

**ADHIYAMAAN COLLEGE OF ENGINEERING (AUTONOMOUS), HOSUR**  
**DEPARTMENT OF ARCHITECTURE**  
**ACADEMIC YEAR 2019 - 2020**

**1.3.1 Course Table (Only the Courses offered in the current academic year)**

S.No	Programme Code	Programme Name	Course code	Course Name	Year of Introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development	Class
1	B ARCH	ARCHITECTURE	118ART03	Architectural Drawing I	2018 - 19	Employability/ Skill Development - Gain knowledge on the building representation in 2D and 3D forms in addition it helps to understand drawing as a medium to visualize and communicate design ideas and preparation of measured drawing.	I YEAR ARCH A & B
2	B ARCH	ARCHITECTURE	118ART04	Materials and Construction I	2018 - 19	Employability/ Skill Development - Equip students with naturally occurring building materials that will look at the design and detail of various building components in a simple load bearing structure and with time it focus on latest trends in practice and usage of new technology/materials.	I YEAR ARCH A & B
3	B ARCH	ARCHITECTURE	118ARP05	Art Studio	2018 - 19	Employability/ Skill Development - Enhance the Infographical presentation skills, visual expression and representation, imaginative thinking and creativity through a hands on working various medium and materials.	I YEAR ARCH A & B
4	B ARCH	ARCHITECTURE	118ARP06	Basic Design	2018 - 19	Skill Development - Design as a process and as a final product and to understand about space, form and order as basic architectural skills.	I YEAR ARCH A & B
5	B ARCH	ARCHITECTURE	118ARE01	Personality development	2018 - 19	Employability/Entrepreneurship/Skill Development - Equip students achieve effectiveness in their professional activities, harness skills and develop qualities suited for the profession.	I YEAR ARCH A & B
6	B ARCH	ARCHITECTURE	118ARE02	Art appreciation	2018 - 19	Employability/ Skill Development - Enabling students to understand visual awareness, creativity and cultural understanding of Design as a Multidimensional creative Art.	I YEAR ARCH A & B
7	B ARCH	ARCHITECTURE	218ART01	Mechanics of Structures - I	2018 - 19	Skill Development - Familiarize with the different types of stresses and strains in order to analyze the structural stability.	I YEAR ARCH A & B
8	B ARCH	ARCHITECTURE	218ART04	Architectural Drawing - II	2018 - 19	Employability/ Skill Development - Enhance the skills of representation in drawings techniques and develop the graphical language of architecture.	I YEAR ARCH A & B
9	B ARCH	ARCHITECTURE	218ART05	Materials and Construction - II	2018 - 19	Employability/ Skill Development - Focus on various building materials and construction techniques based on the performing standards and codes with the application of each material in both historical and modern context.	I YEAR ARCH A & B
10	B ARCH	ARCHITECTURE	218ARP06	Architectural Design Studio - I	2018 - 19	Employability/ Entrepreneurship/ Skill Development - Involve students in a design project with simple space planning and the understanding of the functional aspects of it which respond as both tangible factors such as geography and intangible factors such as culture.	I YEAR ARCH A & B

11	B ARCH	ARCHITECTURE	218ARE01	Clay Modeling	2018 - 19	Employability/ Entrepreneurship/ Skill Development - Gain Knowledge on the physical and anatomical elements of 3D forms and capability to express the concepts three dimensionally.	I YEAR ARCH A & B
12	B ARCH	ARCHITECTURE	218ARE03	Model Making	2018 - 19	Employability/ Entrepreneurship/ Skill Development - Equip students with the basic skills necessary to represent their ideas with various tools essential for making architectural models.	I YEAR ARCH A & B
13	B ARCH	ARCHITECTURE	318ART01	Mechanics of Structures – II	2019 - 20	Skill Development - Familiarize the student with the effects of transverse forces in beams and implement the knowledge in design projects.	II YEAR ARCH A & B
14	B ARCH	ARCHITECTURE	318ART03	Climate Responsive Architecture	2019 - 20	Employability - Equip the students with scientific background required to design climate responsive buildings, and its climate responsive considerations in architectural design of building and built up areas.	II YEAR ARCH A & B
15	B ARCH	ARCHITECTURE	318ART04	Materials and Construction – III	2019 - 20	Employability/ Skill Development - Gain knowledge on the application of concrete in different buildings and construction industry to support the design from foundation to structural details.	II YEAR ARCH A & B
16	B ARCH	ARCHITECTURE	318ARP06	Computer Aided Design Studio	2019 - 20	Employability/ Entrepreneurship/ Skill Development - Enable students to develop their design with the help of computation and presentation software to get the output of 2D and 3D model construction.	II YEAR ARCH A & B
17	B ARCH	ARCHITECTURE	318ARP07	Architectural Design - II	2019 - 20	Employability/ Entrepreneurship/ Skill Development - Students will have a holistic understanding of the built environment as a complex entity shaped by social, economic and geographical factors and design a small scale project different users.	II YEAR ARCH A & B
18	B ARCH	ARCHITECTURE	318ARE03	Vernacular Architecture of India	2019 - 20	Skill Development - Development of significant contribution of vernacular architecture of place in fabric of that city or region.	II YEAR ARCH A & B
19	B ARCH	ARCHITECTURE	318ARE04	Theory of Design	2019 - 20	Skill Development - Equip the students with the knowledge in the effective design process and address the architectural design in the contemporary times to foresee in the future and to prepare innovative methodologies.	II YEAR ARCH A & B
20	B ARCH	ARCHITECTURE	418ART01	Analysis & Design of Structures – I	2019 - 20	Employability - Strengthen knowledge about structural forces in buildings and forces acting on vertical structural members and implement in design projects.	II YEAR ARCH A & B
21	B ARCH	ARCHITECTURE	418ART02	Environmental Science and Services	2019 - 20	Employability - Focus on the ecosystem, prevention & protection act and understand about the water treatment, collection & distribution and sewage disposals to implement in the community design projects.	II YEAR ARCH A & B

22	B ARCH	ARCHITECTURE	418ART03	Site Planning & Analysis	2019 - 20	Employability/ Skill Development - Equip students with the landform analysis through map and field observation, need and role of Surveying and Levelling related to Architecture, and provide insight in preparing a site analysis & site features in planning roads and parking.	II YEAR ARCH A & B
23	B ARCH	ARCHITECTURE	418ART04	Materials and Construction – IV	2019 - 20	Employability/ Skill Development - Focus on ferrous & non-ferrous metals, its application in different building components in current trends.	II YEAR ARCH A & B
24	B ARCH	ARCHITECTURE	418ARP05	Architectural Design - III	2019 - 20	Employability/ Entrepreneurship/ Skill Development - Thrust will be on rural materials, construction techniques and design details and understand the physical, technical and visual characteristics of a settlements at micro level.	II YEAR ARCH A & B
25	B ARCH	ARCHITECTURE	418ARE01	Energy Efficient Architecture	2019 - 20	Employability - Sensitize the students to space-specific contextual factors in designing a sustainable built environment and the need to use alternative sources of energy in view of the depleting resources and climate change.	II YEAR ARCH A & B
26	B ARCH	ARCHITECTURE	418ARE03	Ergonomics in Building Design	2019 - 20	Skill Development - Expose the students to the requirements of designing for the human comfort in accordance with anthropometry and will have knowledge of ergonomics and its applications in design including designing for the physically challenged and the elderly.	II YEAR ARCH A & B
27	B ARCH	ARCHITECTURE	515ART01	Analysis & Design of Structures - II	2017 - 18	Employability - Gain knowledge on structural understanding of steel as a material in the building industry and contributes to the design and detailing skills of the student.	III YEAR ARCH A & B
28	B ARCH	ARCHITECTURE	515ART03	Interior Design Principles	2017 - 18	Employability/ Skill Development - Explore the ways & means of developing interior spaces proceeding from a general discussion of architectural space to the particular characteristics of interior space in 3 dimensions.	III YEAR ARCH A & B
29	B ARCH	ARCHITECTURE	515ART04	Building Services - II	2017 - 18	Employability - Educate the importance of building services in attaining a holistic architectural design and achieve proficiency in application of electrical services in design & construction.	III YEAR ARCH A & B
30	B ARCH	ARCHITECTURE	515ART05	Materials and Construction –V	2017 - 18	Employability/ Skill Development - To expose the students to the new emerging materials like special glasses, Aluminum etc and make them aware of advanced techniques and use in the design.	III YEAR ARCH A & B
31	B ARCH	ARCHITECTURE	515ARP06	Design Studio - V	2017 - 18	Employability/ Entrepreneurship/ Skill Development - Understand the process of designing for public, involving multiple activities and thrust shall be on structural grid, development regulations, bye-laws and services.	III YEAR ARCH A & B
32	B ARCH	ARCHITECTURE	515ARE01	Waste management and recycling	2017 - 18	Employability - Encourage the use of by products from the industrial waste as alternative building material and thereby reducing its impact on environment.	III YEAR ARCH A & B

33	B ARCH	ARCHITECTURE	515ARE02	Structure and Architecture	2017 - 18	Employability -Integrate the contemporary structural design in the form making process of architectural design.	III YEAR ARCH A & B
34	B ARCH	ARCHITECTURE	615ART01	Analysis & Design of Structures - III	2017 - 18	Employability - Expose the students to various types of progressive structures and provide knowledge about the factors to be considered while designing such structures.	III YEAR ARCH A & B
35	B ARCH	ARCHITECTURE	615ART03	Building Services – III	2017 - 18	Employability - Gain Knowledge on the specialized seervices and integrate the layout of simple air conditioning system for domestic and office buildings and understanding of intelligent buildings and devices used in them.	III YEAR ARCH A & B
36	B ARCH	ARCHITECTURE	615ART04	Materials and Construction –VI	2017 - 18	Employability/ Skill Development - Comprehend and apply knowledge of advanced construction technologies for large span and complex buildings using paneling, pre-cast and pre-stressed concrete elements etc and vertical connectivity for high rise buildings	III YEAR ARCH A & B
37	B ARCH	ARCHITECTURE	615ARP05	Design Studio - VI	2017 - 18	Employability/ Entrepreneurship/ Skill Development -Focus shall be on the integration of intelligent service systems in to the design of the building and involving the process of designing buildings for multiple layers and innovate the use of materials, intense building services and large span structural systems.	III YEAR ARCH A & B
38	B ARCH	ARCHITECTURE	615CEO02	Valuation of Real Properties	2017 - 18	Employability/ Entrepreneurship/ Skill Development - Familizing the students with the issues in financing and investing in real estate with an emphasizing on commercial land values.	III YEAR ARCH A & B
39	B ARCH	ARCHITECTURE	615ARE03	Sustainable Planning and Architecture	2017 - 18	Employability - Integrate Sustainable planning and building principles in architectural design.	III YEAR ARCH A & B
40	B ARCH	ARCHITECTURE	615ARE04	Graphic and Product Design	2017 - 18	Employability/ Entrepreneurship/ Skill Development - Understand the principle of a Graphic design and product design and enhance their ideas in design application.	III YEAR ARCH A & B
41	B ARCH	ARCHITECTURE	715ART01	Landscape Architecture and Design	2018 - 19	Employability/ Skill Development - Enlighten the students about the components of landscape features and the construction of the same and gain knowledge of the various features of innovative and modern landscape design application of innovative detailing and appropriate technologies to further better landscape planning.	IV YEAR ARCH A & B
42	B ARCH	ARCHITECTURE	715ART02	Human Settlement & Planning	2018 - 19	Employability - To study the patterns of human settlements and their relevance to architecture through which the betterment of human living and welfare is achieved	IV YEAR ARCH A & B
43	B ARCH	ARCHITECTURE	715ART03	Specification & Estimation	2018 - 19	Employability/ Entrepreneurship/ Skill Development - Adeqaute knowledge in the making the purpose of estimation and train them in tender preparations, students skill in the calculation of the quantities of various materials used in the construction of building and to develop comprehensive knowledge of valuation of various buildings.	IV YEAR ARCH A & B



44	B ARCH	ARCHITECTURE	715ARP04	Working drawing and detailing	2018 - 19	Employability/ Entrepreneurship/ Skill Development - Gain knowledge about the need and relevance of Working Drawing sets and municipal drawings and their comparison to presentation drawing and their role in construction field.	IV YEAR ARCH A & B
45	B ARCH	ARCHITECTURE	715ARP05	Design Studio - VII	2018 - 19	Employability/ Entrepreneurship/ Skill Development - Enhance the role of architects in creating a sustainable urban environment with the design of large complex.	IV YEAR ARCH A & B
46	B ARCH	ARCHITECTURE	715CEO02	Construction Management	2018 - 19	Employability/ Entrepreneurship - Students able to research, analyze, evaluate and discuss a wide range of construction technologies and mangement strategies.	IV YEAR ARCH A & B
47	B ARCH	ARCHITECTURE	715ARE03	Contemporary Process in Architecture	2018 - 19	Employability/Skill Development - Expose the students to the new processes in the development of concept and design in relation with the computation.	IV YEAR ARCH A & B
48	B ARCH	ARCHITECTURE	715ARE04	Affordable Housing	2018 - 19	Employability - In-depth knowledge of various building materials, specifications and construction detailing techniques of affordable buildings satisfy the need and demand of housing in today context.	IV YEAR ARCH A & B
49	B ARCH	ARCHITECTURE	815ARP01	Internship Program	2018 - 19	Employability/ Entrepreneurship/ Skill Development - Provide adequate knowledge on the practice of architecture profession and to learn the administration, managerial and professional skills, and demonstrate the same in the future arhcitectural design study.	IV YEAR ARCH A & B
50	B ARCH	ARCHITECTURE	915ART01	Urban Design	2019 - 20	Employability - Expose the students the role of urban designer and gain knowledge of the urban spaces, designing of public areas.	V YEAR ARCH A & B
51	B ARCH	ARCHITECTURE	915ART02	Professional Practice & Ethics	2019 - 20	Employability - Introduce aspects of professional conduct, duties and responsibilities and legal rights and procedures of the architectural profession.	V YEAR ARCH A & B
52	B ARCH	ARCHITECTURE	915ARP03	Dissertation	2019 - 20	Skill Development - Introductory guide for students to conduct research on any aspect of the built environment.	V YEAR ARCH A & B
53	B ARCH	ARCHITECTURE	915ARP04	Design Studio - VIII	2019 - 20	Employability/ Entrepreneurship/ Skill Development - Evolving sensitivity to design of spaces at the urban scale – creation of nodes and links, visual landmarks, activity and interaction zones, relationship between commercial, recreational and residential areas.	V YEAR ARCH A & B
54	B ARCH	ARCHITECTURE	915ARE01	Architectural Conservation	2019 - 20	Employability/ Skill Development - Understand the values and ethics of conservation and expose students to conservation process and methodology and need for them in Indian context.	V YEAR ARCH A & B
55	B ARCH	ARCHITECTURE	915ARE04	Disaster Mitigation & Management	2019 - 20	Employability - Gain knowledge about types of disaster resistant building designs and management systems and implement the disaster resistant construction techniques in seismic zones.	V YEAR ARCH A & B

56	B ARCH	ARCHITECTURE	915ARE05	Urban and Regional Planning	2019 - 20	Employability - Planning and managing infrastructure with different schemes and understand the concepts of planning at regional level, city level.	V YEAR ARCH A & B
57	B ARCH	ARCHITECTURE	915ARE06	Construction Planning and Management	2019 - 20	Employability/ Entrepreneurship/ Skill Development - Provide an insight into management of buildings/construction projects involving management financial, machines and human resources.	V YEAR ARCH A & B
58	B ARCH	ARCHITECTURE	1015ARP01	Thesis	2019 - 20	Employability/ Entrepreneurship/ Skill Development - Reflect the culmination of the development of the student's architectural skills and design attitude.	V YEAR ARCH A & B



**SIGNATURE OF CHAIRMAN**

Chairman, Board of Studies  
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Hosur - 635 165  
Krishnagiri (Dt), Tamil Nadu.

**COURSE OBJECTIVES:**

- To understand the concepts of Architectural Drawing with the introduction of drafting fundamentals.
- To understand the language of Architectural representations through Architectural Drawingsystems.
- To understand drawing as a medium to visualize and communicate design ideas.
- To involve students in a number of exercises that will help to understand the representation of 3 Dimensional forms through isometric and axonometric drawings.

**UNIT 1 INTRODUCTION - GEOMETRIC DRAWING**

15 Hrs

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

**UNIT II GEOMETRICAL DRAWING - PLANE GEOMETRY**

20 Hrs

Construction and development of planar surface - square, rectangle, polygon, etc. Introduction of multi-view projection- projection of points, lines and planes, Description of Plane Curves: Ellipse, Parabola and Hyperbola.

**UNIT III GEOMETRICAL DRAWING - SOLID GEOMETRY**

20 Hrs

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

**UNIT IV GEOMETRICALDRAWING: AXONOMETRIC PROJECTION**

20 Hrs

Axonometric, Isometric, plan oblique and elevation oblique projection of planes, solids and combination of solids, introduction to scales.

Note: Exercises on projections will be integrated with models done in art studio I.

**TOTAL: 75 Hrs****COURSE OUTCOMES:**

**CO 1:** Understood the nature of geometrical forms and simple building forms

**CO 2:** Understood on the building representation in 2D and 3D among students in addition to preparation of measured drawing.

**CO 3:** Enabled the students to understand concepts and fundamentals of architectural drawing to develop representation skill.

**CO 4:** Understood axonometric projections as well as representation skills are imparted.


**TEXT BOOKS:**

1. I.H. Morris, Geometrical Drawing for Art Students - Orient Longman, Madras, 2004.
2. Francis Ching, Architectural Graphics, Van Nostrand Rein Hold Company, New York, 1964.

**REFERENCES:**

1. George K.Stegman, Harry J.Stegman, Architectural Drafting Printed in USA by American Technical Society, 1966.
2. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1964
3. Francis D.K. Ching, Architectural Graphics, John Wiley and Sons, 2009
4. Fraser Reekie & Tony McCarthy, Reekie's Architectural Drawing, Architectural Press, 1995
5. Leslie Martin C., Architectural Graphics, The Macmillan Company, New York, 1978
6. George A Dinsmore, Analytical Graphics, Van Nostrand, Company Inc., Canada, 1968

Course Outcome		Program Outcome												Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understood the nature of geometrical forms and simple building forms	3	2	2	2	2	-	-	-	3	2	1	3	3	3	3
CO2	Understood on the building representation in 2D and 3D among students in addition to preparation of measured drawing.	1	1	3	-	-	1	-	-	2	-	1	2	2	-	3
CO3	Enabled the students to understand concepts and fundamentals of architectural drawing to develop representation skill.	3	3	3	3	1	2	1	-	3	-	-	2	3	2	3
CO4	Understood axonometric projections as well as representation skills are imparted.	-	-	3	1	-	1	-	-	2	-	-	1	-	2	-

  
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**COURSE 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 involve students in a number of drawing exercises that will analyse 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 BASIC SHELTERS**

15 Hrs

Construction of shelters using natural materials - Bamboo, straw bales, reeds, casurina, Palmyra Palm, mud blocks -Climate specific influences on shelters - openings in temporary shelters - articulation of openings, doors and window - openings with brick jalli, bamboo split & mat finishes - Roof in temporary shelters - Thatch roof, pan tiles - Fixing details - fencing.

**UNIT II SIMPLE LOAD BEARING STRUCTURES - BRICK MASONRY**

20 Hrs

General introduction of various components of building from foundation to roof- Principles of load bearing Construction - simple brick footing - principles of bonding, English and Flemish bond, rat trap bond, T-Junctions (1 and 1 1 / 2, 2 bricks), L - Junctions, Cross junction (2 bricks), Brick piers, Cavity walls, rat trap bond, plinth and Sill details, brick arches and lintels, compound walls.

**UNIT III SIMPLE LOAD BEARING STRUCTURES - STONE MASONRY**

20 Hrs

Stone foundation - random rubble/ ashlar, copings, stone piers, plinth and sill details, stone arches and lintels, stone fencing, Dhajji wall construction.

**UNIT IV FLOORING**

20 Hrs

Flooring: rammed earth, Natural stones like Shahabad, Tandur, Kota, Kadappa, Marble, Granite, etc., athangudi tiles, red oxide, terracotta tiles (Laying details), brick paving, Glazed ceramic tiles, Vitrified tiles - Finishes: pointing, grouting, pavement, mud plastering, PCC.

**TOTAL: 75 Hrs****COURSE OUTCOMES:**

**CO 1:** Understood the properties, characteristics, strength and application of naturally occurring building materials such as Stone, Bamboo, Lime and Mud.

**CO 2:** Exposed the principles of designing components of load bearing structures – foundation

**CO 3:** Students learned on construction details using building materials such as stone through drawing as well as doing a literature or live case study.

**CO 4:** Understood Students are to submit drawing plates comprising of technical plan, elevation and section along with sketches and details showing method of construction.

**TEXT BOOKS:**

1. Arora S.P. and Bindra S.P., "Text book of Building Construction", DhanpatRai&Sons, New Delhi, 2012.
2. KlansDukeeberg, Bambus – Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000.
3. National Building Code Of India 2005- Part 6 Structural Design- Section 3 Timber and Bamboo.
4. Francis D.K. Ching, Building Construction Illustrated John Wiley & Sons 2000.


**REFERENCES:**

1. Arora S.P. and Bindra S.P., Text book of Building Construction, DhanpatRai& Sons, New Delhi,

2012

2. Chudley R., Construction Technology (Volume 1), Longman publications 3rd Edition,1999
3. Don A. Watson, Construction Materials and Processes, McGraw Hill, 1972
4. Francis D.K Ching, Building Construction Illustrated, John Wiley & Sons, 2000
5. All you wanted to know about soil stabilized mud blocks,HUDCO, New Delhi, 1989
6. Mckay W.B., Building construction, Volume 1 and 2, Longman UK, 1981
7. Rangwala S.C., Building Construction, AnandCharotar Publishing House, India, 2000
8. Sharma S.K., A Text book of Building Construction, S. Chand and company, New Delhi, 1998

Course Outcome		Program Outcome												Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understood the properties, characteristics, strength and application of naturally occurring building materials such as Stone, Bamboo, Lime and Mud.	3	-	3	3	-	3	-	-	-	-	-	-	-	-	2
CO2	Exposed the principles of designing components of load bearing structures – foundation of load bearing structures – foundation	1	2	1	3	-	3	-	-	2	-	-	-	-	-	2
CO3	Students learned on construction details using building materials such as stone through drawing as well as doing a literature or live case study.	-	-	2	3	-	3	-	-	-	-	-	-	-	-	2
CO4	Understood Students are to submit drawing plates comprising of technical plan, elevation Details showing method of construction	-	-	3	2	-	2	-	-	2	-	-	-	-	-	2

  
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**COURSE 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 involve students in a series of exercises which will look at graphic and abstract representations of art
- To sensitize students to the grammar of visual perception by involving them in a series of free hand exercises to understand form, proportion, scale, figure ground etc.,

**UNIT I BASICS OF DRAWING****20 Hrs**

Introduction to Drawing through various period of History - Seeing (Observation/ Proposition /Scale / Texture through study of still life and natural objects), Visualizing (Memory Drawing /Exploratory Drawing), Expressing (Qualities of Lines / Drawing tools and Quality of Expressions- Pen, Pencil, Charcoal, Marker) – Abstraction and communication (Sketching and Free hand Perspective Drawing)

**UNIT II DRAWING FROM OBSERVATION****20 Hrs**

The processes of seeing, Imagining and Representing - Observations on Line and Shape Observation on Tone and Texture - Observations on Form and Structure - Observations on Space and Depth - Sketching Exercises related to the contents specified above

**UNIT III GRAPHIC DESIGN****15 Hrs**

Introduction to history of Graphic Design – Visual perception theory (Gestalts) – Principle of Compositions – Colour Theory – Type Design and Typography (Layouts / Format / Calligraphy) Environmental Graphics (Signage / Logo / enhancing the built environment) – Exercises in Environmental graphic design, color and composition

**UNIT IV PAINTING****20 Hrs**

Introduction to Art / Artists' / Movements and Styles before and after industrial revolution and its Implication on design and architecture – Mediums, Techniques and Tools (Water colours / Posters / Acrylic / Inks / Brushes / Knives / Mixed Media) - Exercises using various techniques and mediums.

**TOTAL: 75 Hrs****COURSE OUTCOMES:**

- CO 1:** The students are exposed to various mediums, techniques and tools.  
**CO 2:** The students gain mastery in sketching, visualizing and expression through manual drawing.  
**CO 3:** Sensitized to culture, craft and context.  
**CO 4:** Skill Development in Handling Materials and in Making Products.

**TEXT BOOKS:**

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.
4. Envisioning Architecture – an analysis of drawing , Iain Fraser & Rod Henmi, 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.

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The students are exposed to various mediums, techniques and tools.	1	-	3	2	-	-	-	-	3	-	-	-	3	2	-
CO2	The students gain mastery in sketching, visualizing and expression through manual drawing.	1	-	3	1	-	-	-	-	3	-	-	-	3	2	-
CO3	Sensitized to culture, craft and context.	2	2	3	2	1	-	-	2	2	-	2	-	3	2	-
CO4	Skill Development in Handling Materials and in Making Products.	2	2	3	3	1	-	-	2	2	-	-	-	3	2	-



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**COURSE OBJECTIVES:**

- To understand the elements and principles of Basic Design as the building blocks of Creative design through exercises that will develop 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 3D Composition by involving students in a number of exercises which will help generation of a form from a two dimensional / abstract idea.
- To understand architecture as a craft, of making and of putting together.
- To sensitize students to materials both planar and plastics and Processes involved in working with them.

**CONTENT:**

Introduction to Spatial Design, Form and Structures 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. – Concepts of Visual perception – Material and processes.

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: Elements and Principles of Visual Composition and Pattern making. Exploring Colour theories and their application in a Visual composition.

Study of texture and schemes of texture both applied and stimulated and their application. Material and Form / Structures – Nature based enquiry into form both Linear and Planar, fluid and plastic forms using simple material like Mount Board, metal foil, box boards, wire string, thermocol, clay, plaster of Paris etc.

Study of Solids and voids to evolve sculptural forms and spaces using specific process oriented methods like casting, mouldings etc., Analytical appraisal of an iconic Design like a rivetvelt chair, Eames chair etc., for form, function, visual characteristics, ergonomics etc. /evolution of a craft. Analytical appraisal of building form in terms of visual character, form and function, play of light and shade, solids and voids, colors and texture.

**TOTAL: 180 Hrs**

**COURSE OUTCOMES:**

**CO 1:** An understanding of the qualities of different elements as well as their composite fusions.

**CO 2:** Ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects.

**CO 3:** Development of required skills – observation / analysis / abstractions / interpretation/representations / expressions through models and drawings.

**CO 4:** Students are trained to develop abstract and real compositions in drawings.

**CO 5:** Simultaneously workshop exercises involving real and abstract models made of match sticks, Card boards, wires, wood pieces to familiarize students with such skills shall be given importance.

**TEXTBOOKS:**


1. Owen Cappelman & 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, McGraw Hill, New York 1992.

**REFERENCES:**

1. V.S.Pramar, 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. C. Lawrence Bunchy - Acrylic for Sculpture and Design, 450, West 33rd Street, New York, N.Y. 10001, 1972.
5. Exner. V, Pressel. D, Basics Spatial Design, Birkhanser, 2009.

Course Outcome		Program Outcome												Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	An understanding of the qualities of different elements as well as their composite fusions.	3	3	3	3	3	3	2	2	3	2	1	-	3	2	2
CO2	Ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects.	2	2	3	2	3	2	1	1	3	1	1	1	3	2	2
CO3	Development of required skills – observation / analysis / abstractions / interpretation/representations / expressions through models and drawings.	2	3	3	3	1	3	1	1	3	1	-	1	3	2	2
CO4	Students are trained to develop abstract and real compositions in drawings.	2	-	3	3	3	3	1	-	3	1	-	-	3	2	2
CO5	Simultaneously workshop exercises involving real and abstract models made of match sticks, Card boards, wires, wood pieces to familiarize students with such skills shall be given importance.	3	-	3	3	2	2	1	-	3	-	-	-	3	2	2

  
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**COURSE OBJECTIVES:**

- To build confidence and guide thought process.
- To help the students achieve effectiveness in their professional activities, harness skills and develop qualities suited for the profession.
- To groom students' attitude and develop communication skill.
- To build the communication skills in the field projects.
- To provide knowledge in time management and projects stages.

**UNIT I PERSONALITY**

5 Hrs

Nature of personality. Theories of personality- Type, Trait, Social Learning. Determinants of personality, Personality traits.

**UNIT II ATTITUDE BUILDING**

6 Hrs

Importance of attitude, factors that determine our attitude, types of attitude, building positive attitude, developing optimism and discipline.

**UNIT III GROUP AND TEAM WORK**

9 Hrs

Group and Team dynamics, Group Structuring- Leadership, role, Tasks, effective team work. Exercises to understand the nature of a team, team building, members and achieving a given task. Purpose (Intellectual ability, creativity, approach to a problem, solving, tolerance, qualities of a leader). Group behavior, analyzing performance

**UNIT IV COMMUNICATION SKILLS**

6 Hrs

Verbal communication, Body language, Vocabulary building, Public speaking and extempore speech skills, Presentation skills, Panel discussions. Written communication- Letters, reports etc. Conflict Management, Assertiveness, Time management.

**UNIT V TIME & STRESS MANAGEMENT**

5 Hrs

Types of time, Identifying time wasters, Time management skills. Importance, Causes, Stress relief mechanisms


**TOTAL: 45 Hrs****COURSE OUTCOMES:**

- CO 1:** Attained Confidence and improved thought process.  
**CO 2:** Understood the behavioral aspects and built attitude.  
**CO 3:** Exposed to a team work to implement in project management.  
**CO 4:** Students are trained in communication skills.  
**CO 5:** Gained knowledge in time management.

**TEXT BOOKS:**

1. Developing Communication Skills, Krishna Mohan & Meera Banerji Macmillan India
2. Principles of Public Relations, C S Rayudu, Himalaya Publishing House
3. Organizational Behavior, K. Ashwathappa, Himalaya Publishing House
4. Emotional Intelligence, Daniel Colman

Course Outcome		Program Outcome												Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Attained Confidence and improved thought process.	-	-	3	-	-	-	2	-	2	-	-	2	3	2	2
CO2	Understood the behavioral aspects and built attitude.	1	-	2	-	-	-	1	-	2	-	-	-	3	2	2
CO3	Exposed to a team work to implement in project management.	3	1	2	2	-	-	2	-	-	-	-	-	3	2	2
CO4	Students are trained in communicationskills	-	-	2	-	-	-	-	-	-	-	-	-	3	2	2
CO5	Gained knowledge in time management.	2	1	2	2	-	-	2	-	-	-	-	3	3	2	2

  
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**COURSE OBJECTIVES:**

- To introduce the vocabulary of art and the principles.
- 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.
- To introduce the vocabulary of art and the principles.
- To inform students about the various art forms through the ages within the cultural contexts.

**UNIT I INTRODUCTION TO ART****3 Hrs**

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****4 Hrs**

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****8 Hrs**

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 Hrs**

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 –forms and media of art.

**UNIT V APPRECIATING ART- INDIAN ART****5 Hrs**

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: 30 Hrs****COURSE OUTCOMES:**

**CO 1:** Ability to understand and appreciate art as a fundamental human expression.

**CO 2:** Awareness of important art productions in the West and India.

**CO 3:** Sensitivity towards individual and collective human cultural productions as unique expressions of historical and geographic context.

**CO 4:** Ability to understand art through ages with different approaches.

**CO 5:** Understood the traditional context, art forms through various works.

**TEXT BOOKS:**

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. H.H. Arnason, 'History of Modern Art', Thames and Hudson, 1977.
4. Partha Mitter, 'Indian Art',




Oxford University Press, 2001.

**REFERENCES:**

1. Peter and Linda Murray, 'The Penguin Dictionary of Art and Artists', Penguin, 1989.
2. E.H. Gombrich, 'The Story of Art', Phaidon, 2002.
3. E.H. Gombrich, 'Art and Illusion', Phaidon, 2002. 'Indian Art since the early 1940s- A Search for Identity', Artists Handicrafts Association of Cholamandal Artists Village, Madras, 1974.
- A.K. Coomaraswamy, 'Fundamentals of Indian Art, Historical Research Documentation Programme, Jaipur, 1985.

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Ability to understand and appreciate art as a fundamental human expression	2	2	3	-	-	-	-	-	-	-	-	-	3	2	-
CO2	Awareness of important art productions in the West and India	1	1	3	-	-	-	-	2	-	-	1	-	3	2	-
CO3	Sensitivity towards individual and collective human cultural productions as unique expressions of historical and geographic context.	1	2	2	-	-	-	-	3	2	-	-	-	3	2	-
CO4	Ability to understand art through ages with different approaches.	-	-	1	1	-	-	-	2	-	-	1	-	3	2	-
CO5	Understood the traditional context, art forms through various works.	2	-	2	-	1	-	-	2	-	-	-	-	3	2	-

  
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**COURSE 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 structural 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 drive the relationship between elastic constants and solving problems.

**UNIT I FORCES AND STRUCTURAL SYSTEMS**

9 Hrs

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**

9 Hrs

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

**UNIT III PROPERTIES OF SECTION**

9 Hrs

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**

9 Hrs

Definition for stress, strain and its types – young's Modulus, Poisson's Ratio - Stress strain diagram for mild steel – Compound bars.

**UNIT V ELASTIC CONSTANTS**

9 Hrs

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

**TOTAL: 45 Hrs****COURSE OUTCOMES:**

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

**CO 1:** Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.

**CO 2:** Analyze any type of determinate trusses with different end conditions.

**CO 3:** To solve the sectional properties for any geometrical shapes.

**CO 4:** The concepts of elastic constants and its applications for various types of problems. Thorough understanding of stresses and strain.

**CO 5:** To Understand the relationship between elastic constants and solving problems.

**TEXT BOOKS:**


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.
5. W.A.Nash, Strength of Materials – Schaums Series – McGraw Hill Book Company, 1989.

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.	3	-	-	-	-	3	-	-	-	-	-	-	3	-	-
CO2	Analyze any type of determinate trusses with different end conditions.	3	-	-	-	-	3	-	-	-	-	-	-	3	-	-
CO3	To solve the sectional properties for any geometrical shapes.	3	-	-	-	-	3	-	-	-	-	-	-	3	-	-
CO4	The concepts of elastic constants and its applications for various types of problems. Thorough understanding of stresses and strain.	3	-	-	-	-	3	-	-	-	-	-	-	3	-	-
CO5	To Understand the relationship between elastic constants and solving problems	3	-	-	-	-	3	-	-	-	-	-	-	3	-	-

  
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**COURSE 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 advanced techniques of representation.
- To develop the skill of representation in advanced drawing techniques and building documentation.
- To explore the student about the sciography for various building

**UNIT I PLANS & SECTIONS OF BUILDINGS**

15 Hrs

Introduction to the basic principles of drawing - scale conversion. Graphical representation of plans and sections of buildings. Floor plans, elements above and below plan cut, reflected ceiling plan, site plan with contours, site sections, building elevations, section of buildings.

**UNIT II PERSPECTIVE: SCIENTIFIC METHOD**

15 Hrs

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, shade and shadows and applying rendering techniques.

**UNIT III PERSPECTIVE: SHORT CUT METHOD**

15 Hrs

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

**UNIT IV SCIOGRAPHY**

15 Hrs

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

**TOTAL: 60 Hrs****COURSE OUTCOMES:**

**CO 1:** The techniques and skills gained learned through this subject Architectural drawing II is very useful to their profession

**CO 2:** Able to construct the perspective drawings of the buildings and 3d views as well the Documentation of buildings through drawings.

**CO 3:** Got exposed to the perspective method.

**CO 4:** Gained Knowledge on the principle of shade and shadows.

**TEXT BOOKS:**


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. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1964.
4. Francis Ching, Architectural Graphics, Van Nostrand and Reinhold Company, NY 1975

**REFERENCES:**

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.VanNostrand, Company Inc., Canada.
4. Interiors: Perspective in Architectural Design Graphic - SMA Publishing Co. Ltd., Japan, 1967.
5. Ernest Norling, Perspective drawing, Walter Foster Art Books, California, 1986.
6. Bernard Alkins- 147, Architectural Rendering, Walter Foster Art Books, 1986.

7. RoberW.Gill, Advanced Perspective, Thames and Hudson, London, 1974

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The techniques and skills gained learned through this subject Architectural drawing is very useful to their profession	2	1	3	2	-	-	1	-	3	-	-	-	3	-	3
CO2	Able to construct the perspective drawings of the buildings and 3d views as well the Documentation of buildings through drawings.	2	1	3	2	-	-	-	-	3	-	-	-	3	-	3
CO3	Got exposed to the perspective method.	1	2	3	1	-	-	-	-	3	-	-	-	2	-	3
CO4	Gained Knowledge on the principle of shade and shadows.	3	2	3	1	-	-	-	-	1	-	-	-	3	-	2

  
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**COURSE OBJECTIVE:**

- To introduce the students to various assembly systems of timber and plywood, its defects and preservation process in architectural applications.
- To enable a student draw joinery details, the various use in building industry, its structural application, and furniture through select exercises.
- To understand cost efficient techniques of construction using different materials by drawing exercises.
- To enable the students to know more about the elements, components, materials and construction techniques to develop strong sense of visualization. The students have to learn the applications and various components through scaled drawings.

**UNIT I TIMBER IN CONSTRUCTION**

18 Hrs

Timbers -Methods of construction using natural timber in joinery works including methods of fixing and options for finishing - Softwood and hardwood - Secondary timber - Physical properties and uses - Defects, Conversion, Seasoning, decay and preservation of timber - Fire retardant treatment, anti-termite treatment. Industrial timbers - plywood, blackboard, particle board, fiber boards. Manufacture and uses - current developments.

**UNIT II TIMBER DOORS AND WINDOWS**

19 Hrs

Different types and joinery details-Doors (Paneled, Battened, Sliding), Windows (paneled, glazed, pivoted and sliding windows)- Ventilators (top hung, louvered, and glazed)- fixtures for doors, windows and ventilators and application for a simple structure with schedule of joinery.

**UNIT III TIMBER ROOF AND STAIRCASE**

19 Hrs

Types of Timber roofs (Flat, Pitched, Lean to)- Components of Timber roof joineries - Types of Roof trusses (King post, Queen post, Open plan, Storage, Scissor, Slope)- Understanding the different slopes and its ratios.

Timber staircases- Basic principles and design details including detailing of handrail and baluster- Exercises - drawings on Dog legged and spiral staircase.

**UNIT IV TIMBER WALLS, PARTITIONS AND FLOORS**

19 Hrs

Methods of construction using natural timber in walls and floors- ply woods, block boards, in fixed partitions, sliding/folding partitions, wall paneling/Cladding- Exercises of the above through drawings based on current scenario.

**TOTAL: 75 Hrs****COURSE OUTCOMES:**

- CO 1:** An understanding of timber products and methods of construction and detailing.  
**CO 2:** Exposed the students to various wooden joinery details of furniture's.  
**CO 3:** An Understanding of cost effective building technologies.  
**CO 4:** With the above knowledge students got to know more about partition details.

**TEXT BOOKS:**

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. S.C.Rangwala, Engineering Materials, CharotarPub.House, Anand, 1997.
2. W.B.Mckay, 'Building Construction', Vol.1, 2, 3 Longmans, U.K. 1981.
3. Don A.Watson, Construction Materials and Processes, McGraw Hill Co., 1972.
4. Alanwerth, Materials, The Mitchell Pub. Co. Ltd., London, 1986.

5. R.Chudleu, 'Building Construction Handbook', British Library Cataloguing in Publication Data, London, 1990.

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	An understanding of timber products and methods of construction and detailing.	2	-	3	3	1	3	1	-	3	-	1	-	3	2	3
CO2	Exposed the students to various wooden joinery details of furniture's.	1	-	3	3	1	3	-	-	3	-	2	-	3	3	-
CO3	An Understanding of cost effective building technologies.	1	2	3	3	2	3	1	-	3	-	1	-	3	3	3
CO4	With the above knowledgestudents got to know more about partition details.	1	2	3	3	2	3	1	-	2	-	1	-	2	3	3



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**COURSE OBJECTIVES:**

- 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 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 building case study by choosing appropriate examples to enable them to formulate and concretize their concepts and architectural program.
- To enable a student, understand the basics of anthropometrics, its application in articulating vertical, horizontal space and later on in simple buildings including considerations for physically challenged through a design process resulting in specific typologies, as specified.

**Measured Drawing-** Combined study of historic document along with small buildings by using simple measuring tools like tapes, photograph.

**Basic anthropometrics-** human functions and their implications for space requirements. Spatial interpretations – various activities and their relationship with spaces. Anthropometry as related to physically handicapped and elderly persons are required to be studied. Functional furniture layout, circulation, lighting and ventilation for spaces.

**Design communication and graphics** -Importance of graphics in architectural design. Types of diagrams – graphic metaphors, are diagram, matrix diagram, network diagram, bubble diagram, circulation diagram, analytical diagram, schematic – symbol, sign, arrows – concept diagrams. Study of site plans, city plans, conceptual drawings. Interpretation of architects' conceptual sketches and the respective buildings.

**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 smallscale.

**Examples of exercises include**

Toilet for a physically handicapped person. Hostel room, bed room, kitchen, living/dining,

- a) Shop, Workshop, pavilions, snack bar
- b) Residence, petrol bunk, fire station, police station, cottage for an elderly couple
- c) Architect's office, Doctor's clinic.
- d) Design of simple building elements such as Entrance portal, Garden pavilion, Memorial, edifice, Bus shelter, snack kiosk and layout of parks.

**TOTAL: 180 Hrs**

**COURSE OUTCOMES:**

**CO 1:** The characteristics of site, importance of site planning and built form/open space relationship has been understood.

**CO 2:** User group responses were ascertained through case-studies.

**CO 3:** Presentation of concepts was enabled through 2D drawings, sketches of model.

**CO 4:** To develop the ability to translate abstract principles of design into architectural solutions for simple problems.

**TEXT BOOKS:**


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. AchyutKanvinde, "Campus design in India", American year Book, 1969
3. Kevin Lynch, "Site planning", MIT Press, Cambridge, 1967
4. Sam F. Miller, "Design Process: A Primer for Architectural and Interior Design", Van Nostrand Reinhold, 1995.

Course Outcome		Program Outcome												Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The characteristics of site, importance of site planning and built form/open space relationship has been understood.	3	3	3	3	2	3	1	-	3	2	2	-	3	3	3
CO2	User group responses were ascertained through case-studies.	2	3	3	2	3	2	1	-	3	2	3	-	3	2	2
CO3	Presentation of concepts was enabled through 2D drawings, sketches of model.	3	2	3	3	1	2	-	-	3	2	2	-	3	2	-
CO4	To develop the ability to translate abstract principles of design into architectural solutions for simple problems.	3	2	3	3	1	2	-	-	3	2	2	-	1	2	3

  
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**COURSE OBJECTIVES:**

- To introduce various fabrication skills and techniques necessary to produce scale models and to encourage preparation of models as an essential phase in design development and evaluation.
- To explore the students about the space related visual skills, and to promote the understanding of relation between space elements.
- To understand the physical and anatomical elements used in the real or virtual three-dimensional animation designing and provides the foundation and capability to represent the concepts three dimensionally.
- To enable the students make understand about the various form of buildings and its characteristics.
- To expose the students to 3D form and its basic sense of geometric sculptural structures.

**Clay Art** – Overview- significance, scope & purpose; material types, source, composition, properties, tools & equipment, techniques, processes, finishing; applications. Utilitarian/ Non- utilitarian products, pottery, sculpture, wall art, garden art, sign art, accessories.

**Plane drawing of composition- Non-figurative Composition.**

- a) In clay. b) Direct in plaster of Paris. Methods and Materials of the following: a) Portrait armature  
a) Molding c) Casting d) Direct plaster of Paris technique

**Introduction to model making**-Need; role of scale models in design: general practices: Digital models. Essentials of model making: understanding of various tools and machines employed, best practices involved in operating the tools and the techniques. Introduction to the Ceramic materials used for model making – clay, types and mixtures, properties. Hand building techniques- making a box with a lid- hollowing out, pinch pots – making a bowl, coiling – making a cylindrical pot, slab-building – making a cube shaped box, hand building with clay strips- making a vase. **Introduction to molds – waste mold, press mold – walling up the model, plate. Hollow casting – a vase. The potter’s wheel – kneading the clay, function of hands in throwing. Learning basic techniques in making different objects like bowl, plate, cylinder, vase, lids.**

**Structure & character study**- Operational problems in building up structure – Foliage & Trunk Study for basic understanding of structure- Bending, Twisting, Curving Forms created from nature- Expanding structure through unit.

- ✓ Three-dimensional practices (nature study)
- ✓ Leaf and flower study. (ii) Clay modeling of leaf and flower from plaster cast.

Medium – Clay, photographs for document. Organic & Inorganic form - Study & Composition Drawing & exercise – composition – sculpture for Basic understanding of 3D Sculpture – Armature –Positioning – spacing – rounding; Found Vitality of the built images. Figurative & Non –Figurative Its high / low relief works by Clay medium – Terracotta – Preparation of clay, using Clay tools, line, texture, shapes, high & low cut – imposing and Extracting from plates – firing – basic understanding of Relief works.

**Sculpture geometrical 3D object study**-To develop the basic sense of sculptural structure – detail drawings in various positions and angles – develop & understand basic Shapes and Forms – any twisting form and its detail study.

- ✓ Known and Unknown 3D Form. Medium – Wire, Plaster of Paris, Clay. Study from Found Objects Intricate Drawing, enlarging images a complete 3D sculpture making to develop the sense & handle true to realism as referred in the found object.

**EXERCISES:**

Introduction to paper sculpting, Basic shapes, sculpting simple forms from paper, Increasing the form’s

complexity, Designing the own model, Creating the model, Creating the model, Designing the motion, creating a short stop motion, Editing, adding sound, Workshop/consultation.

**TOTAL: 75 Hrs**

**COURSE OUTCOMES:**

**CO 1:** Experiments through various types of materials combinations.

**CO 2:** Dexterity; gain knowledge of materials used and their properties, craft skills; visualization skills.

**CO 3:** With the above knowledge the students should make a useful interior product or sculpture with necessary detail.

**CO 4:** Students got exposed to various forms of structure and its characteristics.

**CO 5:** An Expressive thoughts to the 3D sculpture.


**TEXT BOOKS:**

1. Architectural model building- Roark T. Congdon
2. Architectural Echoes in clay- Susen Lefler.
3. Model Making Guidelines- shaping spaces.
4. Modelling Guide – E. Lanteri.

**REFERENCES:**

1. <https://www.rjmodels.com.hk/architectural-models-guide/>
2. [www.architecturalclayproducts.com/](http://www.architecturalclayproducts.com/)

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Experiments through various types of materials combinations.	2	-	2	3	-	-	-	-	1	-	-	-	3	-	3
CO2	Dexterity; gain knowledge of materials used and their properties, craft skills; visualization skills.	2	1	2	3	-	-	-	-	1	-	-	-	3	2	3
CO3	With the above knowledge the students should make a useful interior product or sculpture with necessary detail.	2	2	3	3	-	-	-	-	1	-	-	-	2	-	3
CO4	Students got exposed to various forms of structure and its characteristics.	2	2	3	3	-	3	-	-	1	-	-	-	3	3	3
CO5	An Expressive thoughts to the 3D sculpture.	1	1	2	3	-	1	-	-	2	-	-	-	3	3	2

  
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**COURSE OBJECTIVES:**

- To introduce students to analytical and illustrative drawing techniques as tools in the materialization and expression of thoughts.
- To introduce model making as a generative process, a tool in Design generation.
- To inculcate the dynamic act of constructing in thinking process.
- To understand the challenges of proper craftsmanship.
- To guide the students on model making and general principles of use of basic materials for constructional purposes for developing art skills.

**Introduction to model making** - Introduction to various materials and tools to be used for model making.  
**Material exploration- explorations** (both in traditional materials like mount, foam, thermacoel, clay, plaster of Paris, paper Mache, wood and new age materials like polystyrene, Aerocon blocks, plastics, meshes, and processes like carpentry, casting, molding, welding, laser cutting for study of forms.

**Surface study** - Development of surfaces of simple and composite forms using paper, wire. Experiments with various materials and equipment in terms of preparation of basic forms /geometrical forms with appropriate scale and dimensions.

**Joinery** - Models in appropriate materials for understanding joinery in wooden construction and bonds in masonry based on the programme of building, construction.

**Scale of Model** - Exploration in varying scales of models through instruction in techniques- Residential to urban - Historic / Contemporary buildings. Exploration of the physical model as a tool through all phases of architectural design process, ranging from conceptual to specific design solutions- such as site model, study model, block model and finished presentation models. Study and preparation of model of a complete built structure.

**Examples of exercises include**

- Involves research through a process for example nature to structure and the evolution of a structural system that can be fabricated to scale.
- Presentation models - Topography, textures, landscapes, human elements.

**TOTAL :75Hrs****COURSE OUTCOMES:**

- CO 1:** Exploration of conventional and less conventional techniques of representation in an attempt to creative visualization and to understand drawings as vehicles of thinking.
- CO 2:** Versatility in making models ranging from study to presentation and in varying scales and materials.
- CO 3:** Gained knowledge on the dynamic act of constructing in thinking process.
- CO 4:** Exposed students to proper craftsmanship.
- CO 5:** Students experienced the tools and techniques use in model making.

**TEXT BOOKS:**

1. A pattern Language by Alexander Christopher
2. Structure in Architecture – Heller Robert and Salvadori Mario
3. Total Architecture- Walter Gropius
4. Design Fundamentals in Architecture- Pramdar
5. Structure in Nature- Strategy for Design – Peter Pearce
6. Patterns in Nature- Peter Streebom
7. Elements of Architecture – Meiss Pierré Von
8. Visual Thinking- Am heim Rudolf

9. Architecture: form, space and order - Francis D.K.Ching
10. Robert. W Gill – Rendering with Pen + Ink - Thames, and Hudson – 2007.

**REFERENCE:**

1. A.J. Metric Handbook, editors, Jan Bilwa and Leslie fair weather
2. Architectural Graphic standards editor- Boaz Joseph
3. Planning- the Architect’s handbook by E and O.E.
4. Dernst Neufert’s Architect’s data
5. Time saver standards for Architectural Design Data, Editor John Callender
6. Time saver standards for building types, editor Joseph D.C. and John Callender.
7. Wenninger (Magrus.J.) Spherical Models, Cambridge University Press, 1979
8. John W. Mills, The Technique of Sculpture, B.T.Batsford Ltd., New York Reinhold Publishing Corpn.,London, 1966
9. Marco Frascari - Eleven Exercises in the art of Architectural Drawing, Routledge, 2011
10. Natascha Meuser, Construction and manual Architectural Drawings, DOM Publisher, 2012
11. Rendow Yee, Architectural Drawing A visual Compendium of Types and Methods, Wiley, 2013
12. David Dernie, Architectural Drawing, Laurence King, 2010.
13. Lorraine Farrelly, Representational Techniques, AVA, 2011.

Course Outcome		Program Outcome												Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Exploration of conventional and less conventional techniques of representation in an attempt to creative visualization and to understand drawings as vehicles of thinking.	2	2	3	3	1	3	1	-	3	-	-	-	3	2	-
CO2	Versatility in making models ranging from study to presentation and in varying scales and materials.	2	1	3	3	1	2	1	-	3	-	-	-	3	2	-
CO3	Gained knowledge on the dynamic act of constructing in thinking process.	2	1	3	3	1	1	1	-	3	-	-	-	3	2	3
CO4	Exposed students to proper craftsmanship.	1	2	3	3	-	2	-	-	2	-	-	-	-	3	1
CO5	Students experienced the tools and techniques use in model making.	1	1	2	3	-	3	1	-	1	-	-	-	3	2	2

  
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**COURSE OBJECTIVES:**

- The student would learn how to work out shear force and bending moment on beams subjected to different loading conditions.
- The student would understand shear stress and bending stress distribution in beam sections.
- They would learn to find slope and deflection of beams.
- They learn behavior of long and short columns using Euler's and Rankin's formula.
- They learn the behavior of continuous beams, fixed beams and portal frames.

**UNIT I SHEAR FORCE AND BENDING MOMENT****10 Hrs**

Basic concepts- Shear force and bending moment diagrams for cantilever and simply supported beams subjected to various types of loadings (Point load & Uniformly distributed load)– Point of contraflexure.

**UNIT II STRESSES IN BEAMS****5 Hrs**

Theory of simple bending -bending stresses and shear stresses in beams - examples on simple sections. Stress distribution diagrams.

**UNIT III DEFLECTION OF BEAMS****10 Hrs**

Slope and deflection at a section - Double Integration method for simply supported and cantilever beams for point loads and uniformly distributed loads.

**UNIT IV THEORY OF COLUMNS****10 Hrs**

Short and long columns - Euler's theory- assumptions and limitations –load carrying capacity of columns with different end conditions – Rankine's formula for columns (No derivations) – simple problems.

**UNIT V ANALYSIS OF PERFECT FRAMES AND SLABS****10 Hrs**

Introduction- Types of frames- Assumptions- Analysis of a frame- Slabs- Types of slabs - Loading distribution on slabs (only theory).

**TOTAL: 45 Hrs****COURSE OUTCOMES:**

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

- CO 1:** Apply the concepts of determining the techniques of finding the stresses.
- CO 2:** Use the theory of simple bending theory to find the deflection in beams.
- CO 3:** Analyze and solve the different types of columns.
- CO 4:** Analyze the different types of indeterminate beams.
- CO 5:** Understand the concepts of slab.

**EXERCISES:**

- Students are expected to present simple models for types of beams using different materials for varying span.
- They are expected to submit a report on existing structures by doing field visit.

**TEXT BOOKS:**


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, 2011.
3. R.K. Rajput "Strength of Materials", S.Chand, 2006.
4. Timoshenko, S.P., and D.H. Young, Elements of Strength of Materials, Fifth edition, East West Press, 1993.

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Apply the concepts of determining the techniques of finding the stresses.	1	3	-	3	-	3	-	-	-	-	-	-	2	-	1
CO2	Use the theory of simple bending theory to find the deflection in beams.	1	3	-	3	-	3	-	-	-	-	-	-	2	-	1
CO3	Analyze and solve the different types of columns.	1	3	-	3	-	3	-	-	-	-	-	-	2	-	1
CO4	Analyze the different types of determinate beams.	1	3	-	3	-	3	-	-	-	-	-	-	2	-	1
CO5	Understand the concepts of slab.	1	3	-	3	-	3	-	-	-	-	-	-	2	-	1

  
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**COURSE OBJECTIVES:**

- To provide information on factors that contributes to climate.
- To enable the student to understand the movement of sun in various parts of the globe, its paths, angles, the radiation levels and how to overcome the harmful effects through certain shading devices.
- The students are to be exposed to air movements in and around the buildings resulting in various effects.
- To study the various methods & techniques to incorporate solar passive heating & cooling system through selective examples with stress on materials & design strategies.
- To provide information on various design consideration and parameters that are required for various climatic zones.

**UNIT I INTRODUCTION TO CLIMATE****8 Hrs**

Climate and its components -Factors that determine climate - Methods of recording Climatic data and Instruments used to record various components of climatic conditions- Characteristics of climatic types with examples. Introduction to Micro climate, effects of local factors–Urban heat island.

**UNIT II SOLAR CONTROL****9 Hrs**

Apparent movement of the sun, sun path diagram. Solar geometry - solar chart - Sun angles and shadow angles - Design of solar shading devices. Understanding the sun path & shading devices, orientation of building, openings- sizes, position.

**UNIT III HEAT FLOW THROUGH BUILDING MATERIALS****9 Hrs**

Basic principles of Heat Transfer -Thermal balance of the human body, Thermal comfort indices - Effective temperature, CET, comfort zone - Periodic heat flow in building. Conductivity, Resistivity, Specific heat, Conductance, Resistance and Thermal capacity – Surface resistance and air cavities – Air to air transmittance (U value)- time lag & decrement factor. Building materials with its U value and their application.

**UNIT IV AIR MOVEMENT****9 Hrs**

Air movement in tropical region -The effects of topography on air movement- wind rose diagram, wind pressure, wind velocity, wind shadow. Functions of ventilation - Air movement through & around buildings - factors affecting indoor air flow, stack effect due to the thermal forces.

**UNIT V PASSIVE DESIGN TECHNIQUES****10 Hrs**

General principles of heating- Direct gain - Thermal storage wall - Sunspace -Convective air loop. General principles of cooling- Ventilation - Radiation - Evaporation and Dehumidification - Mass effect. Case examples of buildings. Design considerations, building design & layout planning consideration for warm humid, hot dry, composite and upland climates.

**TOTAL: 45 Hrs****COURSE OUTCOMES:**

- CO 1:** Understanding of climate and its factors.  
**CO 2:** Conceptual understanding of designing the solar shading in Buildings.  
**CO 3:** Understanding of Thermal balance in Human beings.  
**CO 4:** Conceptual understanding of Air flow in Buildings.  
**CO 5:** Designing Climate responsive structure.

**EXERCISES:**

- Information collection regarding the thermal properties of contemporary materials suited for

various climatic zones.

- Calculations of shading devices using solar protractor & sun path diagrams.
- Conceptual understanding of Air flow in Buildings.


**TEXT BOOKS:**

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 NewYork, USA, 1994.
4. Galloe, Salam and Sayigh A.M.M., “Architecture, Comfort and Energy”, Elsevier Science Ltd., Oxford, U.K., 1998.
5. Donald Watson and Kenneth Labs., “Climatic Design” – McGraw-Hill Book Company - NewYork - 1983.
6. Joseph de chiara and Le Coplemann– “Planning and Design Criteria” – McGraw-Hill, New York 1983.
7. B. Givoni, “Passive and Low Energy Cooling of building”, Van Nortrand Reinhold NewYork, USA, 1994.
8. The climate dwelling – “An introduction to climate responsive residential” – by eoin o cofaigh, john aolley- 1996
9. “Energy-efficient buildings in India” – by milimajumdas, tata energy research institute –ministry of non-conventional resources.

Course Outcome		Program Outcome												Program Specific Outcome		
CO'S		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understanding of climate and its factors.	1	3	3	3	2	-	-	1	3	3	-	-	-	-	1
CO2	Conceptual understanding of designing the solar shading in Buildings.	1	2	2	3	2	-	-	1	3	3	-	-	-	-	1
CO3	Understanding of Thermal balance in Human beings.	1	-	2	3	-	-	-	-	3	3	-	-	-	-	1
CO4	Conceptual understanding of Air flow in Buildings.	1	1	2	3	2	-	-	-	3	1	-	-	-	-	1
CO5	Designing Climate responsive structure.	1	2	2	3	2	-	-	-	3	3	-	-	-	-	1

  
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**COURSE OBJECTIVES:**

- To provide basic theoretical knowledge on cement and its types, properties and application to buildings.
- To expose the students on theoretical knowledge on preparation of concrete, grading of the same, need for and types of reinforcement and applications at the site.
- To enable the students to understand application of concrete in foundations, floors, walls, columns, beams and slabs through theory and practical knowledge through scaled construction drawings.
- To provide adequate theoretical exposure on various factors involved in staircase design, their types, structural supports required and finishing details. Practical knowledge on types, foundations, fixing and finishing details will be through scaled construction drawings.

**UNIT I CEMENT AND ITS PROPERTIES****6 Hrs**

Cement: Types of Cement, Manufacturing of cement, composition, properties and uses – Mortar mixing ratios - tests for cement - mortar thickness for various building works; External and Internal plastering.

**UNIT II CONCRETE, PROPERTIES AND CONSTRUCTION - I****16 Hrs**

Suitability requirements for aggregates, grading of aggregates – water mix in concrete-reinforcement – admixtures.

Concreting process its properties - mix proportioning - batching, mixing, transporting, placing, compaction, curing, formwork - quality control - tests for concrete - joints in concrete - concrete finishes. **CONCRETE IN FOUNDATION:** Isolated, combined, continuous and mat footing and Foundation (I- section) **CONCRETE FLOORING:** RCC floor and RCC Road **CONCRETE SLAB:** one-way slab and two slab and Concrete lintels with sunshade

**UNIT III RCC CONSTRUCTION-II****27 Hrs**

**CONCRETE WALL:** RCC Bank strong room, RCC Retaining wall and concrete culvert. **CONCRETE STAIRCASES:** foundation of staircase, Straight flight, Folded Staircases, Stinger beam in staircase and cantilever staircases

**UNIT IV CONCRETE IN STEEL & GLASS COMPOSITE SYSTEMS****26 Hrs**

Applications of concrete using Steel & Glass in building components - **CONCRETE & STEEL:** Concrete Fence Post, Composite girder, Composite column and composite slab. **FLOORING:** Composite flooring decks and structural glass floors. **WALL:** Ferro cement walls, steel-plate composite wall system and structural glass walls. **ROOF:** Metal roof and structural glass Roof.

**TOTAL: 75 Hrs****COURSE OUTCOMES:**

**CO 1:** Understanding the properties of cement and its uses in building component.

**CO 2:** Understanding the properties and grading of concrete in buildings & an exercise to understand the concrete foundation, flooring and slabs.

**CO 3:** Understanding through detail construction techniques of walls and staircases.

**CO 4:** Understanding through detail construction techniques of composite systems of wall, flooring and roof & its detailing of various components.

**EXERCISES:**

- Students are asked to collect materials and document the properties of concrete Exercises involving construction of stair cases.


**TEXT BOOKS:**

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", DhanpatRai PublishingCompany Pvt. Ltd., New Delhi, 1996
4. S.P Arora and S.P Bindra, "A Text Book of Building Construction", DhanpatRaiPublishing 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
6. S.C.Rangwala, Engineering Materials, Charotar Publishing House, India, 1997.
7. Alan Banc, Stairs, Steps and Ramps, Butter worth Heinemann ,1996
8. M.S.Shetty, Concrete Technology, S.Chand& Co. Ltd., New Delhi, 1986.

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understanding the properties of cement and its uses in building component.	1	-	3	3	2	3	-	-	3	-	-	-	-	-	1
CO2	Understanding the properties and grading of concrete in buildings & an exercise to understand the concrete foundation, flooring and slabs.	1	-	2	3	-	3	-	-	3	-	-	-	-	-	1
CO3	Understanding through detail construction techniques of walls and staircases.	1	2	2	3	-	3	-	-	3	-	-	-	-	-	1
CO4	Understanding through detail construction techniques of composite systems of wall, flooring and roof & its detailing of various components.	1	2	2	3	1	3	-	-	3	-	-	-	-	-	1

  
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**COURSE OBJECTIVES:**

- To enable the student, understand of computers and printers.
- To enable the student, understand basic interface and editing necessary for creating 2D objects.
- To enable the student an understanding of tools for creating 3D objects and understanding of modification tools for the same.
- To enable the student an understanding of finishing and output of the 3D model construction of a 3D model.

**UNIT I INTRODUCTION TO COMPUTER****15 Hrs**

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,

**UNIT II INTRODUCTION TO COMPUTER AIDED 2D DRAFTING****20 Hrs**

Understanding the use of drawing tools, object editing, drawing objects, filing and setting drawing units, scales, limits that size and dimensioning, texting-Advance command programming - transparent overlays hatching utilities, assigned colour and line type, use of multiline, style, block, symbol Library manipulation for accurate drawing

**Exercise:**

Setting up of drawings of various simple architectural objects with complete text and dimensioning,

**UNIT III INTRODUCTION TO COMPUTER AIDED 3D****20 Hrs**

Introduction to tools of productivity -blocks, slide facilities, script files, attributes Understanding concepts of V.Port, concept of object linking, and editing session

**Exercise:**

3D surfaces setting up elevation thickness and use of dynamic projections.

**UNIT IV 3D RENDERING AND SETTING****20 Hrs**

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.

**Exercise:**

Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filing.

**TOTAL: 75Hrs****COURSE OUTCOMES:**

- CO 1:** The students benefit by learning software which helps them to better visualize complicated forms
- CO 2:** To introduce to tools of productivity, concept of object linking and editing session, with a thrust on 2D drafting
- CO 3:** Gained knowledge on construction planes, 3D surfaces, use of dynamic projections, techniques of setting to create photo realistic pictures.
- CO 4:** It is also proposed to cover environment setting and image filing as an additional presentation technique and also helps in producing photo realistic images of those 3D forms and it's rendering as a necessity for architects


**TEXT BOOKS:**

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. Sham Tickoo, Advance Technique in AutoCAD Re.14 - 1997
2. V.Rajaraman, Principles of Computer Programming - Prentice Hall of India.
3. Byron S.Gottfried, Theory and problems of programming with C.Schaum's outlineseries, McGraw-Hill Publishing Co.
4. AutoCAD reference manual - Autodesk UNC, 1998.
5. AutoCAD architectural users guide - Autodesk Inc., 1998.
6. Sham Tickko, Understanding AutoCAD - 14 (Windows) - 1997.
7. Deke McClelland, "Photoshop 7 Bible Professional Edition", Wiley John & Son INC, New York, 2000.
8. A. Watt, "Fundamentals of Three-Dimensional Computer Graphics", Addison Wesley, Massachusetts, 1989.
9. Aouad, "Computer Aided Design guide for Architecture, Engineering and construction", Spon process, 2012

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The students benefit by learning software which helps them to better visualize complicated forms	1	2	3	-	-	-	-	-	1	-	-	-	-	-	1
CO2	To introduce to tools of productivity, concept of object linking and editing session, with a thrust on 2D drafting	1	-	3	-	-	-	-	-	2	-	-	-	-	-	1
CO3	Gained knowledge on construction planes, 3D surfaces, use of dynamic projections, techniques of setting to create photo realistic pictures.	1	-	3	1	-	-	-	-	2	-	-	-	-	-	1
CO4	It is also proposed to cover environment setting and image filing as an additional presentation technique and also helps in producing photo realistic images of those 3D forms and it's rendering as a necessity for architects	1	2	3	2	-	-	-	-	3	2	-	-	-	-	1

  
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**COURSE OBJECTIVES:**

- To enable student to familiarize with the given design topic by choosing, relevant and appropriate case studies within the region visiting the sites and analyzing the same.
- To expose students to familiarize with the given topic of design by arranging special lectures from architects.
- To expose him/her to knowledge available on the relevant design at international level, through books and websites.
- To enable the students to understand and develop the Aesthetic components involved in the Design subject.

**CONTENT:**

Designing a built environment requires the development of individual capacity for thought with respect to subjective and objective aspects.

Studying and designing projects of small scale that involve a more immediate and basic experience is important in this context.

The study and project exploration will involve the following aspects from first principles as well as through live studies and theory – human behaviour, activities and needs for various purposes, role of specific form/space in creating particular experiences and effects, built form- open space relationships, spatial organization, environment behaviour aspects (especially those relating to children), site as a positive tool in all scales, potential of materials and construction.

Through this, both the qualitative and quantitative attributes of design can be understood and engaged. This would give training in the ingenious use of architecture to fulfill goals towards a responsive and stimulating environment.

The techniques used for study and presentation can align themselves towards the above, such as cognitive maps, sketches, manual drawings, physical models with simple materials.

The scale and complexity of projects will be commensurate with this - small to medium size projects involving buildings/ small campuses with simple circulation, passive energy, multiples of single unit space, single use buildings.

Some suggestive projects are small buildings or small campuses involving civic/ cultural use, uses related to children such as schools, facilities for people with special requirements. The number of projects is left to the discretion of the faculty based on scale and complexity.

**TOTAL: 180 Hrs**

**COURSE OUTCOMES:**

**CO 1:** The students were exposed to the various components and aspects associated with design concepts and its evolution in public spaces.

**CO 2:** They were also explored to the anthropometric detail for physically handicapped persons in public buildings.

**CO 3:** Students were also asked to document and present the related details collected for the design and are to be given exposure in computer usage.

**CO 4:** The students were exposed into the process of design articulate; glorify spaces in respect of buildings of small scale, small span, horizontal and vertical movements (two or three levels), incorporating barrier free elements and details.

**TEXT BOOKS:**


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 Joseph De Chiara, Julius Panero, Martin Zelnik, "Time Saver Standards for Interior Design and Space Planning", McGraw Hill, 2001.
3. Ernst Neuferts, "Architects Data," Blackwell, 2002.

4. Ramsey et al, "Architectural Graphic Standards", Wiley, 2000.

**REFERENCES:**

1. Ed.by. Quentin Pickard RIBA - The Architects' Hand Book - Blackwell Science Ltd. -2002.
2. De Chiara and Callender, Time Saver Standards Building Types, McGraw-Hill Co., 2nd Edition, 1980.
3. Edward D.Mills, Planning- The Architects Handbook - 10th Edition, British Library Cataloguing in Publication Data, 1985.P&D Act 1995.
4. Neufet Architect's Data, Rudolf Herg, Crosby Lockwood and Sons Ltd., 1970.
5. Wakita\Linde, The Professional practice of Architectural working, drawing John Wiley & Sons, 1984.
6. Andrew Alpern, Handbook of Speciality Elements in Architecture, McGraw Hill Book Co., 1982.
7. Julius Panero & Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design Publication, 1979.

Course Outcome		Program Outcome												Program Specific Outcome		
CO'S		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The students were exposed to the various components and aspects associated with design concepts and its evolution in public spaces.	2	3	3	3	3	3	2	2	3	3	1	-	-	-	1
CO2	They were also explored to the anthropometric detail for physically handicapped persons in public buildings.	3	3	3	3	3	3	2	2	3	1	1	-	-	-	1
CO3	Students were also asked to document and present the related details collected for the design and are to be given exposure in computer usage.	3	2	3	3	2	1	-	-	3	1	1	-	-	-	1
CO4	The students were exposed into the process of design articulate; glorify spaces in respect of buildings of small scale, small span, horizontal and vertical movements (two or three levels), incorporating barrier free elements and details.	3	3	3	3	1		1	1	3	-	-	-	-	-	1

  
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**COURSE OBJECTIVES:**

- To study the approaches, definition, concepts and typologies of the vernacular architecture of a region for better understanding, comprehension and interpretation.
- To understand the role of locally available or indigenous materials and climate in the architecture expression of Northwestern India through case studies.
- To understand the regional expression in the architecture of southern India through the study at settlements and unit levels through case studies.
- To study the colonial influences in India and understand the character of the multi cultured architectural expression through case studies.
- To understand the elements and character of vernacular architecture in the public and royal buildings of Northwestern India.

**UNIT I INTRODUCTION****9Hrs**

Definition and classification of Vernacular architecture - Different approaches and concepts to the study of vernacular architecture - Cultural and contextual responsiveness of vernacular architecture - Aesthetic, Architectural and anthropological studies in detail

**UNIT II TRADITIONAL PRINCIPLES OF SETTLEMENT PLANNING****9 Hrs**

Historical, Cultural and Vernacular Influences in settlement planning - Town planning principles of the towns of Jodhpur, Jaipur, Jaisalmer, Gwalior – Settlement pattern

**UNIT III VERNACULAR ARCHITECTURE OF WESTERN & NORTH INDIA****9 Hrs**

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 (Dhungas)- with materials & Construction methods

**UNIT IV VERNACULAR ARCHITECTURE OF SOUTH INDIA****10 Hrs**

Religious and Domestic Architecture of Kerala – Example: Padmanabhapuram palace -Traditional houses of Tamil Nadu - Chettinad houses and Aghraharams - Vernacular architecture of Malanad – Karnataka. - Principles of Planning, Climatic influences, religious practices, beliefs & culture, materials of construction & construction detail.

**UNIT V WESTERN INFLUENCES ON VERNACULAR ARCHITECTURE****8 Hrs**

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 Hrs****COURSE OUTCOMES:**

- CO 1:** Students will be able to understand the character of the multi cultured architectural expression through case studies.
- CO 2:** Documented and presentation on planning principles of different towns for their better understanding of local culture.
- CO 3:** Gained knowledge on various manmade and nature forces behind the evolution of traditional architecture.
- CO 4:** Also understood the overlapping and the influence of anthropology, sociology and culture in the architecture style and character of a region.
- CO 5:** Enabled them to understand the impact of colonial architecture on settlement pattern and houses.

**TEXT BOOKS:**

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. G.H.R. Tillotsum-The tradition of Indian Architecture Continuity,Controversy - Change since 1850, Oxford University Press, Delhi, 1989.
2. V.S.Praman, Havali- Wooden Houses & Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
3. Kullrishan Jain &Minakshi Jain - Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad, 1992.
4. Carmen Kagal, VISTARA - The Architecture of India, Pub: The Festival of India,1986

Course Outcome		Program Outcome												Program Specific Outcome		
CO'S		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Students will be able to understand the character of the multi cultured architectural expression through case studies.	1	2	2	-	-	-	2	2	-	-	-	-	-	-	1
CO2	Documented and presentation on planning principles of different towns for their better understanding of local culture.	1	-	2	-	-	-	2	2	-	-	-	-	-	-	1
CO3	Gained knowledge on various manmade and nature forces behind the evolution of traditional architecture.	-	-	-	2	1	-	1	2	2	1	-	-	-	-	1
CO4	Also understood the overlapping and the influence of anthropology, sociology and culture in the architecture style and character of a region.	3	1	-	1	1	-	-	3	1	1	-	-	-	-	1
CO5	Enabled them to understand the impact of colonial architecture on settlement pattern and houses.	2	1	-	-	-	-	1	3	-	-	-	-	1	-	1

  
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**COURSE 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 generates ideas for architectural design and the importance of the participatory approach to design.
- To expose student to design process, the various stages, considerations in design, methodology.

**UNIT I INTRODUCTION TO DESIGN****6 Hrs**

Definition of design, understanding of design, purpose of design, nature of good design and evaluation of design, types of design classifications, role of designer, design in history.

**UNIT II DESIGN PROCESS****6 Hrs**

Context for architectural design problems, design process, stages in the design process from different considerations, different ideas of design methodology.

**UNIT III DESIGN PROBLEMS AND SOLUTIONS****12 Hrs**

Different approaches to design, problem solving or intuitive, formulation of problems, nature of creative design problems, goals in design. Concept of pattern language- participatory approach to design.

**UNIT IV DESIGN THINKING****15 Hrs**

Understanding the terms creativity, imagination, etc. Theories on thinking, convergent and divergent thinking, lateral and vertical thinking, creative techniques like checklists, brainstorming, syntactic, etc. design puzzles and traps, blocks in creative thinking.

**UNIT V DESIGN CONCEPTS, PHILOSOPHIES AND STRATEGIES****6 Hrs**

Various approaches to generate ideas for architectural design - types of concepts, personal philosophies and strategies of individual designers, channels to creativity in architecture with examples of renowned Architects.

**Total: 45 Hrs****COURSE OUTCOMES:**

- CO 1:** They'll be able to analyze various stages of design process and implement the same in their design.
- CO 2:** They'll get exposed to the works of eminent architects and be able to analyse the design thinking process.
- CO 3:** The students were made to understand how architectural design solutions generated are linked to philosophy, strategies that lead to creativity in architecture.
- CO 4:** Exposed on the design solution based on intuition, creativity and goals.
- CO 5:** Understood on how architectural design solutions generated are linked to philosophy, strategies that lead to creativity in architecture.

**TEXT BOOKS:**

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
6. James C.Snyder, Anthony J.Catarex- Introduction to Architecture, McGraw-Hill Inc.,1979.
7. Allen Mave Evans &Caula David Dumes Nil, An Invitation to Design, MacmillanPublishing Co., New York, 1982.
8. Design methods- Christopher Jones
9. Helen Marie Evans, Dumesnil, Carla Davis, "An Invitation to Design",Macmillan Publishing Co., New York, 1982

Course Outcome		Program Outcome												Program Specific Outcome		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	They'll be able to analyze various stages of design process and implement the same intheir design.	1	2	3	-	-	-	-	-	2	-	-	-	-	-	1
CO2	They'll get exposed to the works of eminent architects and be able to analyses the design thinking process.	1	3	2	1	1	-	-	-	2	-	-	-	-	-	1
CO3	The students were made to understand how architectural design solutions generated are linked to philosophy, strategies that lead to creativity in architecture.	1	2	-	1	3	-	1	-	3	-	-	-	-	-	1
CO4	Exposed on the design solution based on intuition, creativity and goals.	1	3	-	1	3	-	-	-	3	-	-	-	-	-	1
CO5	Understood on how architectural design solutions generated are linked to philosophy, strategies that lead to creativity in architecture.	-	2	-	1	2	-	-	-	3	-	-	-	1	2	2

  
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**COURSE OBJECTIVE:**

- To introduce the design of various steel components in a building.
- To understand the types, efficiency, strength, advantages and disadvantages of Riveted, Bolted and welded joints in steel.
- To enable students in understanding the design of Tension (beams) and compression (columns) steel members under various conditions.
- To study the properties and various design methods of concrete.
- To understand the design of reinforced concrete one way and two way slabs.

**UNIT I STEEL STRUCTURES – RIVETED, BOLTED AND WELDED JOINTS****12 Hrs**

Introduction -Properties of rolled steel sections. Types and failure of connections – rivet, bolt and weld. Applications, advantages and disadvantages of rivet, bolt and weld connections -Design of rivet, bolt and weld Joints for Axially Loaded Members (Excluding eccentric connections).

**UNIT II TENSION MEMBERS AND STEEL BEAMS****12 Hrs**

Introduction – Net sectional area – Permissible stresses. Design of Axially loaded Tension member – Lug angle – Tension splice. Introduction on steel beams – laterally supported and unsupported beams - Allowable stresses - General specifications. Design of laterally supported beams.

**UNIT III STEEL COLUMNS****12 Hrs**

Introduction – various shapes – built up section - Allowable stresses. Design of axially loaded columns (Excluding eccentric connections).

**UNIT IV PROPERTIES OF CONCRETE AND VARIOUS DESIGN METHODS****12 Hrs**

Concrete- Introduction, types and properties – Grades, strength & durability of concrete - -Concept of Working stress method, Ultimate Load Method and Limit State Method -Advantages of Limit State Method over other methods. Various limit stages - characteristic load and characteristic strength of materials - partial safety factor – stress-strain relationship of steel and concrete - safety and serviceability requirements.

**UNIT V LIMIT STATE DESIGN OF SLABS****12 Hrs**

Design of one-way two-way and continuous slabs using IS Code co-efficient for various edge conditions. Exercise on One-way and Two- way slab with drawing.

**TOTAL: 60 Hrs****COURSE OUTCOMES:**

At the end of the course, the students will be able to understand:

**CO 1:** Design of steel joints for maximum efficiency and strength.

**CO 2:** Tension members and columns are designed for various conditions by applying the codal provisions.

**CO 3:** Design of axially loaded steel columns.

**CO 4:** Basic knowledge about concrete.

**CO 5:** Design of one way and two way RC slabs.

**TEXT BOOKS:**

1. M.R. Shiyekar, "Limit State Design in Structural Steel", PHI Learning Private Limited, 2010.
2. N. Subramanian, "Design of Steel Structures", Oxford Higher Education, 2008.
- 3.P.Dayaratnam, "Design of Reinforced Concrete Structures", Oxford and IBH Publishing Co.,1983.

**REFERENCES:**

1. S.K. Duggal, "Limit State Design of Steel Structures", McGraw Hill Education, Private Limited, 2010.
2. Dr. V. L. Shah, Prof. Veena Gore, "Structures Publications", Pune, 2012.
3. S.S. Bhavikatti, "Design of Steel Structures" by Limit State Method as per IS800-2007, I.K. International Publishing House Pvt, Ltd, 2012.
4. Ramachandra S., Design of Steel Structures, Standard Book House, Delhi, 1984.
5. Gurucharan Singh, Design of Steel Structures, Standard Publishers, New Delhi, 1982.
6. Negi "Design of steel Structures", Tata McGraw-Hill Book Company, New Delhi 1997.
7. Dr. B.C. Punmia, "Reinforced Concrete Structures", Vol, 1 & 2 Laxmi publication, Delhi, 2004.
8. IS 456 "Indian Standard, Plain and Reinforced Concrete, Code of Practice, Bureau of Indian Standards, 2000.

Course Outcomes		Program Outcomes												Program Specific Outcomes		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	Design of steel joints for maximum efficiency and strength.	1	3	-	-	-	3	-	1	-	-	1	-	3	-	3
CO 2	Tension members and columns are designed for various conditions by applying the codal provisions.	1	3	-	-	-	3	-	1	-	-	1	-	3	-	3
CO 3	Design of axially loaded steel columns.	1	3	-	-	-	3	-	1	-	-	1	-	3	-	3
CO 4	Basic knowledge about concrete.	1	3	-	-	-	3	-	1	-	-	1	-	3	-	3
CO 5	Design of one way and two way RC slabs.	1	3	-	-	-	3	-	1	-	-	1	-	3	-	3

  
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**COURSE OBJECTIVES:**

- To make students understand the basic fundamentals of Environment and its Ecosystem and its Bio-diversity.
- To enable students to understand about various kinds of environmental pollution and its prevention and protection acts and policies.
- To make students understand the importance of water quality, its purification treatments at city level and distribution in small towns and at individual building level.
- To expose the students to the fundamentals of sewage treatment, their collection and disposal at building and town level and their construction system involved in services.
- To make students understand other city level disposal collection, conveyance, recycling, storm water drains and disposals along with new sustainable methods.

**UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY****10 Hrs**

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem –Introduction to biodiversity– Case study of simple ecosystems – pond, river, hill slopes.. Biogeographically 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 with case examples – 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.**

**UNIT II ENVIRONMENTAL POLLUTION AND ACTS****8 Hrs**

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 –Role of an individual in prevention of pollution – pollution case studies . Case study of local polluted site – Urban / Rural / Industrial / Agricultural. Effects of modern agriculture. Environmental protection Act. Air (prevention and control of Pollution) Act. Water (prevention and control of Pollution) Act. Wildlife protection Act. Forest conservation Act. Issues involved in enforcement of environmental legislation.

**UNIT III WATER SOURCE MANAGEMENT TREATMENT AND DISTRIBUTION****8 Hrs**

Surface and ground water sources - quality/quantity - nature of impurities Types of pipes used - Laying, Jointing, testing internal water supply in buildings - Municipal byelaws, regulations, standards. Treatments - water supply systems - treatment systems - centralized treatment - uses and treatment - Desalination - ionization - reverse osmosis. - Distribution system in small towns - Water conservation, rainwater collection - methods of harvesting - storm water drains in layouts, towns and cities - Waste water recycling.

**UNIT IV SEWAGE TREATMENT AND DISPOSAL SYSTEMS****10 Hrs**

Environmental sanitation -Sanitation in buildings. Primary and secondary treatment Activated sludge - Sequencing Batch Reactor(SBR) and Moving Bed Bio film Reactor (MBBR)/ Fluidized Aerobic Bioreactor- Arrangement of sewerage systems in Housing, large factories, shopping centres - sewage pumping station, causes and control of solid waste. Sewage disposal, construction details of sewers and connections. collection, conveyance, recycling and disposal of town refuse system - sanitation in unsewered areas of cities - alignment of storm water drains in residential areas and cities.

**UNIT V INNOVATIVE PRACTICES****9 Hrs**

Sustainable development – urban problems related to energy – water conservation, rain water harvesting, and 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, case studies. – Wasteland

**TOTAL: 45 Hrs**

**COURSE COUTCOMES:**

**CO 1:** The students are exposed about environment and its ecosystem to Indian geographical context.

**CO 2:** They are also exposed to various issues and pollutions related to environment and acts and policies to protect environment.

**CO 3:** Students understood various techniques and methods involved in water treatment and disposal

**CO 4:** Gained knowledge on modern techniques of sewage disposal and storm water.

**CO 5:** Knowing alternate Sustainable practices for Water harvesting and environmental challenges.

**TEXTBOOKS:**

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, PearsonEducation, 2004.
3. S.C.Rangwala, Water Supply and Sanitary Engineering, Charotar Publishing House, Anand 388 601,1989.
4. G.M.Fair, J.C.Geyer and D.Okun, Water and Waste Water Engineering, Vol. II, John Wiley & Sons, Inc., New York, 1968.
5. Manual of Water supply and Treatment, Second Edition, CPHEEO, Ministry of Works and Housing, New Delhi, 1999.
6. Manual on Sewerage and Sewage Treatment, CPHEEO, Ministry of Works and Housing, New Delhi,2013.
7. Manual on Strom water drainage system, CPHEEO, Ministry of Works and Housing, New Delhi,2019.


**REFERENCES:**

1. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
2. Erach Bharucha, "Textbook of Environmental Studies", Universities Press(I) PVT, LTD, Hydrabad, 2015.
3. G. Tyler Miller and Scott E. Spoolman, "Environmental Science", Cengage Learning India PVT, LTD, Delhi, 2014.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.

Course Outcomes		Program Outcomes												Program Specific Outcomes		
		PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	The students are exposed about environment and its ecosystem to Indian geographical context.	-	3	3	1	-	-	-	1	3	2	-	-	2	2	2
CO 2	They are also exposed to various issues and pollutions related to environment and acts and policies to protect environment.	-	-	1	2	1	1	-	-	3	-	-	-	2	1	-
CO 3	Students understood varioustechniquesand methods involved in water treatmentand disposal	1	3	1	2	1	1	-	-	3	-	-	-	2	-	-



CO 4	Gained knowledge on modern techniques of sewage disposal and storm water.	-	3	1	2	1	1	-	-	3	-	-	-	3	2	-
CO 5	Knowing alternate Sustainable practices for Water harvesting and environmental challenges.	-	2	2	2	1	1	-	-	3	-	-	-	3	2	-

  
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**COURSE OBJECTIVES:**

- To understand the importance of survey equipments and its applications.
- To orient the students towards several influencing factors which govern the sitting 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 and regulations
- To provide an insight of integrity the site features in planning roads and parking.

**UNIT I INTRODUCTION****6 Hrs**

Definition of plot, site, land and region, units of measurements. Introduction to survey, Importance's of survey, methods of surveying and its related cases study. Understanding Survey equipment's and with their application. Understanding the administration maps and site drawings, including FMB. . Introduction to master plans and land use for cities, development control rules.

**UNIT II SITE DRAWINGS****8 Hrs**

Introduction to measuring a site, drawing out from measurements and Computation 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****15 Hrs**

**Site Inventory:** natural, cultural, man-made and aesthetic factors. Importance of site analysis as offering potential and limitation to architectural design factors- such has on-site/ off- site, topography, hydrology, soils, vegetation and climate and microclimate. **Analysis of site landform:** Characteristics of contours, direct and indirect methods of contouring, interpolation, slope analysis, grading process, grading criteria, functional and aesthetic. Preparation of maps of matrix analysis & composite analysis – Case studies and exercises on the above.

**UNIT IV ANALYSIS OF SITE SERVICES****8 Hrs**

**Site services** –surface drainage, irrigation system - sources of water supply and means of waste disposal system Principles of positive drainage and grading for drainage in a site. Location and design of sewage treatments. Methods to control soil erosion. Planning for rain harvesting. Understanding the above through site analysis diagram.

**UNIT V SITE LAYOUT PRINCIPLES****8 Hrs**

Organization of vehicular and pedestrian circulation, Geometric calculation for movement. Types of roads, hierarchy of roads, networks, road widths and parking, regulations. Turning radii & street intersections. Site selection criteria for different building typologies, impact of building development on the surroundings including aspects such as traffic, noise, pollution, microclimate. Site selection criteria for commercial and institutional projects. The project will be explored through analysis / models/ sketches/ drawings.

**TOTAL: 45 Hrs**

**COURSE OUTCOMES:**

**CO 1:** The contextual importance on site analysis can be understood based on the various site factor with respect to the study area.

**CO 2:** Various scientific and analytic site analysis techniques is understood.

**CO 3:** To document on-site and off-site factors, site analysis diagram.

**CO 4:** To prepare the contour analysis, understood the development control regulation, understood the building surrounding analysis.

**CO 5:** To prepare site analysis diagram from the above units for commercial and institutional projects.


**TEXT BOOK:**

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 Coppleman; "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.
6. Introduction to Landscape – John Moltoch

Course Outcomes		Program Outcomes												Program Specific Outcomes		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	The contextual importance on site analysis can be understood based on the various site factor with respect to the study area.	3	2	3	2	2	-	1	1	3	-	1	1	2	1	2
CO 2	Various scientific and analytic site analysis techniques is understood.	3	3	3	3	2	-	1	1	3	-	1	1	-	-	-
CO 3	To document on-site and off-site factors, site analysis diagram.	3	3	3	2	2	-	-	1	3	-	1	1	-	-	1
CO 4	To prepare the contour analysis, understood the development control regulation, understood the building surrounding analysis.	3	3	3	2	1	-	-	1	3	-	1	1	2	1	1
CO 5	To prepare site analysis diagram from the above units for commercial and institutional projects.	3	3	3	2	2	-	-	1	3	-	1	1	-	-	-

  
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**COURSE OBJECTIVE:**

- 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 as steel and steel alloys. (Theory Only)
- To understand in detail through drawings, the types of sections in steel, joints, application in columns, beams, steel components and trusses.
- To understand aluminum and aluminum alloys, its properties, products and non-ferrous products used in construction industry. (Theory only)
- To understand in detail through working drawings, the various types of aluminum doors, windows, ventilators and roofing system as applied in construction industry.
- To enable the students to understand that Ferrous metals and Non-Ferrous metals are equally important in construction industry by studying their manufacture properties, applications and uses and current trends in terms of theory and thereby enabling them to represent the different building components through relevant drawings.

**UNIT 1 FERROUS METALS**

12 Hrs

Properties and uses of cast iron, wrought iron, pig iron and steel. Market forms of steel: structural steel, stainless steel, steel alloys – properties and uses- Current development.

**UNIT 2 STEEL SECTIONS JOINTS AND STEEL CONSTRUCTIONS**

26 Hrs

Drawings: Steel joints and connections. - Design exercises using structural steel sections for column and beam Connections. **Steel components:** Steel doors: (Framed & Sliding), steel windows: (Casement window & Sliding window), Steel grill designs for windows, **Steel stairs:** (spiral stair), and steel hand rails and balustrade. **Steel Roof trusses** - simple trusses in steel. (King post truss, Queen Post truss). **Gates:** entrance gate, rolling shutter. Composite materials design details for Steel and Glass.

**Exercises of the above components and drawings.**

**UNIT 3 NON FERROUS METALS**

12 Hrs

Properties and uses of Aluminum and Aluminum Alloys. Market forms of Aluminum: extrusions, foils, castings, sheets - Study of protection to non- Ferrous metals and product such as anodizing, powder coating and chromium plating-current developments.

**UNIT 4 ALUMINIUM CONSTRUCTIONS**

25 Hrs

Drawings: Design exercises using Aluminum 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).

Aluminum roofing: North lighting, glazing bar, roofing sheets and construction details for gutter. Composite materials design details for Aluminum and Glass.

**Exercises of the above components and drawings.**

**TOTAL: 75 Hrs****COURSE OUTCOMES:**

**CO 1:** An Understanding of ferrous metals in terms of its properties, manufacture and their applications in architectural construction.

**CO 2:** The students are able to understand in detail the method of construction of various building components using steel and steel components.

**CO 3:** An Understanding of Non-ferrous metals in terms of its properties, manufacture and their

applications in architectural construction.

**CO 4:** This also helps the student to understand the different construction practices adapted for the various components specific to the material in which it's made.

**CO5:** Students to understand that ferrous metals and Non-Ferrous metals are equally important in construction industry

**TEXT BOOK:**

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.
3. W.B. Mickay – Building construction Vol 1, 2 and 3 – Longmans, UK 1981.

**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
6. R.Chudley – Building Construction Handbook – BLPD, London 1990.
7. S.C.Rangwals – Engineering materials – Charotar Publishing, Anand.
8. Francis D.K.Ching – Building Construction illustrated. VNR, 1975.
9. Gorenc, Tinyou Syam, : Steel Designer's handbook", CBS Publishers and Distributors, New Delhi, Bangalore ,2005
10. Don A.Waston, " Construction Materils and Porcess", McGraw Hill Co., 1972.

Course Outcomes		Program Outcomes (PO's)												Program Specific Outcomes PSO's		
CO's		PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	An Understanding of ferrous metals in terms of its properties, manufacture and their applications in architectural construction.	-	2	3	3	2	-	2	-	3	1	1	-	-	3	-
CO 2	The students are able to understand in detail the method of construction of various building components using steel and steel components.	3	-	-	3	-	1	-	3	2	1	1	-	-	-	-
CO 3	This also helps the student to understand the different construction practices adapted for the various components specific to the material in which it's made.	2	3	3	-	3	-	2	-	3	1	1	-	-	3	-
CO 4	Students to understand that ferrous metals and Non-Ferrous metals are equally important in construction industry	3	2	3	3	2	1	-	3	3	1	1	-	-	-	-



**COURSE 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.

**1. DESIGN STUDIO - RURAL PROJECT****105 Hrs**

Documentation and analysis related to rural precincts - visits to selected villages - surveys on visual, socioeconomic and environmental behavior studies - Physical & technical aspects of rural design elements & Planning methods - study existing conditions - analysis of survey data - preparation of report. Comprehensive analysis of rural settlement in a hierarchical manner. Preparation of design solution for housing & community facilities. Single level planning in small scale- presentation of report & design.

**2. SUGGESTIVE TYPOLOGIES/ PROJECTS:****75 Hrs**

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, Co-operative societies, community centre.

**TOTAL - 180 Hrs****COURSE OUTCOMES:**

- CO 1:** Student's ability to understand the concept of community and settlement evolution and the built environment as influenced by Socio-economic, Cultural, Environmental and Technical factors.
- CO 2:** Ability to provide a sensitive approach to the design of the built environment taking into account the above mentioned factors.
- CO 3:** Educated the student into the process of design in different context (Rural) by choosing relevant topics of community or civic importance.
- CO 4:** Thrust was given on rural materials, construction techniques and design details.
- CO 5:** Students gained knowledge the physical, technical and visual characteristics of a settlements at micro level.

**TEXT BOOK:**

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

Course Outcomes		Program Outcomes (PO's)												Program Specific Outcomes PSO's		
CO's		PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	Student's ability to understand the concept of community and settlement evolution and the built environment as influenced by Socio-economic, Cultural, Environmental and Technical factors.	1	3	3	3	3	-	1	-	3	1	-	-	3	1	-
CO 2	Ability to provide a sensitive approach to the design of the built environment taking into account the above mentioned factors.	2	3	3	3	2	1	1	-	3	-	-	-	3	1	-
CO 3	Educated the student into the process of design in different context (Rural) by choosing relevant topics of community or civic importance.	3	3	3	3	2	1	-	-	3	-	1	-	3	2	-
CO 4	Thrust was given on rural materials, construction techniques and design details.	2	2	3	3	2	2	-	-	3	-	-	-	3	2	-
CO 5	Students gained knowledge the physical, technical and visual characteristics of a settlements at micro level.	2	2	3	3	2	1	-	-	3	-	1	-	3	2	-

  
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**COURSE OBJECTIVE:**

- To trace out evolution of energy conscious buildings and techniques from historic period based on climatic zone of the world.
- To enable students understand solar geometry and heat transfer mechanism in buildings and energy conservation.
- To study methodologies to incorporate solar passive heating system in buildings through select case studies with stress on materials and techniques.
- To study ways to incorporate solar passive cooling systems through select examples with stress on materials and techniques.
- To enable student to understand importance of site planning, vegetation types, water bodies as factors inspiring concepts of design.
- To make the students aware of the future trends in creating sustainable built environment.

**UNIT I CLIMATE AND SHELTER****6 Hrs**

Climate responsive design features in Historic Perspective - Examples of traditional architecture of various places in different climate zones.

**UNIT II SOLAR ENERGY AND BUILDINGS****7 Hrs**

General principles and techniques – solar passive architecture. Methods of energy conservation techniques. Solar water heating system. Heat transfer and Thermal Performance of Walls and Roofs. Future Trends - Photo Voltaic Cells and Thermal Energy Storage.

**UNIT III PASSIVE SOLAR HEATING****10 Hrs**

General principles – Various methods of Maximizing exposure to solar radiation in cold & temperate climate. Direct gain systems - Glazed walls, Bay windows, Attached sun spaces. Indirect gain systems – Trombe wall, Water wall, Solar Chimney, Transwall, Roof pond, Roof radiation trap, Solarium. Isolated gain systems – Natural convective loop. Case studies on buildings designed with passive heating techniques.

**UNIT IV PASSIVE COOLING****10 Hrs**

General principles – Various techniques of shading to reduce heat gain in tropical climate. Evaporative cooling, Nocturnal radiation cooling, Passive Desiccant cooling, Induced ventilation, Earth sheltering, Earth Berming, Wind Towers, Earth Air tunnels, Curved Roofs & Air Vents, Insulation. Case studies on buildings designed with passive cooling techniques.

**UNIT V ENERGY EFFICIENT DESIGN CONCEPTS****12 Hrs**

Design Considerations involving Site Conditions, Land form & orientation – Vegetation type & Pattern – Water Bodies – Open Space & Built form - Plan form & Elements – Roof form – Fenestration pattern & Configuration – Building envelope & finishes. Daylight Factor and Analysis. Contemporary Trends in Energy Efficient Architecture.

**TOTAL: 45 Hrs****COURSE OUTCOME:**

- CO 1:** The students are exposed to alternative sources of energy and are exposed to passive design considerations
- CO 2:** An understanding on site design conditions for various climatic zones in creating sustainable built environment. Also gained knowledge in passive heating techniques for various building.
- CO 3:** Understood the concepts of passive cooling techniques satisfying the demand of future needs.

**CO 4:** Exposed the students to various design concepts with model making.

**CO 5:** To understand the importance of Energy conservation in general and solar energy particularly and to incorporate energy efficient techniques in Planning, design and detailing of buildings.

**TEXT BOOKS:**


1. MiliMajunder, Teri – Energy – Efficient Bldg in India – Thomson Press , New Delhi – 2001
2. J.K Nayak&Others , Energy Systems Energy Group,- Isa Annal Of Passive Solar Architecture.
3. Manual on Solar Passive Architecture, IIT Mumbai and Mines New Delhi, 1999
4. Arvind Krishnan & Others, “ Climate Responsive Architecture”, A Design Handbook for
5. Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2001
6. Majumdar M, “Energy-efficient Building in India”, TERI Press, 2000.
7. 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 homeconstruction”, Taunton Press, 2008
6. “Climatically Responsive Energy Efficient Architecture”, PLEA/SPA, New Delhi 1995.
7. Ms.Sudha, N.K.Bansal and M.A.S.Malik, “Solar Passive Building”, Pergamon press.
8. James D. Ritchie – Successful Alternate Energy Methods – Structures Publishing Co . Michigan 1980.
9. George Basid& Others – Energy Performance of Bldg – CRC Press, Florida 1984.
10. Ralph M .Lebens – Passive Solar Architecture in Europe – 2, Architecture Press, London 1983.

Course Outcomes		Program Outcomes												Program Specific Outcomes		
CO's		PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	The students are exposed to alternative sources of energy and are exposed to passive design considerations	1	3	3	2	2	-	1	1	3	2	-	-	-	1	2
CO 2	An understanding on site design conditions for various climatic zones in creating sustainable built environment. Also gained knowledge in passive heating techniques for various building.	1	3	3	2	1	-	1	-	3	2	-	-	-	1	2
CO 3	Understood the concepts of passive cooling techniques satisfying the demand of future needs.	1	3	2	3	2	-	2	-	3	2	-	-	-	3	-
CO 4	Exposed the students to various design concepts with model making.	3	3	2	3	1	-	2	3	3	2	-	-	-	3	-

CO 5	To understand the importance of Energy conservation in general and solar energy particularly and to incorporate energy efficient techniques in Planning, design and detailing of buildings.	1	3	3	2	3	-	2	-	3	2	-	-	3	-	-
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 Krishnagiri (Dt) Tamil Nadu.

**COURSE OBJECTIVES:**

- To understand the principles of human factors and the relationship to environmental design.
- To understand issues of ergonomic design with built environment.
- To orient the student towards the criteria to be considered in the built environment for the physically challenged individuals.
- To learn metrological analysis of the anthropometrics relationship to ergonomic environmental design.
- To enable the students in understanding the psychosocial aspects of ergonomic necessities in design.

**UNIT I INTRODUCTION TO HUMAN FUNCTION****8 Hrs**

Human being in the manmade world and importance of ergonomics, Gross human anatomy, Ergonomics for children and old people.

**UNIT II ERGONOMICS AND DESIGN****12 Hrs**

Introduction to Anthropometrics – static and dynamic, Muscles and work physiology, Static and Dynamic work including maximum capacity. Anthropometric dimensions for designing interior spaces and products for children, men, women and elderly.

**UNIT III INCLUSIVE DESIGN****10 Hrs**

Spatial Requirements for the physically handicapped – Ramp, toilets and corridor design-Design issues in the design of old age homes – Criteria to be considered in the Built environment when designing for the blind and physically challenged individuals and universal design principles.

**UNIT IV ENVIRONMENTAL ERGONOMICS****8 Hrs**

Simulation and Responses in various environmental conditions including, thermal, illumination, noise and vibration-Importance of ergonomic design in the built environment.

**UNIT V ADVANCED ERGONOMICS****7 Hrs**

Ergonomics and its application - Workstation, Physical Environment and Materials Handling. Psychosocial aspects of Design and aesthetical incorporation of ergonomic necessities in design.

**TOTAL: 45 Hrs****COURSE OUTCOME:**

**CO 1:** Understand the relevance of human factors and anthropometrics to environmental design.

**CO 2:** Explain the importance of ergonomic design in the built environment.

**CO 3:** Analyze anthropometric dimensions for designing interior spaces and products for children, men, women, elderly and physically challenged individuals.

**CO 4:** Demonstrate design analysis that follows the principles of human factors/ergonomics.

**CO 5:** This also helps the student to understand the ergonomic necessities in design.

**TEXT BOOKS:**

1. Sanders, M.M. & McCormick, E.J. (1993) Human Factors in Engineering & Design, 7th ed. McGrawHill, NY.
2. Human factors/ergonomics for building and construction Martin Helander
3. Body space: Anthropometry, Ergonomics and the Design of Work, 3rd edition, CRC. Ulijaszek, S. & Mascie-Taylor, N. (1994)

4. Anthropometry: The Individual and the Population (Cambridge Studies in Biological and Evolutionary Anthropology) Cambridge University Press.

**REFERENCES:**

1. Sanders, M.M. & McCormick, E.J. (1993) Human Factors in Engineering & Design, 7th ed. McGrawHill, NY.
2. NLS. Eligibility of Blind and Other Physically Handicapped Persons for Loan of Library Materials.
3. "Eligibility of Blind and Other Physically Handicapped Persons for Loan of Library Materials". Loc.gov. 2013-06-28. Retrieved 2013-07-28.
4. Panero, J. & Zelnick, M. (1979). Human Dimension and Interior Space:
5. A Source Book of Design Reference Standards, Watson-Guptill. Salvendy, G. (2006).
6. Hand book of Human Factors and ergonomics, 3rd edition, Wiley. Lang, J. (1987). Lang, J. (1987).
7. Creating architectural theory: The role of the behavioral sciences in environmental design, NY: Van Nostrand Reinhold. Pheasant, S. & Haslegrave, C. (2005)
8. Alvin R. Tilley (2001). The Measure of Man and Woman: Human Factors in Design, Henry Dreyfuss Associates. Zar, J. (1999).
9. Biostatistical analysis, 4th edition, NJ: prentice Hall. Gordon, C. (1990). 1988

Course Outcomes		Program Outcomes (PO's)												Program Specific Outcomes PSO's		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	Understand the relevance of human factors and anthropometrics to environmental design.	3	3	3	2	2	-	1	1	3	2	-	-	-	2	-
CO 2	Explain the importance of ergonomic design in the built environment.	3	3	3	2	2	-	1	1	2	1	-	-	-	-	2
CO 3	Analyze anthropometric dimensions for designing interior spaces and products for children, men, women, elderly and physically challenged individuals.	2	3	1	2	-	2	1	2	2	1	-	-	2	-	-
CO 4	Demonstrate design analysis that follows the principles of human factors/ergonomics.	3	3	2	3	2	3	2	1	2	1	-	-	2	-	-
CO 5	This also helps the student to understand the ergonomic necessities in design.	3	3	3	3	1	2	2	3	1	1	-	-	2	-	-

  
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**COURSE OBJECTIVES:**

- Be familiar with the knowledge of various design methods for concrete structures and also know about partial safety factor, stress strain relationship of concrete
- Be acquainted with the knowledge of limit state design of beam including singly reinforced, doubly reinforced and flanged beam
- To gain knowledge of limit states design of RCC slabs using IS codes.
- To strengthen student's knowledge about reinforced cement concrete and its applications in buildings. To equip students about the methods of designing various structural members using reinforced cement concrete.

**UNIT I            PROPERTIES OF CONCRETE AND VARIOUS DESIGN METHODS            5 Hrs**  
Structural properties of concrete - Grades and Strength of Concrete - durability -Concept of Working stress method, Ultimate Load Method and Limit State Method – Advantages of Limit State Method over other methods -stress strain relationships.

**UNIT II            LIMIT STATE DESIGN - INTRODUCTION            6 Hrs**  
Various limit stages - characteristic load and characteristic strength of materials - partial safety factor – stress-strain relationship of steel and concrete - safety and serviceability requirements.

**UNIT III            LIMIT STATE DESIGN OF BEAMS            10 Hrs**  
Analysis and Design of rectangular sections for bending - singly reinforced, doubly reinforced, flanged sections and continuous beams.  
**Exercise on singly and doubly reinforced beam with drawings.**

**UNIT IV            LIMIT STATE DESIGN OF SLABS            12 Hrs**  
Design of one-way two-way and continuous slabs using IS Code co-efficient for various edge conditions. Introduction to shells and folded plates and classification of shells.  
**Exercise on One-way and Two- way slab with drawings.**

**UNIT V            CIRCULAR SLABS AND FLAT SLABS            12 Hrs**  
Design of RCC Circular slabs - simply supported and fixed slabs with uniformly distributed loads. Design principles of flat slabs - code provisions – Simple design problems.  
**Exercise on flat slabs with drawings.**

**TOTAL: 45 Hrs**

**COURSE OUTCOMES:**

The students will able to

**CO1:** Gain basic knowledge about concrete and its applications with case studies.

**CO2:** Understanding the various methods in designing the members such as beams and slabs.

**CO3:** Apply the limit state design methods to design RCC beams and slabs and present the same.

**CO4:** Design of one way & two way slab.

**CO5:** Present drawings and case study on concrete beams and slabs through photography documentation, video presentation and modeling.


**TEXT BOOKS:**

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. Vazirani and Ratwani, Concrete Structures, Khanna Publishers, New Delhi, 1969.

**REFERENCES:**

1. Dr. B.C. Punmia, "Reinforced Concrete Structures", Vol, 1 & 2 Laxmi publication, Delhi, 2004.
2. IS 456 "Indian Standard, Plain and Reinforced Concrete, Code of Practice, Bureau of Indian Standards, 2000.
3. S.Unnikrishnan Pillai and Devados Menon, "Reinforced Concrete Design" – Tata McGraw

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	Gain basic knowledge about concrete and its applications with case studies.	2	1	3	-	-	-	-	2	3	-	-
CO 2	Understanding the various methods in designing the members such as beams and slabs.	2	1	3	-	-	-	-	2	3	-	-
CO 3	Apply the limit state design methods to design RCC beams and slabs and present the same.	2	1	3	-	-	-	-	2	3	-	-
CO 4	Design of one way & two way slab.	2	1	3	-	-	-	-	2	3	-	-
CO 5	Present drawings and case study on concrete beams and slabs through photography documentation, video presentation and modeling.	2	1	3	-	-	-	-	2	3	-	-

  
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**COURSE OBJECTIVES:**

- To introduce the process of interior design with an understanding of principles and elements and how these could enhance themes and concepts.
- To make the student aware of the evolution in the historical context and as to how arts and crafts influence decoration and detail.
- To enable student understand the importance of floors, ceilings, walls and other elements of buildings to contribute to aesthetic and physiological effect.
- To introduce the other components like lighting fixtures, objects of art, hard and soft landscape elements for good articulation of space.
- To make students aware about the role of furniture's, types, as reflectors of life style and trends in the value systems of people.

**UNIT I INTRODUCTION TO INTERIOR DESIGN & HISTORY OF INTERIOR DESIGN 10 Hrs**

Definition of interior design - interior design process - vocabulary of design in terms of principles and elements - Introduction to the design of interior spaces as related to typologies and functions, themes and concepts. Brief study of the history of interior design through the ages relating to historical context, design movements, folk arts and crafts, vernacular design in India with reference to interior design and decoration.

**UNIT II ELEMENTS OF INTERIOR DESIGN - FURNITURE DESIGN 15 Hrs**

Study of the relationship between furniture and spaces, human movements & furniture design as related to human comfort, Function, materials and methods of construction changing trends and lifestyles, innovations and design ideas. Study on furniture for specific types of interiors like office furniture, children's furniture, residential furniture, display systems.

**Exercises on live scale furniture design.**

**UNIT III ELEMENTS OF INTERIOR DESIGN - ENCLOSING ELEMENTS 20 Hrs**

Introduction to various elements in interiors like floors, ceilings, walls, staircases, openings, interior service elements, incidental elements. Various methods of treatment involving the uses of materials and methods of construction in order to obtain certain specific functional, aesthetic and psychological effects - design projects.

**Exercises on Hotel room interiors, Music shop, Restaurant, Children's bedroom and show rooms.**

**UNIT IV ELEMENTS OF INTERIOR DESIGN – LIGHTING & ACCESSORIES 15 Hrs**

Study of interior lighting, different types of lighting their effects types of lighting fixtures, other elements of interiors like accessories used for enhancement of interiors, paintings.

**Exercises on Banquet halls, cinema or exhibition halls.**

**UNIT V INTERIOR LANDSCAPING 15 Hrs**

Interior landscaping, elements like rocks, plants, water, flowers, fountains, paving, artifacts, etc. their physical properties, effects on spaces and design values.

**Exercises on interior & exterior spaces, terrace gardens and courtyards.**

**TOTAL: 60 Hrs**

**COURSE OUTCOMES:**

The students will able to

**CO1:** Case study presentations to understand the vocabulary of interior design in Indian context.

**CO2:** Present live scale furniture design models for various spaces.

**CO3:** Understand the various components in interior space and present the same through drawings.

**CO4:** Analysis of interior lighting through case study or video presentations.

**CO5:** Provide interior landscape design with necessary details and drawings for terrace garden courtyards etc.

**TEXT BOOKS:**

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.SaranyaDoshi, 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.
6. Julius Penero and Martin Zelnik, Human Dimensions and Interior space Whitney Library of Design, NY 1979.

**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.
6. Syanne Slesin and Stafford Ceiff- Indian Style, Clarkson N.Potter, New York, 1990.
7. Dorothy, S-D., Kness, D. M., Logan, K. C. and Laura, S. (1983). Introduction to Interior Design.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	Case study presentations to understand the vocabulary of interior design in Indian context	3	2	-	-	3	-	-	3	2	2	3
CO 2	Present live scale furniture design models for various spaces.	3	3	-	-	3	-	-	2	-	2	3
CO 3	Understand the various components in interior space and present the same through drawings.	3	2	3	1	-	-	-	3	2	3	3
CO 4	Analysis of interior lighting through case study or video presentations.	3	2	3	-	-	-	-	3	2	3	3
CO 5	Provide interior landscape design with necessary details and drawings for terrace garden courtyards etc.	3	3	3	-	-	-	-	3	2	3	3

  
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**COURSE OBJECTIVES:**

- To give detailed input on low and high voltage supplies, precautionary methods required for safety, electrical circuit supply and distribution and knowledge on Sub-station required for public buildings and campuses.
- To enable students understand the importance of lighting in buildings for visual appreciation, factors and laws involved in illumination.
- To give additional knowledge on sources of light, its classification and intensities required for various types of gas jets, their advantages and disadvantages in usage.
- To understand the basic fundamental properties of acoustics & electrical services.
- To distinguish between sounds and noise its types, transmission, control its insulation and remedial measure in buildings.
- To understand the corrective acoustic measures required to floors, walls, ceilings, windows and doors for effective articulation.

**UNIT I ELECTRICAL SYSTEMS AND LAYOUTS IN BUILDING****9 Hrs**

Basics of electricity - Single/Three phase supply - Protective devices in electrical installations - Earthing for safety - Types of earthing - ISI specifications. Types of wires, wiring systems and their choice - Main and distribution boards – transformers, sub stations and switch gears. Electronic and Communication systems -Communication and data systems- communication spaces, pathways, cabling systems, voice and data, communication, Electronic security systems, computer labs/server rooms.

**Exercises:** Electrical layout of a simple residence, school, commercial buildings with concealed and unconcealed wiring with necessary detail and drawings.

**UNIT II FUNDAMENTALS OF LIGHTING****9 Hrs**

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 & LIGHTING DESIGN OF BUILDINGS****9 Hrs**

Electric light sources: 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 Artificial light sources, spectral energy distribution, Luminous efficiency- 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 - Illumination level (NBC) nominal calculations of lighting for small application.

**UNIT IV FUNDAMENTALS OF ARCHITECTURAL ACOUSTICS****9 Hrs**

Fundamentals – Sound - classification of sound measure of sound decibel scale-loudness-intensity-problems-Weber-Fechner law-wave length-frequency-period. frequency, intensity, wave length, Generation and propagation of high frequency and low frequency sound waves, transmission; reception of sound. Reverberation time – Sabine’s formula for reverberation time (rate of growth and decay) – absorption coefficient- determination of absorption co-efficient problems and its calculation and problems. Behavior of sounds in enclosed space.

Factors affecting acoustics of building (optimum reverberation, loudness, focusing, echo, echelon effects, resonance and noise) and their remedies- principles to be observed in the acoustical design of an auditorium. Effects of geometry and shape; site selection, acoustical properties of building materials, absorption coefficient; choice of materials and treatment for interior surfaces. Acoustics and 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: 45 Hrs**

**COURSE OUTCOMES:**

**CO1:** Electrical Drawing with the basics of Electricity and wiring system to be submitted for a residential building.

**CO2:** Catalogues on various types of lights to be collected and displayed.

**CO3:** Prepare, Design and estimate the electrical load required for any building.

**CO4:** Apply the illumination required for different occupancies and tasks.

**CO5:** Case study visit to recording to understand the spatial design characteristics of studios and materials used.

**TEXT BOOKS:**

1. Philips, "Lighting in Architectural Design", McGraw Hill. New York, 1964.
2. R. G. Hopkenson & J. D. Kay, "The lighting of Buildings", Faber & Faber, London, 1969.
3. E.P.Ambrose, Electric Heating, John Weley & Sons Inc., New York, 1968
4. R.G.Hopkenson & J.D.Kay, The lighting of Buildings, Faber & Faber, London, 1969

**REFERENCES:**

1. Handbook of building Engineers in metric systems, NBO(India), 1968
2. National Building Code of India, 2005 (NBC 2005)
3. Electrical Engineering by Anw
4. ari.
5. Electrical Technology by VH Cotton
6. Electrical wiring, Estimation and Costing, by L Uppal.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	Electrical Drawing with the basics of Electricity and wiring system to be submitted for a residential building.	3	2	-	-	3	-	-	3	2	2	3
CO 2	Catalogues on various types of lights to be collected and displayed	3	3	-	-	3	-	-	2	-	2	3
CO 3	Prepare, Design and estimate the electrical load required for any building	3	3	3	2	1	2	-	-	2	1	1
CO 4	Apply the illumination required for different occupancies and tasks	3	2	1	-	-	-	-	-	3	2	1
CO 5	Case study visit to recording to understand the spatial design characteristics of studios and materials used.	2	3	3	2	1	-	2	-	2	-	1

  
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**COURSE OBJECTIVES:**

- To understand the various materials and membranes for damp and water – proofing their method of application depending on the context like residential building and swimming pool, through detail drawing.
- To study the heat transfer into buildings by various U – value materials, their properties, uses and methods of application in floors, walls and roofs, through detail drawing.
- To understand the various floor and wall finishing materials, their properties, method of laying and making them to adopt for barrier free environment, through detail drawing.
- To understand the properties, uses and applications of various paints, enamels, emulsions, varnishes and their varieties for contextual application in buildings.
- To educate students on protective, preventive and corrective actions, to be taken in a building with regards to various materials, details, and stages in construction, for comprehensive understanding of practices to cover damp and water proofing. Types of insulation, covering, paints and exterior cladding.

**UNIT I DAMP AND WATER PROOFING****20 Hrs**

**Damp proofing-** Hot application and cold application, Properties of Materials for DPC, Classification of material- Flexible material- bitumen felts, fiber/glass fiber based, plastic DPC Membrane (polythene sheet), Semi rigid materials- mastic asphalts, Rigid materials- first class bricks, stones, slates, cement concrete, Grout materials- cement slurry and acrylic based chemical or polymers, Selection of Materials for Damp Proof Course in Buildings- Hot bitumen, Mastic asphalt, Bituminous felts, Metal sheets, Combination of sheets and felts, Stone, Bricks, Mortar, Cement concrete and Plastic sheets.

**Water Proofing-** Cementitious Waterproofing, Liquid Waterproofing Membrane, Bituminous Membrane, Bituminous Coating, Polyurethane Liquid Membrane. Application of the above under various situations- case study and exercise involving in the above.

**Exercise on Damp-Proofing In Residential Building, Swimming Pool.**

**UNIT II THERMAL INSULATION****15 Hrs**

**Heat Transfer-** conduction, convection, and radiation and Heat gain by building and materials methods of heat insulation or thermal insulation- Roofs, exposed walls and exposed windows, doors & ventilators etc. Insulation Materials & Systems- U-value for common materials- Fibrous /Mineral Insulation Materials- Rock wool, Glass wool and Slag wool- **Rigid Insulations-** Extruded Polystyrene Foam, Polyurethane Foam, Polyisocyanurate Foam and Expanded Polystyrene Foam, Application Areas for Insulation- Roofs, wall insulation (Internal and External).

**Exercise on Commercial building and Cold storage.**

**UNIT III ACOUSTIC INSULATION****15 Hrs**

Acoustic insulation Materials- Types of Acoustic Insulation- **Gypsum-** Properties and uses, Plaster of Paris and hydride Gypsum. **Blankets and Batts-** fiberglass and mineral fiber.

**Gypsum Panels-** Ecophon, Metal Ceiling Tiles, **Acoustic Panels-** Acoustic Fabric Wrapped Panels, Acoustic Panel Room, Cotton Acoustic Panels, Foam Acoustic Panels, Art Acoustic Panels and indoor and outdoor acoustic panels-straw panels, Foam egg-crate panels.

**Viscoelastic Products-** plywood, drywall or cement board- Brief case study on uses in building industry of the above.

**Exercise on Recording Studios, performance halls, conference space etc.**

**UNIT IV FLOOR AND WALL COVERING****10 Hrs**

**Floor Covering:** Flooring- Softwood, Hardwood- Resilient flooring- linoleum, asphalt, vinyl (composition and solid), rubber, cork tiles- Properties, uses and laying methods.

**Wall Covering:** Porcelain, enameled metal. Wood veneer, vinyl, plastic surfaced paneling- Properties, uses and laying methods.

**Wall and Floor tiles** Ceramic Glazed, Mosaic, Quarry and Cement tiles- Properties, uses and laying methods. Detailing for physically handicapped. Brief case study on uses in building industry of the above.

**Exercise on Cold storage, Class Room, performance halls, Gym space, Hospital and interior of restaurant and office space, etc.,**

**UNIT V EXTERIOR FINISHES****15 Hrs**

Exterior Finishes-Types of exteriors finishes like painting, Cladding, Structural glazing and contemporary surface treatment- different types of composite materials with their properties and uses in building.

**Exercise on Shopping complex, Car showroom, Commercial complex and interior spaces of restaurant and office space etc.**

**TOTAL: 75 Hrs****COURSE OUTCOMES:**

**CO1:** The students understood various components of buildings in terms of damp proofing and waterproofing through case study of swimming pool and collections of materials and catalogue.

**CO2:** The construction techniques of thermal insulation in a cold storage to be presented as a report.

**CO3:** Worked on the different insulation and acoustics materials.

**CO4:** Analyze and present the different construction practices adapted for the various components specific to the material and finishes in the floor and wall coverings.

**CO5:** The students are asked to the documentation through materials, catalogue, photograph and video presentation the various exterior finishes of paints, cladding, structural glazing and their contextual application in buildings.

**TEXT BOOKS:**

1. S.C.Rangwala, Building Construction (Sixteenth Edition) Charotar Publishing House, Anand, India, 1997.
2. Basic Civil Engineering by Satheesh Gopi

**REFERENCES:**

1. Jack M.Launders, Construction Materials, Methods, careers pub, J.Holland, Illinois Wileox Co., Inc. 1983.
2. Arthur R.Llons, Materials for architects and builders - An introduction, Holder Headline group, Great Britain, 1997.
3. Don.A.Watson, Construction Materials and Processes, McGraw-Hill Book Co., 1972
4. W.B. McKay, Building construction, Longman, U.K.
5. Francis. D. K. Ching – A Visual Dictionary of Architecture – Van Nostrand Reinhold – 1997.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	The students understood various components of buildings in terms of damp	3	3	3	-	3	-	-	2	3	2	3

	proofing and waterproofing through case study of swimming pool and collections of materials and catalogue.											
CO 2	The construction techniques of thermal insulation in a cold storage to be presented as a report.	2	3	3	-	3	-	-	-	-	3	2
CO 3	Worked on the different insulation and acoustics materials.	1	3	2	-	-	-	-	2	3	2	-
CO 4	Analyze and present the different construction practices adapted for the various components specific to the material and finishes in the floor and wall coverings.	2	3	2	-	2	3	-	2	3	2	-
CO 5	The students are asked to the documentation through materials, catalogue, photograph and video presentation the various exterior finishes of paints, cladding, structural glazing and their contextual application in buildings.	2	3	3	2	1	-	2	-	2	-	1

  
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**COURSE OBJECTIVES:**

- 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, and large scale movement of people and identity of buildings.
- To make the student understand the complexity, functioning and salient features of the design project through organizing field visit, train them to document and present the findings.
- To emphasize on the importance of understanding the relationship between open space and built form, built form to build 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 passive and active energy, experiential qualities; multi bayed, multiple storied and circulation intensive, technology, structural clarity and services in terms of lighting, ventilation, movement, fire safety, security, water supply, sewage etc. Thrust will be also on use of computer for presentation skills and introducing elements and detail for making building barrier free. Application and use of relevant building bye-laws and provisions of National Building Code

**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 center, Shopping centers (Commercial), Health centers, Nursing homes (institutional) Etc.

Introduction to three-dimensional modeling of spaces using Computer. Construction and manipulation of three-dimensional building databases, Rendering 3 D images and Presentation techniques.

**TOTAL: 240 Hrs****COURSE OUTCOMES:**

**CO1:** Ability to provide a sensitive approach to the design of the built environment taking into the social and cultural needs of contemporary urban life.

**CO2:** The various components and aspects associated with the urban environment in terms of physical infrastructure, socio cultural aspects, gender issues etc. are looked at ways to address them through their designs.



**CO3:** Mapping and diagramming techniques were detailed in the design process to help them explore the design.

**CO4:** Student's ability to understand the DCR and its applications, an orientation to Computer Aided Drafting.

**CO5:** Explored on design of buildings addressing the socio – cultural & economic needs of contemporary urban society.

**TEXT BOOKS:**

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
2. Kanvinde, Campus Planning in India
3. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967
4. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995
5. Edward D.Mills, Planning, 4 volumes, Newnes, Butterworths, London, 1976. 2.P&D Act 1995.
6. E and O.E. Planning. Liffie Books Ltd., London, 1973.
7. National Building Code and Bureau of Indian standard publications.
8. Ed.By.Quentin Pickard RIBA - The Architects' Hand Book - Bladewell Science Ltd. - 2002
9. De Chiara Callender, Time Saver Standard for Building Types, McGraw-Hills Co., 1973.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	Ability to provide a sensitive approach to the design of the built environment taking into the social and cultural needs of contemporary urban life.	3	3	3	2	3	-	-	2	3	3	2
CO 2	The various components and aspects associated with the urban environment in terms of physical infrastructure, socio cultural aspects, gender issues etc. are looked at ways to address them through their designs.	2	3	3	-	3	3	2	1	3	-	3
CO 3	Mapping and diagramming techniques were detailed in the design process to help them explore the design.	3	3	3	-	-	3	-	2	2	3	-
CO 4	Student's ability to understand the DCR and its	2	3	3	-	2	3	-	2	3	2	-

	applications, an orientation to Computer Aided Drafting.											
CO 5	Explored on design of buildings addressing the socio – cultural & economic needs of contemporary urban society.	3	3	3	2	3	-	2	-	2	-	1

  
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**COURSE OBJECTIVES:**

- To create awareness on categorization of waste and intelligent management of waste with due concern in protecting the environment.
- To know about the various generation factor and its cradle to grave.
- To encourage the use of by products from the industrial waste as alternative building material and thereby reducing its impact on environment.
- To ensure sustainability through recycling the waste products/materials.
- To enable the students understand about the environmental management and energy conservation.

**UNIT I INTRODUCTION****6 Hrs**

Waste in built environment – Traditional practices of waste management. Current Scenario in India – Categorization to solid, liquid and gaseous wastes – sectors responsible for waste generation.

**UNIT II WASTE AND BUILT ENVIRONMENTAL****12 Hrs**

Solid and Liquid waste from residential and commercial buildings – Environmental significance – segregation and treatment of wastes. Industrial case studies, Experiments in construction industry– Role of NGOS in waste management.

**UNIT III ALTERNATIVE BUILDING MATERIALS****10 Hrs**

Need for recycling industrial – byproducts as alternative building materials – use of fly ash, Furnace slag, Quarry dust, silica fume, waste lime and gypsum. Technology required for manufacturing, specification and application in construction industry.

**UNIT IV RECYCLING OF WASTES****10 Hrs**

Meaning of sustainable approach – Identification and workability of waste. Concept of recycling Solid and Liquid wastes in building industry – Solid waste recycling, Vermi Composting, Biogas production. Liquid waste recycling methods and practices.

**UNIT V ENVIRONMENTAL MANAGEMENT AND ENERGY OPTIONS****7Hrs**

Degradation of environment due to waste – Salient features of environmental laws. Rain water harvesting techniques. Biological and Thermal energy options – Refuse derived fuel and other options.

**TOTAL: 45 Hrs****COURSE OUTCOMES:**

The student should be able to

**CO1:** Understood the traditional practices of waste management factors in various buildings.

**CO2:** Gained knowledge on the waste generation factor and cradle to cradle and cradle to grave.

**CO3:** Explore new alternative energy resources and building materials for healthy environments through literature studies.

**CO4:** Ensure a sustainable design approach through waste recycling methods.

**CO5:** Understand the significances of sustainable development and the need to enforce the environmental acts.

**TEXT BOOKS:**

1. Tchobanoglous, G. & Kreith, F. (2002). Handbook of Solid Waste Management, 2nd ed. McGraw-Hill, New York.
2. Howard S. Peavy, Donald R. Rowe and George Tchobanoglous, "Environmental Engineering", McGraw - Hill Co., 1988.
3. Environmental Science- Towards a sustainable future by Richard T. Wright, PHI Learning, New Delhi 2008.
4. Textbook of Environmental Science & Technology by M.Anji Reddy, BS Publications, 2010.
5. Waste water engineering, treatment and reuse by Metcalf & Eddy, fifth edition, Tata McGraw Hill.

**REFERENCES:**

1. Ravindrarajah, R.S, Tam. T.C. Properties of concrete made with crushed concrete a coarse aggregate, - Magazine of concrete Research, Vol-37, March 1985.
2. Arceivala. S.J., "Wastewater Treatment for pollution Control"- Tata-McGraw Hill, New Delhi, 1986.
3. ERM.UK Municipal Solid waste Management, Study for the MMA-Vol-1 Interim Report, August-1995.
4. R.Ambalavanan and A.Roja "Feasibility Studies on Utilisation of Wastelime, Gypsum with Fly Ash - The Indian concrete Journal – Vol. – 70 Nov-1996.
5. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	Understood the traditional practices of waste management factors in various buildings.	3	2	2	2	3	-	-	2	3	3	2
CO 2	Gained knowledge on the waste generation factor and cradle to cradle and cradle to grave.	2	3	3	-	2	-	2	1	3	-	-
CO 3	Explore new alternative energy resources and building materials for healthy environments through literature studies.	2	-	3	-	-	-	-	2	3	3	-
CO 4	Ensure a sustainable design approach through waste recycling methods	1	-	3	3	1	-	-	2	3	2	-
CO 5	Understand the significances of sustainable development and the need to enforce the environmental acts.	2	3	3	2	1	-	2	-	3	-	1

  
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**COURSE OBJECTIVES:**

- To study evolution of structural systems through history.
- To familiarize the students with concepts of structural design through works of architects/ engineers.
- To integrate the contemporary structural design in the form making process of architectural design.
- 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 9 Hrs**

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 9 Hrs**

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

**UNIT III CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – I 8 Hrs**

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 9 Hrs**

The select case studies could include Inmos Microchip Factory, Centre Commercial St. Herbtain, 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 10 Hrs**

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 Hrs****COURSE OUTCOMES:**

- CO1:** The structural design in the pre-industrial and post-industrial era is presented with detailed drawings and sketches.
- CO2:** Literature review and presentations of the world renowned buildings as case examples.
- CO3:** A critique of any one case example of Architects works mentioned above to be discussed.
- CO4:** It will encourage the student to exercise judgment in areas of structure, form and process.
- CO5:** A seminar presentation including the structural expression, architectural form and building services to be presented in detail with case examples.

**TEXT BOOKS:**

1. Greene King Draught Beer Dept and Schlumberger Cambridge Research Centre, UK by Michael Hopkins
2. Design Center, Linz, Austria and Two Family House in Pullach Thomas Herzog
3. King Abdul Aziz International Airport, Haj Terminal by SOM

**REFERENCES:**

1. "Paper Arch" and Japan Pavilion at Expo 2000 in Hannover by Shigeru Ban
2. Pavilion of the Future, Expo 92, Seville by Martorell, Bohigas & Mackay (MBM)
3. Daring Harbour Expo Center, Sydney Australia by P. COX
4. Olympic Archery Building by Enric Miralle & Carme Pinos
5. Eagle Rock House by Ian Ritchie
6. Le Grande Arche de La Defense by J O Spreckelsen

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	The structural design in the pre-industrial and post-industrial era is presented with detailed drawings and sketches.	3	3	3	2	2	-	-	3	2	3	-
CO 2	Literature review and presentations of the world renowned buildings as case examples	2	1	-	-	-	1	-	2	3	3	1
CO 3	A critique of any one case example of Architects works mentioned above to be discussed	1	2	2	-	-	-	-	3	2	3	1
CO 4	It will encourage the student to exercise judgment in areas of structure, form and process.	3	3	-	2	1	-	1	2	-	2	3
CO 5	A seminar presentation including the structural expression, architectural form and building services to be presented in detail with case examples.	3	1	2	2	1	-	2	-	3	-	1

  
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**COURSE OBJECTIVES:**

- To understand the design and detailing of short RC columns by limit state design.
- To understand the design of doglegged staircase
- To understand design of isolated column footing and combined footing.
- To enable students learn the concepts and design of retaining wall
- To expose the student to grasp the idea about prestressed concrete

**UNIT I LIMIT STATE DESIGN OF RCC COLUMNS****8 Hrs**

Code provisions - Design of axially loaded short and long columns of rectangular and circular sections - ties and spiral reinforcements.

**UNIT II LIMIT STATE DESIGN OF STAIRCASE AND BRICK MASONRY****10 Hrs**

Types of staircases - Design of doglegged staircase. Analysis and Design of brick masonry, load bearing walls - codal requirements.

**UNIT III LIMIT STATE DESIGN OF FOUNDATION****10 Hrs**

Types of foundations - Isolated pad footings - combined footings for simple design problems. Design principles for raft and pile foundation (No Design calculations).

**UNIT IV RETAINING WALL****12 Hrs**

Retaining wall – Introduction, types and modes of failure of retaining wall-Design of Cantilever Retaining wall

**UNIT V PRESTRESSED CONCRETE****5 Hrs**

Principles of pre-stressing, methods of pre-stressing, advantages and disadvantages

**NOTE:** Reference to IS codes and tables be permitted in the examination.

**TOTAL: 45 Hrs****COURSE OUTCOMES:**

At the end of day the students will be able to understand and

**CO1:** Gain basic knowledge about RCC column and its applications with case studies.

**CO2:** Design of dog legged staircase.

**CO3:** Design of isolated column footing and combined footing.

**CO4:** The concepts and design of cantilever retaining wall.

**CO5:** Principles and methods of prestressed concrete.

**TEXT BOOKS:**

- 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. Vazirani and Ratwani, Concrete Structures, Khanna Publishers, New Delhi, 1969.

**REFERENCES:**

1. Dr. B.C. Punmia, "Reinforced Concrete Structures", Vol, 1 & 2 Laxmipublication, Delhi, 2004.

2. IS 456 "Indian Standard, Plain and Reinforced Concrete, Code of Practice, Bureau of Indian Standards, 2000.
3. S.Unnikrishnan Pillai and Devados Menon, "Reinforced Concrete Design" – Tata McGraw
4. IS Code of practice for Pre stressed concrete, IS: 1343 – 1980, Govt Publications.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	Gain basic knowledge about RCC column and its applications with case studies	3	2	3	-	-	-	2	3	-	3	-
CO 2	Design of dog legged staircase	3	2	3	-	-	-	2	3	-	-	-
CO 3	Design of isolated column footing and combined footing.	3	2	3	-	-	-	2	3	3	1	-
CO 4	The concepts and design of cantilever retaining wall.	3	2	3	-	-	-	2	3	-	-	2
CO 5	Principles and methods of pre-stressed concrete.	3	2	3	-	-	-	2	3	-	-	2



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**COURSE OBJECTIVES:**

- To inform students on basic knowledge on thermodynamics principles and air conditioning components.
- To inform students about the system involved behind the mechanical ventilation in building.
- To enable students to understand the various types of air-conditioning systems available and their applications and choice based on the typology of building and loads.
- To inform students on the cause of fire, need for protection, standards and norms involved, various considerations in planning and making it barrier free.
- To provide knowledge to students on vertical transportation systems in buildings and the design of service core.

**UNIT I BASIC REFRIGERATION PRINCIPLES AND AIR-CONDITIONING****15 Hrs**

Thermodynamics – Transfer of Heat - Vapor compression cycle - compressors - evaporators' Refrigerant control devices - Air handling units - Cooling towers. Air conditioning systems for various types of buildings (small buildings and large building) calculation of air-conditioning loads – Chilled water plant – All Air systems, all water system –equipment of spaces and size for the chiller plant, cooling tower, Fan room, circulation pumps and pipes, Air-distribution systems: Ducts and duct systems, Air outlets. Air-conditioning methods and equipment: window units, split units and central Air-conditioning systems. Location of air-conditioning equipment in buildings

**UNIT II MECHANICAL VENTILATION****9 Hrs**

Mechanical/Artificial Ventilation – Need for mechanical ventilation in buildings. Rate of ventilation for different occupancies. Methods and equipment employed for mechanical ventilation in buildings.

**UNIT III AIR-CONDITIONING – DESIGN ISSUES AND HORIZONTAL DISTRIBUTION OF SYSTEMS****12 Hrs**

Selection – Energy Efficient systems – Choice for small and large buildings – Horizontal distribution of services for large buildings – Grouped horizontal distribution of mechanical services. NBC 2005 and BIS. Architectural requirement of various equipment. Residential and commercial air-conditioning, energy conservation techniques.

Exercises: Calculation of air – conditioning load for various building types.

**UNIT IV FIRE SAFETY – DESIGN AND INSTALLATIONS****12 Hrs**

Causes of fire in building and how it spreads, fire load, fire hazards, smoke detection, alarms, extinguishers and grading of structural elements due to fire as per NBC. Classification of building types and fire safety design principles and standards as per NBC. Brief description of characteristics of combustible and non-combustible materials in case of fire. General guidelines for egress design for multistory building. Rules for fire protection and firefighting requirements in different building typologies - prevention, evacuation strategies and suppression measures. Exercise on drawing layout for fire safety systems in building type.

**UNIT V VERTICAL TRANSPORTATION SYSTEMS IN BUILDING****12Hrs**

Elevators, escalators, conveyors, travellers, dumb waiters – types and applications – round trip time, design of lift lobby and vertical transportation core. Latest technologies in vertical transport system and integration of lifts and escalators with building automation systems. Location and

arrangement in buildings. Space requirement, serving floors, grouping, size, shape of passenger car and door arrangement.

Exercises: Case study visit to commercial complexes, hospitals, apartments and offices.

**TOTAL: 60 Hrs**

**COURSE OUTCOMES:**

**CO1:** The students are exposed to various air conditioning systems and their applications.

**CO2:** They are also exposed to various design issues in the distribution systems.

**CO3:** An understanding of fire safety, firefighting, fire prevention and installations in buildings.

**CO4:** A detail understanding of design guidelines of vertical transportation system in current trends.

**CO5:** Exposed to students, specialized service in buildings like air-conditioning, its principles, components, applications, safety measures, fire-safety in buildings, fire resistant materials, and devices for safety detection of fire, gadgets involved, precautionary measures, and integration of these in architectural design.

**TEXT BOOKS:**

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).
6. ISHRAE Handbook for Refrigeration 2015.

**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
3. Heating ventilation and Air conditioning – Swenson S. Don, Amer Technical Pub.
4. ISHRAE: All about AHU's – Air Handling Units.
5. CIBSE Guide D: Transportation Systems in Buildings (2010).

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	The students are exposed to various air conditioning systems and their applications.	2	3	-	3	1	-	-	3	3	-	3
CO 2	They are also exposed to various design issues in the distribution systems	3	1	-	-	2	-	-	-	2	1	1
CO 3	A detail understanding of design guidelines of vertical transportation system in current trends.	1	-	1	-	2	1	-	-	-	1	-
CO 4	A detail understanding of design guidelines of vertical transportation system in current trends.	2	1	-	3	-	3	-	2	1	-	1
CO 5	Exposed to students, specialized service in buildings like air-conditioning, its	1	-	3	3	1	2	-	3	3	2	2

	principles, components, applications, safety measures, fire-safety in buildings, fire resistant materials, and devices for safety detection of fire, gadgets involved, precautionary measures, and integration of these in architectural design.												
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**AIM**

To inform students on the recent construction technology developed by leading research organization in India with a thrust on materials that are developed in this context. The students will also gain knowledge on vertical movement systems in multi – storied and high – rise buildings, the various mechanisms and devices, detailing of innovative built in furniture their installations, working so as to integrate them in the process of design.

**COURSE OBJECTIVES:**

- To make students gain knowledge on innovative construction techniques adopted for floor, wall and roofing by research organization and its examples.
- To further inform students on advanced techniques in foundation with a thrust on pile and precast slabs application detail through construction drawing.
- To make the students understand the various types of vertical movement like lifts and escalators in terms of their varieties, installations in planning, contextual application with certain details for making them barrier free, through construction and detail drawings.
- To expose to the students other novel systems of horizontal movements like conveyors and moving walk – ways through basic input of theory and working drawing.
- To study on innovative structures for built-in furniture in the construction industry..

**UNIT I CONSTRUCTION SYSTEMS DEVELOPED BY RESEARCH ORGANISATION 15 Hrs**

Study of Construction Techniques through research organizations like CBRI, HUDCO, SERC and BMPTC. Floor, wall and roofing systems. - Ferro cement its properties, uses and application in building construction including the techniques of preparation, casting, curing, etc.

Exercise on: column, Compound wall, and security cabin & water tank.

**UNIT II PRECAST STRUCTURES 15 Hrs**

Pile foundation-different types of piles, details of pile capping, joints of precast piles, wall and columns. Precast and cast in-situ with reinforcement details for different types of flat grid/Waffle slabs.

Exercise on: Precast housing project and lobby design for shopping mall.

**UNIT III VERTICAL MOVEMENT EQUIPMENTS IN BUILDINGS I 20 Hrs**

**Elevators** - Historical development of elevators or lifts. Elevators - size, capacity, positioning of core under planning grid.

**Types of elevators** - Electric, hydraulic - passenger, hospital, capsule, freight, etc. Dumb waiters, details of lift shaft and other mechanism.

Exercise on: Passenger lift for high rise building, commercial building. Capsule lift for low rise building, Dump waiter for laundry and kitchen restaurants and Hospital lift.

**UNIT IV VERTICAL MOVEMENT EQUIPMENTS IN BUILDINGS II 10 Hrs**

Escalators -Historical development of Escalators. Escalators types -Parallel and criss cross escalators. Exercise on: Escalators details in shopping mall. Mechanism and working of Escalators with details.

**UNIT V HORIZONTAL MOVEMENT EQUIPMENTS IN BUILDINGS 15 Hrs**

**Conveyors and Travelator** - Historical development of Conveyors and Travelator its types such as horizontal belt, horizontal moving walkways - concern for physically handicapped mechanical safety systems and automatic detailing and fitting for physically handicapped such provisions for

the wheel chairs used in the Travelator. Exercise on: cargo section understanding about top and ground Conveyors details. Moving walkways at Airports, Public transport and Supermarkets.

**TOTAL : 75 Hrs**

**COURSE OUTCOMES:**

The students should be able to understand:

**CO1:** How to innovate better technology through the recent research building materials and its advantage in building industry.

**CO2:** Knowing the advance and techniques used for the large precast foundation and large span slabs supports.

**CO3:** Acknowledge on the Elevators and Escalators its function and their installation details.

**CO4:** Exercise the knowing it on the Conveyors system in building and their advantage and usages.

**CO5:** Understanding the modern usages of built- furniture and fitting etc, the aesthetic appeal and efficiency in building construction.

**TEXT BOOKS:**

1. Concrete Technology by Shetty M.S.
2. Handbook on Safety Code for Elevators and Escalators A17.1/CSA B44 – 2013- by ASME
3. The Vertical Transportation Handbook, 4th Edition by George R. Strakosch (Editor), Robert S. Caporale (Editor)

**REFERECES:**

1. J.H.Callender, Time Saver Standard for Architectural Design Data, McGraw-Hill, 1994.
2. James Ambrose, Building Construction, Service Systems, Van No strand Reinhold, New York, 1992.
3. Pamphets supplied and other literatures from N.B.O., SERC, CBRI, 1970 onwards.
4. R.Chudley, Construction Technology, Richard Clay (Chaucer Press) Ltd., Suffolk, 1978.
5. NATIONAL BUILDING CODE OF INDIA PART 8 BUILDING SERVICES- Section 5 Installation of Lifts and Escalators
6. The Modern Wonder Book of Knowledge by Henry Chase.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	How to innovate better technology through the recent research building materials and its advantage in building industry.	2	3	-	3	1	-	-	3	3	-	3
CO 2	Knowing the advance and techniques used for the large precast foundation and large span slabs supports.	3	1	-	-	2	-	-	-	2	1	1
CO 3	Acknowledge on the Elevators and Escalators its function and their installation details.	1	-	1	-	2	1	-	-	-	1	-
CO 4	Exercise the knowing it on the Conveyors system in building and their advantage and usages.	2	1	-	3	-	3	-	2	1	-	1
CO 5	Understanding the modern usages of built- furniture and fitting etc, the aesthetic appeal and efficiency in building construction.	1	-	3	3	1	2	-	3	3	2	2

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**COURSE OBJECTIVE:**

- To make the student understand the complexity, functioning and salient features of the design project through organizing field visit, train them to document and present the findings.
- To balance complex planning needs in buildings of large floor areas and diverse requirements.
- To critically question and creatively address aspects such as sustainable architecture and green buildings.
- To explore advanced computer aided presentation techniques involving 2D and 3D drawings and virtual models, apart from physical models.
- To inculcate the importance of services integration and construction in spatial planning in the context of design of high-rise buildings and service intensive buildings.

**CONTENT:**

Scale and Complexity: Planning and designing of large scale housing and building projects that address the social and cultural needs of contemporary urban life, advance building services, sustainable design practices, multiple storied and circulation intensive systems for large scale design projects. Importance of urban development regulations, building by-laws and architectural controls.

Thrust will be also on use of computer for presentation skills and introducing elements and detail for making building barrier free. Application and use of relevant building bye-laws and provisions of National Building Code

**Areas of concern / focus**

- Planning integration and detailing.
- Landscape details.
- Structural viability and interiors components.
- Sustainable building practices
- intelligent building techniques and service integration

**Typology/ project:** College, office buildings (Institutional) Large Commercial Complex (Commercial), Convention centre, Health Care and hospitality, Mixed Residential Developments (Residential).

Working drawings for any one design Using Computer for presentation Skills

**TOTAL: 180 Hrs**

**COURSE OUTCOMES:**

**CO 1:** The student would be able to balance diverse aspects of buildings by making right choices in design situations after studying various criteria.

**CO 2:** They would be able to apply knowledge in realms such as sustainable built environment, services and complex building designs.

**CO 3:** Student enabled to confidently design large complex buildings and campuses, which involves structural synthesis, effective movement systems within and around buildings, complying with all rules and regulations demonstrated in at least two large projects.

**CO 4:** Understood that stress also shall be on making such buildings barrier free and adopting green building practices in design and detailing.

**CO 5:** Gained knowledge about the importance of services integration and construction in spatial planning with respect the site context.



**TEXTBOOKS:**

1. Sustainable Design, Ecology, Architecture & Planning, Daniel Williams, John Wiley & sons Inc, NJ, 2007.
2. MiliMazumdar, Energy Efficient Buildings in India, TERI, New Delhi, 2012.
3. Sustainable Building Design Manuals I & II, TERI 2004.

**REFERENCES:**

1. Watson, D.(Editor), "Time-saver Standards for Architectural Design: Technical Data for Professional Practice", McGraw-Hill Co., 2005.
2. Neufert, P., "Architects' Data", 3rd Ed., Blackwell Science.
3. Ed.By.Quentin Pickard RIBA - The Architects' Hand Book - Blackwell Science Ltd. - 2002
4. Chiara, J.D., Panero, J., Zelnik, M., "Time Saver Standards for Housing and Resident Development", 2nd Ed., McGraw-Hill.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	The student would be able to balance diverse aspects of buildings by making right choices in design situations after studying various criteria.	-	2	-	3	3	1	-	-	2	2	3
CO 2	They would be able to apply knowledge in realms such as sustainable built environment, services and complex building designs	2	2	-	3	3	2	-	-	3	2	3
CO 3	Student enabled to confidently design large complex buildings and campuses, which involves structural synthesis, effective movement systems within and around buildings, complying with all rules and regulations demonstrated in at least two large projects.	-	2	-	3	3	1	-	-	3	2	3
CO 4	Understood that stress also shall be on making such buildings barrier free and adopting green building practices in design and detailing	2	-	-	3	3	1	-	-	3	2	3
CO 5	Gained knowledge about the importance of services integration and construction in spatial planning with respect to the site context	2	-	-	3	3	1	-	1	3	2	3



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**COURSE OBJECTIVES:**

- To provide students with a comprehensive background of the sustainability movement within the design and construction field
- To supply students with both technical and philosophical positions on sustainability
- To give students the skills necessary to examine design schemes and propose sustainable possibilities
- To expand critical thinking and analysis skills, as well as further develop research and writing abilities.
- To help students understand that design is also a product of political, social and economic decisions
- To provide student with the ability to distinguish between sustainable and unsustainable design characteristics

**UNIT I INTRODUCTION****6 Hrs**

Elaborate the concept of sustainable development and design from an interdisciplinary perspective; historical context – Brunt land Commission – Rio Summit - Agenda 21. Cradle-to-cradle approach in built environment by McDonough, overview of different designs principles and models of sustainable design ex: Biomimicry as a nature inspired design.

**UNIT II RESOURCE EFFICIENCY****10 Hrs**

Building energy literacy as a foundation for sustainable design. Study of eco-friendly building materials, construction technologies, energy sources - renewable and non-renewable. Introduction to carbon footprint, concept of life cycle analysis with multiple case studies, followed by a field trip.

**UNIT III PRACTICE OF SUSTAINABLE ARCHITECTURE****12 Hrs**

Introduce the standards and metrics for sustainable buildings; understanding the rationale and structure of the rating systems. Categories with LEED rating system will be elaborated. Examples of rating systems and case studies: LEED, BREEM and DGNB.

**UNIT IV RATING SYSTEMS IN INDIAN CONTEXT****9 Hrs**

Introduce Zero Energy Buildings (ZEB) with examples. Examples of rating systems in Indian context: Role of IGBC- EDGE and GRIHA, with case studies.

**UNIT V FUTURE OF SUSTAINABLE DESIGN: PLANNING AND POLICIES****8 Hrs**

Living Buildings as a philosophy of sustainable design, Biomimicry, Carbon neutral cities and Sustainable Development Goals (SDG).

**TOTAL: 45 Hrs****COURSE OUTCOMES:**

**CO1:** The course ends with the completion of an "impact project", where students will collaborate to design/learn and implement a short project that addresses the myriad problems and opportunities presented by sustainability.

**CO2:** To provide student with the ability to distinguish between renewable & non-renewable sources.

**CO3:** Understanding on green organizations worldwide and with Indian context.

**CO4:** Exposed to the Rating systems with Indian Examples.

**CO5:** To sensitize students about the importance and need for Sustainable Planning concept and Appropriate Architectural Design concepts as an emerging thrust area.


**TEXT BOOKS:**

1. "Elevating Habitat" by Coffman;
2. "Design on the Prairie" by Myers
3. "Ecological Design" by Sim Van Der Ryn and Stuart Cowan
4. Bioclimatic Architecture – ENEA and IN/ARCH publication Edition 1989
5. McDonough, W. (1993) Design, Ecology, Ethics and the Making of Things.

**REFERENCES:**

1. Beer, Environment Planning for Site Development.
2. Sustainable Architecture and Urbanism: Concepts, Technologies and examples by auzin-Muller(D) – Birkhauser 2002.
3. Eco-Tech : Sustainable Architecture and High Technology by Slessor© - Thames and Hudson 1997.
4. Ecodesign : A manual for Ecological Design by Yeang(K) – Wiley Academy 2006.
5. Brotoc, Sustainable architecture high-tech housing.
6. Roofs, Eco-house a design guide.
7. Sharma, Brij Kishore, " Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
8. U.R.Gahai, " (1998) Indian Political System ", New Academic Publishing House, Jalaendhar.
9. R.N. Sharma, " Indian Social Problems ", Media Promoters and Publishers Pvt. Ltd.
10. Yogendra Singh, " (1997) Social Stratification and Charge in India ", Manohar, New Delhi. Manik&GirishKomisva, IIPA, keeping Cities Clean and Green, Uppal Publishing House, 1997.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	The course ends with the completion of an "impact project", where students will collaborateto design/learn and implement a short project that addresses the myriad problems and opportunities presented by sustainability.	-	-	2	3	-	1	-	-	2	3	1
CO 2	To provide student with the ability to distinguish between renewable & non- renewable sources.	1	-	1	3	-	1	-	-	2	3	-
CO 3	Understanding on green organizations worldwide and with Indian context	1	-	2	3	-	1	-	-	2	3	2
CO 4	Exposed to the Rating systems with Indian Examples.	2	-	-	3	-	1	-	2	2	3	2
CO 5	To sensitize students about the importance and need for Sustainable Planning concept and Appropriate Architectural Design concepts as an emerging thrust area	2	-	1	3	-	1	-	3	2	3	1

  
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**COURSE OBJECTIVES:**

- To impart an understanding of the scope and nature of Graphic design as a discipline.
- To introduce the principle of a Graphic design and enhance their ideas in design application.
- To understand the evolution of design, development and challenges in Product design.
- To understand the ergonomics in product design.
- To develop skills to conceptualize, create and market an appropriate product.

**UNIT I INTRODUCTION TO GRAPHIC DESIGN****8 Hrs**

Graphic design – elements, principles and their applications. Basics of Typography, Grid systems, Identity Design, logo design. Stationery design: Visiting cards, Envelope design, Letterhead design.

**UNIT II GRAPHIC DESIGN APPLICATIONS****8 Hrs**

Introduction to software packages for graphic design applications - Shape, connotation of forms, sign mounting and size considerations, formats, folding and binding. Label designs for product packaging on paper and cardboards mock-ups. Design for Print media.

**UNIT III INTRODUCTION TO PRODUCT DESIGN****10 Hrs**

Product Design – an introduction, Definition of Product Design, Product Design methods, Role of Product Designers. Form Studies - Concept of Form and Space, Form elements and their properties, Study of Form relationship, Organization of form, Balance, Orientation of form. Considerations of Colour, Pattern, Texture and Proportion in products and product environments. Relating Form to Materials. Use of Computers for Form generation. Manufacturing Processes.

**UNIT IV ERGONOMICS IN PRODUCT DESIGN****9 Hrs**

Terminologies in ergonomics – biomechanics, comfort zone – elements of comfort analysis and designing product based on ergonomics, materials, working parameters and visual perception for products. Selection of the projects is based on customer needs.

**UNIT V DESIGN EXERCISES****10 Hrs**

The project is supported by detailed discussion on various stages in the design process emphasizing the complementary nature of systematic and creative thinking. Design of Household elements– lamp shade, wall clock, table vase etc. Design of furniture – Chairs/Computer table, Kitchen racks, Cabinets etc. Design of outdoor elements- garden furniture, lamp holders, water bowls etc. Element design for the physically and mentally different people.

**TOTAL: 45 Hrs****COURSE OUTCOMES:**

**CO1:** The students understood the role of Graphic and product design as a discipline, and its role in understanding and interpreting a real life design.

**CO2:** Explored on applications of graphic design in terms of packaging and labeling, its extent in media industry.

**CO3:** Various reading methods were explored, to understand the contemporary design process as well as manufacturing process of product design.

**CO4:** Understood the ergonomic standards in various product design and experience through case examples.

**CO5:** Exploration of design ideas through various exercise was done for reference.

**TEXT BOOKS:**

1. J. Bowers, Introduction to Two- Dimensional Design: Understanding Form and Function, John Wiley and Sons, 1999.
2. L. Holtzschue, Understanding Colour: An Introduction for Designer, 2nd Edition, John Wiley and Sons, 2002.
4. B. Gordon and M. Gordon, Complete Guide to Digital Graphic Design, Thames and Hudson, 2002.
5. P. B. Meggs, Typographic Design: Form and Communication, John Wiley and Sons, 2000.
6. P. B. Meggs, Type and Image: The Language of Graphic Design, VNR, 1992 R.

**REFERENCES:**

1. H. G. Greet and R. R. Kostellow, Elements of Design and the Structure of Visual Relationships, Architectural Press, NY, 2002.
2. K. Critchlow, Order in Space: A Design Source Book, Thames and Hudson, 1969.
3. C. Akner-Koler, Three-dimensional Visual Analysis, Institution for Industrial design, Konftfack, Sweden, 1994.
4. Practical Methods for the Systematic Development of New Products, Publisher: Chapman & Hall, 1995.
5. Roozenburg and Eekels, Product Design: Fundamentals and Methods, Publisher: John Wiley & Sons Inc; New Ed edition, 1995.
6. Goodrich, Kristina; Design Secrets: Products: 50 Real-Life Projects Uncovered - Industrial Designers Society of America; Publisher: Rockport Publishers June 2001.
7. Rouse, William B.; Design for Success: A Human-Centered Approach to Designing Successful Products and Systems, Publisher: Wiley-Interscience; 1991.
8. J.M. Gordon Jr., Industrial Design of Plastics Products, John Wiley and Sons, 2003.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO 3
CO 1	The students understood the role of Graphic and product design as a discipline, and its role in understanding and interpreting a real life design	3	-	2	2	2	-	1	1	2	3	-
CO 2	Explored on applications of graphic design in terms of packaging and labeling, its extent in media industry	3	-	2	2	2	-	1	1	2	3	-
CO 3	Various reading methods were explored, to understand the contemporary design process as well as manufacturing process of product design.	3	-	2	2	2	-	1	1	2	3	-
CO 4	Understood the ergonomic standards in various product design and experience through case examples	3	-	2	2	2	-	1	1	2	3	-
CO 5	Exploration of design ideas through various exercise was done for reference	3	-	2	2	2	-	1	1	2	3	-

  
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**COURSE 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 study the evolution and growth of garden design in select periods and countries and a visual appraisal of the same through examples.
- To expose to students, the role of landscape elements in the organization of large open areas like parks, playfields, at city scale.
- To understand specific design criteria for specific functional areas of cities.

**UNIT I INTRODUCTION****10 Hrs**

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

**UNIT II ELEMENTS IN LANDSCAPE DESIGN****12 Hrs**

Introduction to hard and soft landscape elements. Different types of hard landscape elements. Plant materials, water and landform - classification, characteristics, use and application in landscape design. Visual aspects of plant forms.

**UNIT III GARDEN DESIGN****13 Hrs**

Outline of landscape and garden design in Indian history. Japanese, Italian Renaissance, Mughal and English gardens.

Basic principles in Landscape design. Landscape and garden design in history - Japanese, Italian Renaissance and Mughul gardens in India, Study of notable examples.

**UNIT IV SITE PLANNING****10 Hrs**

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

**UNIT V LANDSCAPING OF FUNCTIONAL AREAS****15 Hrs**

Urban open spaces and principle of urban landscape; Street landscaping, landscape design for waterfront areas and functional areas in urban centers; green roofs & indoor landscaping of spaces. Contemporary public landscape projects.

**TOTAL: 60 Hrs****EXERCISES**

Application of Landscape design for site plans, small gardens, residential areas, urban spaces, neighborhood open spaces, courtyards etc.

**COURSE OUTCOMES:**

**CO 1:** Awareness of the role of landscape design with respect to macro scale of sustainability and ecology as well as in the micro scale of shaping of outdoor environments.

**CO 2:** Knowledge about the elements of landscape design and their scope.

**CO 3:** Sensitivity towards evolution of different garden and landscape design across time and context.

**CO 4:** An understanding of landscape design with respect to site planning and different functional



typologies of spaces.

**CO 5:** Gained knowledge on urban open spaces and principles of urban landscape.


**TEXT BOOKS:**

1. Motloch, J.L., 'An Introduction to Landscape Design', US: John Wiley and Sons, 2001.
2. Michael Laurie, 'Introduction to Landscape Architecture', Elsevier, 1986.
3. Sauter D; 'Landscape Construction', Delmar Publishers; 2000.
4. Geoffrey And Susan Jellicoe, 'The Landscape of Man', Thames And Hudson, 1987.

**REFERENCES:**

1. T S S for Landscape Architecture, McGraw Hill, Inc, 1995
2. Grant W Reid, From Concept to Form in Landscape Design, Van Nostrand Reinhold Company , 1993.
3. Brian Hacket, Planting Design, McGraw Hill, Inc, 1976
4. Handbook of urban landscape, Cliff Tandy, Architectural press, 1973
5. T.K. Bose and Chowdhury, Tropical Garden Plants in Colour, Horticulture And Allied Publishers, Calcutta, 1991.
6. Garrett Eckbo, The Art the Home landscaping, McGraw-Hill Book Co., London, 1956.
7. Testsuro Yoshida, Gardens of Japan, Jr.MarcusG.Sims, 1963.
8. Clift Tandy Hand Book of Urban Landscape, The Architectural Press, London, 1971.
9. John O.Sinurds Earthscape, McGraw-Hill Book Co., New York, 1878.
10. Harvey M.Rubenstein, A guide to Site and Environmental Planning 3rd Volume John Wiley and Sons, New York, 1987.
11. Sylvia Crowe Sheila Haywood, The Gardens of Mughal India, Vikas Publishing House, Pvt. Ltd., India, Delhi, India, 1973.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO 1	Awareness of the role of landscape design with respect to macro scale of sustainability and ecology as well as in the micro scale of shaping of outdoor environments.	3	-	-	-	-	-	-	-	3	3	3
CO 2	Knowledge about the elements of landscape design and their scope.	3	3	-	-	2	-	-	-	3	3	2
CO 3	Sensitivity towards evolution of different garden and landscape design across time and context.	3	3	2	-	-	-	-	-	1	3	2
CO 4	An understanding of landscape design with respect to site planning and different functional typologies of spaces.	3	3	2	1	-	-	-	-	-	1	-
CO 5	Gained knowledge on urban open spaces and principles of urban landscape.	-	2	1	3	1	2	1	1	2	1	2

  
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**COURSE OBJECTIVES:**

- To enable students to understand the evaluation and growth of the settlements in the nature and its elements (Content and Container)
- To familiarize the students with Planning concepts and process in Urban and Regional Planning.
- To enable student understand about the various planning principles followed by various townplanners through the history.
- To enable students understand how planning activities are regulated in the state at various levels.
- To understand the impact of globalization and need for the emerging cities.

**UNIT I INTRODUCTION TO HUMAN SETTLEMENTS****10 Hrs**

Elements & Types of Human Settlement – Human Settlements as expression of Civilization, Physical form, nucleus of settlement growth during different periods up to the industrial revolution. Socio-Political context and their effect on settlement development during medieval and renaissance periods. A synopsis of settlement development from prehistoric period to Modern times Greek, Roman, Egypt and Medieval settlements. Role of man and society for the growth & decay of human settlements. Change in mode of Production. Shift of population and the concentration of activities. Impact of industrialization and urbanization.

**UNIT II FORMS OF HUMAN SETTLEMENTS****9 Hrs**

Structure and form of Human settlements – Linear, non-linear and circular – nature shells & Network – their functions and Linkages – Anatomy & classification of Human settlements – Locational, Resource based, Population size & Occupational structure – Combinations – reasons for development – advantages and disadvantages – case studies – factors influencing the growth and decay of human settlements. Factors influencing the growth and decay, growth pattern of urban settlements during the last one-century in our country. Structure and Form of Human settlements: Different physical forms, examples and their functional characteristics.

**UNIT III PLANNING CONCEPTS****10 Hrs**

Principles of ancient town planning in India. Evolution of settlements, their planning and building. 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****8 Hrs**

Aim, objective, scope and content of Regional plan, Master plan, zonal plan and urban renewal plan. 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****8 Hrs**

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

**COURSE OUTCOMES:**

**CO 1:** Understanding on evolution of Human settlements and role of human in growth of settlements.

**CO 2:** Various reading methods were explored, to understand the historical as well as present urban form, the dynamics of Urban Form and various Human Settlements pattern.

**CO 3:** Understanding on planning principles of various town planners.

**CO 4:** Exposure given to the urban renewal schemes and planning concepts.

**CO 5:** An understanding of the interrelationship between Human Settlements structure and Social Dynamics.

**TEXT BOOKS:**

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.
5. John Ratchiffe, An Introduction to Town and Country Planning.
6. Gallion Arthur B & Eisna Simon, The Urban Pattern: City Planning and Housing..L.R. Kadiyali, Traffic Engineering and Transport Planning.
7. Rodwin, Lloyd, ed., 1987. Shelter, Settlements and Development (Hemel Hempstead, United Kingdom, Unwin Hyman Ltd.)

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO 1	Understanding on evolution of Human settlements and role of human in growth of Settlements.	2	3	2	-	3	-	-	2	3	3	1
CO 2	Various reading methods were explored, to understand the historical as well as present urban form, the dynamics of Urban Form and various Human	3	3	3	-	-	-	-	2	3	3	-

	Settlements pattern.											
CO 3	Understanding on planning principles of various town planners.	2	3	3	-	3	-	-	-	2	3	-
CO 4	Exposure given to the urban renewal schemes and planning concepts.	1	2	2	3	1	2	2	1	3	3	3
CO 5	An understanding of the interrelationship between Human Settlements structure and social dynamics	2	2	2	3	1	2	3	2	3	3	3



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**COURSE OBJECTIVES:**

- To enable understanding with respect to quality and quantity of materials, quantity and classes of skilled and unskilled labors, and tools and plants required for projects.
- To give an understanding of how to draw up specifications for the different items of civil engineering project and also to prepare the schedule of programming of the project.
- To give knowledge on how to prepare approximate as well as detailed estimates and to have a clear picture of the project expenditure.
- To help calculate the exact quantities of items of work done for effecting payment especially when direct measurements are difficult and also to determine the quantities of different materials required for various items of work.
- To give understanding of how to prepare valuation report of real and landed property.

**UNIT I SPECIFICATION AND SPECIFICATION WRITING****10 Hrs**

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. 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 II ESTIMATION****9 Hrs**

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. Costs associated with constructed facilities. Approaches to cost estimation. Type of construction cost estimates. Cost Indices. Applications of cost indices to estimating. Estimate based on engineer's list of quantities. Estimation of operating costs.

**UNIT III DETAILED ESTIMATE****12 Hrs**

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

**UNIT IV VALUATION****6 Hrs**

Valuation. Explanation of terms. Types of values. Sinking fund. Years of purchase. Depreciation. Types of depreciation. Valuation of real properties. Types, methods and purpose of valuation.

**UNIT V BUDGETING****8 Hrs**

Elements of cash flow. Time value of money. Capital investment decision. Types of business firms. Budget and Budgetary Control. Types of Budgets. Preparation of financial budget.

**TOTAL: 45 Hrs****COURSE OUTCOME:**

**CO 1:** An understanding of the art of building construction through specification writing.



**CO 2:** Ability to work out the approximate estimate of building.

**CO 3:** An understanding on detailed estimate for small scale building projects and low cost housing.

**CO 4:** An understanding on valuation for building on sinking fund, purchase, and depreciation.

**CO 5:** An understanding on cash flow, capital investment and budget.


**TEXTBOOKS:**

1. Rangwala. S.C, 'Estimating, Costing and Valuation (Professional practice)', Charotar Publishing House, 1984
2. M.Chakraborti,'Estimating Costing, Specification and Valuation in Civil Engineering, Chakraborti, 1992.
3. B.W. Dutta, 'Estimating and Costing' UBS Publishers and Distributors, 1983.
4. S.Sanga Reddi and P.L.Meiyappan, 'Construction Management', Kumaran Publication, Coimbatore.
5. Gurcharan Singh and Jagdish Singh, 'Estimating Costing and Valuation', Standard Publishers Distributors, 2012.

**REFERENCES:**

1. 'I.S.1200-1968 Methods of Measurements of Buildings and Civil Engineering works'.
2. Latest schedule of rates of P.W.D.
3. Latest Data book of P.W.D.
4. PWD Standard Specifications. Govt Publication.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO 1	An understanding of the art of building construction through specification writing.	1	-	2	-	-	-	3	-	-	-	1
CO 2	Ability to work out the approximate estimate of building.	1	-	2	-	-	-	3	-	-	-	1
CO 3	An understanding on detailed estimate for small scale building projects and low cost housing.	1	-	2	-	-	-	3	2	-	-	1
CO 4	An understanding on valuation for building on sinking fund, purchase, and depreciation.	-	3	1	-	-	-	-	-	1	1	1
CO 5	An understanding on cash flow, capital investment and budget.	-	2	2	1	1	2	3	2	-	1	-

  
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**COURSE OBJECTIVES:**

- To introduce various aspects involved in the construction of buildings through the understanding of different types of architectural and technical drawings.
- To enable the understanding of architectural design as integrating spatial and technical concerns.
- To enable development of an architectural design project into schematic drawings through integrating concerns of structure, construction and services as layers.
- To create architectural drawings for construction and as a base for structures and services drawings.
- To design, incorporate and detail architectural and interior components of the architectural design project.

**UNIT I UNDERSTANDING BUILDING DRAWINGS****22 Hrs**

Understanding a comprehensive set of drawings for any building project through collection of drawings of live projects and presentation. The drawings should include architectural working drawings from macro to micro scale- site plan, building plans, staircase details, kitchen and toilet detail of joinery, etc., structural drawings and service drawings to include electrical, plumbing, and mechanical and HVAC details.

**UNIT II EVOLVING SCHEMATIC DESIGN INTEGRATING ARCHITECTURAL DESIGN WITH STRUCTURAL AND SERVICE CONSIDERATIONS****30 Hrs**

Evolving a conceptual design project into schematic design, balancing different technical considerations. Considerations to include appropriate structural, plumbing, electrical, mechanical and HVAC systems. Working out schemes to decide and finalise on the best possible design that integrates everything together. Scale of the project could be small to medium and include any typology, involving a newly created, quick, simple design or an older design from previous academic years.

**UNIT III ARCHITECTURAL WORKING DRAWINGS****28Hrs**

Preparation of architectural working drawings for the resolved schematic design. Drawings to include site plan, centre line drawings, building drawings, detailed drawings of specific areas like staircases and wall sections, dimensions explaining the various components, joinery schedule, etc.,

**UNIT IV DETAILED DRAWINGS OF ROOMS AND ARCHITECTURAL COMPONENTS****22Hrs**

Design and preparation of detailed drawings of joinery including doors, windows and ventilators. Design and preparation of layouts of service intensive rooms like kitchens and toilets. Design and detailing out of floor, wall and ceiling finishes/construction/ laying.

**UNIT V DETAILED DRAWINGS OF BUILT IN COMPONENTS****18Hrs**

Design and preparation of detailed drawings of built in furniture and components based on the room/typology to include counters, cabinets, wardrobes, storage, fittings and fixtures, display units, workstation, etc.,

**TOTAL: 120 Hrs****COURSE OUTCOMES:**

**CO 1:** An understanding of all the aspects that go into the making of a building through drawings related to construction.

**CO 2:** Understanding on the drawings related to the structural services.

**CO 3:** Ability to resolve spatial concerns with technical aspects of a building.

**CO 4:** Understood on the preparation drawings of rooms, layouts of service.

**CO 5:** Ability to design and detail components within a building.

**TEXTBOOKS:**

1. De Chiara and Callendar, 'Time Saver Standards for Building Types', McGraw Hill Co, 1980.
2. Richardson Dietrick, 'Big Idea and Small Building', Thames and Hudson, 2002.
3. Edward D Mills, Planning-'The Architecture Handbook', British Library Cataloguing in Publication Data, 1985.

**REFERENCES:**

1. Susan Dawson, 'Architect's Working Details -Volume 1-10', E- Map Construct, 2004.
2. 'Swimming Pools', Lane Book Company, Menlo Park, California, 1962.
3. Nelson L Burbank, 'House Carpentry Simplified', Simmons-Boardman Publishing Corporation, 1961.
4. 'Landscape Construction', Delmar publisher, 2000.
5. Grant W. Reid, 'Landscape Graphics', Whitney Library of Design, 1987.
6. Francis. D. K. Ching, 'Building Construction Illustrated', John Wiley & Sons, 2011.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO 1	An understanding of all the aspects that go into the making of a building through drawings related to construction.	2	3	2	-	3	-	-	2	3	3	1
CO 2	Understanding on the drawings related to the structural services.	3	3	3	-	-	-	-	2	3	3	-
CO 3	Ability to resolve spatial concerns with technical aspects of a building.	2	3	3	-	3	-	-	-	2	3	-
CO 4	Understood on the preparation drawings of rooms, layouts of service.	1	-	1	-	-	-	2	3	2	3	3
CO 5	Ability to design and detail components within a building.	2	2	2	-	2	-	1	-	2	3	3

  
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**COURSE OBJECTIVE:**

- To make the student realize that architectural design process become more and more complex at advanced level and could be understood by analyzing live case studies - appropriate documentation and presenting the same.
- To create awareness among students through organized expert lectures and various aspects of design.
- To strengthen the knowledge base on architectural design processes thro' works of international and national architects referred from libraries, available literature and Websites.

**DESIGN STUDIO****180 Hrs**

**Design of advanced and complex problems - comprising of group and multi storied structures and infrastructure** - with regard to climatic conditions, orientation, services, circulation problems relating to large developments Design and detailing for movement and use by handicapped persons within and around building.

**Examples: Multi storied Residential flats, campus design, urban centers, Housing Senior citizens' neighborhood, Transport terminals etc, and Time problem using computer-aided design shall be introduced.**

**TOTAL: 180 Hrs****COURSE OUTCOMES:**

The students should be able to:

**CO 1:** Design advanced and complex problem comprising of group and multistoried structures and infrastructures.

**CO 2:** Use computer for drawing and presentation skills using appropriate software.

**CO 3:** Understanding from pre-final stage, to be conversant with all challenges in large complex design, in group, multi storied developments covering structural innovations, energy conservation, awareness to costing of projects and legal implications.

**TEXT BOOKS:**


1. De. Chiara and Callender, "Time – saver Standards for Building Types", McGraw-Hill Co., New York, 1973.
2. The Handbook of Building Types., NUFERT ARCHITECTS DATA, New International edition, Second international edition. BSP Professional Books. Oxford (1980) Backwell scientific Publications.
3. Time – Saver Standards for Architectural Design Data, seventh edition. The reference of architectural fundamentals McGraw Hill international edition, architectural series (1998).
4. Ed.By.Quentin Pickard RIBA "The Architects' Handbook", Bladewell Science Ltd., 2002.

**REFERENCES:**

1. Edward D Mills, planning, 4 volumes, newness Butterworths, London 1976P&D Act 1995.
2. E and OE -Planning -London Liffie Books Ltd 1973
3. Ed.By.Quentin Pickard RIBA - The Architects' Hand Book - Bladewell Science Ltd. – 2002
4. De Chiara Callender, Time Saver Standard for Building Types, McGraw-Hills Co., 1973.
5. Handbook on Building Construction Practices (Excluding Electrical Work). Bureau of Indian Standards, New Delhi, 1997.
6. National Building of India 2005, Bureau of Indian Standards, New Delhi.

7. Macmillan Encyclopedia/ architects, Vol II, The free press, London, 1982.
8. A visual dictionary of Architecture, Francis D.K.Ching, John wiley & Sons, Inc. 1997.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO 1	Design advanced and complex problem comprising of group and multistoried structures and Infrastructures.	2	3	2	-	3	-	-	2	3	3	1
CO 2	Use computer for drawing and presentation skills using appropriate software.	2	3	3	-	3	-	-	-	2	3	-
CO 3	Understanding from pre-final stage, to be conversant with all challenges in large complex design, in group, multi storied developments covering structural Innovations, energy conservation, awareness to costing of projects and legal implications.	2	2	3	3	3	2	3	1	3	3	3

  
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 Chennai - 600 042, Tamil Nadu.



**COURSE OBJECTIVES:**

- To investigate the contemporary theories of media and their influence on the perception of space and architecture.
- To study the various aspects of Digital Architecture and its exploration through emerging phenomena that relies on abstraction of ideas.
- To expose the students to the new concept by understanding and recognizing the relation between nature and human thereby developing nature based solution to the architecture problems influenced by biomimetic.
- 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.
- To provide an overview of various Contemporary design processes and its relation to computation.

**UNIT I INTRODUCTION AND ASPECTS OF DIGITAL ARCHITECTURE****12 Hrs**

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. Aspects of Digital Architecture – Design and Computation – Difference between Digital Process and Non-Digital Process – Architecture and Cyber Space.

**UNIT II BIOMIMICRY****10 Hrs**

Origin of Biomimicry - Nature as a model, measure and mentor, changing metaphor and approach organic architecture, Biomimicry in architecture - overlap between biology and architecture - living building– emerging biomimetic technologies, zero carbon buildings, nanotechnology in architecture works of Douglas Cardinal, Imre Makovecz, Daniel Liebermann, Eugene Tsui, Jacques Gillet, Petra Gruber - Biomimetic cities-Biomimetic Future Approach - Nature model - New applications of biological life into Architecture - Biomimicry and sustainability.

**UNIT III SHAPE GRAMMAR****6 Hrs**

Spatial rules, shape grammar and form properties, form generation with Islamic patterns, Palladian villas, Victorian windows, Works of Alvar Siza

**UNIT IV FRACTALS IN ARCHITECTURE****8 Hrs**

Self-similarity, little scale and large scale analysis, principles in architecture, Fractals in Indian and European architecture

**UNIT V SEMINARS - CASE STUDY****9 Hrs**

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 Hrs****COURSE OUTCOMES:**

**CO 1:** Student shall gain insight to the various contemporary design process/theories and their relation to computation.

**CO 2:** Students would be able understand the approach towards biomimicry and nano technologies.

**CO 3:** 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.

**CO 4:** To sensitize students explores how contemporary processes, in the pursuit of creativity and fluidity, have become more abstract

**CO 5:** Experimental, attempting to overcome the pragmatic determinism attributed to more conventional working methods.

**TEXT BOOKS:**

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 Lingering 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.
6. Peter Szalapaz, Contemporary Architecture & The Digital Design Process, Elsevier, 2005.
7. David Pearson, The New Organic Architecture, Gia Books Ltd, UK, 2001.
8. John K Waters, Blobitecture, Rock fort publications, 2003.
9. Ivan Margolius, Architects+ Engineers= Structures, Wiley Academy, 2002.5. Clovis Heimsath, Maryann Heimsath, Lisa Hardaway, Geometry in architecture: Texas buildings yesterday and today, University of Texas Press, 2002.
10. Carl Bovill, Fractal geometry in architecture and design, Birkhäuser, 1996.
11. Benyus J. M, Biomimicry: Innovation Inspired by Nature, Harper Perennial, New York, 2002
12. Pawlyn M., Biomimicry in Architecture, RIBA Publishing, 2011
13. Gruber P., Biomimetics in Architecture: Architecture of Life and Buildings, Springer, 2010
14. Mazzoleni I., Architecture Follows Nature - Biomimetic Principles for Innovative Design (Biomimetics), CRC Press, 2013

Course Outcomes		Program Outcomes								Program Specific Outcomes		
CO's		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO 1	Student shall gain insight to the various contemporary design process/theories and their relation to computation.	2	2	-	-	-	2	2	1	2	1	1
CO 2	Students would be able understand the approach towards biomimicry and nano technologies.	3	-	3	-	-	-	-	2	3	3	-

CO 3	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.	2	3	3	-	3	-	-	-	2	-	-
CO 4	To sensitize students explores how contemporary processes, in the pursuit of creativity and fluidity, have become more abstract	1	2	-	-	2	-	2	-	3	2	3
CO 5	Experimental, attempting to overcome the pragmatic determinism attributed to more conventional working methods.	-	2	2	-	-	2	2	3	3	3	3



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**COURSE OBJECTIVES:**

- To know about the social and economic factors influencing housing design and the various schemes in housing promotion in the Indian context.
- To create awareness about the various standards backed by BIS, NBC, and DCR including layout conditions, Buildings rules related to housing in high rise context.
- To expose students to affordable housing systems and their delivery mechanism along with environmental compliances.
- In-depth knowledge of various building materials, specifications and construction detailing techniques of affordable buildings
- To study about the various stages involved in development of housing, its management, and how to make the same user friendly and environment friendly through participatory approach.

**UNIT I HOUSING ISSUES & SOCIO ECONOMIC ASPECTS – INDIAN CONTEXT****8 Hrs**

Need and Demand - National Housing Policy - Housing Agencies and their role in housing development - Impact of traditional life style. Social factors influencing Housing Design, affordability, economic factors

**UNIT II INTRODUCTION TO AFFORDABLE HOUSING****9 Hrs**

Affordable Housing – Definition, Difference over low cost housing, Key components influencing cost of buildings. Transition from Low Rise housing to High Rise housing- Standards and Regulations - DCR relevant to housing in Low rise and High Rise developments

**UNIT III AFFORDABLE HOUSING SYSTEMS****10 Hrs**

Modular coordination in building design, Prefabrication- Total and Partial, impact of prefabrication on employment. Use of PERT and CPM methods in building construction. Affordable housing in different contexts – Temporary and Permanent, Disaster resistant structures, Light Weight, Collapsible structures

**UNIT IV CONSTRUCTION DETAILING FOR AFFORDABLE HOUSING****12 Hrs**

Building construction detailing for cost reduction. Specification types and methods Low cost building materials, application based on suitability without trade off on comfort, Research and development by various organizations in India and foreign countries on cost control techniques – Case Studies of works of Laurie Baker, B.V.Doshi, Charles Correa, Shigero Ban , Moshe Safdie, Alejandro Aravena

**UNIT V AFFORDABLE HOUSING MANAGEMENT****6 Hrs**

Various stages and tasks in Project Development -Costing for a typical case study across a cross section of income groups - Housing Management - Community participation - Environmental aspects

**TOTAL: 45 Hrs****COURSE OUTCOME:**

- CO 1:** Ability to understand issues relating to Housing policy and need for Affordable housing. Following cost effective techniques and yet design for diversity.
- CO 2:** Explored to National Housing Policy and social influencing factors in Housing Design.
- CO 3:** Understood the Methods of building Construction in different context.
- CO 4:** A detail understanding about the research and development by various organization and its construction techniques.
- CO 5:** Gained Knowledge in housing managements in various environmental aspects.

**TEXT BOOKS:**

1. Richard Kintermann and Robert small, "Site planning for Cluster Housing", Van Nastrand Reinhold company, Jondon/New York 1977.
2. Saxena A. K., "Sociological Dimensions of Urban Housing and Development ", Common wealth Publications, 2004
3. Joseph de Chiara and others, "Time Saver Standards for Housing and Residential development", McGraw Hill Co, New York 1995.
4. Forbes Davidson and Geoffrey Payne, "Urban projects Manual", Liverpool University press, Liverpool 1983.
5. HUDCO publications – Housing for low income, sector model.
6. Karnataka.state Housing Board - MANE - Publication - 1980.

**REFERENCE:**

1. National Building of India 2005, Bureau of Indian Standards, New Delhi.
2. Bhatta, Basudeb (15 April 2010). *Analysis of Urban Growth and Sprawl from Remote Sensing Data. Advances in Geographic Information Science. Springer. p. 23.* ISBN 978-3-642-05298-9.
3. "Definition Affordable Housing" (PDF).
4. CNHED Archived 4 February 2012 at the Wayback Machine
5. "Queensland Affordable Housing Consortium [QAHC], Australia" (PDF). *Archived from the original (PDF) on 26 April 2012.*
6. "Affordable Housing: Issues, Principles and Policy Options" (PDF). *Canberra, Australia: Australian Council of Trade Unions. July 2007. Archived from the original (PDF) on 26 May 2012.* Retrieved 8 December 2011.
7. "Definition: Affordable Housing" Archived 26 April 2012 at the Wayback Machine, Queensland Affordable Housing Consortium, Australia
8. "Good practice and guidance, Reports and summaries". 29 November 2009. Retrieved 8 December 2011.

Course Outcomes		Program Outcomes								Program Specific Outcomes		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO 1	Ability to understand issues relating to Housing policy and need for Affordable housing. Following cost effective techniques and yet design for diversity.	3	-	3	-	-	-	-	2	3	3	-
CO 2	Explored to National Housing Policy and social influencing factors in Housing Design.	3	3	2	-	-	2	3	1	1	2	3

CO 3	Understood the Methods of building Construction in different context.	3	2	2	-	-	-	1	3	1	1	3
CO 4	A detail understanding about the research and development by various organization and its construction techniques.	2	3	2	-	-	2	-	3	2	2	3
CO 5	Gained Knowledge in housing managements in various environmental aspects.	2	1	1	-	-	-	-	3	1	-	2

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**COURSE OBJECTIVES:**

- 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,
- To provide knowledge and 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.

**OUTLINE:**

The internship program would be done in offices with a minimum of 5 years professional Experience empanelled by the Institution and in firms 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 student is expected to be exposed to preparation of working drawing, detailing, and preparation of architectural models, computer applications in design and drafting, filing system in respect of documents, drawing and preparation of tender documents. Site experience may be given in respect of supervision of the construction activity, observing the layout on site, study of the stacking methods of various building materials, study of taking measurement and recording. Students will have to maintain a day to day record of their engagement for the period of training.

This will be recorded in an authorized diary to be counter signed by the architect at the end of each month and the same diary shall be sent to the department once in a month. At the end of the training period, a student will have to produce a certificate of experience and satisfactory performance from the concerned office in the prescribed format.

At the end of the Internship program 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.

**TOTAL: 16 WEEKS**

**COURSE COUTCOMES:**

**CO1:** Clarity about the field of architecture with the various stages of works.

**CO2:** An understanding about the total process that goes into the making of a building and execution.


**CO3:** An overall idea of the nuances of architectural practice.

**CO4:** To give familiarity about client meeting and tendering.

**CO5:** To provide exposure to the various dimensions of architectural practice through anintensive

internship program.

Course Outcome		Program Outcome								Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	Clarity about the field of architecture with the various stages of works.	2	2	1	1	2	3	3	3	1	1	2
CO2	An understanding about the total process that goes into the making of a building and execution.	3	3	3	2	3	3	3	3	2	2	3
CO3	An overall idea of the nuances of architectural practice.	2	3	2	3	3	2	1	2	3	2	3
CO4	To give familiarity about client meeting and tendering.	1	3	1	3	3	3	3	2	3	2	3
CO5	To provide exposure to the various dimensions of architectural practice through an intensive Internship program.	2	3	1	3	3	3	3	2	3	2	3

  
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**COURSE OBJECTIVES:**

- To create an understanding of urbanism and urban morphology as arising from various forces through history.
- To introduce the scope and nature of urban design as a discipline.
- To introduce the components of a city and their interdependent roles.
- To help perceive, interpret and understand the city in different ways.
- To create awareness of some contemporary urban issues and how they are addressed.

**UNIT I EVOLUTION OF URBANISM****12 Hrs**

Outline of forces shaping urbanism. Urbanism of river valley civilisations. Morphology of pre-industrial European cities to include Greek and Roman cities, medieval European towns, Renaissance urbanism and ideal cities. Industrialisation and impact on urbanism. American grid iron planning. Theories, ideas and practice of good urban planning/cities/urbanism in early 20th century. Outline of historic cities of India. Temple town urbanism of Tamil Nadu. Mughal city form. Medieval cities of India. Colonial urbanism in India. Outline of modernist cities and urbanism across the world. Morphology of Indian modernist cities of Chandigarh, Bhuvaneshwar and Gandhi Nagar.

**UNIT II URBAN DESIGN AND THE CONTEMPORARY CITY****6 Hrs**

Evolution of urban design as a discipline, its scope and objectives. Components of contemporary urban space such as blocks, density, neighbourhood, streets etc., and their interdependencies. Outline of issues/ aspects of contemporary urban space and articulation of need for urban design. Scope and objectives of urban design as a discipline.

**UNIT III URBAN UNDERSTANDING THROUGH TEXTS AND THEORIES****6 Hrs**

Discussion of key texts/topics on urbanism. Imageability and Lynch. Townscape and Cullen, Genius Loci and Schulz. Historic city and Rossi. Social aspects of urbanism and Jane Jacobs, William Whyte, Jan Gehl. Collage city and Colin Rowe.

**UNIT IV URBAN MAPPING AND ANALYSIS****12 Hrs**

Outline of ways to perceive and understand different components of urban setting through appropriate tools. Tools to include maps of different kinds, sketches, photo documentations, reading, data collection from various sources, transects, theories. Aspects to include topography, geology and hydrology, micro climate and vegetation, urban density and growth especially in Asian cities, city limits/boundaries, urban architecture, typologies, infrastructure, land parcels, public space, demographics, patterns of usage, land use. Understanding through study of published information and field exercises involving cities.

**UNIT V ASPECTS AND ISSUES OF CONTEMPORARY URBANISM****9 Hrs**

Understanding contemporary urbanism through case studies of aspects, issues and solutions. Topics to include place making, identity, suburban sprawl, generic form, privatisation of public realm, role of real estate, transportation, zoning, globalisation, sustainability, heritage, conservation, urban renewal, community participation, gender, class, urban morphology, technology.

**TOTAL: 45 Hrs****COURSE OUTCOME:**

**CO 1:** Awareness of the evolution and characteristics of urban forms, their components and interdependencies through case studies.

**CO 2:** Understanding of urbanism through theories, aspects, issues and solutions.

**CO 3:** Knowledge of ways to look at and interpret urbanism today.

**CO 4:** Students understood how architecture is related to urban design in the planning process; how cities have aesthetic and visual impacts, how cities could be visualized as an act of will and how architects can contribute to city's re building and renewal through understanding of space articulation in cities of east and west

**CO 5:** Explored about the aspects and issues of of Contemporary at the Gobal level.

**TEXTBOOKS:**

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. Malcolm Moor, 'Urban Design Futures', Routledge, 2006.
5. Geoffrey Broadbent, 'Emerging Concepts in Urban Space Design', Taylor & Francis, 2003.

Course Outcome		Program Outcome								Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	Awareness of the evolution and characteristics of urban forms, their components and interdependencies through case studies.	2	2	-	3	3	1	2	3	3	2	1
CO2	Understanding of urbanism through theories, aspects, issues and solutions.	2	3	-	3	3	1	2	3	2	3	2
CO3	Knowledge of ways to look at and interpreturbanism today.	3	1	-	3	3	1	2	3	3	2	3
CO4	Students understood how architecture is related to urban design in the planning process; how cities have aesthetic and visual impacts, how cities could be visualized as an act of will and how architects can contribute to city's re building and renewal through understanding of space articulation in cities of east and west	3	1	-	3	3	1	2	3	3	2	1
CO5	Explored about the aspects and issues of of Contemporary at the Gobal level.	3	1	-	3	3	1	2	3	2	2	2

  
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**COURSE OBJECTIVES:**

- To inculcate the spirit of exploration and research in architecture.
- To enable the conversion of effort into a coherent line of thought through writing/documentation/models/ anymedia.
- To serve as prelude to Thesis.
- To enable the acquisition of in-depth knowledge in a specific aspect/ issue in the discipline of architecture as well as develop perspectives on the same through thought, reading, study, analysis, expression, documentation.
- To understand the current scenario problem going all around the place.

**CONTENT:**

Design studio emphasize on explaining and understanding Architecture primarily through the mode of making. Dissertation offers an opportunity to look at architecture, history and design primarily through textual. However, like design, dissertation involves process of observation, reflection and abstraction. Students are encouraged to choose any topic of there interest. They may range from analyzing the works of an architect, history, typological changes, writing, design process and many more. The dissertation should state its objectives, followed by exhaustive documentation and arguments. The emphasis however, could vary according to the topic. The dissertation proposal in about 1500 words stating the topic issues to be explored and the scope must be submitted. After approval the work would be periodically reviewed. A well written report of a minimum 15,000 words must be submitted in the prescribed format, if any provided by the University. The student would subsequently make a presentation of his/her work and defend them.

**TOTAL: 120 Hrs**

**COURSE OUTCOMES:**

**CO 1:** A dissertation report with a coherent line of thought as reflected in the written structure and the core content which could be open ended.

**CO 2:** Ability to research deeply into a subject and develop depth in thought in any specific area based on point of view, observation, analysis and study.

**CO 3:** Ability to look at architecture from an informed, analyzed and well thought out personally unique or objective perspective which would help strengthen the thesis process.

**CO 4:** Students explored on the tools and methodology adopted to collect the required data relevant to the study.

**CO 5:** Strengthen the analysis skill and identifying root cause of problems.

**TEXT BOOKS:**

1. Bjarkel Ingels, 'Yes is More', Taschen, 2009
2. Bernard Tschumi, 'Manhattan Transcripts', Wiley, 1994.
3. Rem Koolhaas et al, 'Project on the City II: The Harvard Guide to Shopping', Taschen, 201.
4. Charles Correa, 'The New Landscape: Urbanisation in the Third World', Concept Media, 199.
5. Iain Borden and Kaaterina Ruedi; 'The Dissertation: An Architecture Student's Handbook', Architectural Press, 2006.
6. Linda Grant and David Wang, 'Architectural Research Methods', John Wiley Sons, 2013.
7. Vian Ahmed, Alex Opoku, Zeeshan Aziz, 'Research Methodology in the Built Environment', Rutledge, 2016.

**REFERENCES:**

1. Wayne C Booth, Joseph M Williams, Gregory G. Colomb, 'The Craft of Research', 2nd Edition, University of Chicago Press, 2016.



2. Ranjith Kumar, 'Research Methodology- A Step by Step Guide for Beginners', Sage Publications, 2011.
3. John W Creswell, 'Research Design: Qualitative, Quantitative and Mixed Methods Approaches', Sage Publications, 2014.
4. Richard Coyne, 'Interpretation in Architecture: Design as Way of Thinking', Routledge, 2005. Adam Sharr, 'Reading Architecture and Culture', Routledge, 2012.
5. Ian Border, Kurt Rueideu, The Dissertation, An Architectural Students Hand Book, Architectural Press, 2000
2. Linda Grant and David Wang, Architectural Research Methods, John Wiley Sons, 2002

Course Outcome		Program Outcome								Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	A dissertation report with a coherent line of thought as reflected in the written structure and the core content which could be open ended.	-	3	2	2	3	1	-	2	3	3	3
CO2	Ability to research deeply into a subject and develop depth in thought in any specific area based on point of view, observation, analysis and study.	2	3	2	2	3	1	-	2	3	3	3
CO3	Ability to look at architecture from an informed, analyzed and well thought out personally unique or objective perspective which would help strengthen the thesis process.	2	3	2	2	3	1	-	2	3	3	3
CO4	Students explored on the tools and methodology adopted to collect the required data relevant to the study.	2	3	2	-	3	-	-	2	1	2	3
CO5	Strengthen the analysis skill and identifying root cause of problems.	2	3	2	1	3	-	-	2	2	3	2

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**COURSE OBJECTIVES:**

- To introduce current materials and products in architecture that are eco-friendly, composite, durable, advanced, smart.
- To inform about innovations in materials and practices in building industry.
- To focus on materials and systems, their properties and connections, intrinsic relationship with structural systems and environmental performance.
- To create opportunities to change the way in which we construct and retrofit buildings by added values in terms of increased performance and functionality.
- To focus on addressing the new challenges of durability in changing climate. It also help the students to experience the implementation of new technology concepts which are applied in field of Advanced construction

**UNIT I INTRODUCTION****5 Hrs**

Introduction and need for ultra-performance materials in building design as a substitute to conventional materials. Newer application for special performance, thermal/sound/moisture protection, fitting, equipment and furnishing. Properties of contemporary materials – multidimensional, repurposed, recombinant, intelligent, interfacial, transformant, etc.

**UNIT II ADVANCED CONCRETE AND COMPOSITE REINFORCEMENT****10 Hrs**

Types of advanced concrete and its applications. Workability and mechanical properties, durability and reliability of advanced concrete materials. Manufacturing and application in buildings. Bendable concrete, light transmitting concrete, translucent concrete, pervious concrete, eco-cement, etc., Introduction to manufacture, types, properties and performance of new reinforcement materials in concrete - Aramid fibres, bio-steel, carbon (Graphite) Fibres and fibre glass etc.

**UNIT III COMPOSITE MATERIALS****10 Hrs**

Types, terminology and classification of composite materials based on particle reinforced, fiber reinforced, structural and composite benefit in building construction. Composite materials manufacturing process. Use of composite materials namely Polymer Matrix Composites (PMCs) and Fibre-Reinforced Polymers (FRPs) along with cement, steel, aluminium, wood, glass, etc., for thermal insulation, fire protection, coating, painting and structural monitoring, etc.

**UNIT IV NANO-MATERIALS AND NANO-COMPOSITES****10 Hrs**

Definition, manufacture and types of nano materials. Properties, performance of nano materials in building construction, types and application of nano-materials like carbon, nanotubes etc., Nano composite used with cement, steel, aluminium, wood, glass for thermal insulation, fire protection, coating and painting and structural monitoring etc.. Nano technologies in building and construction.

**UNIT V DIGITAL AND TENSILE MATERIALS****10 Hrs**

Types of materials and its constitution, manufacturing and construction technology requirement for 3D printed buildings structure and Extraterrestrial printed structures. Tensile fabric structure by digital printing. Translucent fabric, thin-film photovoltaics, texlon foil, PVC (poly vinyl chloride) coated polyester cloth and PTFE (poly tetra fluoro ethylene) (teflon) coated glass cloth.

**TOTAL: 45 Hrs**

**COURSE OUTCOME:**

**CO 1:** Exposure to the need and use of various contemporary materials in creating innovation and ultra-performance in building design.

**CO 2:** An understanding of characteristics and performance of the newer materials in terms of detailing and application to the context.

**CO 3:** Had a insight about the composite benefit in building construction.

**CO 4:** Gained Knowledge on Nano materials and nano composite materials.

**CO 5:** Had an exposure of tensile materials and its pros and cons.

**TEXTBOOKS:**

1. Christiane Sauer, 'Made of...New Materials Sourcebook for Architecture and Design', Prestel Pub, 2010.
2. Mel Schwartz, 'Encyclopaedia of Smart Materials -Vol1,2', Wiley-Interscience, 2001.
3. Senem Özgönül Şensan, 'Smart Materials and Sustainability: Application of Smart Materials in Sustainable Architecture', LAP Lambert Academic Publishing, 2010.
4. Axel Ritter, 'Smart Materials in Architecture, Interior Architecture and Design', Birkhäuser Architecture, 2002.

**REFERENCES:**

1. Michelle Addington, & Daniel L Schodek, 'Smart Materials and New Technologies: for the Architecture and Design Professions', Architectural Press, 2005.
2. Michael F. Ashby, Paulo Ferreira, Daniel L. Schodek, 'Nanomaterials, Nanotechnologies and Design: An Introduction for Engineers and Architects', Butterworth-Heinemann, 2009.
3. Blaine Brownell, 'Transmaterial 2', Princeton Architectural Press, 2008.
4. John Fernandez, 'Material Architecture: Emergent Materials for Innovative Buildings and Ecological Construction', Taylor & Francis, 2006.

Course Outcome		Program Outcome								Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	Exposure to the need and use of various contemporary materials in creating innovation and ultra-performance in building design.	2	1	-	3	1	3	2	-	3	3	1
CO2	An understanding of characteristics and performance of the newer materials in terms of detailing and application to the context.	2	3	-	2	-	1	2	-	2	3	2
CO3	Had a insight about the composite benefit in building construction.	-	1	-	3	-	2	2	-	2	2	-
CO4	Gained Knowledge on Nano materials and nano composite materials.	-	3	-	3	-	2	2	-	-	-	1
CO5	Had an exposure of tensile materials and its pros and cons.	1	1	-	3	-	3	2	-	3	3	2



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**COURSE OBJECTIVE:**

- To understand the contemporary issues in urban planning.
- To familiarize with simple Town planning techniques.
- To understand the changing scenario in the context of globalization.
- To Analyze the Futuristic concepts of urban & Regional planning through Theories.
- To provide insight to the students about the basic urban and regional planning concept and its techniques in the overall understanding of classification of settlements, land-use, zoning and types of development plan

**UNIT I INTRODUCTION TO URBAN AND REGIONAL PLANNING****9 Hrs**

Influence of socio-economic factors in the development of human settlements, growth and decay of human settlements. Classification of settlements: Classification based on population, functions, locations, Municipal status. Town and its land uses, graphical representation and colour, character of a town, categories of a town, densities of a town, Principles, Advantages and types of Zoning.

**UNIT II REGIONAL PLANNING****8 Hrs**

Introduction to Regional Planning - Types of Region – Regional Policies - Principles & Methodologies of Regional Planning - Constraints & factors for consideration of regional plans- Case studies of regional planning.

**UNIT III URBAN PLANNING****12 Hrs**

Introduction to Urban Planning -Types of Plans – Perspective Plan, Structure Plan, Master plan, Comprehensive Plan, Detailed Development Plan, City Corporate Plan, Business Plan - Its Scope & Contents - Data Collection – Future proposals & Policies– coding of land use Maps – Development Regulations & Bye laws – Limitations. Contemporary problems of settlements, Environmental impact of unplanned growth.

**UNIT IV PLANNING TECHNIQUES****8 Hrs**

Data Collection Techniques, Types of Surveys, Data and Map Analytical Techniques, Applying Carrying Capacity for Urban and Regional planning, Threshold Analysis – Factors taken into consideration to assess the most suitable land use & weighted overlay of Land suitability, Projection Techniques - Population Projection and Economic Projection, Plan formulation through Remote Sensing & Geographic Information System.

**UNIT V FUTURISTIC CONCEPT****8 Hrs**

Basic concept in New Urbanism, Smart growth, TOD, Form-Based Codes, Rural village, Transect Future of cities and cities of future - Sustainable cities, Intelligent cities, Liveable cities, Resilient cities, Smart Cities, Global city, Eco city, Compact city, Vertical urbanism, MediCity, Sports city.

**TOTAL: 45 Hrs****COURSE OUTCOME:**

**CO 1:** The student will understand and exposed to classification of settlements, land-use, zoning, types of development plan, will be acquainted with the current issues in urban planning.

**CO 2:** The students will be familiarized with simple Town planning techniques and futuristic concepts.

**CO 3:** Understood the changing scenario in the context of globalization.

**CO 4:** Exposed to the planning techniques of various region.

**CO 5:** Gained the knowledge about the Futuristic concepts of urban & Regional planning through Theories.


**TEXT BOOKS:**

1. "The urban pattern: City planning and Design" by Gallion and Eisner.
2. "Urban planning" by Chapin
3. "Urban and Regional planning" by Remegowda

**REFERENCES:**

1. Anthony James Catanese, James C. Snyder, Urban Planning, McGraw-Hill, 1988
2. Peter Hall, Urban & Regional Planning, Routledge, Taylor & Francis Group, London, 2002
3. Rame Gowde K.S., Urban & Regional Planning, Prasara University of Mysore, 1972
4. John Ratcliffe, An Introduction to Town and Country Planning, Hutchinson 1981
5. Arthur B. Gallion and Simon Eisner, The Urban Pattern – City planning and Design, Van Nostrand Reinhold company
6. Rangwala, Town Planning, Charotar publishing house
7. G.K.Hiraskar, Town Planning
8. Town Planning, A.Bandopadhyay, Books and Allied, Calcutta 2000

Course Outcome		Program Outcome								Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	The student will understand and exposed to classification of settlements, land-use, zoning, types of development plan, will be acquainted with the current issues in urban planning.	-	3	1	3	3	-	2	3	3	3	3
CO2	The students will be familiarized with simple Town planning techniques and futuristic concepts.	-	3	1	3	3	-	2	3	3	3	2
CO3	Understood the changing scenario in the context of globalization.	2	3	1	3	3	-	2	3	2	3	2
CO4	Exposed to the planning techniques of various region.	2	3	1	3	3	-	2	3	2	2	3
CO5	Gained the knowledge about the Futuristic concepts of urban & Regional planning through Theories.	2	3	1	3	3	2	2	3	2	2	2

  
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**COURSE OBJECTIVES:**

- To introduce the design potential of steel as a material in construction and its inherent structural benefits.
- To inform about the various components of steel as structural and aesthetic design through case studies.
- Its ability to create architecturally interesting or long-span solutions which is cost effective.
- To provide familiarity with the best practices of steel as a construction material.
- To provide flexibility to express or conceal a building's structural frame, either externally or internally, and can help facilitate the artistic expression the client desires

**UNIT I INTRODUCTION TO STEEL AS BUILDING MATERIAL****8 Hrs**

Materiality of steel, structural properties of steel, advantages of steel in construction. History of metal in construction – Iron to Steel. Steel and tension. Industrialization and mass fabrication of steel. Casting of steel in historic and contemporary examples. Invention of hollow structural sections. Hot rolled steel shapes, various hollow structural sections.

**UNIT II HIGH TECH AND CONTEMPORARY ARCHITECTURE****10 Hrs**

Introduction to high tech movement. Understanding of various typologies of high tech movement – Extruded, Grid/Bay, Diagrids, arched/ curved structures, tensile. Advantages of diagrids over standard frames. Curved steel – creating curves in steel buildings, limitations in curving steel. Evolution of AESS (architecturally exposed structural steel) through high tech movement.

**UNIT III STRUCTURAL EXPRESSION OF STEEL****10 Hrs**

Introduction to AESS (architecturally exposed structural steel), standard structural steel versus AESS. Factors that define AESS. Characteristics and categories of AESS. Connection types for AESS – bolted, welded and cast connections. Member types for AESS – Tubular and standard sections. Various steel frame design, basic connection strategies, basic understanding of steel floor systems, truss systems and braced systems.

**UNIT IV SUSTAINABILITY, STEEL AND OTHER MATERIALS****9 Hrs**

Introduction to steel as a sustainable material. Recycled, reuse and adaptive reuse of steel. Steel and glazing systems, support systems for glazing. Technical aspects of combining steel with glass. Various steel and glass envelope systems - curtain wall system, wind braced support systems, cable net walls, spider steel connections with structural glass, simple and complex cable systems. Handling curves and lattice shell construction. Advanced framing system – Steel and Timber. Low carbon design strategies.

**UNIT V FABRICATIONS, ERECTION AND IMPLICATIONS ON DESIGN****8 Hrs**

Study on transformation of architectural design into fabricated elements. Study of process profile through case studies. Role of physical and digital models in fabrication. Steel in temporary/ exhibit buildings. Need for corrosion and fire protection. Various finishes and coating systems of steel. Detailed study on corrosion protection and fire protection systems. Transportation, site issues and erection on site. Erection of beams and columns. Effects of climate and weather on erections. Other issues relating to practical implication of design on site.

**TOTAL: 45 Hrs**



**COURSE OUTCOMES:**

**CO 1:** Ability to understand the concepts of designing with steel structures and its components.

**CO 2:** Understanding about the tubular members to provide efficient design with aesthetically slender members.

**CO 3:** Student can able to understand the combination of form and function of steel and as an expression of a whimsical playful intent while at the same time functioning as a primary load carrying system.

**CO 4:** An understanding of steel as a structural, functional and aesthetic material in design and construction practice.

**CO 5:** Understood the significance of the use of steel technologies and evidence to support the architects' needs and also outlines how the steel construction procurement process works in the construction fields.


**TEXTBOOKS:**

1. TerrimeyerBuake, 'Architectural Design in Steel', SPON, 2004.
2. Peter Silver et al, 'Structural Engineering for Architects', Laurence King, 2013.

**REFERENCES:**

1. Victoria Ballard Bell & Patrick J Rand; 'Materials for Architectural Design', Lawrence King, 2006.
2. Ettinger J. Van et al (Editors), 'Modern Steel Construction in Europe', Elsevier, 1963.
3. Benevolo, Leonardo, 'History of Modern Architecture, 2 Volumes', Routledge & Kegan Paul, 1960.
4. 'Handbook of Steel Construction', Canadian Institute of Steel Construction, 2010.
5. John Leckie, 'Steel and Other Materials', Canadian Institute of Steel Construction, 2007.

Course Outcome		Program Outcome								Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	Ability to understand the concepts of designing with steel structures and its components.	-	-	2	3	3	3	2	1	1	2	2
CO2	Understanding about the tubular members to provide efficient design with aesthetically slender members.	-	-	1	3	3	3	2	-	-	-	3
CO3	Student can able to understand the combination of form and function of steel and as an expression of a whimsical playful intent while at the same time functioning as a primary load carrying system.	2	3	3	3	3	3	2	1	2	3	2
CO4	An understanding of steel as a structural, functional and aesthetic material in design and construction practice.	2	3	3	3	3	3	2	1	-	3	-
CO5	Understood the significance of the use of steel technologies and evidence to support the architects' needs and also outlines how the steel construction procurement process works in the construction fields.	2	3	3	3	3	3	2	-	2	2	3

  
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**COURSE OBJECTIVES:**

- To enable addressing of specific projects through key identified issues inherent in the project or to enable development of thought processes in specific areas/aspects into a project.
- To facilitate development of ability to complete and handle projects independently as a precursor to professional life.
- To ensure consolidation and application of the knowledge gained in preceding years of the programme towards a design topic of the student's choice.
- To demonstrate the students' capability of synthesizing architecture, engineering systems, social sciences and humanities through a capstone project which showcases creative and critical thinking abilities and skills developed through the course.
- To expose the students to handle the Architectural design projects and research Projects.

**CONTENT:**

Students would choose a topic of their choice to pursue in terms of idea exploration and/or design potential which they would undertake to completion. The topic could be project based needing specific areas of study/approach or study based/thought-process based leading to a project. If it is the latter, care should be taken to have topics that have or lead to sufficient architectural design component/content which is the primary field of study in the programme.

Students would submit the topic for approval with a rough outline of the nature of the project, area of interest, study and design scope, challenges, possible case studies and/or areas of study, methodology and outcome. The areas of study/research/design can include any of the broad areas of the discipline - contemporary needs of society, history, theory, sustainability, structural or service oriented design, projects that involve complex planning and integration of several aspects, appropriate architecture, urban design, contemporary processes, social housing, urban oriented architectural design, conservation oriented architectural design.

The progress of work will be reviewed periodically throughout the semester. At the end of the semester, they would submit the thesis project. The final submission will include study sheets, optional study models, design concept/approach sheets, optional conceptual design/process models, design presentation sheets, final model, working drawings and detailed drawings of a selected part of the project, project report which summarises the entire thesis work and soft copy of all the work.

**TOTAL: 540 Hrs**

**COURSE OUTCOMES:**

**CO 1:** Skill, knowledge and expertise in the domain of architectural design.

**CO 2:** Ability to handle a major architectural project independently through all stages.

**CO 3:** Exposed the students to choose their topic as per the demand in the current scenario.

**CO 4:** Student understood the relationship between Architecture Engineering systems, social science and humanities.

**CO 5:** Ability to independently handle an Architectural Design Project, research the requirements of a project, Prepare a brief, try alternative approaches/ concepts, and evaluate them on way to make a final comprehensive proposition.

**TEXT BOOKS:**

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, London/New York, 1977.
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Course Outcome		Program Outcome								Program Specific Outcome		
CO's		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	Skill, knowledge and expertise in the domain of architectural design.	3	3	3	3	2	-	-	1	3	3	3
CO2	Ability to handle a major architectural project independently through all stages.	1	3	-	1	2	-	-	-	-	2	1
CO3	Exposed the students to choose their topic as per the demand in the current scenario.	2	3	3	2	3	3	3	3	3	3	3
CO4	Student understood the relationship between Architecture Engineering systems, social science and humanities.	3	3	3	2	3	3	3	3	3	3	3
CO5	Ability to independently handle an Architectural Design Project, research the requirements of a project, Prepare a brief, try alternative approaches/concepts, and evaluate them on way to make a final comprehensive proposition.	2	3	3	2	3	3	3	3	3	3	3

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