.

REQUIRED READING:

1. Deke McClelland, "Photoshop 7 Bible Professional Edition", Wiley John & Son INC, New York, 2000.
2. A. Watt, "Fundamentals of Three-Dimensional Computer Graphics", Addison Wesley, Massachusetts, 1989.
3. Aouad, "Computer Aided Design guide for Architecture, Engineering and construction", Spon process, 2012

REFERENCES:

1. Ralph Grabowski, "The Illustrated AutoCAD 2002 Quick Reference", 1st edition, Cengage Learning, 2001
2. Sham tikoo, "Autocad 2000: A Problem-Solving Approach", Delmar Cengage Learning, 1999.
3. Fiorello. J. A., "CAD for Interiors beyond the basics", Wiley publications, 2011.

OBJECTIVES

- To understand both in general and in detail the methods of construction by using basic materials such as brick; clay products and natural timber for both structural and non- structural components.
- To understand both in general and in detail the methods of construction by using man-made timber products such as ply wood.
- To understand the quality assurance measures and testing procedures related to material, workmanship and performance for the topics discussed.

UNIT I BRICKS & CLAY PRODUCTS 15

Basics of brick bonding principles, exercises involving different types of brick bonding. Design and construction of various structural components using bricks in single or (Ground+1) buildings – small house, community hall, snack bar etc. and understanding the same through case studies including methods of construction of various non-structural building components such as partition walls, screens, compound walls, parapets, coping - understanding the same through exercises and case studies.

Design exercises using clay blocks for flooring, roofing and walling in single or (Ground+1) buildings including detailing of Mangalore tiles, pot tiles, pan tiles roofing -understanding the same through exercises and case studies.

UNIT II TIMBER JOINERY 20

Methods of construction using natural timber in joinery works including methods of fixing and options for finishing - Windows (panelled, louvered, glazed and sliding windows) - Doors (panelled, glazed, sliding, sliding/folding, louvered and pivoted) – Ventilators (top hung, bottom hung, pivoted, louvered, and glazed) – Hardware for doors, windows and ventilators - Exercises involving the above through drawings and application of the above for a single or (G+1) building with schedule of joinery.

UNIT III TIMBER WALLS, FLOORS, TRUSSES AND STAIRCASES 10

Methods of construction using natural timber in various structural components of the building such as walls, floors, roof trusses - Exercises involving the above through case studies - Types of timber staircases. Methods of construction of timber staircases- basic principles and design details including detailing of handrail and baluster- Exercises involving the above through drawings.

UNIT IV TIMBER PARTITIONS, PANELLING, FALSE CEILING 20

Methods of construction using man-made timber products such as ply woods, block boards, etc., in fixed partitions, sliding/folding partitions, wall panelling, false ceiling - Exercises of the above through drawings and case studies.

UNIT V GLASS 10

Construction methods using glass for single storey glass structures like pavilions, green houses, staircases. Construction methods using glass for single/multi-storey buildings including curtain walling details – Exercises of the above through case studies and drawings.

TOTAL: 75 PERIODS**OUTCOMES:**

- An Understanding of Brick and clay products and timber in methods of construction and in detailing.
- An Understanding of Testing Procedures, Quality assurance and workmen ship is imparted,

REQUIRED READING

1. Don A. Watson, "Construction Materials and Processes", McGraw Hill, 1972.
2. W.B. McKay, "Building Construction", Vol, 1 and 2, Longmans, UK, 1981.
3. S.C Rangwala "Building Construction", Charotar Publishing House, India, 2000
4. S.K.Sharma, "A Text book of Building Construction", S.Chand & Co Ltd., New Delhi, 1998

REFERENCES

1. American Institute of Timber Construction (AITC), "Timber Construction Manual", Wiley Publishers, 2004
2. Francis D.K Ching "Building Construction" illustrated, John Willey & Sons, 2008.
3. Wills H Wagner, Howard Bud, "Modern Carpentry", Good Heart – Wilcox publishers, Portland, 2003
4. Barry, "Construction of Buildings", Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005.

AR6313

ARCHITECTURAL DESIGN - II

L T P/S C
0 0 14 7

OBJECTIVES:

To create an understanding of the inter relationships amongst various elements of architecture – form, function, space planning, user perception and behaviour.

- To understand the characteristics of site and the importance of site planning which includes built form and open space.
- To understand the relationship between form and spaces and the importance of aesthetics.
- To ascertain the response of user group through case studies.
- To enable the presentation of concepts through 2D drawings, sketches and model.

CONTENT:

Scale and Complexity :Project involving organization of multiples of single unit space with predominantly horizontal movement as well as single use public buildings of small scale; passive energy

Areas of concern/ focus:

- form-space relationships
- spatial organization
- behavioral aspects especially those relating to children
- site planning aspects
- appropriate materials and construction

Suggestive Typologies/ projects: residential buildings, institutional buildings: nursery or primary schools, schools for children with specific disabilities, primary health center, banks, neighbourhood market, neighbourhood library, Gate complexes including security Kiosk and entry / exit gates.

OUTCOMES:

The characteristics of site, importance of site planning and built form/open space relationship as been understood. User group responses were ascertained through case-studies. Presentation of concepts was enabled through 2D drawings, sketches of model.

TOTAL: 210 PERIODS

REQUIRED READING

1. Joseph De Chiara, Michael J Crosbie, "Time Saver Standards for Building Types", McGraw Hill Professional, 2001.
2. Julius Panero, Martin Zelnik, "Human Dimension and Interior Space", Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, "Time Saver Standards for Interior Design and Space Planning", McGraw Hill, 2001.
4. Ernst Neuferts, "Architects Data," Blackwell, 2002.
5. Ramsey et al, "Architectural Graphic Standards", Wiley, 2000.

REFERENCES

1. Richard P. Dober, "Campus Planning" - Society for College and University Planning, 1996.
2. Achyut Kanvinde, "Campus design in India", American year Book, 1969
4. Kevin Lynch, "Site planning", MIT Press, Cambridge, 1967
5. Sam F. Miller, "Design Process: A Primer for Architectural and Interior Design", Van Nostrand Reinhold, 1995.

OBJECTIVES:

- To understand Islamic architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Indian context through the evolution of the mosque and tomb in the various phases of Islamic rule in the country.
- To gain knowledge of the expertise of the Mughal rulers in city building and garden design.

UNIT I INTRODUCTION TO ISLAMIC ARCHITECTURE 8

History of Islam: birth, spread and principles - Islamic architecture as rising from Islam as a socio-cultural and political phenomenon- evolution of building types in terms of forms and functions: mosque, tomb, minaret, madarasa, palace, caravanserai, market - character of Islamic architecture: principles, structure, materials and methods of construction, elements of decoration, colour, geometry, light

UNIT II ISLAMIC ARCHITECTURE IN INDIA & ARCHITECTURE OF THE DELHI SULTANATE 12

Advent of Islam into the Indian subcontinent and its impact including the change in the architectural scene- overview of development based on political history and the corresponding classification of architecture - Islamic architecture in India: sources and influences

Establishment of the Delhi Sultanate- evolution of architecture under the Slave, Khalji, Tughlaq, Sayyid and Lodhi Dynasties – tombs in Punjab- important examples for each period

UNIT III ISLAMIC ARCHITECTURE IN THE PROVINCES 8

Shift of power to the provinces and evolution of regional architecture with their own unique influences: geographic, cultural, political, etc., - Bengal, Gujarat, Jaunpur, Malwa, Kashmir, Deccan (Gulbarga, Bidar, Golconda and Bijapur) - important examples for each region

UNIT IV MUGHAL ARCHITECTURE 9

Mughals in India- political and cultural history- synthesis of Hindu-Muslim culture, Sufi movement - evolution of architecture and outline of Mughal cities and gardens under the Mughal rulers: Babur, Humayun, Akbar, Jahangir, Shahjahan, Aurangzeb- important examples- decline of the Mughal empire.

UNIT V CROSS-CULTURAL INFLUENCES 8

Cross cultural influences across India and secular architecture of the princely states: Oudh, Rajput, Sikh, Vijayanagara, Mysore, Madurai- important examples

TOTAL: 45 PERIODS**OUTCOMES:**

- Various criticisms against modernism
- The conditions associated with post modernity in terms of cultural, political conditions etc.
- An understanding of various postmodern directions in architecture
- Architectural responses as reactions to changing cultural paradigms
- An understanding of post independent Indian architecture

REQUIRED READINGS:

1. George Mitchell, "Architecture of the Islamic World - Its History and Social meaning", Thames and Hudson, London 1978.
2. Robert Hillenbrand, "Islamic Architecture- Form, Function and Meaning", Edinburgh University Press 1994.
3. Brown Percy, "Indian Architecture (Islamic Period)", Taraporevala and Sons, Bombay, 1983.
4. Satish Grover, "Islamic Architecture in India", CBS Pub, New Delhi, 2002

REFERENCES:

1. Christopher Tadgell, "The History of Architecture in India", Penguin Books (India) Ltd, New Delhi, 1990.
2. R.Nath, "History of Mughal Architecture", Vols I to III - Abhinav Publications, New Delhi, 1985.
3. Catherine Asher, "Architecture of Mughal India", Cambridge University Press, 2001
4. Monica Juneja, "Architecture in Medieval India: Forms, Contexts, Histories", New Delhi, Permanent Black, 2001

AR6403**ENVIRONMENTAL SCIENCE****L T P C
3 0 0 3****OBJECTIVES:**

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES**10**

Definition, scope and importance of environment – need for public awareness - Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill /mountain.

UNIT II ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY**14**

Concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds; Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT III ENVIRONMENTAL POLLUTION**8**

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.

– wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

OUTCOMES:

1. Students are sensitized on the need for natural resource management, and sustainable lifestyles
2. Students appreciate the value of ecosystem and the need and methods for conserving the same.
3. Students understand the how pollution and hazards can be mitigated.

REQUIRED READING:

1. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education, 2004.
2. Erach Bharucha, "Text book of Environmental Studies", University Press, Hyderabad, 2006.
3. Anubha Kaushik and Kaushik C.P., "Perspectives in Environmental Studies" New age International (P) Ltd., New Delhi, 2005.
4. Venugopala Rao.P, "Principles of Environmental Science and Engineering" Prentice Hall of India Pvt. Ltd., New Delhi, 2006.

REFERENCES:

- 1 Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.
- 2 Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007
- 3 Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005
- 4 Richard T. Wright, "Environmental Science" Prentice Hall of India Pvt. Ltd., New Delhi, 2007

AR6404

BUILDING MATERIALS - IV

**L T P/S C
3 0 0 3**

OBJECTIVES:

- To study ferrous and non ferrous materials in construction.
- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such steel and steel alloys, aluminum and aluminum alloys.
- To inform the innovations in the steel industry and the standards and accepted industrial practices involved.
- To inform the properties, characteristics and application of plastics in the construction industry as well as other light weight roofing materials.

OBJECTIVES:

- To Study Water supply, treatments, distribution and plumbing system for all type of buildings.
- To Study Waste water treatments, Sewer lines for all types of buildings.
- To Study Drainage system for a Small Campus and a Residential neighbourhood.
- To understand Refuse collections, disposal, composting, Landfill, Bio gas for a Town and City.
- Applications of all the above systems to a Buildings, Small Campus and a Residential neighbourhood.

UNIT I WATER QUALITY, TREATMENTS AND DISTRIBUTION 12

Sources of water supply – Water Quality - Water requirements for all type of residential, commercial, Industrial buildings and for town – Water treatment methods – Screening, aeration, Sedimentation, Filtration, Disinfection, Softening, conveyance of water – Distribution of water – Choice of pipe materials - Types of fixtures and fittings – System of plumbing in all type of buildings.

UNIT II WASTE WATER, TREATMENTS AND DISPOSAL 12

Waste water – Sewage disposal, primary treatment. Secondary treatment, Biological treatment and Modern types of Sewage Treatment Plants - Sewer line fixtures and traps, Manholes, Septic tank.

UNIT III STORM WATER DRAINAGE AND RAIN WATER HARVESTING 10

Basic principles of storm water drainage – drain pipes and type of pipe – storm water gutter – rain water harvesting principles – storage sumps

UNIT IV SOLID WASTE, COLLECTIONS, TREATMENTS, DISPOSAL, MODERN DRAINAGE SYSTEMS 12

Refuse collection, disposal, Incinerator, Composting, Vermicomposting, Sanitary Land filling, Bio gas system and Modern renewable energy system. Modern plumbing system, drainage collection system, disposal for a housing colony, small towns – Selection of pumps and Construction of pump rooms.

UNIT V APPLICATION OF THE ABOVE UNITS 14

Layout design and details of water supply distribution system in a Campus or Small residential neighbourhood - Layout design and details of sewage and drainage system for different types of buildings - water supply pipe lines, storm water drainage pipe lines and Rain water Harvesting for small residential neighbourhood.

TOTAL: 60 PERIODS**OUTCOMES**

1. Students have through understanding of how water and waste water are managed, in residential unit, small campus and for a large city.
2. Students are aware of the principles and best practices for Solid waste management in residential unit, small campus and for a large city.

REQUIRED READINGS:

1. Manual of water supply and treatment, Second edition, CPHEEO, Ministry of works and housing, New Delhi, 1977
2. AFE Wise, JA Swaffied Water, "Sanitary & Waste Services in buildings", V Edition, Mitchell Publishing, Co. Ltd., 2002.
3. Punmia B.C., "Waste Water Engineering", Laxmi Publications, 2009.
4. Arceivala S.J., "Waste Water Treatment for Pollution Control", Tata McGraw Hill, 2008.
5. S.C.Rangwala, "Water supply and sanitary engineering", Chartar publishing house, Anand, 1989.

REFERENCES:

1. G.M. Fair, J.C. Geyer and D.Okun, "Water and Waste water engineering", Volume II, John Wiley & Sons, Inc. New York, 1968
2. Manual on sewerage and sewerage treatment, CPHEEO – Ministry of works and housing, New Delhi, 1980
3. Renewable energy, basics and technology, supplement volume on integrated energy systems, Auroville, 1998.

AR6412

BUILDING CONSTRUCTION - III

L T P/S C
0 0 5 3**OBJECTIVES:**

- To introduce construction of building components in Reinforced Cement Concrete.
- To introduce various water proofing, insulation & protection systems and their methods of construction.
- To expose the students to the advanced construction systems developed by research institutes in the country and the detailing of the same.
- To understand the quality assurance measures and testing procedures related to material, workmanship and performance for the above topics.

UNIT I CONCRETE CONSTRUCTION 25

Detailing of walls, roofs and flooring, foundations using RCC in simple framed buildings including detailing of RCC beams, columns, slabs (one way slabs, 2-way slab, continuous, flat slab etc.), detailing of apertures (lintels, sunshades, arches etc..) Exercises of the above through case studies and drawings of selected building types.

UNIT II WATER-PROOFING AND DAMP-PROOFING OF CONCRETE STRUCTURES 10

Construction methods for water-proofing and damp proofing for walls, roofs, basements, retaining walls, swimming pools etc. -Exercises of the above through case studies and drawings.

UNIT III DESIGN AND CONSTRUCTION METHODS FOR CONCRETE STAIRCASES 15

Staircases - basic principles, for different types of staircase for support conditions for stairs and details of handrail, baluster etc. and finishes for stairs - Exercises of the above through case studies and drawings

UNIT IV ADVANCED CONSTRUCTION SYSTEMS DEVELOPED BY RESEARCH ORGANISATIONS IN INDIA 10

Design and detailing of building materials and components developed by research organizations like CBRI, SERC, NBO, and BMTPC – Exercises of the above through case studies and drawings.

UNIT V PLASTICS AND OTHER MATERIALS 15

Design and construction details using primary plastic building products for walls, partitions and roofs. Design and construction details using secondary building products for windows, doors, rooflights, domes, and handrails. Use of GI Sheets, Polycarbonate sheets, Teflon.

TOTAL: 75 PERIODS**OUTCOMES:**

The students understood how Reinforced Cement Concrete could be used for the various components of a building as well as in waterproofing and insulation and protection systems. The role of advanced construction systems that have been developed by research institutes throughout the country were also explored. Quality assurance and testing methods, after looking at the basics and research explorations associated with the materials were looked at.

REQUIRED READING

1. M.S.Shetty, "Concrete Technology", S.Chand & Co.ltd, New Delhi, 1986.
2. Dr. B.C.Punmia, "A Text book of Building Construction", Laxmi Publications Pvt. Ltd., New Delhi, 2005.
3. T.D Ahuja and G.S. Birdie, "Fundamentals of Building Construction", Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1996
4. S.P Arora and S.P Bindra, "A Text Book of Building Construction", Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1990
5. Alan Blanc, "Stairs, Steps and Ramps", Butterworth, Heinemann Ltd., 1999

REFERENCES:

1. Francis D.K. Ching, "Building Construction illustrated", John Wiley & Sons, 2000
2. W.B. McKay, "Building Construction", Vol 1 and 2, Longmans, UK, 1981.
3. Barry, "Construction of Buildings", Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005
4. Pamphlet and Manuals supplied or published by SERC, BMPTC, HUDCO and Other research organization
5. R.M. Davis, "Plastics in Building Construction", Battersea College of Technology, Blackie, London, 1966

AR6413

ARCHITECTURAL DESIGN - III

L T P/S C
0 0 14 7

OBJECTIVES:

- To create a holistic understanding of the socio-cultural, geographic and economic aspects that shape the built environment as well as to expose the students towards the design of simple community oriented buildings.
- To make a comprehensive study of a rural settlement that is an exemplar of collective design evolved organically over a period of time.
- To expose the students on the methodology of conducting various surveys covering, physical, visual characteristics and demographic aspects.
- To understand the vernacular / traditional architecture involving local materials and construction techniques.
- To emphasis on the importance of designing built form and open spaces that meet the aspirations of the community.
- To enable the presentation of concepts through 2D and 3D presentation including sketches and model.

CONTENT:

Scale and Complexity: Projects involving public and community oriented buildings - multi room, single use, small span, multiple storied, horizontal and vertical movement; active cum passive energy; comprehensive analysis of rural settlement in a hierarchical manner.

Area of concern/ focus :

- Rural settlements and architecture
- Community oriented design
- Simple public buildings (not more than Ground+ 2 floors)

Suggestive Typologies/ projects : Rural projects that involve studies and design at settlement and building level- noon meal centre, market, primary health centre; department store, higher secondary school, campus students centre

TOTAL: 210 PERIODS

OUTCOMES

- Students ability to understand the concept of community and settlement evolution and the built environment as influenced by Socio-economic, Cultural, Environmental and Technical factors.
- Ability to provide a sensitive approach to the design of the built environment taking into account the above mentioned factors.

REQUIRED READING

1. Joseph De Chiara, Michael J Crosbie, "Time Saver Standards for Building Types", McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, "Human Dimension and Interior Space", Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, "Time Saver Standards for Interior Design and Space Planning", McGraw Hill, 2001.
4. Ernst Neufert "Architects Data", Blackwell 2002
5. Ramsey et al, "Architectural Graphic Standards", Wiley, 2000

REFERENCES:

1. Richard P. Dober, "Campus Planning", Society for College and University Planning, 1996.
2. Kanvinde, "Campus design in India", American year Book, 1969
3. Kevin Lynch, "Site planning", MIT Press, Cambridge, 1984
4. Sam F. Miller, "Design Process: A Primer for Architectural and Interior Design", Van Nostrand Reinhold, 1995

AR6501

DESIGN OF STRUCTURES - II

L T P/S C

3 0 0 3

OBJECTIVES:

- To inform about the methods of design through working stress and limit state methods.
- To use the above two methods for the design of Concrete beams and slabs under various conditions.
- To use the limit state method for design of a concrete staircase.
- Case studies and models wherever applicable.

UNIT I DESIGN OF CONCRETE MEMBERS AND WORKING STRESS DESIGN OF BEAMS

12

Concept of Elastic method, Ultimate Load Method and Limit State Method – Advantages of Limit State Method over other methods. Analysis and Design of Singly and Doubly reinforced rectangular and flanged beams for bending.

UNIT II LIMIT STATE DESIGN OF BEAMS

12

Analysis and design of singly and doubly reinforced rectangular and flanged beams for Bending – Design of Continuous beams using IS code co-efficient.

UNIT III LIMIT STATE DESIGN OF SLABS

7

Behavior of one way and two way slabs – Design of one way and two way slabs for various edge conditions - Corner effects.

UNIT IV DESIGN OF CIRCULAR SLABS

7

Design of Simply supported and fixed Circular slabs subjected to uniformly distributed loads.

UNIT V DESIGN OF STAIRCASE BY LIMIT STATE METHOD

7

Types of Staircases – Design of Dog Legged Staircase.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Understand the different concepts of WSM and LSD methods using the codal provisions.
- RC beams and slabs to be designed by applying the above concepts.
- Dog legged staircase design using LSD.

REQUIRED READING

1. S.N. Sinha, "Reinforced Concrete Design", Tata McGraw Hill Publishing Co. Ltd, New Delhi, 1998.
2. Shah, "Reinforced Concrete", Vol. 1 and 2, Charotar Publishing House, Anand, 1998.

REFERENCES:

1. P.Dayaratnam, "Design of Reinforced Concrete Structures", Oxford and IBH Publishing Co., 1983.
2. C. Sinha and S.K. Roy, "Fundamentals of Reinforced Concrete", S.Chand & Co., New Delhi, 1983.
3. Dr. B.C. Punmia, "Reinforced Concrete Structures", Vol, 1 & 2 Laxmi publication, Delhi, 2004.
4. IS 456 "Indian Standard, Plain and Reinforced Concrete, Code of Practice, Bureau of Indian Standards, 2000.
5. S.Unnikrishnan Pillai and Devados Menon, "Reinforced Concrete Design" – Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1999.

AR6502

HISTORY OF ARCHITECTURE AND CULTURE - V

L T P/S C
3 0 0 3

OBJECTIVES:

- To introduce the condition of modernity and bring out its impact in the realm of architecture
- To study modern architecture as evolving from specific aspects of modernity- industrialisation, urbanisation, material development, modern art as well as society's reaction to them.
- To study the further trajectories of modern architecture in the post WWII period.
- To create an overall understanding of the architectural developments in India influenced by colonial rule.

UNIT I LEADING TO A NEW ARCHITECTURE 9

Beginnings of modernity –Origin and development of Neo Classicism- Structural Neo classicists: Laugier, Soufflot, Schinkel, Labrouste - Romantic Neo classicists:Ledoux, Boullée, Durand, Jefferson- Industrialization and its impact- Urbanization in Europe and America- split of design education into architecture and engineering streams- Emergent new building / space types- Growing need for mass housing- Development of Industrial material and construction technologies- concrete, glass and steel- structural engineering, standardization-Industrial exhibitions- Chicago School and skyscraper development.

UNIT II REVIEWING INDUSTRIALISATION 6

Opposition to industrial arts and production - Arts and Crafts in Europe and America : Morris, Webb- Art Nouveau: Horta, Van De Velde, Gaudi, Guimard, Mackintosh - Vienna secession: Hoffman, Olbrich- Wright's early works

UNIT III MODERN ARCHITECTURE: DEVELOPMENT AND INSTITUTIONALISATION 12

Adolf Loos and critique of ornamentation- Raumplan: Peter Behrens- Werkbund – Modern architecture and art - Expressionism: Mendelsohn, Taut, Polzeig- Futurism- Constructivism, Cubism-Suprematism- De–Stijl Bauhaus- Gropius, Meyer and Mies -CIAM I to X and its role in canonizing architecture- growth of International Style Ideas and works of Gropius, Le Corbusier, Aalto, Mies, later works of Wright

UNIT IV MODERN ARCHITECTURE : LATER DIRECTIONS 8

Post WW II developments and spread of international style – Later works of Corbusier: Brasilia, Unite- Works of later modernists: Louis Kahn, Paul Rudolph, Eero Saarinen, Philip Johnson

UNIT V COLONIAL ARCHITECTURE IN INDIA 10
 Colonialism and its impact- early colonial architecture :forts, bungalows, cantonments – Stylistic transformations: Neo- classicism, Gothic Revival and Indo Saracenic - PWD and institutionalization of architecture - Building of New Delhi showcasing imperial power.
TOTAL: 45 PERIODS

OUTCOMES:
 The condition of modernity and its impact on architecture has been introduced. The evolution of modern architecture from specific aspects of modernity like Industrialisation, Urbanisation etc and its post-world war II trajectories were studied. An overall understanding of the architectural developments of colonial India was obtained.

- REQUIRED READING:**
1. Kenneth Frampton, “Modern Architecture: A Critical History”, Thames & Hudson, London, 1994.
 2. Manfredo Tafuri., “Modern Architecture”, Harry N. Abrams Inc, 1980.
 3. Leonardo Benevolo, “History of Modern Architecture”, 2 Vols., reprint, MIT Press, 1977.
 4. Miki Desai et. al., “Architecture and independence”, Oxford University Press, 2000.
 5. William J. Curtis, “Modern Architecture since 1900”, Phaidon Press, 1982.

- REFERENCES:**
1. Thomas Metcalf, “An imperial Vision”, Faber & Faber/ Electa, 1980.
 2. Christian Norburg-Schulz., “Meaning in Western Architecture”, Rizzoli, Revised edition, 1993.

AR6511 BUILDING SERVICES- II L T P/S C
2 0 2 3

- OBJECTIVES:**
- To inform the students of the laws and basics of electricity and wiring systems within domestic and commercial buildings
 - To expose the students to the fundamentals of lighting and lighting design
 - To familiarize the students to the basic design principle systems of vertical distributions systems within a building
 - To expose the student with the NBC Code for all of the above building services

UNIT I ELECTRICAL AND ELECTRONIC SYSTEMS: 10
ELECTRICAL WIRING SYSTEMS
 Laws of electrical circuits: Ohms and Kichoffs Laws Basics of electricity – Single/Three phase supply. Earthing for safety – types of earthing - ISI specifications Electrical wiring systems in domestic and commercial buildings. Conduits, Types of wiring Diagram for connection. Bus way, Bus Bars, lighting track and conduits (Aluminum metallic, non metallic) arrangements. Power handling, equipment, switch board, panel boards. Lighting conductors : Purpose, materials, fixing, earthing arrangements Electronic and Communication systems Communication and data systems- communication spaces, pathways, cabling systems, voice and data, communication, Electronic security systems, computer labs/server, Rooms etc. Electrical Installations in Buildings. Main and distribution boards – transformers – switch gears– substations – space requirement and Layout of the same in building types

UNIT II FUNDAMENTALS OF LIGHTING 12
 Principles of light – Electromagnetic radiation, waves, nature of vision, measurement of lighting. Principles of illumination: definitions, Visual tasks, Factors affecting visual tasks Units of light, definitions of flux, solid angle, luminous intensity –utilization factor – depreciation factor- MSCP – MHCP, brightness, glare.

UNIT III ILLUMINATION AND LIGHTING 8
 Electric light sources: brief description, characteristics and application of different types of lamps, methods of mounting and lighting control Luminaries classification/ - Lumen method for design – Room reflectance/ Glare – manufacturer’s data on luminaries / luminaries cost

UNIT IV LIGHTING DESIGN: INSTALLATION AND APPLICATION IN BUILDINGS 18

Artificial light sources, spectral energy distribution, Luminous efficiency- color temperature – color rendering, Additive, subtractive color and their application areas and outdoor lighting Lighting for Office, Schools, Libraries, Residential, Hospital, Parking, Outdoor. Elementary ideas of special features required and minimum level of illumination for the physically handicapped and elderly in building types Solar energy systems for lighting – Photovoltaic systems for Residential/Commercial buildings. Reducing electric loads, installation and maintenance – LEED certification & energy efficient lighting, Lighting controls, Solar systems – Case studies and exercises involving in the above

UNIT V CONVEYING SYSTEMS 12

Basic design Principles, criteria for planning sizing, selection and layout of vertical distribution systems – (lifts, Escalators and moving walkways) along with mechanical, dimensional details Elevators- types of elevators - design criteria, capacity, frequency, car size, speed, number and size of elevators, layout of banks of elevators, planning and locating service cores in buildings, types of elevators – pit, machine room details – NBC code Escalators and Conveyors parallel and criss cross escalators, horizontal belt conveyors, horizontal moving walkways – design criteria, speed size, capacity, number

Detailing for comfort, convenience of users- special features for physically handicapped and elderly - Case studies and exercises involving in the above.

TOTAL: 60 PERIODS

OUTCOMES:

- The students understand the basics of Electricity and wiring system
- The students are exposed to Fundamentals of Lighting and Lighting design
- An Understanding of Vertical transportation system in a building

REQUIRED READINGS:

1. E.P. Ambrose, “Electric Heating”, John Wiley & Sons Inc., New York, 1968.
2. Philips, “Lighting in Architectural Design”, McGraw Hill. New York, 1964.
3. R. G. Hopkenson & J. D. Kay, “The lighting of Buildings”, Faber & Faber, London, 1969.
4. Elevators, Escalators , “Moving Walkways”, Manufactures catalogues, John Wiley, 1967.
5. National Building Code of India, 2005 (NBC 2005)

REFERENCES:

Electrical Systems:

1. Handbook of building Engineers in metric systems, NBO(India), 1968
2. National Building Code of India, 2005 (NBC 2005)

AR6512

SITE ANALYSIS AND PLANNING

L T P/S C

2 0 2 3

OBJECTIVES:

- To teach the importance of site and its content in architectural creations
- To orient the students towards several influencing factors which govern the siting of a building or group of buildings in a given site.
- To teach various techniques of site analysis through exercises and case studies.
- To teach the students the methodology of preparing a site analysis diagram. This will serve as a prelude to any architectural creation through exercises.

UNIT I INTRODUCTION

8

Definition of plot, site, land and region, units of measurements. Introduction to survey, methods of surveying, where they are used, Surveying Instruments and their application. Need for surveying. Measuring and drawing out a site plan from the measurements

UNIT II SITE DRAWINGS 12
 Computation of area by geometrical figures and other methods. Drawing marking out plan, layout plan and centerline plan – Importance, procedure for making these drawings and dimensioning. Setting out the building plan on site – Procedure and Precautions. Exercises on the above.

UNIT III SITE ANALYSIS 16
 Importance of site analysis; On site and off site factors; Analysis of natural, cultural and aesthetic factors – topography, hydrology, soils, vegetation, climate, surface drainage, accessibility, size and shape, infrastructures available - sources of water supply and means of disposal system, visual aspects; Preparation of site analysis diagram. Study of microclimate:- vegetation, landforms and water as modifiers of microclimate. Study of land form;- contours, slope analysis, grading process, grading criteria, functional and aesthetic considerations – Case studies and exercises on the above.

UNIT IV SITE CONTEXT 16
 Context of the site. Introduction to existing master plans land use for cities, development control Rules. Preparation of maps of matrix analysis & composite analysis. Site selection criteria for housing development, commercial and institutional projects - Case studies.

UNIT V SITE PLANNING AND SITE LAYOUT PRINCIPLES 8
 Organization of vehicular and pedestrian circulation, types of roads, hierarchy of roads, networks, road widths and parking, regulations. Turning radii & street intersections

TOTAL: 60 PERIODS

OUTCOMES

- The contextual importance on site analysis can be understood based on the various site factor with respect to the study area.
- A first hand understanding of site drawings for Landscape Architecture and Urban design is studied.
- Various scientific and analytic site analysis techniques is understood.
- A methodological approach for preparation of master plans for small scale and large scale projects can be understood.

REQUIRED READING:

1. Kevin Lynch, “Site planning”, MIT Press, Cambridge, MA, 1984.
2. Edward. T. Q., “Site Analysis”, Architectural Media, 1983.

REFERENCES:

1. B.C.Punmia, Ashok K. Jain, Ashok Kr. Jain, Arun Kr. Jain, “Surveying”, Vol.I, Firewall Media, 2005.
2. P.B.Shahani, “Text of surveying”, Vol. I, Oxford and IBH Publishing Co, 1980
3. Joseph De.Chiarra and Lee Copleman, “Urban Planning Design Criteria”, Van Nostrand Reinhold Co., 1982
4. Storm Steven, “Site engineering for landscape Architects”, John wiley & Sons Inc, 2004.
5. Second Master Plan – Development Regulations – CMDA, 2008

AR6513

BUILDING CONSTRUCTION - IV

L T P/S C
0 0 5 3

OBJECTIVES:

- To understand both in detail the methods of construction using steel for structural purposes such as roof trusses and roof covering.
- To understand both in detail the methods of construction of building components using steel such as staircases, rolling shutters, doors and windows.

- To understand both in detail the methods of construction of building components using aluminum such as doors and windows, partitions and curtain walling.
- To understand both in detail the methods of construction of building components using plastics such as doors and windows, partitions, roofs and curtain walling.
- To understand quality assurance measures and testing procedures related to material, workmanship and performance for the above topics.

UNIT I STEEL CONSTRUCTION INCULDING STAIRCASES 25

Design exercises using structural steel sections for walls, foundations, column-beam connections and design and detailing of steel roof trusses (north-light, butterfly truss, space frames etc.,) including construction methods for roof covering using steel, aluminium, asbestos, etc., for long span structures like furniture, apparel factory etc., - Steel staircases basic principles for different types of staircases - Support conditions for stairs and details of handrail, baluster etc. - finishes for stairs - Exercises of the above through case studies and drawings.

UNIT II STEEL DOORS, WINDOWS AND ROLLING SHUTTERS 10

Different Types of doors and windows (openable, sliding etc., methods of construction using steel) - Design and detailing of steel rolling shutter, collapsible gate etc.- Exercises of the above through case studies and drawings.

UNIT III ALUMINIUM DOORS, WINDOWS AND VENTILATORS 10

Brief study of aluminium products- market forms of aluminium, aluminium extrusions- sketches of the above - Aluminium doors and windows - design details for doors (openable, sliding, pivoted and fixed) - Design details for windows (openable, sliding, fixed, louvered) – Design details for Ventilators (top hung, pivoted and louvered) - Exercises of the above through case studies and drawings.

UNIT IV ALUMINIUM ROOFING, PARTITIONS, STAIRS 15

Aluminium roofing (Northlighting, glazing bar, roofing sheets, construction details including gutter details) - Aluminium partitions (fixed partitions, false ceiling, shop front construction methods and details) - Aluminium staircase - design and construction details- including detailing of handrail and baluster - Exercises of the above through case studies and drawings.

UNIT V ALUMINIUM CURTAIN WALLING 15

Aluminium Curtain walling (design and construction details using aluminium for curtain walls)

TOTAL: 75 PERIODS

OUTCOMES:

- The students are able to understand in detail the method of construction of various building components using steel, aluminum and plastic.
- This also helps the student to understand the different construction practices adapted for the various components specific to the material in which its made.

REQUIRED READING

1. Dr. B.C. Punmia, "A Text book of Building Construction", Laxmi Publications Pvt. Ltd., New Delhi, 2004.
2. T.D Ahuja and G.S. Birdie, "Fundamentals of Building Construction", Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1996

REFERENCES

1. Alan Blanc, "Architecture and Construction in Steel", E & FN Spon, London, 1993
2. Alan Blanc, "Stairs, Steps and Ramps", Butterworth, Heinemann Ltd., 1999
3. W.B. McKay, "Building Construction" Vol. 1 and 2, Longmans, UK, 1981.
4. Barry, "Introduction to Construction of Buildings", Blackwell Publishing Ltd., Oxford, 2005
5. Alan J. Brookes, "Cladding of Buildings", E & FN Spon, London, 1998

OBJECTIVES:

- To explore the design of buildings addressing the socio – cultural & economic needs of contemporary urban society.
- To enable the students to understand the importance of spatial planning within the constraints of Development Regulations in force for urban areas.
- To enable the students to design for large groups of people in a socially and culturally sensitive manner, taking into account aspects such as user perception, crowd behaviour, large scale movement of people and identity of buildings.
- To emphasis on the importance of understanding the relationship between open space and built form, built form to built form and site planning principles involving landscaping circulation network and parking.
- To explore computer aided presentation techniques involving 2D and 3D drawings and models as required.

CONTENT:

Scale and Complexity: Buildings and small complexes that address the social and cultural needs of contemporary urban life (residential. Commercial, institutional) with a thrust on experiential qualities; multi bayed, multiple storied and circulation intensive; passive and active energy Areas of concern/ focus

- behavioral aspects and user satisfaction
- socio-cultural aspects
- designing for the differently abled
- Building byelaws and rules
- Appropriate materials and construction techniques
- Climatic design

Typology/ project: Housing Projects- detached, semi-detached, row housing, cluster housing, apartment; housing and facilities for other user groups- Old age Home, orphanage, working women's hostel, home for physically and mentally challenged; Museum/ Art centre, Educational campus, R & D centre, shopping complex

TOTAL: 210 PERIODS**OUTCOMES**

- Understanding DCR and its applications
- Understanding Campus Planning
- Sensitive to Socio-Economic aspects
- An orientation to Computer Aided Drafting

REQUIRED READING

1. Joseph De Chiara, Michael J Crosbie, "Time Saver Standards for Building Types", McGraw Hill Professional, 2001.
2. Julius Panero, Martin Zelnik, "Human Dimension and Interior Space", Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, "Time Saver Standards for Interior Design and Space Planning", McGraw Hill, 2001.
4. Ernst Neuferts, "Architects Data", Blackwell, 2002
5. Ramsey et al, "Architectural Graphic Standards", Wiley, 2000.

REFERENCES

1. Richard P. Dober, "Campus Planning" - Society for College and University Planning, 1996.
2. Kanvinde, "Campus design in India", American year Book, 1969
3. Kevin Lynch, "Site planning", Literary Licensing, LLC, 2012
4. Sam F. Miller, "Design Process: A Primer for Architectural and Interior Design", Van Nostrand Reinhold, 1995

OBJECTIVES:

- To introduce the context for the critiques of modern architecture and the evolution of new approaches.
- To study in detail the different post modern directions in architecture.
- To understand the trajectory of architecture in India from the end of colonial rule to the contemporary period- architectural debates associated with nation, establishment of modern architecture and subsequent quest for Indianness.

UNIT I CRITIQUING MODERNISM 9

TEAM X- Brutalism- projects of Smithsons and Aldo Van Eyck – writings of Jane Jacobs, Robert Venturi, Aldo Rossi and Christopher Alexander.

UNIT II AFTER MODERNISM – I 10

Conditions of Post Modernity- various postmodern directions in architecture– canonization of Post Modernism– works of Graves, Venturi, Moore- postmodern classicism- ideas and works of urbanism: Soleri, Archigram and Metabolism- Neo Rationalism.

UNIT III AFTER MODERNISM – II 7

High Tech architecture: Works of Stirling, Rogers and Piano – Deconstructivist theory and practice- Eisenmann, Hadid, Gehry, Libeskind, Tschumi

UNIT IV ALTERNATIVE PRACTICES AND IDEAS 7

Critical Regionalism- Ideas and works of Baker, Fathy, Ralph Erskine, Lucien Kroll, Ando, Bawa, Barragan, Siza

UNIT V POST INDEPENDENT ARCHITECTURE IN INDIA 12

Architectural debates associated with nation formation– early modernist architecture- post independence city planning: Chandigarh and Bhuvanesarwar- influences on post independence architects- Architecture of Kanvinde, Raje, Doshi, Correa, Nari Gandhi, Raj Rewal- PWD architecture – new directions after 1960s- post- independent architecture of Chennai

TOTAL: 45 PERIODS**OUTCOMES**

The context for the critique of modern architecture and the evolution of new approaches were introduced. The different post modern directions in architecture were studied in detail. The trajectory of Architecture in post-colonial india was understood.

REQUIRED READING:

1. Kenneth Frampton, “Modern Architecture: A Critical History”, Thames & Hudson, London, 1994.
2. Diane Ghirardo , “Architecture after Modernism”, Thames & Hudson, London, 1990.
3. Miki Desai et. al., “Architecture and independence”, Oxford University Press, 2000
4. Christopher Alexander, “Pattern Language”, Oxford University Press, Oxford, 1977
5. Robert Venturi , “Complexity and Contradiction in Architecture”, 1977.

REFERENCES:

1. Michael Hays ed., “Architecture Theory” since 1968, CBA, 1999
2. Jane Jacobs, “Deaths and Life of Great American Cities”, Vintage, 2003
3. James Steele, “Hassan Fathy”, Academy Editions, 1985
4. Kenneth Frampton ed, “Charles Correa”, The Perennial Press, 1998
5. William Jr. Curtis, “Balkrishna Doshi, An Architecture for India”, Rizzoli, 1988

OBJECTIVES:

- To expose the students to the science behind an air-conditioning and refrigeration system.
- To familiarize them with the various air- conditioning systems and their applications
- To study the design issues for the selection of various systems and their installation
- To inform of the various ways by which fire safety design can be achieved in buildings through passive design.
- To familiarize the students with the various fire fighting equipment and their installation.
- To familiarize the students with the fundamentals of acoustics and principles in designing various built environment.

UNIT I AIR CONDITIONING: BASIC REFRIGERATION PRINCIPLES 4

Thermodynamics – Heat – Temperature – Latent heat of fusion – evaporation, saturation temperature, pressure temperature relationship for liquid refrigerants – condensate cycle, air cycle, chilled water cycle and cooling water cycle – vapor compression cycle – compressors – evaporators – Refrigerant control devices – electric motors – Air handling Units – cooling towers

UNIT II AIR CONDITIONING: SYSTEMS AND APPLICATIONS 12

Air conditioning system for small buildings – window types, evaporative cooler, packaged terminal units and through the wall units split system

b) Case for Central Plant – DX system – Chilled Water System – Air Cooled and Water Cooled condensers – Air Distribution system – VAV & VRV Systems – Low temperature applications - Configuring/ sizing of mechanical equipment, equipment spaces and sizes for chiller plant, cooling tower, Fan room, Circulation Pumps, Pipes, ducts – case studies.

UNIT III AIR CONDITIONING: DESIGN ISSUES AND HORIZONTAL DISTRIBUTION OF SYSTEMS 8

Design criteria for selecting the Air conditioning system for large building and energy conservation measures - Typical choices for cooling systems for small and large buildings - Horizontal distribution of services for large buildings - Grouped horizontal distribution over central corridors, Above ceiling, In floor, Raised access floor, Horizontal distribution of mechanical services – case studies.

UNIT IV FIRE SAFETY: DESIGN AND GENERAL GUIDELINES OF EGRESS DESIGN - FIRE DETECTION AND FIRE FIGHTING AND INSTALLATION 24

Principles of fire behavior, Fire safety design principles _ NBC Planning considerations in buildings – Non- Combustible materials, egress systems, Exit Access – Distance between exits, exterior corridors – Maximum travel distance, Doors, Smoke proof enclosures General guidelines for egress design for Auditoriums, concert halls, theatres, other building types, window egress, accessibility for disabled- NBC guidelines – lifts lobbies, stairways, ramp design, fire escapes and A/C, electrical systems – case studies Fire Detection and Fire Fighting: Heat smoke detectors – sprinkler systems -Fire fighting pump and water requirements, storage – wet risers, Dry rises -Fire extinguishers & cabinets -Fire protection system – CO2 & Halon system - Fire alarm system, snorkel ladder -Configuring, sizing and space requirements for fire fighting equipments.

UNIT V ACOUSTICS 12

Fundamentals – Sound waves, frequency, intensity, wave length, measure of sound, decibel scale, speech and music frequencies, Reverberation time.

Acoustics and building design-site selection, shape volume, treatment for interior surfaces, basic principles in designing open air theatres, cinemas, broadcasting studios, concert halls, class rooms, lecture halls, schools, residences, office buildings including constructional measures and sound reinforcement systems for building types – case studies

TOTAL: 60 PERIODS

OUTCOMES:

- The students are exposed to various air conditioning systems and their applications. They are also exposed to various design issues in the distribution system.
- An understanding of fire safety, fire fighting, fire prevention and installations in buildings including code requirements.
- The students are exposed to fundamentals of acoustics and its applications in buildings

REQUIRED READINGS:

1. William H. Severns and Julian R. Fellows, "Air conditioning and Refrigeration", John Wiley and Sons, London, 1988
2. "Fire Safety: National Building Code of India 1983" published by Bureau of Indian Standards.
3. Dr. V. Narasimhan, "An introduction to building physics", Kabir Printing works, Chennai-5, 1974.
4. David Egan, "Concepts in Architectural Acoustics", 1972.
5. National Building Code of India, 2005 (NBC 2005).

REFERENCES:

1. A.F.C. Sherratt, "Air conditioning and Energy conservation", The Architectural Press, London, 1980
2. Andrew H. Buchanan, "Design for fire safety", First edition John Wiley & Sons Ltd., New York., 2001

AR6612

ARCHITECTURAL DESIGN DEVELOPMENT

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OBJECTIVES:

- To enable students to appreciate the various stages in which architectural drawings are prepared such as Concept Stage, Schematic / Preliminary Stage, Approval Stage, Design Development Stage, Tender Drawings & Documentation Stage and Construction Drawing Stage
- To enable students to appreciate the challenges in detailing for both the newly designed buildings as well as while carrying out additions and alterations to existing buildings.
- To enable students to understand the various Furniture, Fittings & Equipment (FFE) that are needed in buildings and their installation methods.
- To train students towards adopting an integrated approach while dealing with complex buildings incorporating various allied requirements.

**UNIT I INTRODUCTION TO CURRENT DEVELOPMENTS IN
BUILDING INDUSTRY**
10

Smart Materials: Characteristics, classification, properties, energy behaviour, intelligent environments. Recycled and ecological materials and energy saving materials: Straw- bale, card board, earth-sheltered structures, recycled plastics, recycled tyres, paper-crete, sandbags, photovoltaic, solar collectors, light-pipes, wind catchers - Exercises of the above through case studies and drawings.

**UNIT II DETAILING OF WALLS, ROOFS AND FLOORING FOR
INSTITUTIONAL BUILDINGS**
20

- a) Detailing of a residence - selected spaces.
- b) Detailing of classrooms, library (in school, college)
- c) Detailing of lecture hall, auditorium, exhibition spaces
- d) Detailing relevant to a small industrial structure showing wall cladding, insulated roofing, gantry support, floor trenches and industrial doors - Exercises of the above through case studies and drawings

CONTENT:

Scale and Complexity: Advanced and complex problems involving large scale Multi-storeyed buildings and complexes for Residential/ Commercial/ Institutional/ Mixed-Use in an urban context with focus on visual characteristics, service integration and sustainable practices.

Areas of focus/ issues:

- sustainable building practices, green issues, alternative energy
- intelligent building techniques and service integration
- Architectural Detailing
- Advanced building practices

Typology / project: office building, multi-use centre, convention center, multiplex, corporate complex, health care and hospitality building

TOTAL: 210 PERIODS

OUTCOMES:

An ability to understand issues in buildings with respect to density, services and energy consumption as well as make the right choices in design situations involving these issues.

- Understand Green Building concepts and basic principles of sustainable built environment
- Incorporate services Integration
- Understand context based programme & design

REQUIRED READING:

1. Joseph De Chiara, Michael J. Crosbie, "Time Savers Standards for Building Types", McGraw Hill Professional 2001.
2. Ernst Neuferts, "Architects Data", Blackwell, 2002.
3. National Building Code of India, Vol 1-5, 2005.
4. Daniel Williams, "Sustainable Design: Ecology, Architecture & Planning", John Wiley & sons Inc, NJ, 2007.
5. Richard P. Dober, "Campus Architecture: Building in the Groves of Academe", McGraw-Hill, 1996.

REFERENCES:

1. Kevin Lynch, "Site Planning", MIT Press, Cambridge, 1984.
2. Mili Mazumdar, "Energy Efficient Buildings in India", TERI, New Delhi, 2012
3. Diane Tsang, "SPACE Shopping Mall", Pace Publishing, 2011
4. Lara Menzel, "Office Architecture and Design", Braua Publishers 2009.
5. Sheri Koonen, "Prefabulous and Sustainable: Building and Customizing an affordable, Energy efficient home", ABRAMS, 2010.

AR6701

SPECIFICATIONS AND ESTIMATION

L T P/S C
3 0 0 3

OBJECTIVES:

1. To inform to students the need and importance of specification, how to write specification – important aspects of the design of a specification.
2. To inform to students the need for estimation the concept of abstract and detailed estimates based on measurement of materials and works.
3. To inform to students about cost control and about valuation and depreciation
4. To inform students on writing feasibility report of a project.

UNIT I SPECIFICATION

7

Necessity of specification, importance of specification, - How to write specification, - Types of Specification, -Principles of Specification writing, - Important aspects of the design of specification – sources of information – Classification of Specification.

UNIT II SPECIFICATION WRITING 10

Brief Specification for 1st class, 2nd class, 3rd class building. Detailed specification for earthwork excavation, plain cement concrete, Reinforced concrete, first class and second class brickwork, Damp proof course, ceramic tiles/marble flooring and dado, woodwork for doors, windows frames and shutters, cement plastering, painting & weathering course in terrace.

UNIT III ESTIMATION 10

Types & purpose, Approximate estimate of buildings – Bill of quality, factors to be considered, - principles of measurement and billing, contingencies, measurement of basic materials like brick, wood, concrete and unit of measurement for various items of work – abstract of an estimate.

UNIT IV DETAILED ESTIMATE 10

Deriving detailed quantity estimates for various items of work of a building. Like earthwork excavation, brick work, plain cement concrete, Reinforced cement concrete works, wood work, iron works, plastering, painting, flooring, weathering course for a single storied building.

UNIT V CURRENT TRENDS 8

Methods of contracting and its link to specification drafting - the Business Environment and the structure in practice. Valuation, depreciation and its implications – case studies.

TOTAL: 45 PERIODS

OUTCOMES

Students learn the art of building construction through specification writing. Students learn to work out the approximate estimate, detailed estimate for small scale building projects and low cost housing

REQUIRED READING

1. S.C. Rangwala, "Estimating, Costing and Valuation(Professional practice)", 1984
2. B.W. Dutta, "Estimating & Costing" (Revised by S. Dutta), UBS Publishers Distribution P.Ltd. India, 1983
3. M. Chakraborti, "Estimating Costing and Specification", 1984
4. Gurcharan singh & Jagdish singh, "Estimating Costing and Valuation", Standard Publishers Distributors, 2012

REFERENCES

1. T.N. Building practice, Vol:1 Civil Govt Publication.
2. PWD Standard Specifications. Govt Publication, 2012.

AR6702

HUMAN SETTLEMENTS PLANNING

**L T P/S C
3 0 0 3**

OBJECTIVES:

- To have an overview on the vocabulary of Human settlements To understand the various elements of Human Settlements and the classification of Human Settlements
- To familiarize the students with Planning concepts and process in Urban and Regional Planning.

UNIT I INTRODUCTION 9

Elements of Human Settlements – human beings and settlements – nature shells& Net work – their functions and Linkages – Anatomy & classification of Human settlements – Locational, Resource based, Population size & Occupational structure.

UNIT II FORMS OF HUMAN SETTLEMENTS 9

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.

UNIT III PLANNING CONCEPTS 9

Planning concepts and their relevance to Indian Planning practice in respect of Ebenezer Howard – Garden city concepts and contents – Patrick Geddes – Conservative surgery – case study – C.A. Perry – Neighborhood concept Le Corbusier – concept and case studies.

UNIT IV URBAN PLANNING AND URBAN RENEWAL 9

Scope and Content of Master plan – planning area, land use plan and Zoning regulations – zonal plan – need, linkage to master plan and land use plan – planned unit development (PUD) – need, applicability and development regulations - Urban Renewal Plan – Meaning, Redevelopment, Rehabilitation and Conservation – JNNURM – case studies.

UNIT V ISSUES IN CONTEMPORARY URBAN PLANNING IN INDIA 9

Globalization and its impact on cities – Urbanisation, emergence of new forms of developments – self sustained communities – SEZ – transit development – integrated townships – case studies.

TOTAL: 45 PERIODS

OUTCOMES:

1. To explore the students about the dynamics of Urban Form and various Human Settlements pattern
2. To understand the interrelationship between Human Settlements structure and Social Dynamics

REQUIRED READING:

1. C.L.Doxiadis, Ekistics, “An Introduction to the Science of Human Settlements”, Hutchinson, London, 1968.
2. Andrew D.Thomas, “Housing and Urban Renewal”, George Allen and Unwin, Sydney, 1986.
3. “Ministry of Urban Affairs and Employment”, Government of India, New Delhi,1999 ‘
4. “Urban Development Plans: Formulation & Implementation”, Guidelines, 1996.
5. Madras Metropolitan Development Authority, ‘Master Plan for Madras Metropolitan Area, Second Master Plan, 2007.

REFERENCES:

1. Government of India, “Report of the National Commission on Urbanisation”, 1988.
2. Hansen N., “Regional Policy and Regional Integration”, Edward Elgar, UK, 1996.
3. Sandhu. R. S., “Sustainable Human Settlements”, Asian Experience, Rawat publications, 2001.
4. Gastek.P.,“Living Plans:New concepts for advanced housing”, Brikhauser publications, 2005.

AR6703

PROFESSIONAL PRACTICE AND ETHICS

**L T P/S C
3 0 0 3**

OBJECTIVES:

- To give an introduction to the students about the architectural profession and the role of professional bodies and statutory bodies.
- To teach the students about the importance of code of conduct and ethics in professional practice and the mandatory provisions as per Architects Act 1972.
- To expose the students some of the important legal aspects and legislations which have a bearing on the practice of architectural profession.
- To enable the students to grasp the advanced issues concerning professional practice such as tendering, contracting including alternative practices in project execution and project management.
- To expose the students to the implications of globalisation on professional practice with particular reference to WTO and GATS and equip them for international practice.

UNIT I	INTRODUCTION TO ARCHITECTURAL PROFESSION CODE OF CONDUCT AND ETHICS	9
	Importance of Architectural Profession – Role of Architects in Society – Registration of Architects – Architect's office and its management – Location, organisational structure - Infrastructure requirement, skills required, elementary accounts – Tax liabilities.	
	Role of Indian Institute of Architects – Architects Act 1972 (intent, objectives, provisions with regard to architectural practice) – Council of Architecture (role and functions) – Importance of ethics in professional practice – Code of conduct for architects, punitive action for professional misconduct of an architect.	
UNIT II	ARCHITECT'S SERVICES, SCALE OF FEES & COMPETITIONS	9
	Mode of engaging an architect – Comprehensive services, partial services and specialised services – Scope of work of an architect – Schedule of services – Scale of fees (Council of Architecture norms) – Mode of payment – Terms and conditions of engagement – Letter of appointment.	
	Importance of Architectural competitions – Types of competitions (open, limited, ideas competition) – Single and two stage competitions – Council of Architecture guidelines for conducting Architectural competitions – National and International Competitions - Case studies.	
UNIT III	TENDER & CONTRACT	12
	Tender - Definition - Types of Tenders - Open and closed tenders - Conditions of tender – Tender Notice - Tender documents - Concept of EMD - Submission of tender - Tender scrutiny - Tender analysis – Recommendations – Work order - E-tendering (advantages, procedure, conditions).	
	Contract – Definition - Contract agreement - its necessity – Contents (Articles of Agreement, Terms and Conditions, Bills of Quantities and specifications, Appendix) – Certification of Contractors Bills at various stages.	
	New trends in project formulation and different types of execution (BOT, DBOT, BOLT, BOO, etc.) - Execution of projects – The process (Expression of interest, Request for Proposal, Mode of Evaluation of Bids, Award of work)	
UNIT IV	LEGAL ASPECTS	6
	Arbitration (Definition, Advantages of arbitration, Sole and joint arbitrators, Role of umpires, Award, Conduct of arbitration proceedings) – Arbitration clause in contract agreement (role of architect, excepted matters)	
	Easement – (meaning, types of easements, acquisition, extinction and protection)	
	Copy rights and patenting – (provisions of copy right acts in India and abroad, copy right in architectural profession)	
	Consumer Protection Act (Intent, Architects responsibility towards his clients)	
UNIT V	IMPORTANT LEGISLATIONS AND CURRENT TRENDS	9
	Development Regulations in Second Master Plan for CMA, Chennai Corporation Building Rules 1972 - Factories Act – Persons with Disabilities Act – Barrier Free Environment - Coastal Regulation Zone – Heritage Act.	
	Globalisation and its impact on architectural profession – Preparedness for International practice – Entry of Foreign architects in India – Information Technology and its impact on architectural practice.	
	Emerging specialisations in the field of Architecture – Architect as construction / Project manager – Architectural journalism – Architectural photography.	
	TOTAL: 45 PERIODS	

OUTCOMES:

- Understand the role of professional and statutory bodies
- Understand the provisions in Architects Act 1972
- Understand code of conduct
- Understand the process and role of an architect in project execution.

REQUIRED READING:

1. Architects Act 1972.
2. Publications of Handbook on Professional practice by IIA.
3. Publications of Council of Architecture-Architects (Professional conduct) Regulations 1989, Architectural Competition guidelines
4. Roshan Namavati, "Professional practice", Lakhani Book Depot, Mumbai 1984.
5. Ar. V.S. Apte, "Architectural Practice and Procedure", Mrs. Padmaja Bhide, 2008
6. Development Regulations of Second Master Plan for Chennai Metropolitan Area -2026.
7. J.J.Scott, "Architect's Practice", Butterworth, London, 1985

REFERENCES:

1. Second Master Plan – Development Regulations – CMDA, 2008
2. T.N.D.M. Buildings rules, 1972.
3. Consumer Protection Act, 2011
4. Arbitration Act, 2005
5. Persons with Disabilities Act, 1995

AR6711**URBAN DESIGN**

L	T	P/S	C
2	0	2	3

OBJECTIVES:

- To understand the scope and nature of urban design as a discipline
- To introduce the components of a city and their interdependent roles.
- To understand the evolution of historic urban form
- To learn to interpret the city in different ways and layers.
- To create awareness of contemporary urban issues as well as learn about possible ways to address them

UNIT I INTRODUCTION TO URBAN DESIGN 8

Components of urban space and their interdependencies- outline of issues/ aspects of urban space and articulation of need for urban design- scope and objectives of urban design as a discipline

UNIT II HISTORIC URBAN FORM 12

Western: morphology of early cities - Greek agora - Roman forum - Medieval towns- Renaissance place making - ideal cities – Industrialization and city growth - the eighteenth century city builders Garnier's industrial city - the American grid planning- anti urbanism and the picturesque- cite industrielle- cite nuovo-radiant city .

Indian: evolution of urbanism in India- Temple towns - Mughal city form- medieval cities - colonial urbanism- urban spaces in modernist cities: Chandigarh, Bhuvaneshwar and Gandhi Nagar- subsequent directions – case studies.

UNIT III THEORISING AND READING URBAN SPACE 8

Ideas of Imageability and townscape: Cullen, Lynch- place and genius loci- collective memory- historic reading of the city and its artefacts: Rossi- social aspects of urban space: life on streets and between buildings, gender and class, Jane Jacobs, William Whyte

UNIT IV ISSUES OF URBAN SPACE**20**

Understanding and interpreting of urban problems/ issues- place-making and identity, morphology: sprawl, generic form, incoherence, privatized public realm- effects/ role of real estate, transportation, zoning, globalisation - ideas of sustainability, heritage, conservation and renewal- contemporary approaches : idea of urban catalyst, transit metropolis, community participation – studio exercise involving the above.

UNIT V BEST PRACTICE IN URBAN DESIGN**12**

Contemporary case studies from developing and developed economies that offer design guidelines and solutions to address various issues/ aspects of urban space – case studies.

TOTAL: 60 PERIODS**OUTCOMES**

The students understood the role of Urban design as a discipline, and its role in understanding and interpreting a city. Various reading methods were explored, to understand the historical as well as present urban form. They also looked at addressing urban design issues in terms of awareness creation as well as with possible ways to address them.

REQUIRED READING:

1. A.E.J. Morris, "History of Urban Form before the Industrial Revolution", Prentice Hall, 1996
2. Edmund Bacon , "Design of Cities", Penguin, 1976
3. Gordon Cullen, "The Concise Townscape", The Architectural Press, 1978
4. Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999
5. "Time Saver Standards for Urban Design", Donald natson, McGraw Hill, 2003.
6. Kevin Lynch, "The Image of the City", MIT Press, 1960.
7. Rithchie. A, "Sustainable Urban Design: An Environmental Approach", Taylor & Francis, 2000.

REFERENCES:

1. Jonathan Barnett, "An Introduction to Urban Design", Harper Row, 1982
2. Lawrence Halprin, "Cities", Reinhold Publishing Corporation, New York, 1964
3. Gosling and Maitland, "Urban Design", St. Martin's Press, 1984
4. Molcolm Moor, "Urban Design Futures", Routledge, 2006
5. Geoffrey Broadbent, "Emerging Concepts in Urban Space Design", Taylor & Francis, 2003.

AR6712**ARCHITECTURAL DESIGN - VI****L T P/S C****0 0 16 8****OBJECTIVES:**

- To understand the continuity and dynamics of urban form with a thrust on the interrelationships between the disciplines of architecture, urban design and town planning
- To understand the various components and aspects of the urban environment as well as their interrelationships
- To understand in specific components/issues such as public spaces, physical infrastructure, socio-cultural aspects- heritage, gender, class, dynamics of urban growth
- To understand people as users of the urban environment in various scales.
- To explore techniques of mapping and diagramming to understand the dynamic urban environment.
- To take design decisions in a comprehensive manner understanding their implications in the larger context.

CONTENT:

Scale and Complexity: projects involving the urban context and architecture in the urban context with a thrust on understanding interdependencies and formulating appropriate design directions.

- Areas of focus/ issues:
 - exploration of relationship between building and larger context
 - contemporary processes in design
 - appropriate architecture

- addressing issues in urban areas – transportation, sustainability, heritage, sprawl, place making, identity, collective memory
- Mixed use programming

Typology/ project: those involving large scale urban interventions as well as large scale projects which have impact on the urban context- revitalization and renewal of urban fragments, evolving guidelines for heritage areas, adaptive reuse, urban waterfront development, transportation nodes, new communities, multi-use urban complexes.

TOTAL: 240 PERIODS

OUTCOMES

The students looked at various components and aspects associated with the urban environment in terms of physical infrastructure, socio cultural aspects, gender issues etc. and looked at ways to address them through their designs. Mapping and diagramming techniques were explored in the design process to help explore the design process better.

REQUIRED READING:

1. Jonathan Barnett, "An Introduction to Urban Design", Harper & Row, 1982
2. Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999.
3. I. Jawgeih, "Life between Buildings", Using Public Space, Arkitektens Forleg 1987.
4. Donald Watson, "Time Savers Standard for Urban Design", McGraw Hill, 2005.
5. Malcolm moor, "Urban design Futures", Routledge, 2006.

REFERENCES:

1. Edmund Bacon , "Design of Cities" , Penguin, 1976
2. Gordon Cullen, "The Concise Townscape", The Architectural Press, 1978
3. Lawrence Halprin, "Cities", Revised Edition, MIT Press 1972.
4. Gosling and Maitland, "Urban Design", St. Martin's Press, 1984
5. Kevin Lynch, "Site Planning", MIT Press, Cambridge 1967

AR6811

THESIS

L T P/S C
0 0 34 17

OBJECTIVES:

All the architectural design courses offered since semester II culminate in the thesis Project to motivate students to involve in individual research and methodology. This is to train them in handling projects independently.

TOPICS OF STUDY

The main areas of study and research can include advanced architectural design, including contemporary design processes, urban design including urban-infill, environmental design, conservation and heritage precincts, housing etc. However, the specific thrust should be architectural design of built environment. Preparation of presentation drawings, working drawings, detailed drawings and study model are part of the requirements for submission.

METHOD OF SUBMISSION

The Thesis Project shall be submitted in the form of drawings, project report, models, slides, CDs and reports.

TOTAL: 510 PERIODS

OUTCOMES

A comprehensive understanding in handling a major Architectural independently

REQUIRED READING:

1. Linda Grant and David Wang, "Architectural Research Methods", John Wiley Sons, 2002

REFERENCES:

1. Donald Appleyard, "The Conservation of European Cities", M.I.T. Press, Massachusetts, 1979.
2. Richard Kintermann and Robert, "Small Site Planning for Cluster Housing", Van Nostrand Reinhold Company, Jondon/New York 1977.
3. Miller T.G. Jr., "Environmental Sciences", Wadsworth Publishing Co., 1994
4. Geoffrey And Susan Jellico, "The Landscape of Man", Thames And Hudson, 1987.
5. Arvind Krishnan & Others, "Climate Responsive Architecture", A Design Handbook for Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2007

AR6081**PRACTICAL TRAINING - I****L T P/S C
0 0 20 10****OBJECTIVES:**

- To expose students to the daily realities of an architectural practice through Practical Training
- To facilitate an understanding of the evolution of an architectural project from design to execution.
- To enable an orientation that would include the process of development of conceptual ideas, presentation skills, involvement in office discussions, client meetings, development of the concepts into working drawings, tendering procedure, site supervision during execution and coordination with the agencies involved in the construction process.

CONTENT:

The Practical Training -I would be done in offices / firms in India empanelled by the Institution in which the principal architect is registered under the Council of Architecture.

The progress of practical training shall be assessed internally through submission of log books supported by visual documents maintained by students every month along with the progress report from the employer/s of trainees

The students would be evaluated based on the following criteria:

1. Adherence to time schedule, Discipline.
2. Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings.
3. Ability to work as part of a team in an office.
4. .Ability to participate in client meetings and discussions.
5. Involvement in supervision at project site.

At the end of the Practical Training - I, a portfolio of work done during the period of Practical Training along with certification from the offices are to be submitted for evaluation by a viva voce examination. This will evaluate the understanding of the students about the drawings, detailing, materials, construction method and service integration and the knowledge gained during client meetings, consultant meetings and site visits.

OUTCOMES

- Students undertake their practical training in India
- Students learn to work on multiple projects in an office and learn all aspects relating to making of a building starting from Concept Development, Scheme Development, Presentation, Working Drawings, Specifications, Estimation etc. and through site visits students get exposed to practical aspects of making a building and other aspects like client meetings, project planning, project management time management which they are not exposed to in the college.

OBJECTIVES:

- To strengthen further the understanding of students to the nuances of architectural practice through Practical Training
- To facilitate an understanding of the evolution of an architectural project from design to execution.
- To enable an orientation that would include the process of development of conceptual ideas, presentation skills, involvement in office discussions, client meetings, development of the concepts into working drawings, tendering procedure, site supervision during execution and coordination with the agencies involved in the construction process.

CONTENT:

The Practical Training -II would be done in offices / firms in India empanelled by the Institution in which the principal architect is registered with the Council of Architecture if the firm is in India or in an internationally reputed firm established abroad.

The progress of practical training shall be assessed internally through submission of log books supported by visual documents maintained by students every month along with the progress report from the employer/s of trainees.

The students would be evaluated based on the following criteria:

1. Adherence to time schedule, Discipline.
2. Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings.
3. Ability to work as part of a team in an office.
4. Ability to participate in client meetings and discussions
5. Involvement in supervision at project site.

At the end of the Practical Training -II a portfolio of work done during the period of internship along with certification from the offices are to be submitted for evaluation by a viva voce examination. This will evaluate the understanding of the students about the drawings, detailing, materials, construction method and service integration and the knowledge gained during client meetings, consultant meetings and site visits.

OUTCOMES

Students take up internship in any from India or abroad and learn all aspects of making a building as specified in AR8032. In addition to this, students also learn on modern methods of construction using the latest technology and how to handle large scale projects incorporating project planning, project management, etc.

OBJECTIVES:

- To introduce the vocabulary of art and the principles.
- To inform students about the various art forms through the ages within the cultural contexts.
- To study Modern Art and the new directions that evolved in the 19th and 20th centuries.
- To inform the production of art in the Indian context through history and the contemporary manifestations.

UNIT I INTRODUCTION TO ART**6**

Definition of art - need for art – role of art – art reality, perception, representation- categories of art in terms of media and technique - appreciating art: form, content and context

UNIT II VOCABULARY OF ART**8**

Introducing the vocabulary of art constituted by elements (line, shape, form, space, colour, light, value, texture) and principles (unity, variety, harmony, rhythm, balance, proportion, emphasis, contrast, movement)

UNIT III APPRECIATING ART – BEGINNINGS TO MODERN ART 12

Appreciating art through the study of art production in the West from the beginnings to the birth of modern art. Important works from the following art traditions will be studied and analysed in terms of their form, content and context Prehistoric Art - Egyptian and Mesopotamian art Greek and Roman art– Medieval art - Renaissance and Baroque art - Neoclassicism - Romanticism – Realism

UNIT IV APPRECIATING ART- MODERN ART AND AFTER 10

Appreciating art through the study of art production in the West over history from modern art till the present. Important works from the following art traditions will be studied and analysed in terms of their form, content and context :

Context for new directions in art in the late 19th and early 20th century - Impressionism - post Impressionism – Fauvism- Expressionism- Cubism – Dadaism – Surrealism - abstract art – Futurism - Constructivism – Suprematism – De Stijl - Abstract Expressionism - Pop art - Op art- new forms and media of art

UNIT V APPRECIATING ART- INDIAN ART 9

Appreciating art through the study of art production in India over history. Important works from the following art traditions will be studied and analysed in terms of their form, content and context Indus Valley Art - Hindu Buddhist and Jain art - Mughal and Rajput miniatures - art during the colonial period - modern Indian Art.

TOTAL :45 PERIODS

OUTCOMES:

- Students are able to appreciate the art forms and analyse the same and resizing the concept in their architecture profession.
- Gathered information across the world art and the use of art in architecture and its use
- Gathered, sound knowledge on how to art can be effectively used in to architecture and Interior Design.

REQUIRED READING

1. Fred, S. Kleiner, “Gardener’s Art through Ages”, Harcourt College Publishers, 2001
2. Bernard S. Myers, Understanding the Arts, Holt, Rinehart and Winston Inc, 1964
3. Edith Thomory, “A History of Fine Arts in India and the West”, Orient Longman Publisher’s Pvt. Ltd, 1982
4. H.H. Arnason, “History of Modern Art”, Thames and Hudson, 1977.

REFERENCES:

1. Peter and Linda Murray, “The Penguin Dictionary of Art and Artists”, Penguin books 1989.
2. E.H. Gombrich, “The Story of Art”, Phaidon, 2002
3. E.H.Gombrich, “Art and Illsuion”, Phaidon, 2002
4. Artists Handicrafts Association, “Indian Art since the early 1940s- a search for Identity”,1974
5. A.K.Coomaraswamy, “Fundamentals of Indian Art”, Historical Research Documentation Programme, Jaipur, 1985

AR6002

ENERGY EFFICIENT ARCHITECTURE

L T P/S C

3 0 0 3

OBJECTIVES:

- To inform the need to use alternative sources of energy in view of the depleting resources and climate change.
- To familiarise the students with simple and passive design considerations
- To inform about the importance of day lighting and natural ventilation in building design
- To make the students aware of the future trends in creating sustainable built environment.

UNIT I	PASSIVE DESIGN	10
Significance of Energy Efficiency in the contemporary context, Simple passive design considerations involving Site Conditions, Building Orientation, Plan form and Building Envelope - Heat transfer and Thermal Performance of Walls and Roofs		
UNIT II	ADVANCED PASSIVE ARCHITECTURE- PASSIVE HEATING	10
Direct Gain Thermal Storage of Wall and Roof - Roof Radiation Trap - Solarium - Isolated Gain		
UNIT III	PASSIVE COOLING	8
Evaporative Cooling - Nocturnal Radiation cooling - Passive Desiccant Cooling – Induced Ventilation - Earth Sheltering - Wind Tower - Earth Air Tunnels		
UNIT IV	DAY LIGHTING AND NATURAL VENTILATION	5
Daylight Factor - Daylight Analysis - Daylight and Shading Devices - Types of Ventilation - Ventilation and Building Design.		
UNIT V	CONTEMPORARY AND FUTURE TRENDS	12
Areas for innovation in improving energy efficiency such as Photo Voltaic Cells, Battery Technology, Thermal Energy Storage, Recycled and Reusable Building materials, Nanotechnology, smart materials and the future of built environment, Energy Conservation Building code.		

TOTAL: 45 PERIODS

OUTCOMES:

- The students are exposed to alternative sources of energy and are exposed to passive design considerations
- An understanding on day lighting and natural ventilation in design in addition to the future trends in creating sustainable built environment

REQUIRED READING:

1. Manual on Solar Passive Architecture, IIT Mumbai and Mines New Delhi, 1999
2. Arvind Krishnan & Others, "Climate Responsive Architecture", A Design Handbook for Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2001
3. Majumdar M, "Energy-efficient Building in India", TERI Press, 2000.
4. Givoni .B, "Passive and Low Energy Cooling of Buildings", Van Nostrand Reinhold, New York, 1994

REFERENCES:

1. Fuller Moore, "Environmental Control Systems", McGraw Hill INC, New Delhi - 1993
2. Sophia and Stefan Behling, Solpower, "The Evolution of Solar Architecture", Prestel, New York, 1996
3. Patrick Waterfield, "The Energy Efficient Home: A Complete Guide", Crowood press Ltd, 2011.
4. Dean Hawkes, "Energy Efficient Buildings: Architecture, Engineering and Environment", W.W. Norton & Company, 2002
5. David Johnson, Scott Gibson, "Green from the Ground Up: Sustainable, Healthy and Energy efficient home construction", Taunton Press, 2008

AR6003

THEORY OF DESIGN

L T P/S C
3 0 0 3

OBJECTIVES:

- To understand design and the role of the designer in changing society.
- To familiarize the students with methodologies, theories and models of the design process.
- To inform students about the term creativity and introduce techniques which will enable creative thinking.
- To inform the approaches that generate ideas for architectural design and the importance of the participatory approach to design.

UNIT I	INTRODUCTION TO DESIGN	7
Definition and understanding of design- design in history - changing role of designer on society- different classifications of design according to scale, process, mode of production, etc.		
UNIT II	DESIGN METHODOLOGY MOVEMENT	10
Context for the rise of the design methodology movement- theories of the first generation and the second generation design methodologists- various models of the design process- focus on the design problem: ideas of escalation/regression and wicked problem.		
UNIT III	CREATIVE THINKING	10
Understanding the term creativity- theories on thinking: left brain/ right brain, convergent and divergent thinking, lateral and vertical thinking- design spectrum from the logical to chance - blocks in creative thinking- various techniques to generate creativity		
UNIT IV	ARCHITECTURAL CREATIVITY	8
Design puzzles and traps - approaches to generate ideas for architectural design - types of concepts- personal philosophies and strategies of individual designers - channels to creativity in architecture		
UNIT V	DESIGN AND PEOPLE	10
Concept of pattern language- participatory approach to design - design as process		

TOTAL: 45 PERIODS

OUTCOMES:

An ability to think about architecture as one of the many fields under the broader ambit of design as a fundamental human activity.

REQUIRED READINGS:

1. Geoffrey Broadbent, "Design in Architecture, Architecture and the Human sciences", John Wiley & Sons, New York, 1981.
2. Bryan Lawson, "How Designers Think", Architectural Press Ltd., London, 1980.
3. Anthony Antoniades, "Poetics of architecture", Theory of design, John Wiley & sons, 1992.
4. Paul -Alan Johnson, "Theory of Architecture: Concepts, Themes", Wiley 2008 VNR, 1994
5. Christopher Alexander, "Pattern Language", Oxford University Press, 1977

REFERENCES

1. Edward De Bono, "Lateral Thinking", Penguin, 1990.
2. Christopher Jones "Design methods", Wiley, 1980.
3. Tom Heath, "Method in Architecture, John Wiley & Sons, New York, 1984.
4. Nigel Cross, "Developments in Design Methodology", John Wiley & Sons, 1984.
5. Helen Marie Evans, Dumesnil, Carla Davis, "An Invitation to Design", Macmillan Publishing Co., New York, 1982

AR6004	EVOLUTION OF HUMAN SETTLEMENTS	L T P/S C
		3 0 0 3

OBJECTIVES:

- To outline the origins of human settlements and its determinants and their evolution through the course of history.
- To study the characteristics of Human settlements and the manifestation of settlements as expression of political aspirations.
- To understand the changing scenario in the context of globalization.

UNIT I	IMPORTANCE OF EVOLUTION OF HUMAN SETTLEMENTS	9
Origin of civilization, effects of civilization on Human settlements, determinants of Human settlements, ancient towns in India.		

UNIT II	HISTORICAL PERIODS AND GROWTH OF HUMAN SETTLEMENTS	9
	Ancient, medieval, renaissance, industrial and post industrial age	
UNIT III	HUMAN SETTLEMENTS AND THEIR CHARACTERISTICS	9
	Importance of shelter and its form and scale in city, concepts of land marks, axis and orientation, city as living commercial, cultural and functional entities.	
UNIT IV	HUMAN SETTLEMENTS AS POLITICAL EXPRESSION	9
	Washington DC, Brazilia, Pretoria, Milton Keynes, New Delhi. Chandigarh, contributions of Ebenezer Howard, Lewis Mumford, Patrick Geddes, C.A. Doxiadis	
UNIT V	HUMAN SETTLEMENTS IN A CHANGING WORLD	9
	Global city and city orign and Global economy and Trade, information and communication technology and its impact on cities, city of the future and future of cities, Sustainable cities.	

TOTAL: 45 PERIODS

OUTCOMES:

- The students were able to understand the factors which determinants formation of settlements from prehistoric to the contemporary era.
- The students understood the expressions of settlements in terms of cultural, social, economic and political context of a region.
- An understanding how globalization transformed the contemporary settlements.
- The students were able to understand how sustainability is important in the future of any settlement.

REQUIRED READING:

1. Kosambi D.D., The Culture and Civilisation of ancient Indian historical outline, Vikas publishing Home Pvt. Ltd. Delhi, 1994.
2. Sjoberg G, The Preindustrial city, the Force Press, New York, 1960.
3. Combaire J, "How cities Grew", The Florham Press, Madison, N.J., 1959.
4. Dickinson R.E., "The West European City", Routledge and Kegan Paul Ltd., London,1961
5. Sandhu R.S., "Sustainable Human Settlements"; Asian Experience, Rawat Publications, 2001.

REFERENCES:

1. Dutt B., "Town Planning in Ancient India", New Asian Publishers, 1972.
2. Mumford L , "The City in History", Harcourt, Brace, and World, New York, 1961
3. Combaire J, "How cities Grew", The Florham Press, Madison, N.J., 1959.

AR6005

INTERIOR DESIGN

L T P/S C

3 0 0 3

OBJECTIVES:

- To introduce the vocabulary of interior design.
- To familiarize the students with an overview of interior and furniture design and design movements through history.
- To inform the various components of interior space and treatment and finishes for the same.
- To familiarize the students with the various components of interior design like lighting, landscaping and furniture.

UNIT I INTRODUCTION TO INTERIOR DESIGN 8

Definition and process of interior design - vocabulary of interior design in terms of principles and elements - introduction to the design of interior spaces as related to typology and function, themes and concepts

UNIT II HISTORY OF INTERIOR AND FURNITURE DESIGN 8

Overview of interior and furniture design in the Western context through the ages relating to historical context, design movements and ideas -overview of folk arts and crafts of India with reference to their role in interior decoration.

UNIT III COMPONENTS OF INTERIOR SPACE- INTERIOR TREATMENT AND FINISHES 10

Treatment of components such as floors, ceilings, walls, partitions, window treatments, accessories, etc., in terms of their choice and design related to materials, methods of construction, colour, texture, etc., based on functional, aesthetic and psychological criteria

UNIT IV COMPONENTS OF INTERIOR SPACE- LIGHTING AND LANDSCAPING 10

Interior lighting - different types of lighting - types of lighting fixtures- their effects and suitability in different contexts Interior landscaping elements: rocks, plants, water, flowers, fountains, paving, artifacts, etc., their physical properties and effects on spaces

UNIT V COMPONENTS OF INTERIOR SPACE- FURNITURE 9

Furniture design as related to human comfort and function, materials and methods of construction, changing trends and lifestyles, innovations and design ideas - furniture for specific types of interiors: office furniture, children's furniture, residential furniture, display systems, etc.

TOTAL: 45 PERIODS

OUTCOMES:

An understanding of interior design as an interdisciplinary as well as allied field related to architecture.

REQUIRED READING:

1. Francis D.K.Ching, "Interior Design Illustrated", V.N.R. Pub. NY 1987
2. Joseph DeChiara, Julius Panero, Martin Zelnik, "Time Saver's Standards for Interior Design", McGraw-Hill Professional 2001
3. John F.Pile, "Interior Design", John Wiley and Sons 2004
4. Dr.Saranya Doshi, Editor, "The Impulse to adorn - Studies in traditional Indian Architecture", Marg Publications 1982
5. Steport - De - Van Kness, Logan and Szebely, "Introduction to Interior Design", Macmillan Publishing Co NY 1980.

REFERENCES:

1. Helen Marie Evans, "An Invitation to design", Macmillan Pub Co 1982
2. Julius Penero and Martin Zelnik, "Human Dimensions and Interior space", Whitney Library of Design NY 1979
3. "Inca-Interior Design Register", Inca Publications, Chennai 1989
4. Kathryn B.Hiesinger and George H.Marcus, Landmarks of twentieth Century Design; Abbey Ville Press 1993
5. Susanne Slesin and Stafford Cliff, Indian Style, Clarkson N. Potter, New york 1990.

AR6006

STRUCTURE AND ARCHITECTURE

**L T P/S C
3 0 0 3**

OBJECTIVES:

- To study evolution of structural systems through history.
- To familiarise the students with concepts of structural design through works of architects/ engineers.
- To study architectural expression through relevant case studied.
- To evaluate the understanding of the relationship between form & structure through a seminar.

UNIT I HISTORY OF STRUCTURAL DESIGN IN THE PRE INDUSTRIAL ERA 8

Development of monolithic and rock cut structures- trabeated construction-arcuate construction-vaults and flying buttresses- tents and masted structures and bridges through ancient and medieval history.

UNIT II HISTORY OF STRUCTURAL DESIGN IN THE POST INDUSTRIAL PERIOD 8

Post Industrial modular construction of large span and suspension structures in steel and concrete- projects of Pier Luigi Nervi, Maillart, Candella, Buckminster Fuller and Eero Saarinen.

UNIT III CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – I 13

The select case studies could include KCR Terminal at Hung Hom, Hong Kong, B3 Offices in Stockley Park , Sainsbury Centre for Visual Art, Renault Centre and Swindon UK by Norman Foster and Standsted Airport Terminal, London, UK by Fosters/Arup British Pavilion EXPO 1992, Seville, Spain and Waterloo International Terminal by Nicholas Grimshaw

UNIT IV CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – II 10

The select case studies could include Inmos Microchip Factory, Centre Commercial St. Herbain, PA Technology, Princeton and Fleetguard, Quimper UK by Richard Rogers Athens Olympic Stadium and Village, Bridges and Public Bus Stop in St. Gallen , Railway Station, Lyon, France and Stadelhofen Railway station, Zurich Schweiz by Santiago Calatrava Kansai International Airport, UNESCO Workshop, the Jean-Marie Tjibaou Cultural Center, Menil Museum, Thomson Optronics Factory, IBM Traveling Exhibition Pavilion, Columbus International Exposition, Genoa Italy and Lowara Officers, Montecchio Maggiore Italia by Reno Piano Building Workshop

UNIT V SEMINAR 6

Seminar to present a study of architectural form and structural expression through select cases which will aid understanding of structural philosophy and analysis, building envelope and services and construction sequence.

TOTAL: 45 PERIODS

OUTCOMES

1. The student will understand and familiarize the concepts of structural design and its impact/ functional dimension in the architectural design of the historic and contemporary buildings.
2. The student will be acquainted with the architectural expression, its relation between form and structure through relevant case studies.

REQUIRED READING:

1. Shigeru Ban, McQuaid, Matilda, Engineering and Architecture: Building the Japan Pavilion, Phaidon Press Ltd, UK, 2008
2. Cox Architects, The images publishing group, Australia, 2000
3. Masted structures in architecture, James B Harris, architect.; Kevin Pui-K Li, Oxford ; Boston : Architectural Press, 2003

REFERENCES

1. Martorell, Bohigas & Mackay, Pavilion of the Future, Expo 92, Seville (MBM), 1992.
2. P. COX, Daring Harbour Expo Center, Sydney Australia
3. Enric Miralle & Carme Pinos, Olympic Archery Building, 857072 COH
4. Prada Aoyama Tokyo Herzog & De Meuron. *Milan, IT: Progetto Prada Arte Srl, 2003*
5. Christopher Beorkrem, Material Strategies in Digital Fabrication, Routledge, Taylor & Francis Group, 2013

OBJECTIVES:

- To introduce the study of vernacular architecture as a process and not a product.
- To provide an overview of the various approaches and concepts to the study of vernacular architecture.
- To study the various vernacular architecture forms in the various regions of the country.
- To look at the impact of Colonial rule on the vernacular architecture of India.

UNIT I INTRODUCTION**6**

Definition and classification of Vernacular architecture – Vernacular architecture as a process – Survey and study of vernacular architecture: methodology- Cultural and contextual responsiveness of vernacular architecture: an overview

UNIT II APPROACHES AND CONCEPTS**9**

Different approaches and concepts to the study of vernacular architecture: an over view – Aesthetic, Architectural and anthropological studies in detail

UNIT III VERNACULAR ARCHITECTURE OF THE WESTERN AND NORTHERN REGIONS OF INDIA**12**

Forms spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction technique of the vernacular architecture of the following:

- Deserts of Kutch and Rajasthan; Havelis of Rajasthan
- Rural and urban Gujarat; wooden mansions (havelis); Havelis of the Bohra Muslims
- Geographical regions of Kashmir; house boats

UNIT IV VERNACULAR ARCHITECTURE OF SOUTH INDIA**8**

Forms, spatial planning, cultural aspects, symbolism, art, colour, materials of construction and construction technique, proportioning systems, religious beliefs and practices in the vernacular architecture of the following:

- Kerala: Houses of the Nair & Namboothri community; Koothambalam, Padmanabhapuram palace.
- Tamil Nadu: Houses and palaces of the Chettinad region; Agraharams.

UNIT V WESTERN INFLUENCES ON VERNACULAR ARCHITECTURE OF INDIA**10**

Colonial influences on the Tradition Goan house - Evolution of the Bungalow from the traditional bangla, Victoria Villas – Planning principles and materials and methods of construction. Settlement pattern and house typologies in Pondicherry and Cochin.

TOTAL: 45 PERIODS**OUTCOMES:**

- An Understanding on the study of Indian vernacular architecture as a process and also to provide and overview of various approaches and concepts.
- An exposure to various vernacular architectural forms in various regions
- An understanding on the impact of colonial rule on vernacular architecture in India.

REQUIRED READINGS:

1. Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997.
2. Amos Rapoport, House, Form & Culture, Prentice Hall Inc. 1969.
3. R W Brunskill: Illustrated Handbook on Vernacular Architecture, 1987.

REFERENCES:

1. V.S. Pramdar, Haveli – Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
2. Kulbushanshan Jain and Minakshi Jain – Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad 1992.

3. G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.
4. Carmen Kagal, VISTARA – The Architecture of India, Pub: The Festival of India, 1986.
5. S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 2000

AR6008

EARTHQUAKE RESISTANT ARCHITECTURE

L T P/S C
3 0 0 3

OBJECTIVES:

- To understand the fundamentals of Earthquake and the basic terminology
- To provide basic knowledge of earthquake resistant design concepts
- To inform the performance of ground and buildings.
- To familiarise the students with design codes and building configuration
- To understand the various types of construction details to be adopted in a seismic prone area.
- To apply the knowledge gained in an architectural design assignment

UNIT I

7

Fundamentals of earthquakes

- a) Earths structure, seismic waves, plate tectonics theory, origin of continents, seismic zones in India.
- b) Predictability, intensity and measurement of earthquake
- c) Basic terms- fault line, focus, epicentre, focal depth etc.

UNIT II

8

Site planning, performance of ground and buildings

- a) Historical experience, site selection and development
- b) Earthquake effects on ground, soil rupture, liquefaction, landslides.
- c) Behaviour of various types of building structures, equipments, lifelines, collapse patterns
- d) Behaviour of non-structural elements like services, fixtures in earthquake-prone zones

UNIT III

8

Seismic design codes and building configuration

- a) Seismic design code provisions – Introduction to Indian codes
- b) Building configuration- scale of building, size and horizontal and vertical plane, building proportions, symmetry of building- torsion, re-entrant corners, irregularities in buildings- like short stories, short columns etc.

UNIT IV

10

Various types of construction details

- a) Seismic design and detailing of non-engineered construction- masonry structures, wood structures, earthen structures.
- b) Seismic design and detailing of RC and steel buildings
- c) Design of non-structural elements- Architectural elements, water supply, drainage, electrical and mechanical components

UNIT V

12

Urban planning and design

- a) Vulnerability of existing buildings, facilities planning, fires after earthquake, socio-economic impact after earthquakes.
- b) Architectural design assignment- Institutional masonry building with horizontal spread and height restriction, multi-storeyed RC framed apartment or commercial building

TOTAL: 45 PERIODS

OUTCOMES

Students ability to understand the formation and causes of Earthquakes and factors to be considered in the Design of buildings and services to resist Earthquakes.

REQUIRED READING:

1. Guidelines for earthquake resistant non-engineered construction, National Information centre of earthquake engineering (NICEE, IIT Kanpur, India), 2004.
2. C.V.R Murthy, Andrew Charlson. "Earthquake design concepts", NICEE, IIT Kanpur, 2006.
3. Agarwal.P, Earthquake Resistant Design, Prentice Hall of India, 2006.

REFERENCES

1. Ian Davis, "Safe shelter within unsafe cities: Disaster vulnerability and rapid urbanization", Open House International, UK, 1987
2. Socio-economic developmental record- Vol.12, No.1, 2005
3. Mary C. Comerio, Luigia Binda, "Learning from Practice- A review of Architectural design and construction experience after recent earthquakes" - Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto, Italy.

AR6009

LANDSCAPE AND ECOLOGY

L T P/S C
3 0 0 3

OBJECTIVES:

- To familiarize students with the various elements of landscape architecture and the principle of landscape design.
- To provide an overview of ecological balance and impacts of human activities and stress the need for environmental protection and landscape conservation.
- To develop and strengthen the competence in dealing with the analytic, artistic and technical aspects of designing open spaces at different scales.

UNIT I INTRODUCTION 7

Introduction to landscape architecture, ecology, ecological balance, landscape conservation, reclamation and landscaping of derelict lands, environmental impact assessment.

UNIT II ELEMENTS IN LANDSCAPE DESIGN 10

Hard and soft landscape elements; Plant materials - classification, characteristics, use and application in landscape design; Water and Landform,

UNIT III GARDEN DESIGN 10

Landscape and garden design in history - Japanese, Italian Renaissance and Moghul gardens in India, Study of notable examples, Spatial development in landscape design.

UNIT IV SITE PLANNING 10

Organisation of spaces - circulation, built form and open spaces, site planning and micro climate, site planning for neighbourhood parks, children's play area and campus development.

UNIT V LANDSCAPING OF FUNCTIONAL AREAS 8

Urban open spaces and principle of urban landscape; Street landscaping, landscape design for waterfront areas and functional areas in urban centers; green roofs and walls.

TOTAL: 45 PERIODS

OUTCOMES

- i) Understanding of the scope of landscape architecture in the subject
- ii) Basic understanding of elements of landscape
- iii) Understanding of impact of human activities on the environment and the role of architect in mitigating it

REFERENCES :

1. P. Dayarathnam, "Prestressed concrete structures", Oxford and IBM publishing Co., New Delhi, 1982
2. Wolfgang Schueller, "High Rise Building Structures", John Wiley & sons, New York 1976.
3. Frei Otto, "Tensile structures", Volume 1, Pneumatic structures, Volume 2, cable structures . The MIT press, London, 1967.
4. Tall Building structures, "Analysis & Design", Bryan Stafford smith. John wiley, 1991.
5. Thomas Herzog, "Pneumatic structures", Crosby Lockwood staples, London, 1977.

AR6011

ARCHITECTURAL JOURNALISM AND PHOTOGRAPHY

L T P/S C
3 0 0 3

OBJECTIVES:

- To provide basic introduction to the skills relevant to the practice of professional journalism. It introduces students to the fundamentals of writing, explaining of various strategies and their criticism.
- Introduction to Photojournalism and the contributions of photography to the professional practice of architecture and develop proficiency in this art using modern photography techniques.

UNIT I INTRODUCTION

9

Introduction to journalism, key concepts and objectives of Journalism – Specialized journalism: with emphasis on architectural journalism - Journalism skills: research, reporting, writing, editing, photography, columnists, public relationships, criticism.
Issues such as copyright, public art policy, the arts and urban redevelopment. Introduction to local culture scene.

UNIT II TECHNOLOGIES IN JOURNALS

9

Environment, Social Change, Persuasion- Interviewing techniques, Argument and debate as a technique in the investigation of social problems; evidence, proof, refutation, persuasion; training in argumentative speaking.

Introduction to software needed in journalism and photography, video coverage, walk-through of buildings, production of contemporary architectural journalism. Understanding the individual demands in the context of newspapers, radio, film, and television.

UNIT III CONTEMPORARY ARCHITECTURAL JOURNALISM

9

Role of the Editor - Editing of Articles, Features and other stories - Editing for online newspaper and magazines - Text preparation, Mode of presentation, Standards and Guidelines for documentation, Code of ethics, Basic knowledge on Press laws, Press Council of India, Multimedia/online journalism and digital developments.

UNIT IV DISCUSSIONS AND ISSUES

9

Regional, National and International discussion forums, Changes in contemporary and historical design practices. Discussions on topics needed in an architectural journal and current issues - types of journals, works of key architectural journalists, Public Discourse on the Internet, Mass Media and Public Opinion – critique on selected pieces of journalism.

UNIT V ARCHITECTURAL PHOTOGRAPHY

9

Introduction to architectural photography and role of the photographic image in the global world – basic instruction in Photojournalism
Equipment: cameras and lenses – techniques: film speed, exposure measurement, gray scale– photo- finishing and editing digital images.
Perspectives: Single Point, Two- Point, Three- Point and methods of correcting distortions –
Lighting: External and Interior

TOTAL: 45 PERIODS

OUTCOMES:

An ability to critically think and analyse about the effects of architecture on society as well as the tools to enable recording of the same.

REQUIRED READING

1. Edward Jay Friedlander and John Lee, "Feature Writing for Newspapers and Magazines", 4th edition, Longman, 2000.
2. Fuller, David & Waugh, Patricia eds., "The Arts and Sciences of Criticism", Oxford: Oxford University Press, 1999
3. Foust, James, Online Journalism, "Principles and Practices of News for the Web", Holcomb Hathaway Publishers, Scottsdale, AZ, 2005
4. M. Harris, "Professional Architectural Photography", Focal Press, 2001.
5. M. Harris, "Professional Interior Photography", Focal Press, 2002

REFERENCES:

1. Huckerby, Martin., The Net for Journalists: A Practical Guide to the Internet for Journalists in Developing Countries. UNESCO/Thomson Foundation/ Common wealth Broadcasting Association, 2005.
2. Ward, S. J. A. "Philosophical Foundations of Global Journalism Ethics." Journal of Mass Media Ethics., Vol. 20, No. 1, 3-21, 2005
3. M . Heinrich, "Basics Architectural photography", Birkhauser Verlag AG, 2008.
4. Gerry Kopelow, "Architectural Photography: the professional way", 2007

AR6012

CONSTRUCTION AND PROJECT MANAGEMENT

L T P/S C
3 0 0 3

OBJECTIVES:

- The understand different management techniques suitable for planning and constructional projects.
- To understand the management system for accomplishing the task efficiently in terms of both time and cost.

UNIT I INTRODUCTION TO PROJECT MANAGEMENT 4
 Project management concepts-objectives, planning, scheduling Controlling and role of decision in project management. Traditional management system, Gantt’s approach, Load chart. Progress Chart, Development of bar chat, Merits and Demerits.

UNIT II PROJECT PROGRAMMING AND CRITICAL PATH METHOD 15
 Project Network-Events Activity, Dummy, Network Rules, Graphical Guidelines for Network, Umbering the events, Cycles, Development of Network-planning for Network Construction, Models of Network construction, steps in development of Network. Work Break Down Structure, hierarchies. Concepts: critical path method-process, activity time estimate, Earliest Event time, Lastest allowable Occurrence time, start and finish time of activity, float, critical activity and critical path-problems.

UNIT III ANALYSIS 6
 Cost model-Project cost, direct cost, indirect cost, slope curve, Total project cost, optimum duration contracting the network for cost optimization. Steps in cost optimization, updating, resource allocation-resource smoothing, resource leveling.

UNIT IV PROGRAMMING EVALUATION REVIEW TECHNIQUE 10
 PERT network, introduction to the theory of probability and statistics. Probabilistic time estimation for the activities for the activities of PERT Network.

UNIT V CONSTRUCTION MANAGEMENT 9
 Overview of construction management topics including estimating, cost control, quality control, safety, productivity, value engineering, claims, and legal issues.

TOTAL : 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Apply the concepts for large span structures.
- Concepts of construction management, planning and scheduling: apply them with examples.
- Materials storage and equipments for construction to be known before beginning of the work.

REQUIRED READINGS:

1. R. Chudley, Construction Technology, Pearson, 2005.
2. R. Barry, The Construction of Buildings, The English Language Book Society and Crosby Lockwood, Staples, London, 1976.
3. Construction Planning equipment and Methods by RL Peuriboy Tata McGraw Hill, 1979
4. Modern Construction and Management. Frank Harris John Wiley and Sons, 1983.

REFERENCES:

1. National Building Code of India, 2005 (NBC 2005)
2. Frank R. Dagostino, Materials of Construction, Details given Reston Publishing Company, nc. Virginia, 1976.
3. M. Mohsin, Project Planning and Control, Vikas Publishers, New Delhi, 1983
4. Concrete Technology – Theory and Practice, M.S. Shetty, Chand & Co, New Delhi, 2005.
5. Gurcharan Singh, “Building, Planning, Designing and Scheduling”, Standard Publications, 2009.

AR6014 CONTEMPORARY PROCESSES IN ARCHITECTURE L T P/S C
3 0 0 3

OBJECTIVES:

- To investigate various theories of media and its influence on the perception of space.
- To study the various aspects of Digital Architecture and its exploration through emerging phenomena that relies on abstraction of ideas.
- To study the works of contemporary architects who have illustrated the influence of the digital media in evolving architecture. This is to be presented as Seminars.\

UNIT I INTRODUCTION 6

Investigation of contemporary theories of media and their influence on the perception of space and architecture. Technology and Art – Technology and Architecture – Technology as Rhetoric – Digital Technology and Architecture

UNIT II ASPECT OF DIGITAL ARCHITECTURE 9

Aspects of Digital Architecture – Design and Computation – Difference between Digital Process and Non-Digital Process – Architecture and Cyber Space – Qualities of the new space – Issues of Aesthetics and Authorship of Design – Increased Automatism and its influence

UNIT III CONTEMPORARY PROCESS 10

Emerging phenomena such as increasing formal and functional abstractions – Diagrams – Diagrammatic Reasoning – Diagrams and Design Process – Animation and Design – Digital Hybrid

UNIT IV GEOMETRIES AND SURFACES 10

Fractal Geometry – Shape Grammar - Hyper Surface - Liquid Architecture – Responsive Architecture.

UNIT V SEMINAR**10**

Students would make presentation on the ideas and works of the following architects. The proposal must be discussed with course faculty prior to presentation. Greg Lynn, Reiser + Umemotto, Lars Spuybroek / NOX Architects, UN studio, Diller Scofidio, Dominique Perrault, Decoi, Marcos Novak, Foreign Office Architects, Asymptote, Herzog and de Meuron, Neil Denari.

TOTAL: 45 PERIODS**OUTCOMES**

- Students would be able understand the effect of contemporary theories of media on contemporary architectural design.
- Student shall gain insight to the various contemporary design process/theories and their relation to computation.
- Students would be able to identify and go in depth into specific and appropriate aspects relating to the discipline of architecture and reflect this in the realm of design

REQUIRED READING

1. Work of Architecture in the Age of Mechanical Reproduction, Differences MIT press, 1997.
2. Peter Eisenman, Vision Unfolding, Architecture in the Age of Electronic Media, 1992.
3. William J Mitchell, the Logic of Architecture: Design, Computation and Cognition. MIT Press, Cambridge, 1995
4. Ali Rahim, "Contemporary Process in Architecture", John Wiley & Sons, 2000
5. Contemporary Techniques in Architecture", Halsted Press, 2002

REFERENCES:

1. Gillian Hunt, "Architecture in the Cybernetic Age", Architectural Design Profile no.136,1998
2. Sarah Chaplin, "Cyberspace Linger on the Threshold", (architecture, postmodernism and difference, Architectural Design Profile No. 118: Architects in Cyberspace, 32-35, London: Academy Edition, 1995
3. Rob Shields (ed.), "Cultures of the internet: Virtual Spaces, Real Histories, Living bodies", Sage, London, 1996
4. John Beckman, The Virtual Dimension, Architecture, Representation and Crash Culture, Princeton Architecture Press, 1998.
5. William J Mitchell, "City of bits: Space, Place and the Infobahn". MIT Press, Cambridge, 1995

AR6015**SUSTAINBLE PLANNING AND ARCHITECTURE****L T P/S C
3 0 0 3****OBJECTIVES:**

- To understand the concept of sustainability and sustainable development
- To inform the various issues like climate change, ecological footprint, etc.
- To understand low impact construction practices, life cycle costs and alternative energy resources.
- To familiarize the students with the various rating systems for building practices with case studies.
- Through case studies to understand the concept of sustainable communities and the economic and social dimensions.

UNIT I**7**

Concept of Sustainability – Carrying capacity, sustainable development – Bruntland report – Ethics and Visions of sustainability.

UNIT II**8**

Eco system and food chain, natural cycles – Ecological foot print – Climate change and Sustainability.

UNIT III **10**
 Selection of materials Eco building materials and construction – Biomimicry, Low impact construction, and recyclable products and embodied energy. Life cycle analysis. Energy sources – Renewable and non-renewable energy.

UNIT IV **10**
 Green building design – Rating system – LEED, GRIHA, BREEAM etc., case studies.

UNIT IV **10**
 Urban ecology, social and economic dimensions of sustainability, urban heat Island effects, sustainable communities – Case studies.

TOTAL: 45 PERIODS

OUTCOMES:

1. The students are oriented about the concepts of ecosystem carrying capacity, ecological footprint, sustainability and sustainable development.
2. The students are aware of the emerging vulnerabilities of global warming and climate change and understand the contribution of building industry to the same.
3. The students are familiar with the various approaches to achieving sustainable buildings and communities
4. The students understand the various incentives and evaluation systems for green buildings

REFERENCES:

1. Dominique Gauzin – Muller “Sustainable Architecture and Urbanism: Concepts, Technologies and examples”, Birkhauser, 2002.
2. Slessor, Eco-Tech : “Sustainable Architecture and High Technology”, Thames and Hudson 1997.
3. Ken Yeang, “Ecodesign : A manual for Ecological Design”, Wiley Academy, 2006.

REQUIRED READINGS:

1. Arian Mostaedi , “Sustainable Architecture : Low tech houses”, Carles Broto, 2002.
2. Sandra F.Mendler & Willian Odell, “HOK Guidebook to Sustainable Design”, John Willey and sons, 2000.
3. Richard Hyder, “Environmental brief:Pathways for green design”, Taylor and Francis, 2007.
4. Brenda Vale and Robert Vale, “Green Architecture: Design for a sustainable future”, Thames and Hudson 1996.

AR6016	ARCHITECTURAL CONSERVATION	L T P/S C
		3 0 0 3

OBJECTIVES:

- To introduce the various issues and practices of Conservation.
- To familiarise the students with the status of conservation in India and the various agencies involved in the field of conservation worldwide and their policies.
- To outline the status of conservation practice in the country and the various guidelines for the preservation, conservation and restoration of buildings.
- To inform the students about the character and issues in our heritage towns through case studies.

UNIT I INTRODUCTION TO CONSERVATION **9**
 Understanding Heritage. Types of Heritage. Heritage conservation- Need, Debate and purpose. Defining Conservation, Preservation and Adaptive reuse. Distinction between Architectural and Urban Conservation. International agencies like ICCROM, UNESCO and their role in Conservation

UNIT II CONSERVATION IN INDIA **9**
 Museum conservation – monument conservation and the role of Archeological Survey of India – role of INTACH – Central and state government policies and legislations – inventories and projects- select case studies of sites such as Hampi, Golconda, Mahabalipuram - craft Issues of conservation

UNIT III CONSERVATION PRACTICE 9

Listing of monuments- documentation of historic structures- assessing architectural character – historic structure report- guidelines for preservation, rehabilitation and adaptive re-use of historic structures- Case studies of Palaces in Rajasthan, Chettinad and Swamimalai dwellings, seismic retrofit and disabled access/ services additions to historic buildings-heritage site management

UNIT IV URBAN CONSERVATION 9

Over view of urban history of India and Tamil Nadu- understanding the character and issues of historic cities – select case studies of towns like Srirangaram, Kumbakonam and Kanchipuram-historic districts and heritage precincts.

UNIT V CONSERVATION PLANNING 9

Conservation as a planning tool.- financial incentives and planning tools such as Transferable Development Right(TDR)-urban conservation and heritage tourism-case studies of sites like for Cochin, Pondichery French town.- conservation project management.

TOTAL: 45 PERIODS

OUTCOMES

1. The student understands importance of heritage, issues and practices of conservation through case studies.
2. The student will gain understanding on historic materials and their properties various technologies for investigating masonry, foundation and also traditional and modern repair methods.

REQUIRED READING:

1. Donald Appleyard, "The Conservation of European Cities", M.I.T. Press, Massachusetts, 1979.
2. James M. Fitch, "Historic Preservation: Curatorial Management of the Built World" University Press of Virginia; Reprint edition, 1990
3. Robert E. Stipe, A Richer Heritage: Historic Preservation in the Twenty-First Century" , Univ. of North Caroling press, 2003.
4. Conservation Manual , Bernard Fielden; INTACH Publication, 1989.

REFERENCES:

1. B.K. Singh, "State and Culture", Oxford, New Delhi
2. A.G. K. Menon ed. "Conservation of Immovable Sites", INTACH Publication, N.Delhi., 1988
3. Seminar Issue on Urban Conservation

AR6017	URBAN HOUSING	L T P/S C
		3 0 0 3

OBJECTIVES:

- To outline the Issues concerning housing in the Indian Context and the various agencies involved in the production of housing.
- To outline factors that influence housing affordability and to familiarize students with various schemes and policies of the government in the housing sector.
- To inform about the standards and guidelines for housing
- To inform about the various housing design typologies and the processes involves in housing project development.

UNIT I INTRODUCTION TO HOUSING AND HOUSING ISSUES – INDIAN CONTEXT 10

Housing and its importance in Architecture and its relationship with neighbourhood and city planning.

Housing demand and supply – National Housing Policy – Housing agencies and their role in housing development – impact of traditional life style – Rural Housing, Public, private sector housing.

UNIT II SOCIO-ECONOMIC ASPECTS 10

Social economic factors influencing housing affordability – equity in housing development sites and services/-slum upgradation community participation – **Rajiv** Awas Yojana Crime prevention, Health principles in Housing.

UNIT III HOUSING STANDARDS 7

UD PFI – guide lines, standard and regulations – DCR – performance standards for housing.

UNIT IV SITE PLANNING AND HOUSING DESIGN 10

Site Planning : Selection of site for housing, consideration of physical characteristics of site, locational factors, orientation, climate, topography – Landscaping- Housing design - Traditional housing, row housing, cluster housing – apartments and highrise housing relating to Indian situations – case studies in India – integration all types of services, parking, incorporation of green sustainable practices –prefabrication in housing.

UNIT V HOUSING PROCESS 8

Various stages and tasks in project development – community participation and housing management – Environmental aspects and national calamities and disaster mitigation.

TOTAL: 45 PERIODS

OUTCOMES

Ability to understand issues relating to Housing policy and its impact on housing development in Indian context. Students also learn about Evolution of settlement pattern, Design for diversity, Costing etc for a cross section of income groups and design of Disaster resistant structures.

REQUIRED READINGS:

1. Richard Kintermann and Robert small, “Site planning for Cluster Housing”, Van Nastrand Reinhold company, Jondon/New York 1977.
2. Joseph de Chiara and others, “Time Saver Standards for Housing and Residential development”, McGraw Hill Co, New York 1995.
3. Forbes Davidson and Geoffrey Payne, “Urban projects Manual”, Liverpool University press, Liverpool 1983.
4. HUDCO publications – Housing for low income, sector model.

REFERENCES:

1. Christopher Alexander, “A pattern Language”, Oxford University press, New York 1977
2. Leuris (S), Front to back: “A Design Agenda for Urban Housing”, Architectural Press, 2006.
3. Mohanty. L.N.P., Mohanty. S, “Slum in India” APH Publications., 2005
4. Saxena A. K. , “Sociological Dimensions of Urban Housing and Development “, Common wealth Publications, 2004
5. Geol. S. L. Dhaliwal. S. S. “Slum improvement through participatory Urban based Community structures”, Deep & Deep Publications, 2004.