SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
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DEPARTMENT OF ARCHITECTURE

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

Board of Studies meeting for B.Arch. held on 30-06-2020

Venue: Virtual meet in ZOOM platform

Members present:

External Members	Signature	Internal Members	Signature
AR. PRAMOD BALAKRISHNAN Chief Architect, Edifice Chennai		**DR. DEVYANI GANGOPHAHY** Dean & Head Department of Architecture School of Building & Environment	
		DR. SURESH KUPPUSAMY Senior Professor & Design Chair Department of Architecture	
DR. MEGHAL ARYA Associate Professor Faculty of Architecture, CEPT University, Ahmedabad	meghal	**AR. EBIN HORRISON** Associate Professor	
		AR. ARULMALAR.R Associate Professor	
		AR.V. SHANKAR Associate Professor	

1. The Board of Studies approved the proposed Curriculum and syllabus of Regulation 2020 for B.Arch. course with incorporation of suggestions and feedback given by the external members. The suggestions made by the external members are presented in the minutes of meeting are given below.

A Board of Studies meeting was held as Virtual mode in ZOOM platform on 30th June 2020 with the following agenda:

1. Welcome address, opening remarks on the proposal to introduce REGULATION 2020 and the methodology adopted.
2. Comparative analysis of existing R 2015 and proposed R 2020 curriculum structure, R 2020 curriculum structure and Salient Features of Regulation 2020.
3. Detailed discussions on the proposed syllabus (from semesterI to semester X) and proposed Regulation 2020.
4. Any other matter with the permission of Chair.

Minutes of the meeting:

- Dr. Devyani Gangopadhyay presented the welcome address and briefed the agenda of the meeting
- Prof.SureshKuppusamy, discussed on the conceptual framework of the revisions in R2020 syllabus.
- Dr.DevyaniGangopadhyaydiscussed on the salient features of the proposed revised curriculum structure along with the analysis stating the intent of the revisions in curriculum structure and the content integrating with Design studios.
- The professional training was proposed to be shifted to eighth semester as per Council of Architecture Regulations 2017.

- Prof. Meghal, raised a query on COA's distribution of courses as it is mandatory to be followed or optional.
- Prof. Devyani Gangopadhyay, replied it as optional.
- Prof. Meghal asked on the necessity for **Applied mathematics**. She suggested that it could be Geometry instead of Trigonometry and suggested to reduce credits, asked to review on this.
    - Remove this subject and replace other subject or replace these credits to other subjects and integrate with Design.
    - Ar.Pramod said geometrical exercises already there in Architectural Drawing and hence the syllabus can be reoriented apart from geometry.
    - the internal team agreed upon this suggestion.
- Ar. Pramod, commented that **Soft skill development** cannot be just a theory subject for one semester and needs to be proposed in every semester with introduction in I semester, so that we can ensure continuous learning till 9th semester .
- Prof. Meghal, seconded on the above citing this will help the agenda of integration much more. She approved for introducing Soft skill development.
- The internal committee agreed to the external members' decision.
- Ar.Pramod insisted that **Society culture and environment** can't be dealt fully in one semester. He felt the society connect should be reflected in the semester Design studios.
- Prof.Suresh Kuppusamy replied that this can be strengthened and shall be proposed in third and fourth as SCE-I and SCE-II respectively. Lectures can be given in the studio hours on these and can integrate with design.
- Prof.Devyani briefed to the committee members that many students in 9thsem Dissertation project, took society related topics like- Public open spaces, Behavioural study in public spaces like parks, streets and walkability and pursued the dissertation successfully.
- Ar.Pramod and Prof. Meghal approved on introducing Society Culture and Environment upon insisting that the subject is interrelated with Architectural Design.
- Ar. Meghal presented her views on **History Of Architecture.** She commented that only styles are mentioned in the syllabus and deep thinking as a lens through approach needs to be done.
- Ar. Pramod presented his views on the subject -Material and Construction Studio- He suggested that a small-scale design exercise could be given to the students in order to understand the material in detail. Students must have the feel of the material through hands on training, apart from plates.
- Dr Devyani Gangopadhyay explained the strategy of integrating Materials and Construction with Architectural Design. He explained that the previous semester design proposal may be taken up for detailing in Materials and Construction for the following semester.
- Prof. Meghal, appreciated the idea of making students developing details from their previous semester design.
- Prof. Meghal emphasized on the need to integrate some sense of structure in the Materials and Construction. She proposed that the faculty of Structural Engineering and Architecture must work as a team for better understanding of the students. She proposed that preferably a Practicing Architect who has strong knowledge in Structures may take up Structure.
- Prof.Suresh Kuppuswamy/ internal committee agreed for this suggestion subject to availability of such a resource person.
- **Model making workshop-** Ar. Pramod advised to set up kiln for model making workshop within the campus for more activities.
- The internal committee replied that this proposal was already in the budget and will be carried over.
- Both the external members insisted on the Idea of strengthening infrastructure for workshops.
- Prof. Suresh Kuppuswamy, agreed on the recommendation of the externals and registered that Architectural model making can be dealt not as a separate subject, but can be an integral part of theory and design.
- Prof. Meghal agreed on the above and suggested that the Materials and Construction studio and Structure studio can incorporate model making.
- Prof. Meghal proposed that Architectural Education should stress on computational skills rather Computer skills and proposed that softwares like Sketch up, V-Ray can be learnt by the students themselves and need not be a part of the curriculum.
- Prof.Suresh Kuppuswamy, explained that the students need to equip themselves (based on orientation program on Practical training) for practical training. Hence the computer skills are proposed.
- Prof.Meghal suggested to use" **Design Communication"** to make the student equipped for internship.
- Practical Training- Ar.Pramod suggested that SIST must create relationship with practicing architects so that the students can be referred for Internship.
- Prof. Suresh asked the opinion of externals on having the Professional Training in the 10th semester.

- Ar.Pramod had no objection to this proposal, but Prof.Meghal , preferred the Professional Training in the middle of the curriculum so that the students can benefit from the internship and apply the knowledge gained in their academic exercises.
- Dr. Devyani Gangopadhyay asked for further suggestions on the revised syllabus and curriculum
- Ar. Pramod appreciated that voluminous work has been exercised in revising the syllabus. He pointed out that in few places it has become too much to grasp for a student in the limited period of time. He proposed that Design exercises need not be problem solving and the brief should involve the students to develop the design holistically as his/her contribution.
- Ar. Pramod pointed out that it is more important to articulate the design briefs in a manner which creates more interest within the student and makes the student think out of the box. He also forwarded some interesting Architectural Design Studio methodology to the committee as examples of methodology followed in Design studios practiced by him.
- Ar Pramod suggested that for design evaluation, the faculty members of other classes may be involved as internal jury.
- Prof.Devyani, replied that this practice of involving other faculty members is already in practice and agreed this will be implemented for all semesters.
- Prof.Meghal and Ar. Pramod suggested the same curriculum can be presented to the forthcoming Academic council with incorporation of suggestions made by the members.

Prof. Devyani concluded the meeting with acceptance that all the recommendations and observations of the external members will be carried over and incorporated and consequent BOS meeting shall be convened after incorporating the recommendations. Ar. Shankar delivered the vote of thanks, felicitating the external members.

Minutes approved by:

External Members	Signature	Internal Members	Signature
AR. PRAMOD BALAKRISHNAN **Chief Architect, Edifice** **Chennai**		**DR. DEVYANI GANGOPHAHY** Dean & Head Department of Architecture School of Building & Environment	
		DR. SURESH KUPPUSAMY Senior Professor & Design Chair Department of Architecture	
DR. MEGHAL ARYA **Associate Professor** **Faculty of Architecture,** **CEPT University, Ahmedabad**	meghal	**AR. EBIN HORRISON** Associate Professor	
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Note:

	The contents highlighted in yellow colour are newly added in the revised syllabus

SAR 4051	DESIGN STUDIO I ARCHITECTURAL PRINCIPLES I (Basic Design)	L	T	P	Credits	Total Marks
		2	0	9	8	400

COURSE OBJECTIVES

- The studio aims at widening the avenues of creativity and allows inquiring more on lateral thinking.
- The emphasis is on understanding the process of design as a proactive and analytical tool toward generating alternatives which forms the foundation for future design by designing a meaningful space.

MODULE I SHAPE AND ITS MANIPULATION 36 Hrs.

Shape - Primary shapes or circle, triangle and square- Family of shapes - Developing shapes from given geometric shape and working out compositions from them - Understanding colour - use of colour - its application - symbolism using colours - Texture - study of textures Colour - The design exercises shall be aimed at developing the skills to create visually pleasing colour schemes based on principles of colour theory, colour symbolism, harmony and contrast, Impact of light in modulating colours.

MODULE II PRINCIPLES OF DESIGN-ORDERING PRINICILPLES AND SCALE/PROPORTION 42 Hrs.

Ordering principles - Axis, Symmetry, Hierarchy, Datum, Rhythm, Repetition, Transformation, Balance, Contrast, and Pattern - Application of various ordering principles of design in two dimensions. Human & Dramatic Scale - Definition - Means by which they can be achieved with suitable example- Anthropometrics - Anthropological studies and important dimension of man at different activities and reach. Proportioning systems - Classical orders, Golden Section - Type of proportion with suitable example - Form Derived using Proportions – silhouette.

MODULE III FORM AND ITS COMPONENTS AND DERIVATION 42 Hrs.

Articulation and its role as a form modifier - edges and corners, surfaces-The properties of form:.- Transformation of form- dimensional, subtractive and additive- centralized, linear, radial, clustered and grid forms for arriving at new shapes and compositions. Interlocking of forms- interlock of forms differing in geometry (circle, square or triangle) or orientation (rotated grid).

MODULE IV CONCEPTS OF SPACE –SPATIAL RELATIONSHIPS & ORGANIZATION 45 Hrs.

Concepts of space- form- space relationships- Visual & Emotional effects of geometrical forms& their derivatives - Spatial relationships - Space within a space, interlocking spaces, adjacent spaces and spaces linked by a common space, Spatial organization centralised, linear, radial, clustered, grid.

Max : 165 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Facilitate for free expression and creativity in two and three dimensional expressions

CO2: Understanding the basic characteristics of different techniques, mediums and its practical applications. - To develop an insight towards sensibility and aesthetic appreciation.

CO3: Comprehend thorough understanding of colour scheme, scale and proportion.

TEXT / REFERENCE BOOKS

1. Pramar V.S., Design Fundamentals in Architecture, Somaiya Publication Pvt. Ltd., 1973
2. Carolyn M. Bloomer, Principles of visual perception,Van Nostrand Reinhold,1976
3. Francis D.K. Ching, Form - Space – order, Van Nostrand Reinhold company Newyork, 1979
4. Senner Gottfried, The four elements of Architecture, Cambridge University press, London. UK, 1984
5. Antony J.Catanese and James C. Snyder, Introduction to Architecture, Mc Graw Hill, New York 1988
6. Mark Dekay, Brown G.Z., Sun, wind and Light: Architectural design strategies, John Wiley and sons, 3rd edition, 2014

SARA9102	DESIGN STUDIO I	L	T	P	Credits	Total Marks
		1	2	9	7	300

Continuous Assessment	End Semester Examination	Min Pass Marks	
		Continuous Assessment	End Semester Examination
200	100	100	50

COURSE OBJECTIVES:

- The studio aims at widening the avenues of creativity and allows inquiring more on lateral thinking.
- The emphasis is on understanding the process of design as a proactive and analytical tool towards generating alternatives which forms the foundation for future design
- To introduce students to various ideas and techniques of creative thinking and communication; To provide students with a foundation in design through the comprehension of elements and principles of composition;

MODULE I ELEMENTS OF DESIGN, SHAPE AND ITS MANIPULATION 30 Hrs.

Introduction to elements and principles of design – Exploring the interrelationship between part and the whole - Shapes - Developing geometric and organic shapes and compositions - Texture - study of textures – role of texture in stimulating human senses Exploring use of colour and its application in stimulating human senses - symbolism using colors

MODULE II PRINCIPLES OF DESIGN - ORDERING PRINCIPLES AND SCALE/PROPORTION 36 Hrs.

Exploring spatial relationships through ordering principles – spatial transformation using Balance, Contrast, and Pattern Gestalts theory of Composition - Continuity, Similarity, Proximity, Closure, Figure ground. Human & Dramatic Scale - Anthropometrics - Anthropological studies and important dimension of man at different activities and reach. Proportioning systems - Classical orders, Golden Section - Types of proportion.

MODULE III FORM AND ITS COMPONENTS AND DERIVATION 48 Hrs.

Evolution of forms from planes - Study of solids and voids and their interdependence - 3d abstraction -Articulation and its role as a form modifier - edges and corners, surfaces - Transformation of form- dimensional, subtractive and additive-centralized, linear, radial, clustered and grid forms for arriving at new shapes and compositions. Interlocking of forms-interlock of forms differing in geometry or orientation (rotated grid).

MODULE IV CONCEPTS OF SPACE – SPATIAL RELATIONSHIPS & ORGANISATION 32 Hrs.

Concepts of space- form- space relationships- Visual & Emotional effects of geometrical forms & their derivatives - Spatial relationships - Space within a space, interlocking spaces, adjacent spaces and spaces linked by a common space, Spatial organization - centralized, linear, radial, clustered, grid.

TUTORIAL SESSION INTRODUCTION TO COMMUNICATION 14 Hrs.

Basics & Principles– Objectives of Communication – Types - Verbal and non-verbal communication - Barriers to communication - Communication techniques - Listening & understanding - The four essential Communication skills - Levels of Communication: Intrapersonal, Interpersonal, Group, Mass Communication - computer enabled Presentations - Public Speaking Techniques

Max. 165 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understand the basic characteristics of different techniques, mediums and its practical applications.

CO2 Ability to comprehend the elements of space making through understanding the configuration of elements which can be unified as a whole in a composition.

CO3 Apply the basic elements and principles of design and implement them in design compositions

CO4 Analyze, visualize, communicate and represent design

CO5 Create models /sculptures to understand the evolution of three-dimensional forms from two dimensional shapes

CO6 Develop an insight towards sensibility and aesthetic appreciation.

TEXT / REFERENCE BOOKS

1. Pramar V.S., (1973). Design Fundamentals in Architecture, Somaiya Publication Pvt. Ltd.
2. Bloomer, C. M. (1990). Principles of visual perception. Herbert Press.
3. Ching, F. D. (2014). Architecture: Form, space, and order. John Wiley & Sons.
4. Gottfried,S.(1984). The four elements of Architecture, London. UK: Cambridge University press.
5. Catanese A.J. and. Snyder.J.C (1988) Introduction to Architecture, New York: Mc Graw Hill.
6. Dekay.M& Brown G.Z. (2014). Sun, wind and Light: Architectural design strategies, John Wiley and sons, 3rd edition

SAR 4052	ARCHITECTURAL DRAWING I	L	T	P	Credits	Total Marks
		0	0	4	3	200

COURSE OBJECTIVES

- To introduce the students the basics of architectural graphics in terms of both two dimensional and three dimensional drawing which helps to enhance skills to express more complex objects through graphical presentation
- To involve students in a number of exercises to understand the representation of Dimensional forms through isometric and axonometric drawings.

UNIT 1 INTRODUCTION GEOMETRIC DRAWING 10 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 2 GEOMETRICAL DRAWING-PLANE GEOMETRY 18 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 3 GEOMETRICAL DRAWING - SOLID GEOMETRY 18 HRS.

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

UNIT 4 GEOMETRICAL DRAWING – AXONOMETRIC PROJECTION 14 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

MAX : 60 HOURS

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Comprehend basics of 2d and 3d drawings,

CO2: Understand graphical representation of simple and complex objects and apply concepts of 2d and 3d projection in parallel axonometric and isometric projections

CO3: Analyze complex plan elevation and section convert it to on to 3d representation and vice versa

CO4: Check application of these techniques to simple objects / furniture/ built space

CO5: Compose and express complex objects as drawings

TEXT / REFERENCE BOOKS

1. Francis D.K. Ching, Architectural Graphics, John Wiley and Sons, 2009
2. Fraser Reekie & Tony McCarthy, Reekie's Architectural Drawing, Architectural Press, 1995
3. Morris I. H, Geometrical Drawing for Art Students, Orient Longman, Madras, 2004
4. Leslie Martin C., Architectural Graphics, The Macmillan Company, New York, 1978
5. George A Dinsmore, Analytical Graphics, Van Nostrand, Company Inc., Canada, 1968

SARA2101	ARCHITECTURAL GRAPHICS - I	L	T	P	Credits	Total Marks
		1	0	3	2	100

Continuous assessment	End Semester Examination	Minimum pass marks	
		Continuous Assessment	End Semester Examination
70	30	35	15

COURSE OBJECTIVES:

- To outline the basic principles of drafting and rendering techniques
- To understand plane and solid geometry, isometric and axonometric view
- To familiarize with simple objects and building components through measured drawing.

UNIT 1 INTRODUCTION 12 Hrs.

Introduction to fundamentals of drawing/ drafting: Construction of lines, line value, line types, lettering, architectural notations & dimensioning. Basic rendering techniques, basics of sheet presentation drawing, drawing instruments, sheet layout. Use of scale, free hand and geometric construction of Lines

UNIT 2 GEOMETRICAL DRAWING - PLANE GEOMETRY 12 Hrs.

Construction of shapes - angles, circles, tangents. Construction of Plane Curves: Ellipse, Parabola and Hyperbola. Principles of orthographic projections, Construction and Multiview projection of - Points, lines, square, rectangle, polygon, etc.

UNIT 3 GEOMETRICAL DRAWING - SOLID GEOMETRY 16 Hrs.

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

UNIT 4 MEASURED DRAWING 8 Hrs.

Study of plan, section and elevation of simple objects, simple building components and furniture through documentation exercises.

UNIT 5 ISOMETRIC AND AXONOMETRIC VIEW 12 Hrs.

Isometric and Axonometric projection of planes, solids and combination of solid etc. Isometric and Axonometric projection of simple objects, building components etc.

Max. 60 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understand the concepts and fundamentals of architectural drawing.

CO2 Develop representation skills and to generate geometrical forms and its projections.

CO3 Ability to represent various solids and its sectional projection.

CO4 Measure real objects and represent them graphically.

CO5 Create three-dimensional solids and combination of solids

CO6 Develop graphical skill to represent real time objects.

TEXT / REFERENCE BOOKS

1. Ching, F. D. (2015). Architectural graphics. John Wiley & Sons.
2. Reekie, R. F., & McCarthy, T. (1995). Reekie's architectural drawing. Edward Arnold.
3. Morris, I. H. (1912). Geometrical drawing for art students. Longmans, Green.
4. Martin L.C.(1978). Architectural Graphics, The Macmillan Company, New York.
5. Dinsmore.G.A. (1968). Analytical Graphics, Van Nostrand, Company Inc., Canada.

SAR 4053	ART STUDIO WORKSHOP I	L	T	P	Credits	Total Marks
		0	0	4	3	200

COURSE OBJECTIVES

- The studio aims at inducing soft and hard skills, visual expression and representation, imaginative thinking and creativity through hands on workshops.

WORKSHOP I **15 HRS.**

Introduction to art- Elements and principles of Art -Types of Art & Painting-Visual effects of drawing-Composition Approach to sketching- Study of light and shadow.

WORKSHOP II **15 HRS.**

Drawing Skills - Freehand exercise on artistic expression through One Point Perspective, Two Point Perspective and Three Point Perspective- Both Interior & Exterior of the buildings and Nature-Scale drawing.

WORKSHOP III **15 HRS.**

ADVANCED HANDSKILL :Sketching Memory drawing and Creative sketching Rendering, Outdoor sketching Methods and techniques use Pencil, Pen and Ink to prepare drawings in Outdoor areas Drawing from imagination Exercises for gaining confidence and enhancing the creativity Watercolour Painting method in which the paints are made of pigments

WORKSHOP IV **15 HRS.**

PAPER CRAFT : Paper Model Paper collage & conceptual portrayal of abstract forms Origami Forms made by cuts and folds for better understanding of sculpting techniques Paper masks The Art of coloring to express their thoughts and ideas in better Quilling The Art of rolled paper to investigate patterns and forms found in nature

MAX : 60 HOURS

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: To be familiar with the grammar of art and identify various techniques
CO2: To involve and illustrate them in a series of freehand exercises both indoor and outdoor
CO3: To produce composition to represent form, proportion, scale, etc. using diagraming
CO4: To distinguish elements of Art - Line, Form, Colour, Composition, Texture etc.
CO5: To determine methods to achieve complex 3d compositions into models applying origami and paper crafting techniques
CO6: To design and generate abstract forms using model making techniques

TEXT / REFERENCE BOOKS

1. Ching Francis, Drawing a Creative Process, Van Nostrand Reinhold, New York, 1992
2. Alan Swann, Graphic Design School, Harper Collins, 1991
3. Moiva Huntly, The artist drawing book, David & Charles, UK, 1994
4. Frank W., The Artist guide to Composition, David & Charles, U.K., 1994
5. Caldwell peter, Pen and Ink Sketching, B.T.Batsford Ltd., London, 1995
6. Enstice W., Drawing, Pearson Education, 2003

SARA9101	ART STUDIO - I	L	T	P	Credits	Total Marks
		0	0	4	2	100

Continuous assessment	End Semester Examination	Minimum pass marks	
		Continuous Assessment	End Semester Examination
70	30	35	15

COURSE OBJECTIVES:

- Develop sketching and visual representation in different media of different 2-dimensional art forms, painting and interior decoration of walls and floors.
- Correlate three-dimensional art and craft forms, natural forms, structure and learn to model the same in different media.
- Investigate the properties and appropriate use of materials in different craft forms.

UNIT 1 INTRODUCTION 16 Hrs.

Visual Art and Purpose - Expression of Imagination, Function, Ritualistic or Symbolic - Visual qualities and grammar of art; Imaginative thinking and creativity through hands on exercises – Visual effects, study of light and shadow, using lettering and combining lettering with image, in expressive and communicative modes.

UNIT 2 DRAWING AND SKETCHING 20 Hrs.

Sketching and visual representations using various media and tools – image-making, image manipulation and development, enlargement, cropping, reversing, abstraction, changes in colour and treatment, sequential imagery. Imagery from imagination, memory and direct observation

UNIT 3 THREE-DIMENSIONALVISUALISATION 12 Hrs.

Study of outdoor objects /systems and observation of their scale and proportion, natural occurrence, relationships with context, form, structure, color and textures along with its functions

UNIT 4 VISUALIZATION TECHNIQUES AND STORYBOARDING 12 Hrs.

Storyboard/ Cartoon making Graphical representation in the form of illustrations or images displayed in sequence for the purpose of pre-visualizing the area of student's interest. A series of drawings that tells a story. Expressive and Communicative aspects. Implementing abstract or generic ideas.

Max. 60 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Interpret and combine different art forms in different media while appreciating artistic expressions.

CO2 Develop the ability to manipulate various types of images.

CO3 Develop skills in image making, and development of sequential imagery.

CO4 Understand the various techniques of three-dimensional modeling.

CO5 Design and model craft forms using any medium.

CO6 Adapt the properties and applications of materials in different craft forms like terracotta, metal craft etc.

TEXT / REFERENCE BOOKS

1. Jones, J. C. (1992). Design methods,Wiley.
2. Bielefeld, B., & El Khouli, S. (2017). Basics Design Ideas. Birkhäuser.
3. Frank W. (1994). The Artist guide to Composition, David & Charles, UK.
4. Ching, F. D. (2008). Drawing a creative process. Wiley.
5. Pipes, A. (2003). Foundations of art and design. Laurence King Publishing.
6. John, W. (1966). Mills-The Technique of Sculpture, BT Batsford Limited.
7. Bunchy,C.L.(1972). Acrylic for Sculpture and Design, 450, West 33rd Street, New York.
8. White, A. W. (2011). The elements of graphic design: space, unity, page architecture, and type. Skyhorse Publishing, Inc..
9. Elam, K. (2001). Geometry of design: studies in proportion and composition. Princeton Architectural Press.

SAR 1103	VERNACULAR ARCHITECTURE	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To interrelate various traditions of different regions and introduce the cultural and geographical settings and its impact on built environment.
- To discuss different building typologies and understand the fundamentals of their form, function and aesthetics.
- To familiarize the students with various traditional built form with environmental, cultural and geographical settings.

UNIT 1 UNDERSTANDING VERNACULAR ARCHITECTURE 9 Hrs.

Definition and classification of Vernacular architecture - Determinants of Vernacular Architecture - Vernacular Architecture as a process - Survey and study of Vernacular architecture: methodology, cultural and contextual responsiveness - approaches to the study of Vernacular architecture: an overview, Aesthetic, Architectural and Anthropological studies in detail - Vernacular principles in contemporary design.

UNIT 2 VERNACULAR ARCHITECTURE IN THE TROPICS 8 Hrs.

Geographic belt between the Tropic of Cancer and the Tropic of Capricorn - land: geography, topographical influence, forestry, presence of water, Settlement Pattern and spatial planning, Building form & orientation, cultural aspects, symbolism, colour, art, construction materials techniques of the following - The Traditional Malay House, Houses in Thailand, Traditional Architecture in Indonesia - Architecture in Kerala (Houses, Theatres & Palaces), & Tamilnadu (Houses / palaces in Chettinad region) - Evolution of the Bungalow from the traditional hut in Bangla.

UNIT 3 VERNACULAR ARCHITECTURE IN THE DESERTS 7 Hrs.

Settlement Pattern and spatial planning, Building form & orientation, cultural aspects, symbolism, colour, art, construction materials techniques of the following - Architecture in North Africa, Arabia and Middle East Europe - Deserts of Kutch and Rajasthan; Havelis of Rajasthan and Gujarat, Bohra Houses, Subterranean Architecture of Gujarat

UNIT 4 VERNACULAR ARCHITECTURE IN THE HILLS 6Hrs.

Historical perspective of hill architecture and its unique attributes and concerns - Major hill settlements in various regions of the world - A broad view of traditional hill architecture of medieval European settlements and other places -An overview of vernacular hill architecture of Himachal Pradesh - Architecture of Houses in North East India - Geographical regions of Kashmir, Hill Architecture, house boats - Vernacular architecture in Nepal.

Max. 30 Hours

COURSE OUTCOMES:

On completion of the course, student will be able to–

CO1: To classify and understand various determinants of vernacular Architecture, and understand cultural and contextual responsiveness of vernacular architecture.

CO2: To understand various geographical and topographical characteristics and its influence in different settlement patterns and spatial planning across the country.

CO3: To compare traditional Architecture of various regions and its evolution over a period of time.

CO4: To understand and demonstrate about different construction materials and techniques , Architectural style in deserts and hilly regions.

CO5: To examine assorted examples from settlements in desert regions and hilly areas and analyze different cultural context and its impact on built forms.

CO6: To interrelate the role of climate and material and its impact on vernacular buildings and its spatial planning.

TEXT / REFERENCE BOOKS

1. Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997
2. Amos Rapoport, House Form and Culture, Englewood Cliffs, N.J., Prentice Hall, 1969
3.Hassan Fathy, Natural Energy and Vernacular Architecture - Principles and Examples with reference to Hot Arid Climates, University of Chicago Press, Chicago and London, 1986.
4. Fry M. and Drew J., Tropical Architecture in the Dry and Humid Zones. Londres: Bestford, 1964
5. Kulbhushan Jain and Minakshi Jain, Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad, 1992
6. Auroville Charter, Auroville Architecture: Towards New forms, Second Edition, Prisma Publications, 2003

SARA1403	VERNACULAR ARCHITECTURE	L	T	P	Credits	Total Marks
		2	1	0	3	100

COURSE OBJECTIVES:

- To understand the relationship between regional culture and built environment.
- To assimilate the association between environment, culture, geographical settings and their transformation in building typologies.
- To explore the various provocative facts about buildings and its relevance to built form, function and aesthetics.

UNIT 1 UNDERSTANDING VERNACULAR ARCHITECTURE 10 Hrs.

Definition of Vernacular architecture – classification of vernacular Architecture - Determinants of Vernacular Architecture - elements of Vernacular Architecture – approaches to the study of Vernacular architecture - an overview, Aesthetic, Architectural and Anthropological studies - Vernacular principles in contemporary design.

UNIT 2 APPROACHES AND CONCEPTS IN DIFFERENT REGIONS 10 Hrs.

Methodology to survey and study of Vernacular architecture - review of land, geography, topography, cultural and contextual responsiveness in detail - understanding the elements of vernacular architecture and its unique attributes in the tropics, desserts and hilly region - An overview of vernacular architecture in the tropics, deserts and hilly region - settlement pattern and spatial planning, built form and orientation, cultural aspects, symbolism, colour, art, construction materials techniques of the tropics, desserts and hilly region.

UNIT 3 VERNACULAR ARCHITECTURE IN THE TROPICS 10 Hrs.

Analyzing architecture in Tropics - The Traditional Malay House, Houses in Thailand, and Traditional Architecture in Indonesia - Architecture in Kerala (Houses & Palaces), Tamilnadu (Houses / palaces in Chettinad region) Evolution of the Bungalow from the traditional hut in Bangla.

UNIT 4 VERNACULAR ARCHITECTURE IN DESSERTS AND HILLS 10 Hrs.

Architecture in North Africa, Arabia and Middle East Europe - Deserts of Kutch and Rajasthan; Havelis of Rajasthan and Gujarat, Bohra Houses, Subterranean Architecture of Gujarat. Major hill settlements in various regions of the world - Architecture of Houses in North East India - Hill Architecture in Kashmir, house boats - Vernacular architecture in Nepal.

UNIT 5 EXPLORE VERNACULAR ARCHITECTURE 5 Hrs.

Visual observation and brief documentation of small areas/streets, photo documentation of parts of small settlements with rich cultural and architectural characteristics - case studies of leading architects work (vernacular practices)

MAX. 45 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Memorize and recreate the fundamentals of Vernacular Architecture and its process.

CO2 Understand and describe the environmental, social, cultural and economic aspects influencing regional architecture.

CO3 Understand and discuss various theoretical aspects of vernacular Architecture, relate their interconnections and influence in different settlement patterns and spatial planning across the country.

CO4 Explore the various approaches of regional Architecture, compare and contrast different construction materials and techniques employed in regional Architecture.

CO5 Assess various concepts of vernacular Architecture with assorted examples from different regions.

CO6 Construct and demonstrate diverse regional design concepts and to recommend for application.

TEXT / REFERENCE BOOKS

1. Oliver, P. (Ed.). (1997). Encyclopaedia of vernacular architecture of the world (Vol. 3). Cambridge: Cambridge University Press.AmosRapport, House Form and Culture, Englewood Cliffs, N.J., Prentice Hall, 1969
2. Fathy, H. (1986). Natural energy and vernacular architecture, University of Chicago Press, Chicago and London, 1986
3. Fry M. & Drew J.,(1964) Tropical Architecture in the Dry and Humid Zones. Londres: Bestford
4. Jain. K &Jain.M. (1992), Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad
5. Auroville Charter, Auroville Architecture: Towards New forms, Second Edition, Prisma Publications, 2003
6. PramarV.S.(1989) Haveli - Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad,
7. Kennedy, J. F., Smith, M. G., & Wanek, C. (Eds.). (2014). The Art of Natural Building--Completely Revised, Expanded and Updated: Design, Construction, Resources. New Society Publishers.

SAR 4054	DESIGN STUDIO II ARCHITECTURAL PRINCIPLES II	L	T	P	Credits	Total Marks
		1	0	9	8	400

COURSE OBJECTIVES

- To enable the students, understand the principles of composition and its importance in Architecture
- To understand role of transformation of form in Architecture
- To know the importance of spatial qualities.

MODULE I

PRINCIPLES OF COMPOSITION 12 Hrs.

Qualities of - Dominance, Unity, Harmony, Punctuating Effect, Dramatic Effect, Climax, Contrast, Accentuation, Fluidity.

MODULE II

DETERMINANTS IN ARCHITECTURE 18 Hrs.

Socio cultural determinants - Climate as determinant- climate shaping form with examples from history-Structure & Building materials as determinants--Culture temporal & regional influences as determinant in Architecture - Beliefs, Aspiration, values of the user-Definition of personal space, territory, etc., examples from past and modern era.

MODULE III

ANALYZING ARCHITECTURE 24 Hrs.

Articulation and its role as a form modifier - edges and corners, surfaces-The properties of form -Transformation of form- dimensional, subtractive and additive - centralized, linear, radial, clustered and grid forms for arriving at new shapes and compositions. Interlocking of forms - interlock of forms differing in geometry (circle, square or triangle) or orientation (rotated grid).

MODULE IV

EXPLORING ARCHITECTURE 96 Hrs.

The Art of Space Making - Analysing spatial qualities - spatial in quest of a pavilion Design (e.g. Gazebo, Kiosk, Shop, Security Cabin, a Police Booth - developing the Tectonic Vocabulary.

Max. 150 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Understanding the principles of composition

CO2: Analysing the various determinants and its importance in design consideration

CO3: Importance of articulation in Architecture

CO4: Exploration of transformation of form through studies and creating models

CO5: Visualizing and creating modules for interlock of forms

CO6: Developing vocabulary of space making through visualizing and model making

TEXT / REFERENCE BOOKS

Mark Dekay G.Z. Brown, Sun, wind and Light: Architectural design strategies, John Wiley and sons, 3rd edition, 2014

Talbot Hamlin, Forms and functions of 20th century Architecture (Volume 2) , Columbia University press, Newyork,1952

Pramar V.S Design Fundamentals in Architecture, Somaiya Publication Pvt. Ltd., 1973

Francis D K Ching, Form - Space - order - Van Nostrand Reinhold company, Newyork, 1979

Antony J Catanese& Snyder, Introduction to Architecture, McGraw Hill Books Co. New York 1988

Senner Gottfried, The four elements of Architecture, Cambridge University press London, UK, 1984

Leland M. Roth, Understanding Architecture: Its Elements, History, and Meaning, Westview Press, 2014

SARA9202	DESIGN STUDIO II	L	T	P	Credits	Total Marks
		0	1	9	6	300

Continuous Assessment	End SemesterExamination	Min Pass Marks		
		Continuous Assessment	End SemesterExamination	Total
200	100	100	50	150

COURSE OBJECTIVES:

- To enable the students, understand the principles of composition and its importance in Architecture and to understand role of transformation of form in Architecture
- To know the importance of spatial qualities and to experiment and understand the art of space arrangement
- To enable Conceptualization in architecture through creative thinking and to analyse the functional relationship between space, user and built environment

MODULE I PRINCIPLES OF COMPOSITION **30 Hrs.**

Role of Principles of Design in a built form - Qualities of - Dominance, Unity, Harmony, Punctuating Effect, Dramatic Effect, Climax, Contrast, Accentuation, Fluidity. Analyzing compositions - balance, rhythm, movement etc. and its application.

MODULE II ANALYZING ARCHITECTURE **45 Hrs.**

Concept /Content/Context -Understanding the response of a built form as a negotiation of its setting-climatic, social, economic, cultural and aesthetic. Study of built examples through documentation and analysis.

MODULE III EXPLORING ARCHITECTURE **60 Hrs.**

The Art of Space Making - Analyzing spatial qualities - spatial in quest of a pavilion Design (e.g. Gazebo, Kiosk, Shop, Security Cabin, a Police Booth - developing the Tectonic Vocabulary.

TUTORIAL SESSION	DESIGN STORYTELLING AND NARRATIVES	15 Hrs.

Elements of a good story: facts, situation, characters, plot and resolution of a design project; Building context in the design process: Emotional, Environmental, Social context; Organizing ideas- Personas, storyboards, and flowcharts; Documenting processes through writing.

Max. 150 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understand the principles of composition and its importance in architecture

CO2 Document and analyze a modest design project that incorporates technical and environmental areas of study.

CO3 Develop analytical and creative thinking.

CO4 Ability to comprehend the transformation of forms through sketches and three-dimensional models

CO5 Evolve from concept to pragmatic design within a specific timeline

CO6 Present an architectural design project and justify the different approaches that rate their judgement for the final solution

TEXT / REFERENCE BOOKS

1. Brown, G. Z. (1985). Sun, wind, and light. Architectural design strategies, John Wiley and sons, 3rd edition.
2. Hamlin, T. (Ed.). (1952). Forms and Functions of Twentieth-century Architecture: Building types: buildings for commerce and industry, for public health, for transportation, for social welfare and recreation. The community as architecture (Vol. 4). Columbia University Press.
3. Pramar V.S., (1973). Design Fundamentals in Architecture, Somaiya Publication Pvt. Ltd.
4. Leland M. Roth, (2014) Understanding Architecture: Its Elements, History, and Meaning, Westview Press
5. Ching, F. D. (2014). Architecture: Form, space, and order. John Wiley & Sons.
6. Gottfried,S.(1984). The four elements of Architecture, London. UK : Cambridge University press.
7. Catanese A.J. and. Snyder.J.C(1988) Introduction to Architecture, New York: Mc Graw Hill.
8. Dekay.M& Brown G.Z. (2014). Sun, wind and Light: Architectural design strategies, John Wiley and sons, 3rd edition

SAR 4055	ARCHITECTURAL DRAWING II	L	T	P	Credits	Total Marks
		0	0	4	3	200

COURSE OBJECTIVES

- To train the Students in the concept of Measured drawing, Documentation, Perspective Drawing , Sciography, Representation skills, and Techniques for Construction
- To aid as a tool towards effective visualization and presentation of Ideas.
- Enhancing their drawing skills for application in architectural design.

UNIT 1 MEASURED DRAWING 15 HRS.

Introduction to fundamentals of architectural scales and drawings, line value, lettering, drawing representation, format for presentation methods and technique of measuring buildings and their details. Measured drawing of simple objects like furniture, door, windows, column etc.

UNIT 2 PERSPECTIVE 15 HRS.

Characteristic of perspective drawing. Concepts and methods of perspective drawing. One point and two point perspective of simple geometrical forms like cube, prism. One, two and three-point perspective of building interiors and exteriors. Introduction to shortcut perspective method.

UNIT 3 SCIOGRAPHY 12 HRS.

Principles of shade and shadow- construction of shadow of simple geometrical shapes - point, line and planes. Construction of sciography on building shadows of architectural elements.

UNIT 4 DOCUMENTATION 18 HRS.

Documentation of a small scaled building of unique architectural character like kiosks, coffee shops, and Parlour etc.

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MAX : 60 HOURS

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Comprehend the conversion of scale.
CO2: Measurement of simple objects and converting them into drawing, by the usage of scales.
CO3: Equipping the students with knowledge of perspective drawing methods.
CO4: Understanding the basics of sciography and creating shades and shadows for objects.
CO5: Generating drawings based on the understanding of perspective (comparing then by varying the view points) and sciography.apply it as a tool towards effective visualization and presentation.
CO6: Documentation of small scaled structures of unique architectural character.

TEXT / REFERENCE BOOKS

1. Bernard Alkins, Architectural Rendering, Walter Foster Art Books, 1986
2. Claude Batley, Indian Architecture, D.B. Taraporevale Sons and Co. Ltd., Bombay
3. Ernest Norling, Perspective drawing, Walter Fostor Art Books, California, 1986
4. Francis D.K. Ching, Architectural Graphics, Van Nostrand and Reinhold Company, NY 1975
5. George A. Dinsmore, Analytical Graphics, Van Nostrand, Company Inc., Canada, 1968
6. John M. Holmes, Applied Perspective, Sir Isaac Piotman and Sons Ltd., London,1954
7. Leslie Martin C., Architectural Graphics, The Macmillan Company, New York, 1964
8. Robert W. Gill, Basic Perspective, Advanced Perspective, Thames and Hudson, London, 1974

SARA2202	ARCHITECTURAL GRAPHICS - II	L	T	P	Credits	Total Marks
		1	0	3	2	100

Continuous assessment	End SemesterExamination	Minimum pass marks	
		Continuous Assessment	End SemesterExamination
70	30	35	15

COURSE OBJECTIVES:

- To outline the basic principles of perspective drawing and sciography.
- To measure and document-built form and represent it graphically.
- To develop the skill required for constructing a complete rendered three-dimensional simple built form.

UNIT 1 INTRODUCTION OF PERSPECTIVE DRAWING 8 Hrs.

Study of concepts, types and terminologies such as picture plane, station point, vanishing point, eye level, ground level, Horizon line etc. Technical construction of one point, two point and three-point perspective drawings through exercises on simple objects like cube, prism, combination of shapes and views at various eye levels.

UNIT 2 PERSPECTIVE: SCIENTIFIC METHOD & OFFICE METHOD 16 Hrs.

One point, two and three-point perspective of building interiors and exteriors. Adding figures, trees, furniture etc., shade and shadows and applying rendering techniques. Introduction to office perspective method.

UNIT 3 SCIOGRAPHY 16 Hrs.

Principles of shade and shadow- construction of shadow of simple geometrical shapes - point, line and planes. Construction of sociography on Architectural elements.

UNIT 4 MEASURED DRAWING: DOCUMENTATION 10 Hrs.

Documentation of a complete building of a special interest in terms of history, building construction, architectural excellence or technology by using simple measuring tools like tapes, photographs etc.

UNIT 5 ARCHITECTURAL RENDERING 10 Hrs.

Techniques of rendering for various architectural drawings - plans, site plan, elevations, views etc, using mediums like pen and ink etc.,

Max. 60 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understand the concepts and fundamentals of perspective drawing.

CO2 Construct the perspective drawings of the buildings and 3d views.

CO3 Develop representation skills in three dimensional drawings and sociography.

CO4 Develop the skill of architectural drawing through measured drawing of complex structures.

CO5 Apply rendering techniques in architectural drawings.

CO6 Construct a complete rendered three-dimensional drawing of a simple built form.

TEXT / REFERENCE BOOKS

1. Bernard Alkins, Architectural Rendering, Walter Foster Art Books, 1986
2. Claude Batley, Indian Architecture, D.B. Taraporevale Sons and Co. Ltd., Bombay
3. Ernest Norling, Perspective drawing, Walter Fostor Art Books, California, 1986
4. Francis D.K. Ching, Architectural Graphics, Van Nostrand and Reinhold Company, NY 1975
5. George A. Dinsmore, Analytical Graphics, Van Nostrand, Company Inc., Canada, 1968
6. John M. Holmes, Applied Perspective, Sir Isaac Piotman and Sons Ltd., London,1954
7. Leslie Martin C., Architectural Graphics, The Macmillan Company, New York, 1964
8. Robert W. Gill, Basic Perspective, Advanced Perspective, Thames and Hudson, London, 1974

SAR 4056	ART STUDIO WORKSHOP II	L	T	P	Credits	Total Marks
		0	0	4	3	200

COURSE OBJECTIVES

- The studio aims at inducing soft and hard skills, visual expression and representation, imaginative thinking and creativity through hands on workshops.

WORKSHOP I PAINTING **15 HRS.**

Studies from life and environment through direct experiences, the students will be expected to put down the visual observation and reactions with competence. Knowledge of forms, the structures of forms, light & shade, texture, colour variation, perspective etc.

WORKSHOP II (ELECTIVE) CRAFT WORK **10 HRS.**

Bamboo craft	It is a type of work where useful and decorative devices are made completely by Hand or a Simple tool.
Tile making	Create expressive, unified and cohesive three dimensional forms.
Pottery making	Wonder of creation as they learn the art of pottery.
Art out of Waste	Creating crafts out of Waste materials.

WORKSHOP II (ELECTIVE) SCULPTURE **15 HRS.**

Ceramic work	Sculpting techniques on a plane surface.
Soap and wax	The cutting of material such as soap or wax to form a figure or design.
Clay modelling	Clay modelling will be able to sculpt or make any kind of a model.
Moulding process	Making of creative shape

WORKSHOP III (ELECTIVE) VISUALIZATION TECHNIQUE **10 Hrs.**

Concept	A theoretical and practical approach in understanding an abstract or generic idea from Particular instances.
Storyboard/ Cartoon making	Graphical representation in the form of illustrations or images displayed in sequence for the purpose of pre-visualizing the area of student's interest. A series of drawings that tells a story.

WORKSHOP III (ELECTIVE) VISUAL LITERACY **10 HRS.**

Photography	Representation of concept through images will be learnt by the students. The effect of light, shade and shadow can be learnt with easy understanding by the students.
Short film	It is a hands-on class for the students to introduce the art and craft of filmmaking. Students can learn different types of concepts through film making.
Set Design	Sample model by using different materials and techniques.

Max. 60 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: To distinguish elements of craft and paintings.

CO2: To determine methods to achieve complex 3d compositions into models applying origami and paper crafting techniques

CO3: To design and generate abstract forms using model making techniques

TEXT/ REFERENCE BOOKS

1. Kristin Peck, Art of Handmade Tile: Complete Instructions for Carving & Glazing, F + W Media, 2011
2. Jerry Yarnell, Painting Techniques, North Light Books, Cinicinnati, Ohio, 2002
3. Anderson Turner, Pottery Making techniques: a pottery making illustrated handbook, American ceramic Society, 2004
4. Chapman G. and Robson P., Art from Packaging, Heinemann Library, 1997
5. Chapman G. and Robson P., Art from Rocks and Shells, Thomson Learning, 1995
6. Bruce Bam Baum, The Art of Photography, Wiley, 2010

SARA 9201	ART STUDIO - II	L	T	P	Credits	Total Marks
		0	0	3	2	100

Continuous assessment	End Semester Examination	Minimum pass marks	
		Continuous Assessment	End Semester Examination
70	30	35	15

COURSE OBJECTIVES:

- To utilize models as technique for design presentations
- To construct models as a way of representation and experimentation
- To gain an ability to integrate all the technical aspects of sculpture, modelling, and storytelling as means to realize creative ideas to shape into concrete and significant art forms.

MODULE 1 EXPLORING MATERIALITY **10 Hrs.**

Selection of materials used in everyday life – textiles / earthenware terracotta / stone / paper / wax / glass / woodetc. and study their properties and characteristics, materiality and feeling. Processes of additive, subtractive and constructional form-making in expressive and functional modes.

MODULE 2 CREATIVE REPRESENTATIONS OF SPACES **15 Hrs.**

Need for architectural models. Role of scale-models in design - Developing of surfaces and solids viz. Cubes, prisms, cylinders, pyramids, cones. Development of transition pieces, for spheres etc. using appropriate materials. Various materials and tools to be used in model making. Use of materials, viz. paper / mountboard / cardboard in architectural models.

MODULE 3 CREATIVE REPRESENTATIONS OF SPACES **20 Hrs.**

Use of materials, viz. Snow-white board / mountboard / cardboard / Acrylic / Polystyrene (thermocol) / softwood / metals in architectural models. Painting model surfaces with various finishes, development of topography and landscape elements, use of materials like cork, polyurethane foam, use of laser, acid etching, stereolithography for development of building envelopes.

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Max. 45 Hours

COURSE OUTCOME:

On completion of the course the student will be able to:

CO1 Develop the processes of 3-dimensional form making from concept to finish.

CO2 Interpret different art forms in different media while appreciating artistic expressions.

CO3 Observe and interpret different forms and qualities in built and natural environments and objects.

CO4 Design and model craft forms using any medium.

CO5 Develop a narrative approach to art work.

CO6 Interpret the different stories communicated through visualizations of various types.

TEXT / REFERENCE BOOKS

1. Jones, J. C. (1992). Design methods, John Wiley & Sons
2. Bielefeld, B., & El Khouli, S. (2017). Basics Design Ideas. Birkhäuser.
3. Ching, F. D., &Juroszek, S. P. (2010). Design drawing. John Wiley & Sons.
4. Faimon, P., & Weigand, J. (2004). The nature of design. HOW Books.
5. Pipes, A. (2003). Foundations of art and design. Laurence King Publishing.
6. John, W. (1966). Mills-The Technique of Sculpture, BT Batsford Limited.
7. White A.W.(2011). The Elements of Graphic Design: Space, Unity, Page Architecture, and Type, Skyhorse Publishing, Inc.,
8. Elam, K. (2001). Geometry of design: studies in proportion and composition, Princeton Architectural Press.
9. Yarnell,J. (2002). Painting Techniques, North Light Books.
10. Anderson Turner, Pottery Making techniques: a pottery making illustrated handbook, American ceramic Society, 2004
11. Chapman G. and Robson P., Art from Rocks and Shells, Thomson Learning, 1995 6
12. Barnbaum,B. (2010). The Art of Photography, Wiley.

SAR 1202	BUILDING SERVICES I	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To understand the basic principles of water supply and sanitation and to enable them to understand the piping system (pipe above ground and underground) for different types of buildings.
- To provide exposure to planning, design and execution aspects of building services for effective co-ordination during pre-construction and construction phase of projects.
- To explain water supply and sanitary systems for residence & high-rise structures.

UNIT 1 WATER SUPPY ENGINEERING **8 HRS.**

Water sources-surface& groundwater sources, Quantity and quality of water-demand projection, per capita consumption of water, Nature of impurities, water treatment systems, tests - Water Distribution Methods of Distribution, Systems of Supply of Water, Layout of Distribution Pipes-Internal water supply in Buildings Types of Pipes, Laying of pipes - Above & Below Ground, Jointing, Testing-Prevention of Water Wastage - Preparing Water Supply Schemes, standards for water supply.

UNIT 2 PLUMBING **6 Hrs.**

House Drainage, Domestic Sanitary Installations, traps, various Systems of House Plumbing, Rain water harvesting and systems, Drainage of Sub-soil water, Layout of Drainage system, connection to sewers, Standards for Sanitary Conveniences.

UNIT 3 SEWAGE TREATMENT **8 Hrs.**

Primary treatment-Screens, Grit Chambers, Plain Sedimentation tanks or Skimming Tanks &Settling Tanks or Clarifiers, Secondary treatment - Filtration - Contact Beds, Intermittent & Trickling Filters and Activated Sludge Process, Disinfection, Disposal of Sewage-Disposal of sewage from isolated buildings - Septic Tanks, Disposal of sewage in Villages - water recycling.

UNIT 4 ENVIRONMENTAL SANITATION **8 Hrs.**

Environmental sanitation-the importance of sanitation classification of waste, disposal of refuse, composition, collection, conveyance of refuse disposal systems in towns &recovery of refuse Sewerage system - sewage - definitions and importance of quantity of sewage, storm water and design of sewers-systems of sewerage-dry and water carriage systems, patterns of collection, sewers - materials used, shapes of sewers, construction & maintenance of sewers, sewer joints, sewer appurtenances.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Ability to Estimate the required water consumption through per capita consumption of water.

CO2: Calculating the sewage outcome from a building & they will propose septic tank or STP depending upon its need.

CO3: Judicial use of thumb rules to apply in the design of water supply as well as for execution of the same.

CO4: Visit to STP in the campus to understand the process & quality of treated water.

CO5: Interaction between consultant and students, in handling and installation techniques of plumbing line.

TEXT / REFERENCE BOOKS

1. Fair G.M., Geyer J.C. and Okun D.A., Water and Waste Engineering, Volume 2, John Wiley and sons, Inc. New York, 1968
1. Manual on water and treatment, 2nd Edition, CPHEEO, Ministry of works and Housing, New Delhi, 1980
2. Rangwala S.C., water supply and sanitary Engineering, Anand Charotar publishing house, 1981
3. Venugopala Rao P., Textbook of Environmental Engineering, Prentice Hall of India Pvt. Ltd., 2002
4. Husian S.K., Textbook of Water Supply and Sanitary Engineering, Oxford & IBH, 2006

SARA1302	BUILDING SERVICES-I	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To inculcate basic principles of plumbing and sanitation services
- To understand its necessity in architectural space planning parameters.
- To enable them to comprehend the subject thoroughly and integrate the learning in the architectural design.

UNIT 1 WATER SUPPLY AND PLUMBING 8 Hrs.

Introduction to Building Services - Water sources- Quantity and quality of water-demand projection, per capita consumption of water, Nature of impurities, water treatment process,tests,Methods of Distribution, Layout of Distribution Pipes, sump and other storage tanks -Internal water supply in Buildings, Types of Pipes, Laying of pipes, Prevention of Water Wastage ,Fixtures and fittings of a contemporary bathroom and kitchen - Preparing Water Supply Schemes, standards for water supply- ECBC requirements.

UNIT 2 SANITATION AND DRAINAGE 6 Hrs.

House Drainage, Layout of Drainage system, Methods of laying and construction of sewers, Traps - shapes, sizes, types, function, Ventilation of House drainage - Anti siphonage pipe, various system of plumbing, Chambers - fixtures and fittings of toilet, bathroom and kitchen - Rain water harvesting and systems.

UNIT 3 SEWAGE TREATMENT 6 Hrs.

Typical layout and components of sewage treatment plant - Primary and Secondary treatment - Activated Sludge Process, Disinfection, Disposal of Sewage-Disposal of sewage from isolated buildings - Septic Tanks, Disposal of sewage in Villages - Waste water recycling - ECBC requirements

UNIT 4 ENVIRONMENTAL SANITATION 6 Hrs.

Introduction to Environmental sanitation-the importance of sanitation classification of waste- disposal of refuse, Sewerage system - storm water and design of sewers-systems of sewerage-dry and water carriage systems, patterns of collection, sewers - materials used, shapes of sewers, construction & maintenance of sewers, sewer joints, sewer appurtenances, EIA requirements of water supply and drainage systems for large scale infrastructure development.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Spatial requirements for overhead water tank, sump, sewage treatment plant, water treatment plant, plumbing shaft types – ventilation shaft, shaft for different types of pipes, and their location, integration in different building typologies Suggested Assignment: Plates, brochure collection – incorporation of studied concepts in the respective semester's Architecture Design studio - Suggested Assignment: Documentation of Environmental sanitation through Case study and field visits.

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Ability to understand the importance of water supply system and its operation in buildings.

CO2 Identify various types of sanitary fittings, demand calculation and to prepare water supply scheme.

CO3 Develop comprehensive knowledge of design and construction of drainage systems in buildings and built environment

CO4 Ability to understand the process of solid waste management and hence develop strategies for effective waste management in buildings and built environment

CO5 Understand and comprehend the Environmental Sanitation through classification of types of wastes.

CO6 Analyse and develop comprehensive knowledge of architectural space planning for water supply & sanitation system and integration of systems in built forms

TEXT / REFERENCE BOOKS

1. Fair G.M., Geyer J.C. and Okun D.A., Water and Waste Water Engineering: water Supply and wastewater Removal, 3rd Edition, October 2010 John Wiley & Sons,
2. Manual on water supply and treatment, 1999, CPHEEO, Ministry of works and Housing, New Delhi
3. Manual on Sewerage and Sewage treatment Systems, 2013, CPHEEO, Ministry of works and Housing, New Delhi
4. Rangwala S.C., water supply and sanitary Engineering, Anand Charotar publishing house,29th edition,2019
5. Venugopala Rao P., Textbook of Environmental Engineering, Prentice Hall of India Pvt. Ltd., 2004
6. Husain S.K., Textbook of Water Supply and Sanitary Engineering, Oxford & IBH, 3rd edition,2017
7. Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain., "Water Supply Engineering" Laxmi Publications, 1995,. Reprint 2016
8. Dr.B.C. Punmia, Arun Kumar Jain., "Wastewater Engineering", Laxmi Publications, 1998.
9. Rakesh Hooja Ramesh K. Arora, et al.., "Water Management- Multiple dimensions", Rawat Publications, 2007

SAR 1203	SITE PLANNING AND ANALYSIS	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To establish the process involved in analyzing a site and its parameters
- To analyze and identify the criteria in selecting an appropriate site.
- To evolve a methodology for site responsive design.

UNIT 1 PRINCIPLES OF SITE PLANNING 8 Hrs.

Definition of plot, site, region, site planning, units of measurements-Factors influencing a site-Onsite and offsite factors-Topography, hydrology, soils, vegetation, climate, surface drainage, accessibility, size and shape, infrastructures available- sources of water supply and means of disposal system-Organization of vehicular and pedestrian circulation, types of roads, hierarchy of roads, networks, patterns, road widths, turning radii, street intersections- movement material, design consideration- Site zoning regulations- Land use regulations-Development control rules of local bodies- building setbacks- FSI- FAR-plot coverage- OSR- parking regulations and standards.

UNIT 2 SITE SELECTION AND ANALYSIS 8 Hrs.

Study of microclimate: Influence of vegetation, wind, landforms and water as modifier of microclimate-Site selection process- Site selection criteria for housing development, commercial and institutional projects-Importance of site analysis- systemic process of site analysis- site suitability analysis- Analysis of natural, cultural, aesthetic factors and visual characteristics- Site analysis diagram- matrix analysis, composite analysis-Grading Contours-contour maps using GIS- slope Analysis, grading process, grading criteria.

UNIT 3 SITE DESIGN AND SITE DEVELOPMENT 8 Hrs.

Site context- contextual analysis responding to programmatic, functional, environmental, aesthetic factors. Integrated approach to design of building and open spaces-relationship of space and mass, enclosure and spatial perception, spatial enclosure- Sense of space- Introduction to land use mapping, existing master plans-types of plans-site layout- Development of Master plan- Site plan.

UNIT 4 CASE STUDIES 6 Hrs.

Data Collection- Detailed analysis of various factors influencing the site- Preparation of Site Analysis diagram- Analysis of built and open space relationship- concept development- circulation network analysis- Site Development Plan for projects in hilly areas, Housing development, Commercial, institutional spaces and factory buildings.

Max. 30

Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Understanding the parameters and terminology involved in Site Analysis .
CO2: Evaluating the criteria involved in site selection.
CO3: Appraising the site profile with its contextual complexity like contours, slope analysis
CO4: Critical understanding of case studies in site planning to draw inferences
CO5: Total understanding and logical process to develop a site.

TEXT / REFERENCE BOOKS

1. Charles W. Harris, Nicholas T. Dines, Time Savers standards for Landscape Architecture, 1997
2. Edward T.White, Site Analysis: Diagramming information for Architectural design, 1983
3. Joseph DeChiarra and Lee Coppleman, Planning Design Criteria, Van Nostrand Reinhold Co Newyork, 1968
4. Kevin Lynch and Gary Hack, Site planning, MIT Press, Cambridge, 1984
5. Punmia B.C, Surveying, Volume1, Standard Book House, New Delhi, 1983

SARA1304	PRINCIPLES OF SITE PLANNING	L	T	P	Credits	Total Marks
		2	1	0	3	100

COURSE OBJECTIVES:

- To impart knowledge on the site planning principles including the features and parameters that govern the proposed development.
- To educate the students in site selection for different building typologies including the techniques of surveying and site analysis.
- To evolve a methodology for site responsive design strategy through the relation between built environment and their immediate surroundings.

UNIT 1 SITE LAYOUT AND PLANNING PRINCIPLES 8 Hrs.

Definition of plot, site, region, site planning, units of measurements-Factors influencing a site-Onsite and offsite factors-Topography, hydrology, soils, vegetation, climate, surface drainage, accessibility, size and shape, infrastructures available-sources of water supply and means of disposal system-Architectural design consideration and visual aspects. Organization of vehicular and pedestrian circulation, Networks -types of roads, hierarchy of roads, networks, patterns, road widths, turning radii, street intersections.

UNIT 2 SURVEYING AND SITE ANALYSIS 10 Hrs.

Reconnaissance and need for surveying – chain survey, compass survey, plane table & theodolite surveys. Contouring: contour interval, characteristics, uses of contours. Study of site climate – elements of climate. Importance of site analysis-systemic process of site analysis- site suitability analysis- locality plans - Analysis of natural, cultural, aesthetic factors and visual characteristics- Site analysis diagram - Preparation of maps - matrix analysis, composite analysis

UNIT 3 SITE SELECTION AND REGULATIONS 6 Hrs.

Study of microclimate: Influence of vegetation, wind, landforms and water as modifier of microclimate-Site selection process-Site selection criteria for housing development, commercial and institutional projects. Site zoning regulations- Land use regulations-Development control rules of local bodies- building setbacks- FSI- FAR-plot coverage- OSR- parking regulations and standards.

UNIT 4 SITE DESIGN AND DEVELOPMENT TECHNIQUES 12 Hrs.

Site context- contextual analysis responding to programmatic, functional, environmental, aesthetic factors. Integrated approach to design of building and open spaces-relationship of space and mass, enclosure and spatial perception, spatial enclosure- Sense of space- Introduction to land use mapping, existing master plans- types of plans-site layout-Development of Master plan- Site plan. Case study of the projects in hilly areas, Housing development, Commercial, institutional spaces and factory buildings.

UNIT 5 COMPREHENSIVE LEARNING 9 Hrs.

Understanding the site features by visiting a nearby construction site and manual documentation with photos. Reviewing the given site plan and listing the opportunities on site design and development techniques. Detailed study of their specified site for semester design project on the Data Collection- Analysis of various factors influencing the site- Preparation of Site Analysis diagram -Analysis of built and open space relationship- concept development- circulation network analysis- Site development.

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Familiarize knowledge on the site layout and planning principles that govern the proposed development

CO2 Students able to understand the importance of surveying and the different methods of surveying with hands on exercise.

CO3 Preparation of site drawings and analysis of the site for preparing the feasibility of the proposed project

CO4 Skill development on the site selection criteria with the context and typology specific

CO5 Preparation of the matrix diagram with the available factors of site context and design development techniques.

CO6 Exercise on site analysis, site design and development for the given land parcel.

TEXT / REFERENCE BOOKS

1. Dr.B.C.Punmia, A. K. (1983). Surveying Volume 1. New Delhi: Standard book house.
2. Joseph De Chiara, L. E. (1984). Time-Saver Standards for Site Planning. McGraw-Hill .
3. Joseph De Chiara, L. K. (1975). Urban planning and design criteria. Van Nostrand Reinhold .
4. Kevin Lynch, G. H. (1984). Site Planning. Cambridge: MIT Press.
5. Nicholas T. Dines, K. D. (1998). Time-saver standards for landscape architecture: design and construction data. McGraw-Hill.
6. Shahani, P. B. (1979). Text Book of Surveying: V. II. Oxford & I B H Publication.
7. White, E. T. (1983). Site Analysis: Diagramming Information for Architectural Design. Architectural Media.

SAR 1204	CLIMATOLOGY	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To comprehend the role of climate in shaping a climate responsive built form
- Facilitating the learning of Climatic Design.

UNIT 1 CLIMATE AND COMFORT 6 Hrs

Global climatic factors - earth rotation - axis inclination -radiation at earth's surface - earth's thermal balance - wind thermal forces - Components of climate - geographic belt between the tropic of cancer and the tropic of Capricorn - Thermal comfort factors and indices - Site Climate - elements of climate - temperature - humidity - precipitation - sky conditions - solar radiation - Impact of rainfall on design of buildings.

UNIT 2 CLASSIFICATION OF CLIMATE 7 Hrs

Koppen Climate Classification System - Atkinson climate classification - characteristics of tropical climates - warm humid climate, warm humid island climate, hot dry desert climate, hot dry maritime desert climate, composite / monsoon climate, tropical upland climate, climate graph.

UNIT 3 THERMAL PROPERTY OF BUILDING ENVELOPE 10Hrs

Thermal quantities - heat flow rate, conductivity (k-value) & resistivity - conductance through a multi-layered body, surface conductance - transmittance - calculation of U-value - convection, radiation, concept of sol-air temperature & solar gain factor - introduction to periodic heat flow in building, time lag & decrement factor.

UNIT 4 VENTILATION AND DAYLIGHTING 7 Hrs

Functions of ventilation - stack effect due to the thermal forces, wind velocity - wind rose, wind pressure - Air movement through buildings - Air movement around buildings - factors affecting air flow, Wind shadow etc. - Thermally induced air currents. **Max. 30 Hours**

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Understanding climate in detail.

CO2: Interpretation of climate characteristics based on different zones, elements and the factors affecting climate.

CO3: Differentiation between Macro Climate & Micro Climate

CO4: Analyzing the thermal properties of building envelope and evaluating the performance of the envelope, based on its 'U'value by applying the concept of periodic heat flow , time lag and decremental factor.

CO5: Understanding the basics of ventilation and day lighting and the important role played by them in designing of buildings.

CO6: 'Climatology' facilitates the learning of 'Climatic design'

TEXT / REFERENCE BOOKS

1. Arvind Krishan, Nick Baker, Simons Yannas, Szokolay S.V., Climatic Responsive Architecture - A Design Handbook for Energy Efficient Buildings, Tata Mc Graw Hill Publishing Company Ltd, New Delhi, 2001
2. BIS, SP 41: Handbook on Functional Requirements of Buildings (Other than Industrial Buildings), 1987
3. Koenigsberger O.H., Ingersol T.G., Mayhew A. and Szokolay S.V., Manual of Tropical Building and Housing, Orient Longman Pvt. Ltd, 2004
4. Martin Evans, Housing, Climate and Comfort, Architectural Press, London, 1980.
5. Mark Dekay and Brown G.Z, Sun, wind and Light: Architectural design strategies, 3rd edition, John Wiley and sons, 2014
6. Richard Hyde, Climate Responsive Design: A study of buildings in moderate and hot humid climates, E & FN Spon, London, 2000.

SARA1303	CLIMATOLOGY	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To realize the role of climate in shaping a climate responsive built form.
- To understand the need and importance of ventilation, day lighting, shading devices in building design towards the approach of climate responsive built environment.
- To familiarize on passive design strategies for architecture of different climatic zones.

UNIT 1 CLIMATE: FACTORS AND CLASSIFICATION 6 Hrs.

Global climatic factors, Components of climate - Koppen Climate Classification System - Atkinson climate classification - Impact of climate and building on Ecological balance- characteristics of tropical climates - climate graph.

UNIT 2 VENTILATION AND DAYLIGHTING 6 Hrs.

Functions of ventilation - stack effect due to the thermal forces, wind velocity - wind rose, wind pressure - Air movement through buildings - Air movement around buildings - factors affecting air flow and wind shadows. Importance of day lighting – designing principles with day lighting in buildings – Characteristics of natural light: transmission, reflection, diffusion, glare – light shelves and light pipes.

UNIT 3 SOLAR CHARTS AND SHADING DEVICES 8 Hrs.

Introduction to Sun path diagrams - Angles of Incidence – Shadow angle protractor - Horizontal and Vertical Shadow angles - Shadow Mask - Exercises on plotting shadow angles on sun-path diagrams, Design of shading devices for walls with different orientations.

UNIT 4 DESIGN WITH CLIMATE 6 Hrs.

Climate data analysis for various zones - Design considerations and strategies through case studies - hot and dry; hot and humid; warm and humid; cold and cloudy; cold and dry; moderate/composite. Passive design strategies with respect to different climatic zones in India. Selection of building components based on climate classification – Design strategies and construction parameters for Walls, Roofs & floors surfaces (surface color and texture, U value, exterior absorption / insulation) - material properties, thickness and layers / composite walls.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Shading design calculations for wall in four different orientations. Comparative analysis of design strategies in traditional and contemporary buildings for a particular climatic region. Introduction to climatic analysis software for energy calculation of designed building envelope for their studio project with climate consultant,

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Comprehend the role of climate in architecture and the factors affecting the climate.

CO2 Acquire knowledge on the climate classification based on the influencing factors.

CO3 Understand the importance of natural ventilation and day lighting in building design and analyzing their designing strategies.

CO4 Familiarize the sun as a main design element and understanding the sun path diagram in detail for calculating the heating and cooling hours of a region.

CO5 Marking the angle of incidence for equinox, summer and winter solstices for arriving the shadow mask and overshadowing in sun path diagram for the design of shading devices.

CO6 Creating a data base of passive design strategies adapted for different climate zones through a comparative analysis of traditional and contemporary buildings.

TEXT / REFERENCE BOOKS

1. Arvind Krishan, N. B. (2001). *CLIMATE RESPONSIVE ARCHITECTURE:A Design Handbook for Energy Efficient* Buildings. New Delhi: Tata McGraw-Hill Education India.
2. Evans, M. (1980). Housing, Climate and Comfort . London: Architectural Press.
3. Givoni, B. (1976). Man, climate and architecture (Architectural science series). Applied Science Publishers .
4. Mareike Krautheim, R. P. (2014). City and Wind: Climate as an Architectural Instrument. DOM Publishers.
5. Mark DeKay, G. Z. (2014). Sun, Wind, and Light: Architectural Design Strategies. John Wiley & Sons.
6. Majumdar, M. (2001). Energy-efficient buildings in India. TERI Press.
7. O H Koenigsberger, T. G. (2013). Manual of Tropical Housing and Building: Climate Design. Hyderabad: Universities Press India Pvt. Ltd.

SAR 4057	DESIGN STUDIO III	L	T	P	Credits	Total Marks
		0	0	14	9	400

COURSE OBJECTIVES

To study the role of anthropological issues that manifest itself in to creation of a community through a detailed investigation of a generic settlement at micro, Meso and Macro level. It sensitizes the mind about the symbiotic relationship between human need and built environment.

FOCUS

Documenting a settlement with strong cohesive character and map various parameters through illustrative diagrams followed by a detailed analysis to generate logical conclusions.

METHODOLOGY PROPOSED

The studio consist of four phase

Phase I : Workshop on physical and social surveying

Phase II : The students should go for an onsite study of the identified settlement, observe, document and record information. The students should transfer field data in to graphical representation which helps in understanding the settlement holistically.

Phase III : The students map the onsite work in the studio and discreetly analyze the available data to understand the physical, social, visual and Architectonic pattern.

Phase IV : To propose logical solution for the perceived problems the settlement faces with high degree of sensitivity to the documented information.

DESIGN INTEGRATION

The knowledge students acquire from Vernacular Architecture course would act as a catalyst for initiating the contemplation process.

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Ability to collect, assimilate and integrate knowledge in a holistic manner.
CO2: Sensitivity towards the nature and values of unselfconscious and collective design as well asthe interconnectedness of human society and environment.
CO3: Ability to observe and analyse changes in the above.
CO4: Ability to project future transformations and give possible/ appropriate ways to address issues, if any.
CO5: Sensitivity in design approach in community oriented projects with respect to context,collective values and needs.

Max. 210 Hours

TEXT / REFERENCES BOOKS

1. Amos Rapoport, House Form and Culture, Foundations of Cultural Geography, Prentice Hall, Newyork,1969
2. Hassan Fathy, Natural Energy and Vernacular Architecture: Principles and Examples with reference to Hot Arid Climates,
University of Chicago Press, Chicago and London, 1986
3. Amos Rapoport, Culture, Architecture, and Design, Locke Science Publishing, 2005
4. Masud Taj H., Nari Gandhi, Foundation for Architecture, Art & Design Book Press, 2009

SARA9301	DESIGN STUDIO III	L	T	P	Credits	Total Marks
		0	1	9	6	300

Continuous Assessment	End Semester Examination	Min Pass Marks	
		Continuous Assessment	End Semester Examination
200	100	100	50

COURSE OBJECTIVES:

- To understand the relationship between the site and its setting with the built environment
- To generate solutions for a given low rise, multi room space program that are semantic with socio cultural and site-specific context, choice of material and the psychological requirements of the end user.
- To develop an architectural expression which is responsive to the people and environment

STAGE I

The art of decoding and creating spatial configuration of a single use space by understanding human physical, psychological and socio-cultural needs.

STAGE II

Knowledge acclimatization (Phase I) :

Critical analysis as a tool to enable the mind by critiquing selected works of architects for the core values and principle Design and decoding it from a user perspective. Review of literature to give the students the buoyancy to solve the given program.

Iteration and Ideation (Phase II)

Resolving the given Design Program by experimentation and multiple iterations leading to three-dimensional composition by understanding the layers of space making.

Realization (Phase III)

The creation of workable plans and the art of realizing through legible drawings as a medium to communicate the vision, reflecting creative approach drawn from data analysis and climatic consideration to the specific context. Use of a variety of materials and techniques to represent the design.

DESIGN INTEGRATION

Application of the knowledge gained by the students from core courses like Principles of Site Planning and Climatology in developing spatial configurations and its physical relationships.

SUGGESTED TYPOLOGIES (One major & one minor design program.)

Low rise environment like residence / primary health center / school / library / banks / community halls / showroom etc.,

TUTORIAL	SOFT SKILLS	8 Hrs.

Personal Skills-Integrity, adaptability - People's skills- teamwork, communication, respect - Workplace skills- Interpersonal skills- Initiative and enterprise- Professional Skills - Learning Technology - Listening Skills - Motivation skills - Leadership skills- Interpersonal and Team Skills Emotional Intelligence Skills - Expressing ideas -Training and Feedback.

Max. 150 Hours

COURSE OUTCOMES:

On completion of the course the student will be able to

CO1 Assess the site and surroundings and its relationship with the activity, space for the given architectural program.

CO2 Analyze and evaluate a design of given space by dissecting the case studies and evolve inferences.

CO3 Application of anthropology and spatial data for arriving at requirements of the given space.

CO4 Apply the knowledge on climate responsive building design and implement appropriate design strategies.

CO5 Build a Process for Design evolution and communicate through drawings – plan, elevation and sections and final presentation with renderings.

CO6 Evaluation of the design through creation of miniature models and experimentation of space design and 3D through the explored models.

TEXT / REFERENCE BOOKS

1. Alexander, C. (1977). A pattern language: towns, buildings, construction. Oxford university press..
2. De Chiara, J. (2001). Time-saver standards for building types. McGraw-Hill Professional Publishing.
3. Alpern A. (1982), Handbook of specialty Elements in Architecture, Mc Graw Hill Book.
4. Mills.E.D. (1985), Planning - The Architects Handbook, 10th Edition, British Library Cataloguing.
5. Rafael.M. (2005), Theoretical Anxiety and Design Strategies in the Work of Eight Contemporary Architects, MIT Press

SAR1207	BUILDING SERVICES II	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To outline the basic principles of physics of Electricity and its application in simple buildings.
- To understand planning and design aspects of electrical services for building typologies.
- To familiarize electrical layout with appropriate cross section of wires and luminance.

UNIT 1 INTRODUCTION TO ELECTRICITY 8 Hrs.

Electrical supply system, Supply voltages &classification, voltage tolerance, cables, voltage drop-Electric installations: Relationship between phase & line, voltage and currents. Electrical installation: Principles & practices, Distribution, circuits, building Wiring, use of single phase, two phase, three phase etc. System of connection of appliances & accessories, service connections, generators, invertors -Case studies on electric core.

UNIT 2 ELECTRICITY IN BUILDINGS 8 Hrs.

Main Boards & sub distribution boards for multi storied buildings, Standby power supply distribution, transformers, safety methods, principles and practices- Earthling: definition, types, lighting arrestor and I.S.I specifications planning electrical layout and wiring for buildings. Communication networking and electrical layout for special buildings like Exhibitions, theatres and stadiums - Designing the electrical layout for a building, layout, factors and constraints.

UNIT 3 INTRODUCTION TO LIGHTING 6 Hrs.

Characteristics of light, visual task, factors affecting visual task, synthesis of light, sources Measurements of lighting, Intensity, flux, Work surface, laws of illumination, MSCP, MHCP, colour temperature, colour rendering, space height ratio, depreciation factor, utilization factor day light factor, Natural lighting in architecture.

UNIT 4 LIGHTING 8 Hrs.

Artificial Lighting: Requirements & design, type of lamps, fixtures, preparing a lighting scheme with legend , glare, lighting schemes, types of lighting arrangements, Lumen's method of lighting, luminaire arrangement-Specific Lighting: Flood Lighting, concealed lighting, outdoor lighting, mood lighting, accent lighting, LEDs-Lighting for stores, offices, residences, minimum level of illumination required for physically challenged and visually challenged.

Max. 30 Hours

COURSE OUTCOMES:

On completion of the course the student will be able to

CO1: To summarize the relationship between phase and line, voltage & currents and understand the basics about electrical supply system, principles & practices.

CO2: To understand distribution, supply and connection of various accessories and appliances and prepare an electrical layout for special buildings.

CO3: To clarify and discuss basic principles, characteristics of light.

CO4: To understand natural lighting in space planning and various measurements of light.

CO5: To identify and appraise various types of lighting for different interior spaces of varied building typologies.

SARA 1402	BUILDING SERVICES - II	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To outline the basic principles of Electricity and its application in simple buildings.
- To understand planning and design aspects of electrical services for building typologies.
- To familiarize electrical layout with appropriate fixtures and luminance.
- To integrate the learning in the architectural design.

UNIT 1 INTRODUCTION TO ELECTRICITY 4 Hrs.

Introduction to Relationship between phase & line, voltage and currents (with calculation units), Electrical supply system – Power Plant, HT Distribution, Sub-station-transformer-street pillar box, Sources of power supply - Power supply network diagram, Source to demand -Types of power supply based on consumer demand - Basic terminologies and units, Electrical system components - Estimation of power demand for different building typologies - Architectural spaces for electrical systems like Sub stations, electrical rooms, Transformer yard etc., - Single/Three phase supply - Earthing for safety, types of earthing – ISI specifications

UNIT 2 ELECTRICITY IN BUILDINGS 10 Hrs.

Supply load, Demand load, HT/LT service connections, Ring Mains gear (RMG), Transformer, Power Factor, MV panel room, Switch gear, Main Boards & sub distribution boards, Energy meters, System of connection for appliances, fittings & accessories, Conduits and pipes, safety methods, planning electrical layout and wiring for buildings. Designing the electrical layout for residential building, Needs and types of power backup systems: Diesel gensets, Uninterruptible power supply systems, Photovoltaic cells, Architectural spaces for DG's and UPS - Integration of photovoltaic cells in buildings

UNIT 3 INTRODUCTION TO LIGHTING 6 Hrs.

Basic terminologies and units –Luminous flux, candela , solid angle illumination – visual tasks and factors affecting visual tasks, MSCP, MHCP, colour temperature, colour rendering, space height ratio – modern theory of light – special features and minimum level of illumination for various tasks, Lighting principles, classification of lighting based on activity, source and fixture - Design requirements for different building typologies such as residential, commercial institutional spaces etc - Recommendation from NBC - Case studies.

UNIT 4 LIGHTING 6 Hrs.

Artificial Lighting: Requirements & design, type of lamps, fixtures, types of bulbs, energy efficient lighting options, preparing a lighting scheme with legend, glare, lighting schemes, types of lighting arrangements, Lumen's method of lighting, luminaire arrangement- various types of Lighting, Lighting for stores, offices, residences, minimum level of illumination required for physically challenged and visually challenged-ECBC requirements.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Suggested Assignment: Brochure collection of electrical systems and fittings and presentation - Incorporation of studied concepts in the respective semester's Architecture Design studio - Students are expected to have additional sheets on electrical wiring, fittings and lighting drawings

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Summarize the relationship between phase and line, voltage & currents and understand the basics about electrical supply system, principles & practices.

CO2 Understand distribution, supply and connection of various accessories and appliances and prepare an electrical layout for special buildings.

CO3 Clarify and discuss basic principles, characteristics of light.

CO4 Analyze and understand natural lighting in space planning and various measurements of light.

CO5 Identify and appraise various types of lighting for different interior spaces of varied building typologies.

CO6 Ability to acquire skill required for the students to apply Electrical and Lighting aspects in his/her designs.

TEXT / REFERENCE BOOKS

1. Benjamin Evans, Daylight in Architecture, McGraw-Hill Book Company, New York, 1981
2. Hopkinson R.G., Architectural Physics-Lighting, H.M. Stationery Office, London, 1963
3. R.G.Hopkinson&J.D.Kay, The lighting of Buildings, Faber & Faber, London, 1969
4. Derek Philips, Lighting in Architectural Design, McGraw Hill. New York, 1964
5. Millet Marietta, Light Revealing Architecture, Van Nostrand Reinhold, London,1996
6. Pritchard D.C., Lighting, Longman scientific &Technical, Harlow, 1995
7. Peter Treqenza, and David Loe, The Design of Lighting, E & FN Spon, London,2nd edition, 2004,
8. B.Rajarao, Electricity for architects.
9. Energy Conservation Building Code user guide – ECBC, Bureau of Energy Efficiency, New Delhi, India

SAR4058	DESIGN STUDIO IV	L	T	P	Credits	Total Marks
		0	0	13	9	400

COURSE OBJECTIVES:

- To apply the learning on function and aesthetics acquired during the previous semester.
- The studio helps to develop an Architectural expression which is responsive to the people and environment.

FOCUS

To understand relationship between spaces for a given program and solve the psychological requirements of a small multi room space.

METHODOLOGY PROPOSED

The studio consist of three phases

Phase I : Critical analysis of existing designs, along with review of literature will give the students the buoyancy to solve the given program.

Phase II **:** Design Projects will challenge students to explore by experimentation and three dimensional composition of primarily abstract compositions. These activities will make use of a variety of materials and techniques to build a solid base of skills.

Phase III : The creation of workable plans and the art of realizing. Legible drawings are made to communicate the vision.

DESIGN INTEGRATION

The knowledge students acquire from Vernacular Architecture course would act as a catalyst for initiating the contemplation process.

Max. 195 Hours

COURSE OUTCOMES:

On completion of the course the student will be able to

CO1 : Understanding the want and need for the activities in the given space.

CO2 : Application of anthropology and spatial data for arriving at requirements of the given space.

CO3 : Imparting knowledge on the design of given space by dissecting the case studies and evolved inferences.

CO4 : Study and analysis of site and surroundings, the relationship of the activity, space and given site for the architectural programme.

CO5 : Knowledge and implementation on climate responsive building design and implementation of passive design strategies.

CO6 : Process of Design evolution, preparation of drawings – plan, elevation and sections and final presentation with renderings.

CO7: Evaluation of the design through creation of miniature models and experimentation of space design and 3D through the explored models.

TEXT / REFERENCE BOOKS

1.Christopher W Alexander, A Pattern Language: Towns, Buildings, Construction, Oxford University Press, 1977

2.Joseph DeChiara, Time Saver Standard for building types, Mc Graw Hill, 2nd Edition, 1980

3. Alpern A., Handbook of speciality Elements in Architecture, Mc Graw Hill Book, 1982

4. Edward D. Mills, Planning - The Architects Handbook, 10th Edition, British Library Cataloguing in publication Data, 1985

5. Moneo Rafael, Theoretical Anxiety and Design Strategies in the Work of Eight Contemporary Architects, MIT Press, 2005

SARA9401	DESIGN STUDIO IV	L	T	P	Credits	Total Marks
		0	1	11	7	300

Continuous Assessment	End Semester Examination	Min Pass Marks	
		Continuous Assessment	End Semester Examination
200	100	100	50

COURSE OBJECTIVES

- To determine the role of anthropological issues that manifest itself in the creation of a community through a detailed investigation of a generic settlement at micro, Meso and Macro level. It sensitizes the mind about the symbiotic relationship between human need and built environment.
- To understand the physical space as a manifestation of socio-cultural elements
- Documenting a settlement with strong cohesive character and mapping various parameters through illustrative diagrams followed by a detailed analysis to generate logical conclusions.

METHODOLOGY PROPOSED

STAGE I

Perlustration and Social Audit (Phase I)

The exploration of the character of an identified settlement through observation, documentation of the physical, social, visual and Architectonic pattern and to transfer the recorded Field data into graphical representation for a holistic understanding.

Inquisition and Mapping (Phase II)

The mapping of the onsite work in the studio and discreetly analyze the available data to decode relationship between human needs and the physical, social, visual and architectonic pattern of the settlement.

STAGE II

To propose logical solutions for the perceived problems the settlement faces with high degree of sensitivity to the documented information.

DESIGN INTEGRATION

Application of the knowledge gained by the students from core courses like Vernacular Architecture, History Culture and Built Environment and Building Materials in developing spatial configurations.

TUTORIAL	READING & WRITING SKILLS	8 Hrs.

Reading skills: Model of reading to learning, reading tactics and strategies, reading purposes – associated apprehensions, reading for meaning (critical reading), reading outcomes, Reading Space and its qualities - writings on architectural design. Precis Writing - Building a Resume - Presenting Data in Verbal and Nonverbal modes

Max. 150 Hours

SUGGESTED TYPOLOGIES

The study could be carried out in a rural or a semi urban settlement which has strong character and lifestyle, influencing the built form.

COURSE OUTCOMES

On completion of the course the student will be able to

CO1	Comprehend the morphology of a rural settlement over a period of time by understanding elements influencing it.
CO2	Illustrate the nature and values of generic design as well as the interrelationship between human, society and environmental factors.
CO3	Apply various methods of conducting surveys and document the physical, visual characteristics and demographic aspects in a holistic manner.
CO4	Construct a body of knowledge in the vernacular / traditional architecture by decoding local materials and construction techniques.
CO5	Prescribe interventions for the transformation and give appropriate strategies to address aspirations of the community.
CO6	Integrate sensitivity in design approach in community-oriented projects with respect to context, collective values and needs.

TEXT / REFERENCES BOOKS

1. Rapoport, A. (1969), House Form and Culture, Foundations of Cultural Geography, Prentice Hall, Newyork.
2. Fathy, H. (1986), Natural Energy and Vernacular Architecture: Principles and Examples with reference to Hot Arid Climates, University of Chicago Press, Chicago and London.
3. Rapoport, A. (2005), Culture, Architecture, and Design, Locke Science Publishing.
4. Taj M.H.&Gandhi.N (2009), Foundation for Architecture, Art & Design Book press
5. Madhavan,C. (2005), History and Culture of Tamil Nadu: Up to c. AD 1310, D. K. Printworld.

SAR4059	COMPUTER STUDIO I	L	T	P	Credits	Total Marks
		0	0	3	2	100

COURSE OBJECTIVES:

- To learn the fundamentals of image editing
- To expose the students to various aspects of computer applications into Architectural Design and Construction.
- To acquire knowledge in visual composition, productive techniques and drawing output using computer tools.

UNIT 1 INTRODUCTION TO IMAGE EDITING 12 Hrs.

Basic Tools for Editing and Creating Graphics in ADOBE PHOTOSHOP - Layers (layer styles opacity-adjustment layers) Basic Retouching (Colour, manipulations, Levels, Curves, Seeing Colour accurately, Patch tool, Cropping ,Reading palettes, Dust and scratches) - Advanced Retouching(smoothing skin, smoothing wrinkles, special colour effects: black and white, sepia, grainy).

UNIT 2 INTRODUCTION TO GOOGLE SKETCH UP & LUMION 12 Hrs.

Importing AutoCAD drawing File in sketch up-Basic Tools for Editing and Creating- Material apply, rendering with advanced VRAY. Importing 3D MODEL in lumion-Basic Tools for Editing and Creating- Material apply, rendering with advanced rendering tool, final walk through making.

UNIT 3 INTRODUCTION TO VISUAL COMPOSITION USING COMPUTER TOOLS 14 Hrs.

Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing and text, dimensioning in ACAD.

UNIT 4 PRODUCTIVE TECHNIQUES & DRAWING OUTPUT 7 Hrs.

Transparent overlays, hatching utilities, line type, line weight and colour, Multiline, Polyline, etc. Styles, blocks and symbol library in ACAD, File management, retrieving data, attributes, Layout and plotting.

Max. 45 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Gain a working knowledge of Photoshop and develop their skills in editing and altering photographs for through a basic understanding of the tool bar, layers, and the adjustments panel.

CO2:. Understand the fundamentals of Google Sketch Up,and begin a new project using tools and concepts necessary to design and draw

CO3: Create drawing that encompasses the AutoCAD skills learned in the class.

CO4: Possess a basic knowledge of the communication needed to operate the system with the use of a computer aided drafting system for the production of drawings.

TEXT / REFERENCE BOOKS

1. Watt A., Fundamentals of Three-Dimensional Computer Graphics, Addis Wesley, Massachusetts, 1989
2. AutoCAD architectural user guide - Autodesk Inc., 1998
3. AutoCAD 2000: A Problem-Solving Approach, Sham tikoo. Pub: ThomsonLearning,1999
4. Photoshop 7 Bible Professional Edition, Wiley John & Son INC, New York, Deke McClelland, 2000
5. Ralph Grabowski, The Illustrated AutoCAD 2002 Quick Reference
6. Jeffrey Harper, Mastering Autodesk 3ds Max, 2013

SARA2302	COMPUTER AIDED ARCHITECTURAL GRAPHICS - I	L	T	P	Credits	Total Marks
		1	0	2	2	100

Continuous Assessment	End Semester Examination	Min Pass Marks		
		Continuous Assessment	End Semester Examination	Total
70	30	35	15	100

COURSE OBJECTIVES:

- To expose the students to various aspects of computer applications used in Architectural Design and Construction.
- To provide students with the digital skills necessary to efficiently undertake Architectural assignments.
- To develop a proficiency in using computers as a tool for systematic research through analysis and validation and presentation of completed design works

MODULE 1 INTRODUCTION **4 Hrs.**

Introduction to various computer aided tools used in Architecture, Advantages and Disadvantages of each - 2D Vector vs Raster graphics- 3D modeling for exploration and presentation- Tools used for converting 2D to 3D - List of techniques used in the field, Possibilities & Importance of each.

MODULE 2 2D DRAFTING TOOLS **16 Hrs.**

Introduction to CAD Interface - Basic Understanding of coordinates - Model & Paper space - Understanding drawing commands using mouse and keyboard - Setting up limits and Understanding of Function keys - Exploring drawing unit settings (Imperial & Metric)- Line types: Multiline, Polyline, etc. - Line Styles: Dashed, Dotted, etc. - Understanding of Line Weights, Transparent Overlays, hatching utilities - Use of Color - Styles, Blocks and Symbol Library - Annotations & Dimensions - Control of Drawing - Plot and publish settings - Resources and References

MODULE 3 3D MODELLING **20 Hrs.**

Introduction to Sketchup Interface- Importing 2D drawing file into Sketchup - Adjusting Sketchup Settings - Creating and Editing Shapes and Forms - Creating Extrusions, Sweeps and Revolves - Layering, Grouping and Components - Creating textures - Applying materials to objects - Creating and saving styles - Creating plans and sections from 3d model –Geo locating model - Save and Export options - Extensions and Plug-in- Resources and References

MODULE 4 VISUALIZATIONS FOR PRESENTATIONS **16 Hrs.**

Importance of presentations in Architecture - Use of Visuals and Process Diagrams in Architecture - Tools used for presentations - Introduction to Photoshop- Interface and Tools- Composing an Image- Artistic vs Technical- Importing and rendering 2d drawings- Textures and tiling- Layer management and Overlaying- Creating depth in 3 dimensional visuals: Lighting, Shadows and Reflections- Masking and cutting- Adding people, trees, sky, objects- Styles and effects- Techniques of Photo Montage Visualizations- Post production corrections- Save formats- Resources and References

MODULE 5 CONSTRUCTIVE ASSIGNMENTS **4 Hrs.**

Draft Recreate 2D drawings of the previous semester's-built form in AutoCAD and create a 3D Sketchup model for the same. Represent in presentation format using Photoshop as a tool and submit as a portfolio for the end semester viva voce.

Max. 60 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Achieve proficiency in the basic computer skills relevant in the architectural profession

CO2 Construct 2D orthographic projections in CAD

CO3 Visualize design concepts in-the-round and make simple and complex 3D objects

CO4 Retrieve and present drawings and visualizations appropriately for multiple usages across various platforms

CO5 Develop diagrams and visuals to express architectural ideas and concepts.

CO6 Process images and create photo montages for presentation visualizations.

TEXT / REFERENCE BOOKS

1. AutoCAD Architecture User's Guide. (2011). Autodesk, Inc.
2. Grabowski, R. (2001). The Illustrated AutoCAD 2002 Quick Reference. Cengage Learning.
3. SketchUp Hands-on: Student Coursebook. (2016). 3dvinci.
4. Tickoo, S. (1999). AutoCAD 2000: A Problem Solving Approach. Delmar Learning; 1 edition .
5. Watt, A. (1991). Fundamentals of three-dimensional computer graphics. Computers and Geosciences.

SAR 1302	BUILDING SERVICES III	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To understand the physics of sound, its characteristics & behavior both indoors and outdoors.
- To learn the principles of design with particular reference to acoustics in performing spaces.
- To explore the types of mechanical transportation systems and their usage in built environment along with the design parameters.

UNIT 1 INTRODUCTION 8 Hrs.

Characteristics of sound-reflection, transmission, diffraction, absorption coefficient, reverberation time, geometric acoustics, free field, octave band, Sabine's formula, reverberation time calculation - Sound Absorption - acoustic materials& the properties, variable sound absorbers, prefabricated sound absorbing panels, suspended sound absorbers.

UNIT 2 ACOUSTICS 6 Hrs.

Outdoor noise - built form, orientation, earth berms, sound shadow region-Indoor noise-measures to prevent sound transmission, leak, impact noise, false ceiling integrated systems & sound isolation

UNIT 3 DESIGN OF PERFORMING SPACES 8 Hrs.

Design of auditoriums: placing auditorium floors and balcony, stage house details, rear wall treatment, orchestra pit, acoustical defects, sound amplifying systems, Design of Concert halls, open air theatre and Broadcasting studios.

UNIT 4 ELEVATORS & ESCALATORS 8 Hrs.

Types of Lifts - Basic dimension, Traffic analysis, Roundtrip time, lift pit, machine room, types, lift operation, arrangement of lifts, quality & quantity of service - Escalators - basic dimension, Characteristics, arrangement and disposition-Conveyors and Walk ways.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Knowledge on Science of Sound including different types of acoustic materials, their properties and design factors
In the built environment based on the function.

CO2: Comprehend principles of acoustic design and its application in outdoor environment.

CO3: Art and Science of designing performing spaces and broadcasting studios with particular reference to acoustics

CO4: Methods to avoid sound transmission in interior spaces.

CO5: Judicial use of mechanical transportation devices in built environment.

CO6: Total understanding of design standards of diverse mechanical transportation systems like elevators and escalators.

TEXT / REFERENCE BOOKS

1. Siraskar K.A., Acoustics in Building Design, Orient Longman Ltd., 1972
2. Kandaswamy S., Architectural Acoustics and Noise Control, Allied publishers Pvt. Ltd., 2005
3. David Egan, Architectural Acoustics, J.Rose publishing classics, 2007
4. Marshall long, Architectural Acoustics, Elsevier academic press New York, 2006
5. William J. Cavanaugh, Gregory C. Tocci , Joseph A. Wilkes, Architectural Acoustics: principles and practice, Second edition, John Wiley & sons, 2009
6. Subramaniam K., Lift Technology- An Insight on Design Basics and its Evolution, EVB, 2010

SARA1502	BUILDING SERVICES-III	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To develop the understanding of the advanced building services such as Air conditioning, Electromechanical conveyance system, fire and safety.
- To comprehend the services through service core in the design of multi-storey buildings.
- To integrate the learning in the architectural design

UNIT 1 PRINCIPLES OF AIR CONDITIONING SYSTEMS 6 Hrs.

Basic principles, laws and terminologies related to AC - refrigeration systems, components of refrigeration system: compressor, condenser, control devices, evaporator, filters, and cooling tower. Vapor compression cycle, Concepts of cooling load, calculation of cooling load-conductivity, transmission heat load, internal heat gain, concepts of zoning, room air distribution-types of outlets.

UNIT 2 AIR CONDITIONING SYSTEMS 8 Hrs.

Window air conditioners, Package units, direct expansion air conditioning systems - Split units, centralized plants and chilled water plants, Comparison of various systems - Space requirements for A/c units, AHU's & a/c plant, ducting, testing and maintenance on ducts and pipes- Energy saving through design, operation and maintenance - Emerging technologies – VAV, VRV/VRF, Heat Recovery systems, etc., Protection of Ozone Layer-eco friendly refrigerants. Selection criteria, design / structural considerations and energy requirements for above-mentioned air-conditioning systems – ECBC requirements.

UNIT 3 ELECTROMECHANICAL CONVEYANCE SYSTEMS 4 Hrs.

Types of conveying systems: Elevators, Escalators, Travelators – Elevators: Types, Components, Design criteria, Traffic analysis, roundtrip time, Estimation of no. of lifts required for different building, typologies as prescribed by NBC – Escalators: Types, components, Design standards and specification from NBC – Travelators: Types, components, Range – Minimum and maximum distance to be covered, Design standards and specification as per NBC.

UNIT 4 FIRE SAFTEY AND SERVICE CORE 8 Hrs.

Introduction, fire triangle,Fire Hazards, Classification of fire, methods of firefighting, fireload, Fire resistance grading, Grading for buildings, fire safety decision tree, Protection for structural components-Firefighting equipment - alarms, detectors, suppression systems, fire point ,hydrant & hoses –Firefightingservices-Site planning, Fire protection concepts in buildings, design of fire escape routes, design of egress,Requirements for fighting fire in high rise buildings, NBC planning consideration, staircase enclosure, lifts & lifts enclosures, fire lift, basements, air conditioning. Service cores - Definition, design approach, functions of service core, service core types and placements-Service cores-toilets, elevator, electrical, air conditioning, staircases, exits & life safety considerations.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Case studies/ Field visits and their critical appraisal through plates Discussion on various manufactures of Elevators & Escalators on their product categories and specification - Determining air conditioning load, identifying appropriate system developing layout,for their current design exercise - Coordination with other services, architectural and structural designs.Case studies and their critical appraisal - Application of fire and safety norms and regulations in their current design exercise.Space planning for air conditioning systems, conveyance systems, firefighting and service core.

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understand the fundamental principles of air conditioning systems and its operation in buildings.

CO2 Develop comprehensive knowledge on various types of Air conditioning systems and expertise on selection of appropriate system for a specific building typology

CO3 Develop comprehensive knowledge of architectural space planning for air conditioning systems.

CO4 Understand design strategies involved in planning and sizing of electromechanical conveyance systems.

CO5 Develop comprehensive knowledge on fire behavior, principles of firefighting, fire detection system, its integration with building and its importance in space planning.

CO6 Develop comprehensive knowledge on service core design in multistoried buildings.

TEXT / REFERENCE BOOKS

1. Thomas D.Eastop and William Edward Watson, Mechanical services for buildings, Longman scientific and technical publisher, 1992
2. Paul Lang, Principles of Air Conditioning, Delmar publisher, 1995
3. Arora C.P, Refrigeration and Air Conditioning, Tata McGraw Hill, 2000
4. M.H.Lulla, Airconditioning for Architects, Chennai
5. Jain V.K., Fire safety in buildings, New Age International Pvt. Ltd. Publishers, 2010
6. Subramaniam K., Lift Technology- An Insight on Design Basics and its Evolution, EVB, 2010
7. William H.Severns and Julian R Fellows - Air conditioning and Refrigeration - JohnWiley and Sons, London - 1988 Andrew H Buchanan - Design for fire safety - John Wiley and Sons Ltd., New York.

SAR 1303	URBAN COMMUNITIES AND BEHAVIOUR	L	T	P	Credits	Total Marks
		2	0	0	2	100

Course objectives:

- To introduce the basic concepts / theories of psychology relevant to architecture and the relationship between man and the environment.
- To construct knowledge on the fundamentals of designing public areas, theories, solutions and policies related to urban design.
- To familiarize the students with housing policies, need, demand and issues related to health and environment.

UNIT 1 INTRODUCTION **08 Hrs.**

Different perspectives on Urban Society - The concept of community, function and types. History of Urban Communities, Development, The fall of Urban Society. Introduction to environmental psychology, its importance in the field of architecture, understanding the principles of psychology, the roots and edges of environmental psychology- Theories and approaches in Environmental Psychology.

UNIT 2 URBAN METROPOLITAN SOCIETY **07 Hrs.**

Development of Urban Metropolitan Society, Projections of Urban population, Growth of Urban Areas, Dynamics of Metropolitan population growth, Contemporary Urban location theories, Lifestyle in city and suburbs, Urban Politics. The city, urban morphology, movement as motivating factor in design, monuments and dwelling, genius loci, street and square, urban conservation, responsive environments, pedestrian spaces and plazas, social life of small urban spaces, new urbanism, landscape urbanism, sustainable urban form.

UNIT 3 COMMUNAL FUNCTIONS - HOUSING, TRANSPORTATION AND HEALTH **07 Hrs.**

Housing Need, Different Housing types, Supply, Demand. Problem of Slums and squatter settlements. Urban transportation system. Health of Urban Population. Water Pollution, Air Pollution, Garbage and solid waste management. Concept of perception, visual perception, theories on environmental perception-environmental perception and design. Concepts of cognition. Environmental cognition and design. Environment and human response in relation to different environmental variables.

UNIT 4 PHYSICAL ENVIRONMENT AND HUMAN BEHAVIOUR **08 Hrs..**

Concept of personal spaces, personal space and human behavior. Personal space and environmental design. Concept of territoriality, territoriality and human behavior& territoriality and environmental design. Residential environment- Concept of Home. Neighborhood concept & Neighborhood satisfaction. Place attachment theory, Work place environment and behavior. Application of the knowledge in design of a residence, community neighborhood and other built environments.

Max. 30 Hours

Course Outcomes:

CO1: Understanding the importance of environmental psychology in the field of architecture.
CO2: Illustrating the needs of urban society and how morphology plays a role in planning and design.
CO3: Interpreting the requirements of good urban neighbourhoods and public spaces.
CO4: Comparing lifestyle and social mobility of societies in the urban and rural areas.
CO5: Classifying various housing types and their requirements in an urban scenario.
CO6: Evaluating human perception and cognition w.r.t various environmental factors.

TEXT / REFERENCE BOOKS

1. Clifford T. Morgan, Introduction to Psychology, 7th edition, Tata McGraw Hill Publications, New Delhi, 2001
2. Robert G., Environmental Psychology: Principles and Practice, Optimal books, 2002
3. Alan S. Berger, The City: Urban Communities and their problem, Brown Company Publishers, 1978
4. Jake Miller, Edited by Joanne Randolph, Who's who in an Urban Community, Rosen Publishing, 2005
5. Zubir S.S. and Brebbia C.A., Sustainable City VIII, WIT Press, 2014
6. David Rudlin and Nicholas Falk, Sustainable Urban Neighbourhood, Architectural Press, 2009
7. Amos Rapoport, Human aspects of urban form: Towards a Man - Environment approach to urban form and design, Oxford Pergamon press, 1997

SARA1701	URBAN COMMUNITIES AND BEHAVIOUR	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To recommend 'psychology' as an integral prospect of Architectural study.
- To broaden the understanding about various theories illustrating the relationship between man and environment.
- To enhance thinking and examine various concepts that connect communal living and an urban environment

UNIT 1 INTRODUCTION **4 Hrs.**

Basic concepts of Urban Society - recall the definition of community its function and types. History of Urban Communities and its development - Introduction to environmental psychology, its importance in the field of architecture - Understanding the principles and roots of environmental psychology - listing out various theories and approaches in environmental psychology.

UNIT 2 UNDERSTANDING URBAN SOCIETY **10 Hrs.**

Understanding the impact of urban population growth - Dynamics of Metropolitan population growth - Development of Urban Metropolitan Society and urban areas - study of contemporary Urban location theories, Lifestyle in city and suburbs - Urban Politics - understanding the terms urban morphology, monuments and dwelling, genius loci, street and square, urban conservation, responsive environments, pedestrian spaces and plazas, social life, new urbanism, movement as motivating factor in design, landscape urbanism, sustainable urban form.

UNIT 3 RELATIONSHIP BETWEEN HOUSING DEVELOPMENT AND COMMUNAL HEALTH **6 Hrs.**

Housing Need, Different Housing types, Supply, Demand - Problem of Slums and squatter settlements - Health of Urban Population - Water Pollution, Air Pollution, Garbage and solid waste management - Concept of perception, visual perception, theories on environmental perception-environmental perception and design - Environment and human response in relation to different environmental variables.

UNIT 4 PHYSICAL ENVIRONMENT AND HUMAN BEHAVIOUR **6 Hrs.**

Concept of personal space, personal space and human behavior - Personal space and environmental design - Concept of territoriality, territoriality and human behavior territoriality and environmental design - Residential environment - Concept of Home - Neighborhood concept & Neighborhood satisfaction - Place attachment theory, Workplace environment and behavior.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS **4 Hrs.**

Application of the knowledge - contemporary case studies - articles, book reviews, observation and recording human behaviour in an urban space, neighbourhood, etc. Identifying and documenting small issues in neighborhoods.

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Remember and recite the basics description of psychology, man and environment.

CO2 Understand various terminologies related to society, urban planning, urban politics and urbanism.

CO3 Explain and interpret various theoretical aspects of community, communal living, and relate their interconnections, particularly in social and environmental context.

CO4 Differentiate various concepts of personal space, territory, and neighbourhood.

CO5 Check and justify various concepts of physical spaces and its association with human behaviour.

CO6 Carry out a task to plan and design a small community space/ neighbourhood with recommended theories and concepts studied and analysed.

TEXT / REFERENCE BOOKS

1. Clifford T. Morgan, Introduction to Psychology, 7th edition, Tata McGraw Hill Publications, New Delhi, 2001
2. Robert G., Environmental Psychology: Principles and Practice, Optimal books, 2002
3. Alan S. Berger, The City: Urban Communities and their problem, Brown Company Publishers, 1978
4. Jake Miller, Edited by Joanne Randolph, Who's who in an Urban Community, Rosen Publishing, 2005
5. Zubir S.S. and Brebbia C.A., Sustainable City VIII, WIT Press, 2014
6. David Rudlin and Nicholas Falk, Sustainable Urban Neighbourhood, Architectural Press, 2009
7. Amos Rapoport, Human aspects of urban form: Towards a Man - Environment approach to urban form and design, Oxford Pergamon press, 1997

SAR 4061	COMPUTER STUDIO II	L	T	P	Credits	Total Marks
		0	0	3	3	100

COURSE OBJECTIVES:

- To expose the students to various aspects of computer applications into Architectural Design and Construction.
- To explore horizons of technical advances and advantages of computational technologies through the use of computer modeling, rendering and digital fabrication.
- To experience the built form and environment virtually through computer modeling and design construction.

UNIT 1 INTRODUCTION TO REVIT ARCHITECTURE 09 Hrs

Introduction to Revit - Building Information Modelling - Interface- Working with a Project- Navigation between Views, Basic Drawing and Editing- General Drawing Tools- Editing Revit Elements.

UNIT 2 MODIFYING TOOLS 12 Hrs.

Basic Modifying Tools Setting up Levels and Grid - Creating Levels- Importing CAD files- Creating Structural Grids- Adding Columns, Drawing and Modifying Walls- Creating Exterior Shell- Adding Interior Walls, Doors and Windows- Adding Doors and Windows- Loading Families - Creating Additional Part Sizes, Curtain Walls- Creating Curtain Walls- Adding Curtain Grids- Working with Curtain Wall Panels- Adding Mullions.

UNIT 3 COMPONENT TOOLS 12 Hrs

Creating Views- Duplicating View - Adding Callout Views- Creating Elevations - Creating Sections, Floors- Creating Floors - Shaft Openings - Sloped Floors, Components - Adding Components, Reflected Ceiling Plans - Creating Ceilings - Soffits - Adding Ceiling Fixtures, Roofs - Creating Roofs - Roofs by Footprint- Reference Planes and Work Planes- Roofs by Extrusion, Vertical Circulation - Adding Stairs - Creating Ramps - Working with Railings - Construction Documentation.

UNIT 4 DIMENSIONING & TEXTING 12 Hrs.

Setting up Sheets - Placing and Modifying Views - Printing Sheets, Annotation - Working with Dimensions - Working with Text - Adding Detail Lines and Symbols, Tags and Schedules - Adding Tags- Rooms and Room Tags - Working with Schedules - Creating Legends, Detailing in Revit - Setting up Detail Views - Creating and Annotating - Details -Keynoting and Keynote - Legends - Patterning..

Max. 45

Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: To confidently present the individual's design intent, design process and enhance the presentation skill.
CO2:. To generate more design possibilities.
CO3: To visualize designed built form and the environment virtually.
CO4:. To manage time effectively.

TEXT / REFERENCE BOOKS

1. Eddy. Krygiel, Mastering Autodesk Revit Architecture 2011- Wiky Publishing 2010
2. Phil Read, Mastering Autodesk Revit Architecture 2013
3. James Vandezande, Eddy Krygiel, Autodesk Revit Architecture 2013 essentials, 2013

SARA2402	COMPUTER AIDED ARCHITECTURAL GRAPHICS - II	L	T	P	Credits	Total Marks
		1	0	2	2	100

Continuous Assessment	End Semester Examination	Min Pass Marks		
		Continuous Assessment	End Semester Examination	Total
70	30	35	15	100

COURSE OBJECTIVES:

- To create 3 dimensional visualizations for effective representation of architectural design
- To develop advanced proficiency in software for architectural design, presentation and building information management.

2. .

MODULE 1 COMPUTER RENDERING FOR VISUALIZATIONS 20 Hrs.

Computer Rendering as a technique for Visualizations- Photorealistic vs Stylized Visuals - Introduction to V-Ray - 5 Step Render Workflow - Framing: Photographic Composition - Lighting: V-ray lights, Sun and Professional lighting - Materials: Creation, Properties and Setup - Final Render: Settings for Interiors and Exteriors, Day and Night, Render Elements - Post Production: Corrections and Techniques - Exploring Global Settings, Camera, Environment, Output, Indirect Illumination, VFB channels

MODULE 2 INTRODUCTION TO 3D MASSING 4 Hrs.

Introduction to Revit - Building Information Modelling - Interface- Working with a Project- Navigation between Views, Basic Drawing and Editing- General Drawing Tools

MODULE 3 EDITING AND MODIFYING TOOLS 16 Hrs.

Basic Modifying Tools Setting up Levels and Grid - Creating Levels- Importing CAD files- modifying walls - Adding Interior Walls, Doors and Windows - Loading Families - Creation and modifying on Floors - Roof -Stairs -Ramp -Ceiling -Railings

MODULE 4 COMPONENT TOOLS 16 Hrs.

Setting up Sheets - Placing and Modifying Views - Printing Sheets, Annotation - Working with Dimensions - Working with Text - Adding Detail Lines and Symbols, Tags and Schedules - Adding Tags- Rooms and Room Tags - Working with Schedules - Creating Legends, detailing in Revit - Setting up Detail Views - Creating and Annotating - Details -Keynoting and Keynote - Legends - Patterning.

MODULE 5 CONSTRUCTIVE LEARNING 4 Hrs.

Draft the previous semester-built form in Revit and create a 3D model for the building and represent over all into presentation format with computer render visualizations submitted as portfolio at end semester viva voce.

Max. 60 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Create photorealistic and stylized imagery of architectural objects through computer rendered perspectives
CO2 Apply efficient workflows for modeling, texturing, lighting and rendering processes required to create architecture visualizations
CO3 Utilize Revit software for conceptual form finding and massing exercises.
CO4 Articulate the purpose of BIM and how it is applied in the Autodesk Revit software.
CO5 Implement representation of objects in architecture model, and work with elevation, section, and 3D views.
CO6 Generate customizations and templates for repetitive modelling functions.

TEXT / REFERENCE BOOKS

1. Eddy Krygiel, P. R. (2012). Mastering Autodesk Revit 2013 Architecture. Sybex.
2. Lisa DaNae Dayley, B. D. (2013). Photoshop CC Bible. John Wiley & Sons.

SAR 4060	DESIGN STUDIO V	L	T	P	Credits	Total Marks
		0	0	13	9	400

COURSE OBJECTIVES

- To expose the students on services and facilities to be provided to urban communities and train them to deal with the challenges posed in the design of multi-functional public community building in an urban setting

FOCUS

Design of simple medium rise buildings in smaller sites with exploration of form integrated with function incorporating barrier free environment principles.

METHODOLOGY PROPOSED

To expose the students to the issues involved through visits to similar typologies / special lectures / orientation on urban challenges (limitation of land / regulations). Students will be encouraged to approach the problem with a three dimensional approach using study models, 3d sketches, etc. Students will work on manual presentations only.

DESIGN INTEGRATION

Students would be exposed to deal with different projects.

SUGGESTED TYPOLOGIES:

- Shopping arcades / malls / bazaar
- Auditorium / performing centres / museums / gaming parlour / club house
- Marriage halls / community halls / memorial complexes

Max. 195 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Developing an inclination to identify and analyse suitable literature and live case studies appropriate to the design typology

CO2: A thorough understanding of the important local bye laws and Standards applicable to the specific typology

CO3: Developing an appropriate design intent based on notions, ideas with the three dimensional perception as part of design process.

CO4: Integration of the structural grid, parking, services and landscape in architectural design.

TEXT / REFERENCE BOOKS

1. Joseph DeChiara, Time Saver Standard for building types, Mc Graw Hill, 2nd Edition, 1980
2. Donald Watson and Crosbie, Time Saver Standards for Architectural Design, MGH, 2005
3. National Building Code of India, Bureau of Indian Standards, 2005
4. Ernst and Peter, Neufert's Architect's Data, Blackwell publishing professional, 2002
5. Dawson John A. and Lord, Dennis, Nichols, Shopping Centre Development, Policies and Prospects, Nichols, 2005
6. Holme Siedle, James, Barrier Free Design : A Manual For Building Design, Architectural Press, 1996
7. Ham R., Theatres: Planning Guide For Design & Adaptation, Butter Worths, 2005
8. Lawson F., Congress, Convention & Exhibition Facilities: Planning, Architectural Press, 2005

SARA9501	DESIGN STUDIO V	L	T	P	Credits	Total Marks
		0	1	12	7	400

Continuous Assessment	End Semester Examination	Min Pass Marks		
		Continuous Assessment	End Semester Examination	Total
250	150	125	75	200

COURSE OBJECTIVES

- To expose the students on facilities to be provided to urban communities and train them to deal with the challenges posed in the design of multi-functional public buildings in an urban setting.
- To build upon the foundational design skills with more complex constraints and context. It integrates aspects of Architectural theory, Modern building technology, and Computation into the design process
- To understand and resolve the structural design and use of appropriate materials

METHODOLOGY PROPOSED

STAGE I

Studying the design aspects and parameters involved in medium rise buildings with focus on context, user analysis, bye laws and regulations. Analysis of various approaches and strategies to design problem solving using creative thinking techniques, theories related to human behavior and environmental design, climate responsive and barrier free environment principles.

STAGE II

Phase I

Conceptualize and develop novel solutions to built-environment by evolving innovative forms for the perceived Architectural program by using three-dimensional approach through study models, 3d sketches, digital models and exploration of computer aided drawings and presentation.

Phase II (Iteration and Ideation)

Resolving the given design program by experimentation and multiple iterations leading to three-dimensional composition by understanding the layers of space making.

Phase III

Communicate the final outcome through high standard graphical representations (legible Architectural drawings) along with integration of structures and materials

DESIGN INTEGRATION

Application of the knowledge gained from core courses like theories of thinking, climatic design in developing architectural solutions. Computational and presentation skills previously acquired may be incorporated.

TUTORIAL	PERSONAL BRANDING	6 Hrs.

Choosing factors to align based on Vision and mission- Social presence and development- Creativity, Critical thinking, Problem solving; Motivation, Persuasion, Negotiation.

Max. 195 Hours

SUGGESTED TYPOLOGIES:

The focus is on creating complex-built form, connecting multiple spaces and users in a mid-rise built environment like Nursing Homes / Club house/ Museums/ Memorial Complex / Cultural Centre, etc.,

COURSE OUTCOME

On completion of the course the student will be able to

CO1 Examine and infer from suitable literature and live case studies appropriate to the design typology.

CO2 Proposition of precise understanding of the important local bye laws and Standards applicable to the specific typology.

CO3 Developing an appropriate design intent based on notions, ideas with the three-dimensional perception as part of the design process.

CO4 Apply the different techniques of creative thinking in design problem solving.

CO5 Curate a deeper understanding of the need for climate responsive design and universal design.

CO6 Integrate structural grid, parking, services and landscape in architectural design.

TEXT / REFERENCE BOOKS

De Chiara, J., & Crosbie, M. (2017). *Time-saver standards for building types* (4th ed.). McGraw-Hill Education.

Neufert, E. (2019). *Architects' data* (5th ed.). Wiley Blackwell.

Gauzin-Muller, D. (2002). *Sustainable architecture and urbanism*. BirkhauserVerlag AG.

Krishnan, A., Baker, N., Yannas, S., &Szokolay, S. (2017). *Climate responsive architecture:A Design Handbook for Energy Efficient Buildings* (1st ed.). McGraw Hill Education.

Degenhart, C., Heiss, O., Ebe, J., & Fran Ford. (2010). *Barrier-free Design: Principles, Planning, Examples*. Birkhauser.

Bassler, B. (2008). *Architectural graphic standards*. Hoboken, N.J.: John Wiley & Sons.

SAR1306	BUILDING SERVICES IV	L	T	P	Credits	Total Marks
		2	0	0	2	100

Course objectives:

1. To develop an understanding of the advanced building services such as Air conditioning and fire safety system for multi storey building.
2. To give an insight to the advanced service integration system and their applications in building.
3. To foster the ability to choose appropriate systems and integrate the same in their design projects.

UNIT 1 INTRODUCTION TO AIR CONDITIONING SYSTEMS 8 HRS.

Introduction to A/C conditions, basic of refrigeration systems, components of refrigeration system, compressor, condenser, control devices, evaporator, filters cooling tower. Vapour compression cycle. Concepts of cooling load, calculation of cooling load-conductivity, transmission heat load, internal heat gain, concepts of zoning, room air distribution-types of outlets

UNIT 2 AIR CONDITIONING SYSTEMS 6 Hrs.

Types of window and split a/c. Package units, Factory made and split units, centralized plants and chilled water plants, Comparison of various systems-Space requirements for A/c units, AHU's & a/c plant, ducting, testing and maintenance on ducts and pipes.-Designing the Built Environment and selecting the materials and elements for energy efficient Air Conditioning, Protection of Ozone Layer.

UNIT 3 FIRE AND SERVICE CORES 10 Hrs.

Introduction, fire triangle, methods of fighting fire, Classifying fire, objectives of fire safety, Fire Hazards, fire load, Fire resistance grading, Grading for buildings, fire safety decision tree, Protection for structural components-Fire fighting equipment - alarms, detectors, suppression systems, fire point ,hydrant & hoses – Fire fighting services-Site planning, Fire protection concepts in buildings, design of fire escape routes, design of egress, Requirements for fighting fire in high rise buildings - staircase enclosure, lifts & lifts enclosures, fire lift, basements, air conditioning, dampers. Service cores - Definition, design approach, functions of service core, service core types and placements-Service cores-toilets, elevator, electrical, air conditioning, staircases, exits & life safety considerations.

UNIT 4 SERVICE INTEGRATION 6 HRS.

Integration of services - Water pump monitoring & control Electrical - power monitoring - fire alarm system –fire fighting system and monitoring - safety and security systems - FAS, PAS - access control system – fire fighter telephone system - CCTV surveillance system - Control of Computerized HVAC Systems - IBMS system and its components.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Construct knowledge of the fundamentals of air- conditioning systems and applications in buildings.

CO2: An understanding of fire safety, fire fighting and prevention systems in building according to building codes in context.

CO3: Acquiring knowledge about fire fighting systems for a high rise building.

CO4: Ability to select appropriate fire fighting systems and their installation.

CO5: Understanding the fundamentals of service cores, its types and placement in a building.

CO6: An insight to the incorporation of IBMS system within a building and inculcate the concepts into their design projects

TEXT / REFERENCE BOOKS

1.Thomas D.Eastop and William Edward Watson, Mechanical services for buildings, Longman scientific and technical publisher, 1992
2. Paul Lang, Principles of Air Conditioning, Delmar publisher, 1995
3. Arora C.P, Refrigeration and Air Conditioning, Tata McGraw Hill, 2000
4. Jain V.K., Fire safety in buildings, New Age International Pvt. Ltd. Publishers, 2010

SARA1602	BUILDING SERVICES-IV	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To understand the basic principles of physics of sound and enable them to apply the knowledge in various buildings.
- To make students realize the importance of acoustics and equip them with the knowledge for designing acoustically sound performing spaces.
- To make the students understand the design strategies and process in selecting the appropriate vertical transportation devices
- To explore the necessity of integrating the services and centralised control management

UNIT 1 INTRODUCTION TO SOUND 4 Hrs.

Characteristics of sound – reflection, diffusion, transmission, diffraction, absorption - Human ear and hearing – Basic terminology: frequency, pitch, tone, timbre, sound pressure, sound intensity, decibel scale, loudness, threshold of audibility and pain, sound masking, inverse square law – frequency range of audible sounds Types of noises, transmission of noises, acoustical comfort, Concept of Geometric acoustics

UNIT 2 ACOUSTICS 8 Hrs.

Planning & Design against outdoor noise – for air traffic, road traffic and rail traffic – air borne noise & structure borne noise / impact noise – sound isolation – sound transmission class - Acoustic defects – reverberation time - Absorption coefficients of materials. Sound absorbing materials: porous materials, panels, membrane absorbers, space/functional absorbers & cavity / Helmholtz resonators- ECBC requirements

UNIT 3 DESIGN OF PERFORMING SPACES 8 Hrs.

Basic principles in design of auditorium, concert halls, open air theatre, Recording and Broadcasting studio. Sound systems – introduction – types – equipment's such as mics, speaker's etc. – standards – basic principles of sound system design. Exposure to acoustic design and simulation software.

UNIT 4 SECURITY SYSTEMS AND SERVICES INTEGRATION 6 Hrs.

Safety and security systems, PAS - access control system - firefighter telephone system - CCTV surveillance system - Control of Computerized HVAC Systems -Integration of services - Water pump monitoring & control, Electrical - power monitoring - fire alarm system, firefighting system and monitoring - IBMS system and its components –ECBC requirements.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Assignments on solving acoustic problems – Sabine's formula. Case study and observation / analysis of Acoustical Spaces – Concert halls, recording studio, etc. - Discussion on acoustic materials available in market with catalogue and samples. Assignment-Working out individual service layout and arriving coordinated layout for IBMS - Case study on IBMS and critical analysis of the service integration - Applying the knowledge in their current design exercise.

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understand the fundamental principles of acoustics and its importance in architectural design.

CO2 Describe the different types of noise, their transmission and the measures to isolate / control them

CO3 Analyze the various behavior of sound in indoor and outdoor space.

CO4 Solve the acoustical design problems in a space by acoustic treatments.

CO5 Design architectural spaces with respect to acoustic principles

CO6 Understand the need of service integration and automated control

TEXT / REFERENCE BOOKS:

1. SiraskarK.A. (1972). Acoustics in Building Design, Orient Longman Ltd., 1972
2. Kandaswamy S., (2005), Architectural Acoustics and Noise Control, Allied publishers Pvt. Ltd., 2005
3. Egan,D(2007).Architectural Acoustics, Rose publishing classics,
4. Marshall long, Architectural Acoustics, Elsevier academic press New York, 2006
5. Cavanaugh,W.J,Tocci,G.C.,. Wilkes, (2009). J.A Architectural Acoustics: Principles and practice,2nd edition, John Wiley & sons,
6. Sinopoli, J. (2010), Smart Buildings for Architects,Owners and Builders, Elsevier Inc.
7. Energy Conservation Building Code user guide – ECBC, Bureau of Energy Efficiency, New Delhi, India

SAR1307	THEORIES OF THINKING	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To introduce 'design' as an integral feature of a larger context in the current scenario.
- To familiarize the young minds with the nature of design problems, methodology, creative techniques and the outcomes.
- To explore the various channels to creativity and the directions through which they are expressed in the built form and the environment.

UNIT 1 INTRODUCTION TO DESIGN 6 Hrs.

Definition of Design, Understanding of Design, Purpose and nature of good design, evaluation of design, types of Design, classification, role of designer, Context for Architectural design problems, design process, stages in the design processes, from different considerations - Broadbent, Christopher Alexander, Wade.

UNIT 2 DESIGN PROBLEMS AND DIRECTIONS 8 Hrs.

Context for the rise of the Design Methodology Movement, Different approaches in design, problem solving or intuitive, formulation of problems, nature of creative design problems, goals in design, different types of designs and the thrust given to the various solutions.

UNIT 3 DESIGN THINKING 8 Hrs.

Understanding the terms creativity, imagination etc. Theories on thinking, convergent & divergent thinking, lateral & vertical thinking, six hat thinking by Edward de Buno. Creative techniques like checklists, brainstorming etc, design puzzles & traps, blocks in creative thinking. Introduction to various theories in Architecture such as aesthetic theory, proxemic theory. Theory related to human behaviour and environmental design.

UNIT 4 CHANNELS TO CREATIVITY 8 Hrs.

Types of concepts, process of creativity, tangible and intangible channels to creativity in Architecture – the obscure, metaphors, transformation, paradox, precedents, nature, association with other arts, literal interpretation, materials, geometry, origami, literature and poetry etc. philosophies of famous architects.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Generalizing the spirit of the term 'design' in various contexts from multiple perspectives.

CO2: Understanding the types of design problems, need to decode the brief to evolve 'problem driven outcomes'.

CO3: Ability to compare and synthesize mapped design methodologies in various contexts.

CO4: Critically analyze the different types of thinking and creative techniques in different domains.

CO5: Acquiring knowledge to interpret the various channels to creativity and critically analyze the direction through which the ideas are translated in architectural domain.

TEXT / REFERENCE BOOK

1.Christopher Alexander, Pattern Language, Oxford University Press, 1977
2.Edward De Bone, Lateral Thinking: Creativity step by step, Harper & Row, 1970
3.Geoffrey Broadbent, Design in Architecture, Architecture & Human Sciences, John Wiley & sons, New York, 1973
4.James C. Synder and Anthony J. Catanese, Introduction to Architecture, McGraw Hill Inc., 1979
5.Anthony C. Antoniades, Poetics of architecture: Theory of design, John Wiley & Sons, Newyork, 1982
6.Tom Heath, Method in Architecture, John Wiley & sons, Newyork, 1984

SARA1503	THEORIES OF THINKING AND DESIGN PROCESS	L	T	P	Credits	Total Marks
		2	1	0	3	100

COURSE OBJECTIVES:

- To introduce 'design' as an integral feature of a larger context in the current scenario.
- To give a deeper understanding of the nature of design problems, outcomes and techniques that enhances creative thinking.
- To explore the various channels to creativity and the philosophies of famous architects.

UNIT 1 INTRODUCTION TO DESIGN 10 Hrs.

Definition of Design, Understanding of Design, Purpose and nature of good design, evaluation of design, types of Design classifications, role of a designer, Scale, process and production; Context for design problems, design process, stages in the design processes, from different considerations - Broadbent, Christopher Alexander, Wade.

UNIT 2 DESIGN PROBLEMS, PROCESSES AND OUTCOMES 10 Hrs.

Context for the rise of the Design Methodology Movement, Different approaches in design- synchronous and asynchronous approaches, regression and escalation, participatory approach to design, design as process involving time and people, problem solving or intuitive, formulation of problems, nature of creative design problems, goals in design, different types of designs and the thrust given to the various solutions.

UNIT 3 DESIGN THINKING 10 Hrs.

Understanding the terms creativity, imagination etc. types of creativity, Theories on thinking, convergent & divergent thinking, lateral & vertical thinking, six hats thinking by Edward de Buno. Creative techniques like checklists, brainstorming and types, diagramming, mapping, zi-zo-zi, morphological analysis, SCAMPER, parametric exploration, etc, design puzzles & traps, blocks in creative thinking. Introduction to various theories in Design such as aesthetic theory, proxemic theory. Theory related to human behaviour and environmental design.

UNIT 4 CHANNELS TO CREATIVITY 10 Hrs.

Types of concepts, process of creativity, tangible and intangible channels to creativity in Architecture and Design - the obscure, metaphors, transformation, paradox, precedents, nature, association with other arts, literal interpretation, materials, geometry, origami, literature and poetry etc. Philosophies of famous Architects and Designers.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 5 Hrs.

Literature studies of diverse design processes evolved by contemporary architects with a focus on both tangible and intangible channels to creativity.

Max. 45 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Apply the elements and principles of design in aesthetic and utilitarian art.
CO2 Analyse the types of design problems to develop 'problem driven outcomes.
CO3 Explore the various approaches to enhance thinking skills.
CO4 Interrogate techniques to identify new directions in design thinking.
CO5 Analyze the tangible and intangible approaches to creativity in architecture.
CO6 Generate new channels to evolve ideas conceptually

TEXT / REFERENCE BOOKS

1. Alexander, C. (1977). Pattern Language, Oxford University Press
2. De Bone, E. (1970). Lateral Thinking: Creativity step by step, Harper & Row
3. Rendell, J. (2006). Art and architecture: a place between (pp. 1-240). London: IB Tauris..
4. James C. S. &. Catanese, A.J. (1979). Introduction to Architecture, McGraw Hill Inc.
5. Antoniades,A.C (1982)., Poetics of architecture: Theory of design, John Wiley & Sons, New York,
6. Heath,T. (1984). Method in Architecture, John Wiley & sons, New York.

		L	T	P	Credits	Total Marks
SAR4062	DESIGN STUDIO VI	0	0	14	9	400
		Continuous Assessment		Univ Viva		Min Pass Marks
		300		100		200

COURSE OBJECTIVES

- To explore the challenges posed in the designing group of buildings in large site and the importance of structure and service integration in architectural creations.

METHODOLOGY PROPOSED

To train the students on the various planning and infra-structure aspects of planning large sites through seminar / special lecture and visits to site.

DESIGN INTEGRATION

Steel & Glass Technology - the previous semesters Building Construction techniques will complement their design.

HVAC & Fire safety measures as per NBC - shall be integrated with the design.

Students would be exposed to a project of a bigger scale with two different stages.

SUGGESTED TYPOLOGIES

- Campus Planning for Institutions of higher learning
- Integrated Townships with residential / Community spaces and work spaces
- Large commercial complexes

COURSE OUTCOMES

On completion of the course the student will be able to

Design of medium rise large buildings with reasonable complexities in site which are large involving macro level planning and the students will be exposed to the importance of architectural working drawings.

TEXT / REFERENCE BOOKS

1. Joseph DeChiara, Time Saver Standard for building types, Mc Graw Hill, 2nd Edition, 1980
2. Watson, Donald & Crosbie, Time Saver Standards for Architectural Design, MGH, 2005
3. National Building Code of India, Bureau of Indian Standards, 2005
4. Ernst and Peter, Neufert's Architect's Data, Blackwell publishing professional, 2005
5. Wakita/Linde, The Professional practice of Architectural working drawing, John Wiley & sons, 1984
6. Redstone, Louis. G., Institutional Buildings - Architecture of The Contro, MGH, 2005
7. Thompson, Arthur, Introduction To Construction Drawing, Edward Arnold, 2005
8. Donald Watson and Michael J., Time-Saver Standards For Architectural Design Data, MGH, 2005
9. Paul Silver and David Miles, Institutional Architecture, PBC International inc., 2005

SARA9601	DESIGN STUDIO VI	L	T	P	Credits	Total Marks
		0	0	13	7	400

Continuous Assessment	End Semester Examination	Min Pass Marks	
		Continuous Assessment	End Semester Examination
250	150	125	75

COURSE OBJECTIVES:

- To explore the challenges posed in designing group of buildings in large sites.
- To practice the knowledge on structural resolve and building service integration in Architectural creations.

METHODOLOGY PROPOSED

STAGE I

Study through Participatory workshops/seminars/Special lectures on the various energy efficient planning and infra-structure aspects of designing large sites. Research on the various aspects of multi-functional, multi storied, Service intensive complex-built environments with horizontal and vertical circulation and understanding the dynamics of large span structures and integrating appropriate structural systems. Explore latest trends in construction technology andmaterials.

STAGE II

Phase I

Conceptualize and integrate complex issues of the given program, the site, and the vertical and horizontal layering of functional requirements and services with a special focus on energy efficient solutions for both the building and the environment. The design solution should accomplish a strong resolve towards building structures and services systems.

Iteration and Ideation (Phase II)

Resolving the given design program by experimentation and multiple iterations to understand the interrelationship of spaces, the space in between buildings, the structural and services integration.

Phase II

Communicate the final outcome through high standard graphical representations (legible Architectural drawings) with details of structural systems, various services and energy efficient techniques incorporated in the design solution.

DESIGN INTEGRATION

Application of the knowledge gained by the students from core courses like energy efficient architecture, building structures and building services in developing the design.

Max. 195 Hours

SUGGESTED TYPOLOGIES:

Mixed use or single use high rise buildings in a typical urban context like Large commercial complexes /multiplex/ hospital/ hotels/ serviced apartments, etc.,

COURSE OUTCOME

On completion of the course the student will be able to

CO1 Analyze a multi-functional, multi storied, multi-use-built environments and render the needed spatial qualities

CO2 Develop a knowledge repository to understand the importance of spatial proximities and connections

CO3 Solve complex building structural systems in an efficient way and explore various combinations in structural systems

CO4 Analyze and apply integration of specialized building services in multilevel planning of buildings.

CO5 Evolve design focusing on Integrating sustainable energy concepts and techniques.

CO6 Create an innovative built environment using various new age materials and advanced construction technology.

TEXT / REFERENCE BOOKS

1. De Chiara, J., & Crosbie, M. (2017). *Time-saver standards for building types* (4th ed.). McGraw-Hill Education.
2. Neufert, E. (2019). *Architects' data* (5th ed.). Wiley Blackwell.
3. Bureau of Indian Standards. (2016). *National building code of India 2016*.
4. Gauzin-Muller, D. (2002). *Sustainable architecture and urbanism: Concepts, Technologies,Examples*. BirkhauserVerlag AG.
5. Parker, D. And Wood, A. (2013). The Tall Buildings Reference Book. New York: Routledge.
6. Kloft, E. and Johann, E. (2003). *High-rise Manual: Typology and Design, Construction and Technology*, 1st Ed. Basel: BirkhauserVerlag AG.
7. Giedion, S. (2009). Space, Time and Architecture, rev. Ed. Cambridge: Harvard University Press.
8. Lawson, F. (2007). *Congress, convention and exhibition facilities*. Oxford u.a.: Architectural Press.

SAR4063	PROFESSIONAL TRAINING	L	T	P	Credits	Total Marks
		0	0	0	12	600

COURSE OBJECTIVES

- To give the student supervised opportunities to experience the essential practical aspects emphasized in an architect's office
- To provide opportunities to apply their acquired skills and knowledge in working life.

FOCUS

As per the norms laid by the Council of Architecture, India, a candidate has to undergo Professional Training for one semester in an approved architectural firm established not less than five years with a registered architect. A student is to undergo this Professional Training during the seventh semester. The evaluation of the performance of the students in Professional Training shall be as per the assessment procedure laid out in clause 12c (vi) in the regulations.METHODOLOGY PROPOSED

- Procedure for practical training and evaluation mechanism has been evolved in consultation with practicing architects and the feed backs received.
- Monthly report & Final training report - 50% marks University Viva Voce - 50% marks

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Analyzing the strength and the field of interest while choosing the office for doing internship
CO2: Understand the challenges to be faced in the professional life.
CO3: Comprehend the interaction between theory and practice
CO4: Enabling the students to deal with clients, contractors, masons, etc.
CO5: Developing Leadership skills, team work, co-ordination abilities

S21APT	PROFESSIONAL TRAINING		L	T	P	Credits	Total Marks
			0	0	0	10	600
Continuous Assessment	End Semester Examination	Min Pass Marks					
		Continuous Assessment	End Semester Examination				
200	400	100	200				

COURSE OBJECTIVES

- To apply the knowledge gained in the classroom learning in the creation of real time Architectural projects and thematically understand the various stages involved in the successful execution.
- To master the craft of handling Architectural projects and learn the office work flow structure and develop the qualities of an entrepreneur.

METHODOLOGY PROPOSED

Analyze and **document** the strength and the area of specialization while selecting an office for doing an internship. Training shall be taken in the office of an Architect registered with CoA with minimum five years' experience after CoA registration, and working in the field of Architecture. In case the student chooses to work in a firm where the principal is not an architect, he/she must be mentored by an employee of the firm registered with CoA and with the necessary experience. The evaluation of the performance of the students in Professional Training shall be as per the assessment procedure laid out in clause 12c (iv) in the regulations.

COURSE OUTCOMES

On completion of the course the student will be able to

CO1 Application and importance of drawings in the process of building construction and execution.
CO2 Comprehend the inter relationship between Architectural theory and professional practice.
CO3 Apply the professional aspects of an architecture office/company and address multiple issues in conception, preparation and execution of a project on a site.
CO4 Enabling the student to interact and deal appropriate with clients, contractors, vendors, workers on site etc.
CO5 Understand and mitigate the challenges to be faced in professional life.
CO6 Develop leadership skills, team work, co-ordination abilities.

SAR1401	INTRODUCTION TO LANDSCAPE ARCHITECTURE	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To introduce the fundamentals of Landscape architecture and landscape design elements.
- To familiarize the students about the evolution of Landscape Architecture across the history.
- To emphasize the various principles, elements and construction techniques of landscape design.
- To strengthen the students knowledge through case studies in Landscape Architecture

UNIT I INTRODUCTION TO LANDSCAPE 8 Hrs.

Introduction to Landscape Architecture - its scope and role in Architecture and Planning-Landscape Interpretation-Landscape as nature, habitat, Artefact, system, problem, wealth, ideology, history, place and aesthetic-Hard and soft landscape elements-Functional and aesthetic consideration in design-Landscape Planning, Landscape Conservation, Urban Landscape.

UNIT 2 HISTORY OF LANDSCAPE ARCHITETCURE 6 Hrs.

Introduction to landscape historic styles-Mughal gardens of India: Shalimar Bagh and TajMahal, Japanese gardens: Saihoji, Ryoanji & Katsura Imperial palace, Italian Renaissance gardens: Villa Lante At Bagnania, 19th century landscapes - Central Park at America.

UNIT 3 LANDSCAPE DESIGN AND CONSTRUCTION 8 Hrs.

Basic principles of Landscape Design and the Visual composition-Plant selection-Structural characteristics of plants-Creating spaces with plants-Identification of native trees and Indian shrubs-Elements in Landscape design-Landscape engineering-Cutting and filling-Grading-retaining walls-Drainage-Constructions of verticals, walls, fencing, pools etc-pavements-ponds-fountains-sculpture-steps-ramps-underwater construction-precautions to river bank and coastal constructions

UNIT 4 URBAN LANDSCAPE 8 Hrs.

Lighting in garden and ponds-Avenue lighting-terrace gardens-Terrace pool-Rock garden.-Landscaping for Residential areas, Children park and Institutional building-Landscape design for water front as road landscaping-avenues, Roof gardens-Landscape design of small project of dwelling level and neighborhood level including paving and street furniture design (area of 2000 to 3000 sq. meters). **Max. 30 Hours**

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Explore the interactive relationship between humans and their environment.
CO2: Respond with a methodical approach to values and concerns associated with historical and contemporary landscape.
CO3: Develop an understanding of how to utilize the principles and elements of Landscape design.
CO4: Assert the role of Landscape design in ecological balance and impacts of human activities.
CO5: Elaborate on the construction techniques in Landscape Architecture and current practices.
CO6: Demonstrate an understanding of a range of scales from regional planning to garden design.

TEXT / REFERENCE BOOKS

1. Geoffrey and Susan Jellicoe, The landscape of Man, Thames and Hudson,1987
2. Cliff Tandy Hand Book of Urban Landscape, The Architectural Press, London, 1971
3. John L. Motloch, Introduction to Landscape Design, 2nd edition, John Wiley & Sons, 2001
4. John O. Simonds, Landscape Architecture: A manual of site planning and design, Mc Graw Hill, 1983
5. Theodore D. Walker, Planting Design, John Wiley and sons, Canada,1991

SARA 1001	INTRODUCTION TO LANDSCAPE ARCHITECTURE	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To introduce various elements and principles of landscape design, landscape planning, and construction techniques.
- To broaden the understanding of landscape architecture and its role in improving indoor and outdoor environments.
- To appreciate and strengthen competence in dealing with the analytic, artistic and technical aspects of designing open spaces at different scales

UNIT 1 INTRODUCTION TO LANDSCAPE 4 Hrs.

Introduction to Landscape Architecture - its scope and role in Architecture and Planning- Importance of Geology, Hydrology, Flora and Fauna with Landscape Design- hard and soft landscape - Functional and aesthetic consideration in design- Landscape Planning, Landscape Conservation, Urban Landscape.

UNIT 2 HISTORICAL OVERVIEW OF LANDSCAPE ARCHITECTURE 10 Hrs.

Origin of garden in Indian History -Different types of gardens - Vedic, Chinese, Japanese, Italian Renaissance, French, Mughal and English gardens - 19th century landscapes - public parks and residential gardens of colonial period - salient features of various gardens - example depicting various landscape styles - A comparative study of the major Historical landscape garden styles of India and the world; Mughal, European, Japanese and renaissance etc.

UNIT 3 ELEMENTS OF LANDSCAPE DESIGN 8 Hrs.

Basic principles of Landscape Design - natural elements - Landforms, rock water, vegetation - plant types -structure, colour - climate and their role in landscape design - and the Visual composition- Man made elements - garden furniture, lighting fixtures, signage and sign boards, fences, garden hardware and surface treatment, paving materials, surface drainage, artworks, planters, garden shelters, artificial rocks, plants and waterfalls.

UNIT 4 LANDSCAPE DESIGN AND DETAILS 6 Hrs.

Plant selection - Structural characteristics of plants - Creating spaces with plants- Identification of native trees and Indian shrubs -Landscape Construction details- Grading and earthwork - retaining walls-Drainage- verticals, walls, fencing, pools, etc. pavements - ponds - fountains - steps - ramps - underwater construction - waterfront and river bank constructions - terrace - roof gardens

UNIT 5 SUGGESTIVE ASSIGNMENTS 2 Hrs.

Case Studies & Site visits reports on Street landscapes - commercial areas - tot lots - recreational spaces - residential parks etc.

Max. 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 List and describe various elements and principles of landscape architecture.

CO2 Interpret different styles of landscape design with respect to their characteristics and application.

CO3 Illustrate with examples development of landscape architecture during different time periods.

CO4 Inspect and infer the advantage of selection and application of native species with respect to the site and neighbourhood context.

CO5 Critique various options available for lighting in landscape design and justify diverse methods adopted for designing avenues, pockets and nodes in urban areas.

CO6 Plan and design a proposal for the recommended area applying the elements and principles of landscape design.

TEXT / REFERENCE BOOKS

1. Jellicoe, G., & Jellicoe, S. (1987). The landscape of man: shaping the environment from prehistory to the present day (p. 8). London: Thames and Hudson.
2. Tandy, C. (Ed.). (2013). Handbook of urban Landscape. Elsevier.
3. Robinson,N. (1998). The planting design and book, Gower publishing company limited
4. Motloch, J. L. (2000). *Introduction to landscape design*. John Wiley & Sons.
5. Ormsbee, S. J. (1983). Landscape architecture: a manual of site planning and design. Rev.
6. De Chiara. J. & . Koppelman,L.E (1929). Site Planning Standards,
7. Walker, T.D. (1991). Planting Design, John Wiley and sons

SAR1402	SPECIFICATION AND ESTIMATION	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To introduce the fundamentals of specification and estimation in construction of buildings
- To understand and apply techniques , methods to determine the cost involved for various works
- To compare and analyse the various technologies and innovations
- To interpret valuation reports through case studies

UNIT1 SPECIFICATION AND SPECIFICATION WRITING 6 Hrs.

Necessity & importance of specification, Types of Specification - Specification writing, 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 2 ESTIMATION 10 Hrs.

Types & purpose of estimation - Approximate estimate of buildings - Bill of quantities - 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 - Deriving detailed quantity estimates for various items of work of a building like earthwork excavation, brick work, plain cement concrete, Reinforced cement concrete works, wood work, iron works, plastering, painting, flooring, weathering course for a single storied building.

UNIT 3 RATE ANALYSIS 8 Hrs.

Analysis of rates for main items of work using current market rates for materials, labour, plants, tools and equipment, transportation, handling, storage and contractor's profit - Preparing rate analysis for P.C.C, R.C.C, brick work, stone work, plastering and finishes.

UNIT 4 ECONOMICS AND ARCHITECTURE 6 Hrs.

Economics as a determinant to Architectural land & Built form - Construction Technology - Materials, technology, innovations, Labour - Site selection factors - Demand survey - Cost & sale value (guided by market)-Feasibility study and Government Proposals - Methods of contracting and its link to specification drafting - Business Environment and structure in practice - Valuation, depreciation and its implications - case studies. **Max. 30 Hours**

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Identify the importance of specification and estimation in construction
CO2: Categorize detailed specification and estimation for all stages of construction
CO3: Determine the rate analysis for various items of work involved
CO4: Compare and contrast construction technology and innovation
CO5: Integrate the knowledge learnt in preparing valuation reports
CO6: Justify market value based on current scenario

TEXT / REFERENCE BOOKS

1. Rangwala S., Estimating and Costing (Professional practice), Anand Charotar Publishing House, 1990
2. Estimating, Costing, Specification and Valuation in Civil Engineering, M. Chakraborti, 2006
3. Dutta B.W., Estimating & Costing, UBS Publishers Distribution Pvt. Ltd., India, 1991
4. Gurcharan Singh and Jagdish Singh, Estimating Costing and Valuation, Standard Publishers Distributors, 2012
5. Tamilnadu Building Practice, Volume I, Government Publication
6. P.W.D Standard Specifications and Schedule of rates, Government Publication

SARA1603	SPECIFICATION AND ESTIMATION	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To introduce the importance of specification for quality control in design and construction.
- To help the students in the preparation of bill of quantities for estimation and budgeting in construction projects.
- To comprehend the rate for different items of work for costing and valuation of the construction projects.

UNIT 1 INTRODUCTION TO SPECIFICATION 4Hrs.

Definition – Classification of Specification - Necessity and importance of specification. Specification writing - Principles of Specification writing. Important aspects in the design of specification – Differences between Brief and detailed Specification for 1st class, 2nd class, 3rd class building.

UNIT 2 INTRODUCTION TO QUANTITY ANALYSIS 8 Hrs.

Introduction to Quantity analysis – Basic understandings of Unit measurements for various items of work – Mix proportions – Rules adopted for taking out of quantities. Methods adopted in quantity analysis. Deriving detailed quantity for various items of work for a single-story building like earthwork excavation, brick work, PCC, RCC works, wood works, iron and steel works, plastering, painting, flooring, weathering course etc. with different methods.

UNIT 3 ESTIMATION 8 Hrs.

Types & purpose of estimation - Approximate estimate of buildings - Bill of quantities - 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. Deriving detailed estimates for various items of work for a single storied building along with the specification of the materials and BOQ.

UNIT 4 COSTING AND VALUATION 6 Hrs.

Introduction to rates for main items of work using current market rates for materials, labour, plants, tools and equipment, transportation, handling, storage and contractor's profit – Construction technology involved. Preparing rate analysis for P.C.C, R.C.C, brick work, stone work, plastering and finishes - Deriving construction cost as per BOQ. Introduction to Valuation of the properties - terms and values - Depreciation and its types - Types, methods and purpose of valuation.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Preparation of Bill of quantities with the specification of 1st class construction for a single storied residential building. Arriving construction cost for a single storied residential building along with detailed estimation. Detailed specification and estimation for an apartment building with Stilt + Four floors from earth work excavation till the completion of project in MS excel to be submitted as portfolio.

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Acquire knowledge on the specification writing for any construction projects.

CO2 Familiarize students on the need and importance of bill of quantities for arriving project budgeting.

CO3 Explore different methods of estimation and preparation of detailed estimation for the Construction project

CO4 Comparative analysis on the item rates for the different materials, hierarchy of labours, hiring equipment's etc.

CO5 Evaluating the project cost with the detailed estimation and rate analysis.

CO6 Skill to prepare a valuation report for a constructed building with depreciation factor.

TEXT / REFERENCE BOOKS

1. Chakraborti, M. (2006). Estimating,Costing,Specification& Valuation In Civil Engineering .
2. Dutta, B. N. (2016). Estimating and Costing in Civil Engineering (Theory & Practice). UBS Publishers' Distributors Pvt Ltd.
3. Rangawala. (2017). ESTIMATING, COSTING AND VALUATION [PROFESSIONAL PRACTICE and quantity surveying] . Charotar Publishing House Pvt. Ltd.
4. Singh, G. S. (2013). Estimating Costing & Valuation. Standard Publishers Distributors

SAR1405	CONTEMPORARY DIRECTIONS IN ARCHITECTURE	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To introduce the various concepts / theories of architecture Modernism.
- To construct knowledge on the fundamentals of design process & sustainable logics in architecture.
- To familiarize the students with the works & ideology of master architects in India.

UNIT 1 CRITIQUING MODERNISM 6Hrs.

Brutalism - Archigram, Constructivism, Deconstructivism, Writings of Jane Jacobs - Kenneth Frampton, Robert Venturi - Christopher Alexander, Charles Jencks.

UNIT 2 WORKS OF THE MASTERS IN INDIA 7Hrs.

Chandigarh and Bhubaneshwar experiments - Le Corbusier, Koeninsberger, Louis Khan, Nari Gandhi, Baker, B.V.Doshi, Achyut Kanvinde, Charles Correa, Anant Raje, Uttam Jain, Joseph Allen Stein, Raj Rewal, Hasmukh Patel, Bimal Patel, Nimish patel, Karan Grover, Laurie Baker.

UNIT 3 CONTEMPORARY TRENDS IN INDIAN CONTEXT 7Hrs.

Works and ideas: CNT, Sen Kapadia, Gerard da Cunha, Mistry Architects, Sanjay Mohe, Rahul Mehrotra, Chitra Vishwanath, Yatin Pandya, Satprem Maini, Ashok B Lall, Aravind Krishnan, Dean d' Cruz, Manit Rastogi.

UNIT 4 SUSTAINABLE LOGICS AND DESIGN PROCESSES 10Hrs.

Post modernism - Cesar Pelli, Mario Botta, sustainable logics, Eco aesthetics- Meaning of fold, birth of blob- Frank Gehry, Santiago Calatrava, Zaha Hadid, Peter Eisenman, Greg Lynn, Eco cultural- Hassan Fathy - Geoffrey Bawa, Eco technical - Kenneth Yeang, Renzo-piano, Norman Foster, Eco centric- Shigeru Ban, Jeanne Gang, Michael Reynolds, Eco social - Ralph Erskine, Eco medical- Christopher Day.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Understand the various critiquing of modernism.

CO2: Relate various theories & writing of the architecture around the world.

CO3: Criticize& appraise the works of the masters in India.

CO4: Interrelate various master planning experiments in India.

CO5: Interpret and analyze ways adopted the contemporary trends of Indian context by Indian contemporary architects.

CO6: To express importance of Post modernism, co aesthetics, Eco cultural, Eco centric in their design process.

TEXT / REFERENCE BOOKS

1. Kenneth Frampton, Modern Architecture: A Critical History, Thames and Hudson, London, 1994
2. Christopher Alexander, Sara Ishikawa and Murray Silverstein, A Pattern Language, Oxford University Press,1977
3. Robert Venturi, Complexity and Contradiction to Architecture, Museum of Modern art,1977
4. Charles Jencks, Architecture 2000 and Beyond, John Wiley & Sons, Newyork, 2000

SARA1601	CONTEMPORARY DIRECTIONS IN ARCHITECTURE	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To introduce the diverse philosophies of masters in Indian context.
- To construct knowledge on the logics of sustainable architecture from diverse perspectives.
- To comprehend the approaches, strategies and the sensitivity of the Pritzker award winners.

UNIT 1 WORKS OF MASTERS IN INDIA 6 Hrs.

Chandigarh and Bhubaneshwar experiments – Design philosophies and strategies - Laurie Baker, Joseph Allen Stein, Narii Gandhi, B.V. Doshi, Anant Raje, Achyut Kanvinde, Charles Correa, Raj Rewal

UNIT 2 LATE 19thCENTURY 12 Hrs.

Vision and commitment of Pritzker award winners- consistent and significant contributions to humanity and the built environment through the art of architecture - I.M.Pei, Frank O Gehry, Tadao Ando, Renzo Piano, Richard Meier, Norman Foster

UNIT 2 EARLY 20thCENTURY 4 Hrs.

Design philosophies, approaches and strategies adopted by Pritzker award winners in the early 20th century – Rem Koolhaas, Zaha Hadid, Toyo Ito, Shigeru Ban, B.V. Doshi, Arata Isozaki.

UNIT 4 COMPETING LOGICS OF ARCHITECTURE 4 Hrs.

Introduction to the competing logics of architecture – types of logics - Meaning of fold, birth of blob - low tech and high tech - self-sustaining buildings- buildings constructed through participatory processes – strategies adopted by eminent architects at the global level and in Indian context.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Case studies for the six competing logics of sustainable architecture, Philosophies and approaches adopted by the architects with examples. Identify the unique approaches adopted in designing the buildings.

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understand various approaches and strategies adopted by architects in Indian context.

CO2 Distinguish the logics of sustainable architecture.

CO3 Appraise the concepts and approaches adopted to achieve the sustainable logics by eminent architects.

CO4 Construe the common thread intertwined with the Pritzker award winners in the late 19th century

CO5 Analyse and interpret the unique approaches and strategies adopted by Pritzker award winners in the early 20thcentury

CO6 Develop abilities to incorporate unravelled philosophies, approaches and ideologies in architectural design.

TEXT / REFERENCE BOOKS

1. Peltason, R., & Yan, G. O. (Eds.). (2017). Architect: The Pritzker prize laureates in their own words. Black Dog & Leventhal.
2. Szalapaj, P. (2014). Contemporary architecture and the digital design process. Routledge.
3. Mückenheim, M., &Demel, J. (2012). Inspiration: contemporary design methods in architecture. BIS Publishers.
4. Turnbull, J. (2012). Toyo Ito: Forces of nature, Chronicle books
5. Schumacher, P. (2004). Digital Hadid. Springer Science & Business Media.
6. Ambasz, E., Ban, S., & Bell, E. (2001). Shigeru Ban. Princeton Architectural Press.
7. Findley, L. (2005). Building change: Architecture, politics and cultural agency. Psychology Press.
8. Bock, I. (2015). Six canonical projects by Rem Koolhaas. jovis Verlag.
9. Slavicek, L. C., & Pei, I. M. (2009). IM Pei. Infobase Publishing.
10. Van Gerrewey, C. (2019). OMA/Rem Koolhaas: A Critical Reader from'Delirious New York'to'S, M, L, XL'. In OMA/Rem Koolhaas. Birkhäuser.

SAR4065	**DESIGN STUDIO VII**	**L**	**T**	**P**	**Credits**	**Total Marks**
		0	**0**	**18**	**12**	**600**
		Continuous assessment		**Univ viva**		**Min pass marks**
		450		**150**		**300**

COURSE OBJECTIVES

- To expose the students to issues, challenges in the design of Industrial buildings and large built forms involving alternative construction materials and technology.
- To orient the students on the need for creating sustainable urban environment through sound Green building Principles.
- To understand the various green rating systems and procedures involved in it

FOCUS

Exploration of architectural design and form using alternative materials / technologies and Green Building Techniques.

METHODOLOGY PROPOSED

- To conduct workshop on sustainable architecture.
- To organize site visits where Green Building Principles are consciously adopted.
- Visit to Industrial complexes.

DESIGN INTEGRATION

Experience gained through Practical Training

SUGGESTED TYPOLOGIES

- Industrial Complexes
- Sports Complex involving Stadium Buildings
- Cost effective Housing

Max. 270 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Acquiring knowledge in designing of industrial buildings
CO2: Understanding alternative construction materials and technology
CO3: Identifying the various technology for long span structures
CO4: Insight of various green rating systems in today's context with respect to context and typology
CO5: Integrating sustainable urban environment with green principles

TEXT / REFERENCE BOOKS

Joseph DeChiara, Time Saver Standard for building types, McGraw Hill, 2nd Edition, 1980
Donald Watson and Crosbie, Time Saver Standards for Architectural Design, MGH, 2005
Joseph DeChiara; Julius, Time-Saver Standards for Housing And Residential Development, MGH, 2005
National Building Code of India, Bureau of Indian Standards, 2005
Ernst and Peter, Neufert's Architect's Data, Blackwell publishing professional, 2005
Peter Sturzebecher and Ulrich, Architecture for Sport, Wiley - Academy, 2002
Franziska Nauck, edited by Van Uffelen, Chris, Stadiums, Page One, 2006
James B., Fundamentals of Landscaping and Site Planning, the Avi Publications, 2005
Joseph N. Sabatini, Building & Safety Codes for Industrial Facilities, Brikhauser, 2004
Booqs, Green Living: Sustainable Houses, Booqs, 2009

SARA9701	DESIGN STUDIO VII	L	T	P	Credits	Total Marks
		0	0	14	7	400

Continuous Assessment	End Semester Examination	Min Pass Marks	
		Continuous Assessment	End Semester Examination
250	150	125	75

COURSE OBJECTIVES

- To understand and evaluate the dynamics of the urban settlements and the parameters which constitute the built environment in the urban areas.
- To identify the issues and challenges related to the urban areas and their relationship with the built environment.
- To explore urban design and architectural design solutions in context to the urban environment.

METHODOLOGY PROPOSED

STAGE I

Perlustration and Social Audit (Phase I)

The exploration of the character of an identified urban settlement through observation, documentation and graphical presentation of the same to understand the context in a holistic manner. Evaluate urban design through primary/ secondary research, theoretical pursuits and delineate a study area.

Inquisition and Mapping (Phase II)

Mapping of the delineated area and analyze the available data to understand the physical, social, visual and Architectonic pattern.

STAGE II

Urban Design Proposal: To propose logical solutions for the perceived issues in the urban settlement and built environment. with high degree of sensitivity to the documented information as a strategic plan. Individual/ small group projects: To propose an architectural proposal of a built form as part of the strategic plan for the identified urban space supporting socio, economic and environmental factors.

Max. 210 Hours

DESIGN INTEGRATION

All Urban planning principles shall be integrated with any selected urban context for renewal. All services for architectural built form along with the structure shall be integrated with the design.

SUGGESTED TYPOLOGIES

Urban/Sub Urban demarcated area which has scope for understanding present or futuristic urban intervention for a strategic plan supported by detailed design of architectural projects. **Note:** May conduct a joint studio with institutions willing to partner/ Special lectures from Urban Designers/ Planners, Practitioners / Construction Technology Experts to enhance the outcome.

COURSE OUTCOMES.

On completion of the course the student will be able to

CO1 Comprehend the evolution and morphological development of urban settlements

CO2 Understand and apply the concepts of urban design and methodological approaches

CO3 Integrate multiple computation techniques and applications for analysis, conceptualization, representation and communication of Urban Design schemes.

CO4 Assess the complexity of urban phenomena & decode, analyze and interpret the related issues and challenges

CO5 Develop and formulate strategies for desirable development plan of an urban area.

CO6 Identify and propose architectural design solutions addressing the requirements and needs of an urban area.

TEXT / REFERENCE BOOKS

1. Watson, D., Plattus, A. J., Shibley, R. G., & Watson, D. (2003). Time-saver standards for urban design. New York: McGraw-Hill.
2. Morris, E. S. (1997). British town planning and urban design. Harlow, UK: Longman.
3. Friedmann, J. (2012). Varieties of Planning Experience: Toward a Globalized Planning Culture? In the Oxford Handbook of Urban Planning.
4. De Chiara, J., & Hancock, J. (1980). Time Saver Standard for Building Types, McGraw Hill, 2nd Edition.
5. Watson, D. (2004). Time-saver standards for architectural design.
6. De Chiara, J. (2009). Time-saver Standards for Housing and Residential Development: Time Saver Standards.
7. Gehl, J. (2013). Cities for people. Island press.

SAR 1501	PROFESSIONAL PRACTICE AND ETHICS I	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To expose of the important legal aspects and legislations practice and profession.
- To enable the students to understand the important laws and acts relevant to architecture.
- To construct knowledge on emerging trends in the practice of sustainable architecture, role of foreign architects.

UNIT 1 INTRODUCTION 8 Hrs

Importance of Architectural Profession - Role of Architects in Society - Career options open for Architects- Prerequisites for Private Practice - Types of practices (Partnership/ Proprietary Concern /Associate - Architect's office and its management - Location, Infrastructure requirement - organizational structure, Basic accounts - Legal requirements, Registration of Firm, Tax Liabilities, Relationship with clients, contractors, Associate consultants and product Manufacturers.

UNIT 2 CODE OF CONDUCT AND ETHICS 8 Hrs

Role of Professional Body (The Indian Institute of Architects) History, Objectives, its relevance - Architects Act 1972 (Background, intent, objectives)- Council of Architecture (role and function with regard to Architectural practice) - Registration of Architects - Importance of Ethics - guidelines prescribed for professional code of conduct -punitive action for professional misconduct.

UNIT 3 STATUTORY PROVISIONS GOVERNING ARCHITECTURAL PROVISIONS 8 Hrs

Important Acts and Regulations governing the design of buildings- (Town & Country Planning Act, Consumer Protection Act, Copy Right Act, Persons with Disabilities Act, Coastal Regulation Zone Act, Heritage Act, Land Acquisition Act, Factories Act, Cinema Act)-Master Plan Provisions and Development regulations with reference to CMDA -Planning norms and Building Rules-Role of Planning Authority and local body - Building Approval process.

UNIT 4 EMERGING TRENDS 6 Hrs

Meaning of GATS - Globalisation and its impact on architectural profession - Entry of Foreign Architects and their impact in Indian Architectural practice - Information Technology and its impact -specialisation in the field of architecture -Green Buildings and the governing laws. **Max. 30 Hours**

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Understand the role of architects in society.
CO2: Holistic understanding of legal requirements for managing an office and type of practices.
CO3: Acquire knowledge on various acts, development regulations, planning norms and building rules.
CO4: Comprehend the building approval process.
CO5: Figure out the role of foreign architects working in collaboration with local architects.
CO6: Enable the young minds to adopt green building strategies in design

TEXT / REFERENCE BOOKS

1. Handbook of Professional Practice, IIA Publications, India
2. Roshan Namavati, Professional practice, Lakhani Book Depot, Mumbai 1984
3. Apte V.S., Architectural Practice and Procedure, Mrs. Padmaja Bhide, 2008
4. CMDA, Second Master Plan, 2026, CMDA Publications, 2008
5. Architects Act 1972, Council of Architecture, 2011
6. Krishnamurthy K.G. and Rvindra S.V., Professional Practice, PHI Learning Pvt Ltd, Delhi, 2014
7. Handbook of professional Documents, Council of Architecture, 2011

SARA1702	PROFESSIONAL PRACTICE AND ETHICS - I	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To expose of the important legal aspects and legislations practice and profession.
- To enable the students to understand the important laws and acts relevant to architecture.
- To construct knowledge on emerging trends in the practice of sustainable architecture, role of foreign architects.

UNIT 1 INTRODUCTION **6 Hrs.**

Importance of Architectural Profession - Role of Architects in Society - Career options open for Architects-Prerequisites for Private Practice - Types of practices (Partnership/ Proprietary Concern /Associate) - Architect's office and its management – organisation structure, responsibility towards employees, terms & conditions of engagement, letter of appointment. Location, Infrastructure requirement - Basic accounts - Legal requirements, Registration of Firm, Tax Liabilities, Relationship with clients, contractors, Associate consultants and product Manufacturers. Salaried appointment in public and private sector jobs, Scale of charges, applicable building bylaws, municipal approval, development controls, zoning regulations, National Building Code, Master plan, Zonal Plans.

UNIT 2 CODE OF CONDUCT AND ETHICS **8 Hrs.**

Role of Professional Body (The Indian Institute of Architects) History, Objectives, its relevance - Architects Act 1972 (Background, intent, objectives)- Council of Architecture (role and function with regard to Architectural practice) – Functions, constitutions, rules and regulations ,guidelines prescribed for professional code of conduct; Registration of Architects - Importance of Ethics - punitive action for professional misconduct, social responsibility and publications; Ways of getting works: types of works; works partly executed by other architects; precautions before taking up the works; conditions of engagement between architect & client.

UNIT 3 ARCHITECTURAL PROVISIONS **8 Hrs.**

Important Acts and Regulations governing the design of buildings - (Town & Country Planning Act, Copy Right Act, Persons with Disabilities Act, Coastal Regulation Zone Act, Heritage Act, Land Acquisition Act, Factories Act, Cinema Act-Master Plan Provisions and Development regulations with reference to CMDA / DTCP/NBC - Planning norms and Building Rules-Role of Planning Authority and local body - Building Approval process.

UNIT 4 EMERGING TRENDS **4 Hrs.**

Meaning of GATS - Globalisation and its impact on architectural profession - Entry of Foreign Architects and their impact in Indian Architectural practice - Information Technology and its impact -specialisation in the field of architecture -Green Buildings and the governing laws.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS **4 Hrs.**

Exercise to identify the planning parameter for different type of buildings; compare the parameters with NBC / DTCP / CMDA regulations. Prepare architectural proposal for small / medium / big scale project.

Max. 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understand the role of architects in society.
CO2 Holistic understanding of legal requirements for managing an office and type of practices.
CO3 Acquire knowledge on various acts, development regulations, planning norms and building rules.
CO4 Comprehend the building approval process.
CO5 Figure out the role of foreign architects working in collaboration with local architects.
CO6 Enable the young minds to adopt green building strategies in design.

TEXT / REFERENCE BOOKS

1. Handbook of Professional Practice, IIA Publications, India
2. Namavati, R. (1984). Professional practice, Lakhani Book Depot, Mumbai.
3. Apte V.S. (2008). Architectural Practice and Procedure, Mrs. PadmajaBhide
4. CMDA, Second Master Plan, 2026, CMDA Publications, 2008
5. Architects Act 1972, Council of Architecture, 2011
6. Krishnamurthy K.G. &Ravindra S.V. (2014). Professional Practice, PHI Learning Pvt Ltd, Delhi,
7. Handbook of professional Documents, Council of Architecture, 2011

SAR 1502	ARCHITECTURAL CONSERVATION	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To develop a comprehensive knowledge about Conservation and its importance in today's context.
- To enhance the skills of the graduate to understand various principles and practices in the field of architectural conservation.
- To familiarize the students with an overview of best practices in conservation charters, various conservation processes, techniques and skills through case studies.

UNIT I INTRODUCTION TO CONSERVATION 6 HRS.

Definitions of conservation, Need for Conservation, Approaches, Indian context - history and principles of conservation - Role of Conservation architect, ethics and values of Conservation.

UNIT 2 CONSERVATION LEGISLATION 8 HRS.

Charters and Principles: Preserving Cities and Towns - International Charters, Venice to Mexico - Central and State Government Policies and legislations - Various Agencies and their role in conservation - Role of ASI, INTACH & IHCN - Problems of living cities in conservation practices.

UNIT 3 CONSERVATION OF HISTORIC BUILDINGS 8 HRS.

Criteria for identifying historic buildings - guidelines for conservation - Documentation, analysis and investigation of existing condition [surveys, inventory and analysis] in terms of historical and architectural conservation - Concepts and techniques for building conservation - Structural survey reports analysis and synthesis for historical and architectural intervention in the structure listing of faults, repair and alterations - Material conservation

UNIT 4 CASE STUDIES 8 HRS.

Indian Case studies - analysis, methodology and proposals , Tajmahal- Agra, Senate House, Chennai, Ruins of Hampi, Conservation methods adopted in Mamallapuram, Kanchipuram, Case studies in urban settings- Ahmedabad, Hyderabad, Champaner, Madurai, Puducherry. International Case studies - Conservation methods adopted for leaning tower of Pisa, World Heritage sites, UNESCO etc.

COURSE OUTCOMES:

On completion of the course the student will be able to

CO1: Classify and understand various processes involved in conservation practices and understand the cultural and technical background behind the same.

CO2: Understand and appreciate various documentation techniques and its importance in conservation process.

CO3: Compare and determine the limitation in preserving a building, settlement, part of a building with reference to its historical background and authenticity.

CO4: Demonstrate about different concepts and techniques adopted in different regions, with reference to identified case studies.

CO5 Examine architectural and historical intervention in conservation process.

CO6: Interrelate and communicate the analysis, methodology and proposal adopted in various buildings.

Max. 30 Hours

TEXT / REFERENCE BOOKS

1. Bernard Feilden, Guidelines for Conservation, a Technical Manual, INTACH, New Delhi, 1989
2. Bath, A Study in Conservation, HMSO Publication, London, 1977
3. Benny Kuriakose, Nupur Prothi Khanna and Malvika Baja Saini, Guidelines for Preparation of Heritage Management Plan INTACH, 2012
4. Pamela Ward, Conservation and Development in Historic Towns and Cities, Ohrid Press Ltd., 1968
5. Shyam Chainani, Heritage Conservation: Legislative & Organizational Policies for India, INTACH, 2012
6. Worskett Roy, Character of towns an Approach to conservation, Architectural Press, London, 1979

SARA1902	ARCHITECTURAL CONSERVATION	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To introduce the principles and practices of heritage conservation.
- To sensitize the students towards designing in historic environments.
- To explore various methodologies and tools for recording, documentation and inventorying of heritage structures.

UNIT 1 INTRODUCTION TO CONSERVATION 4 Hrs.

Definitions of conservation, Why conservation? Justification of conservation, Approaches, Indian context - history and principles of conservation - Role of Conservation architect, ethics, Values, Significance, Authenticity and Integrity of conservation-Degree of intervention in historic buildings and monuments.

UNIT 2 CONSERVATION LEGISLATION AND CHARTERS 10 Hrs.

Charters and Principles: Preserving Cities and Towns - International Charters, Venice to Mexico - Central and State Government Policies and legislations - Various Agencies and their role in conservation - Role of ASI, UNESCO, ICCROM, ICOMOS, Urban Arts Commission, INTACH and other NGOs involved in Conservation. Criteria for identifying historic buildings - guidelines for conservation - Documentation, analysis and investigation of existing condition [surveys, inventory and analysis] in terms of historical and architectural conservation - Measured Drawing: Techniques of Measurement, Drawing and Presentation - Photographic Documentation.

UNIT 3 CONSERVATION OF HISTORIC BUILDINGS 4 Hrs.

Structural survey reports analysis and synthesis for historical and architectural intervention in the structure listing of faults, repair and alterations - Material conservation

UNIT 4 CASE STUDIES 8 Hrs.

Indian Case studies - analysis, methodology and proposals, Taj mahal- Agra, Senate House, Chennai, Ruins of Hampi, Conservation methods adopted in Mamallapuram, Kanchipuram, Case studies in urban settings-Ahmedabad, Hyderabad, Champaner, Madurai, Puducherry. International Case studies - Conservation methods adopted in World Heritage sites, UNESCO etc.

UNIT 5 DOCUMENTATION 4 Hrs.

Documentation, analysis and investigate the existing condition [surveys, inventory and analysis] of Monument / Precinct / Building/Structure/Landscape/Site by following INTACH guidelines for listing.

Max 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Recognize the philosophy and science of architectural conservation.

CO2 Discuss the appropriate methodologies and tools for recording, documentation and inventorying of heritage structures

CO3 Apply suitable methodology to study and document site and building with reference to given context.

CO4 Critically evaluate and make assessment of heritage components

CO5 Compare different case studies based on methodology and proposal.

CO6 Create listing for unidentified buildings.

TEXT / REFERENCE BOOKS

1. Feilden, B. B. M. (1989). Guidelines for conservation: a technical Manual.
2. Bath, A. (1977). Study in Conservation, HMSO Publication, London
3. Kuriakose, B. Khanna, N.P. &Saini, M.B. (2012). Guidelines for the Preparation of Heritage Management Plan INTACH,
4. Towns, H. (1968). Conservation and development in historic towns and cities.
5. Chainani, S. (1979). Heritage Conservation: Legislative & Organizational Policies for India, INTACH
6. Roy, W. (1979). Character of towns an Approach to conservation, Architectural Press, London
7. Mitra, S. Handbook of conservation of heritage buildings, published by directorate general, central public works department
8. Feilden, B. (2007). Conservation of historic buildings. Routledge.
9. Letellier, R., & Eppich, R. (Eds.). (2015). Recording, documentation and information management for the conservation of heritage places. Routledge.

SAR1403	URBAN DESIGN	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To introduce the determinants of urban form and study how the urban form of cities have changed over the years.
- To familiarize the students about the various urban design theories and their significance in present day context.
- To expose the students to the application of various urban design principals and initiatives through case studies.
- To introduce the students to the various stakeholders and their role in urban design initiatives.

UNIT 1 INTRODUCTION AND HISTORY OF URBAN FORM 8Hrs.

Relationship between Architecture, Urban Design and City planning, Evolution of cities-prehistoric, classical, medieval, renaissance, industrial, modern, colonial & postcolonial and post-world war II urban projects, zoned city and its critics, inclusive urbanism, contemporary urban form, Comparative analysis of public spaces, their organization, location, distribution in towns

UNIT 2 URBAN DESIGN THEORY 7Hrs.

The city, urban morphology, movement as motivating factor in design, Urban Design theories - monuments and dwelling, genius loci, street and square, urban conservation, collage city, responsive environments, checklist for pedestrian spaces and plazas, social life of small urban spaces, new urbanism, landscape urbanism, sustainable urban form and transit oriented development.

UNIT 3 PRACTICE THEORY 7Hrs.

Urban Design as public policy, Case studies of contemporary cities, new towns, new urbanist settlements, transit villages, urban infill projects, public place making projects, eco and sustainable projects, brownfield and adaptive re use developments.

UNIT 4 URBAN DESIGN POLICY 8Hrs.

Urban renewal policy, scope and challenges-Role of planning agencies, Government and quasi government agencies, urban project finance corporations and their role- existing legal framework for urban growth in residential, commercial, recreational and mixed use sectors, opportunities and limitations- urban design charettes - public participation in urban design - Emerging global policy practices for sustainable, equitable urbanism.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: To perceive or understand the relationship between various aspects of Architecture, Urban Design, Town Planning and the Environment.

CO2: To understand evolution of urban form over the years with relevant theories and case studies.

CO3: Compare different urban design theories and concepts and understand its application in real world scenarios in development of urban spaces.

CO4: To comprehend the role of different stakeholders including planning and government agencies in framing urban policy and its impact on development pattern.

TEXT / REFERENCE BOOKS

1. Morris A. E. J., History of Urban form: Before the Industrial revolutions, Rutledge , 1994
2. Spreiregen Paul D., Urban Design-The Architecture of Towns and Cities, Mc Graw Hill Book Company, Newyork, 1965.
3. Gordon Cullen, The Concise Townscape, Van Nostrand Reinhold, New York, 1961
4. Jan Gehl, Life between buildings: Using Public space, Island Press, 2011
5. Michael S. Bernick and Robert B. Cervero, Transit Villages in the 21st century, Mc Graw Hill Companies, Newyork, 1996
6. Edmund N. Bacon, Design of Cities Thames and Hudson, London, 1967

SARA1704	URBAN DESIGN	L	T	P	Credits	Total Marks
		2	1	0	3	100

COURSE OBJECTIVES:

- To introduce the determinants of urban form and study how the urban form of cities have changed over the years.
- To familiarize the students about the various urban design theories and their significance in present day context.
- To expose the students to the application of various urban design principles and contemporary initiatives through case studies.
- To expose the students to various tools and techniques, methods and surveys used in urban design for analysis of urban form.

UNIT 1 URBAN DESIGN THEORY 8 Hrs.

Study of Urban design theories in the past through books of Gordon Cullen and Kevin Lynch, Genius Loci and Schulz, the works of Jane Jacobs, Historic City and Rossi, William Whyte and Jan Gehl, Collage City and Colin Rowe. Current theories in Urban design

UNIT 2 INTRODUCTION AND HISTORY OF URBAN SPACES 12 Hrs.

Relationship between Architecture, Urban Design and City planning, Elements of urban design. Definition of Urban Form, Urban Fabric, Mass and Scale. Understanding of Urban form and spaces at various spatial scales through examples in river valley civilizations, pre-industrial European cities- Greek and Roman cities, medieval European towns and Renaissance history

UNIT 3 CONTEMPORARY TRENDS AND STRATEGIES IN URBAN DEVELOPMENT 12 Hrs.

Urban Design as public policy, Factors for Identifying Area of Intervention – Strategies – Urban Renewal and Urban Sprawl, Urban redevelopment and Urban Conservation. Approaches to Urban Development – Concepts of Transit Oriented Development, Water Front Development, Heritage city development, New Urbanism, Landscape Urbanism, Sustainable Urban Form, Ecologically Sustainable Communities and Smart City concepts. Role of Public Participation in Urban Design.

UNIT 4 TOOLS & TECHNIQUES IN URBAN DESIGN 8 Hrs.

Extensive Study of existing or published reports of Urban Design studies in Indian Cities with special focus on components/aspects and tools /methods. Various methods of conducting a visual survey. Types of surveys, data and map analytical techniques. Tools and methods to include different types of maps/mapping, drawings, sketches, photo documentations, reading, data collection, analysis. Special focus on streets-Expressive quality of built forms, spaces in public domain.

UNIT 5 COMPREHENSIVE LEARNING 5 Hrs.

Case studies of contemporary cities - Morphology of Indian modernist cities of Chandigarh, Bhubaneswar and Gandhi nagar. Temple Towns of Tamil Nadu. Case studies of heritage city/ towns. Sabarmati Waterfront development, Amaravathi etc. Incorporating the various concepts and theories in current semester urban design studio. Students are expected to implement various tools & methods of mapping and surveys in the analysis of urban form in their design studio.

Max. 45 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understanding the evolution of urban form over the years with relevant theories and case studies

CO2 Understanding the relationship between various aspects of Architecture, Urban Design, Town Planning and the Environment

CO3 Resolving and understanding complex urban issues and map the dimensions of urban space

CO4 Compare and contrast different urban design theories and concepts and understand its application in real world scenarios in development of urban spaces

CO5 Develop an understanding of factors effecting built and open spaces at urban scale and methods to perceive, record and analyze them

CO6 Apprehend the various concept of urban form, community spaces and development, the role of public participation in building the urban environment.

TEXT / REFERENCE BOOKS

1. Morris A. E. J. (1984). History of Urban form: Before the Industrial revolutions, Routledge.
2. Spreiregen, P. D. (1965). Urban design, The architecture of towns and cities. Krieger Publishing Company.
3. Cullen, G. (1961). The Concise Townscape, Van Nostrand Reinhold, New York,
4. Gehl, J. (2011). Life between buildings: Using Public space, Island Press,
5. Bernick, M., & Cervero, R. (1997). Transit villages in the 21st century. McGraw Hill Companies
6. Edmund, N. (1967). Bacon, Design of Cities. London: Tames and Hudson, 15.
7. Barnett, J. (1982). An Introduction to Urban design, Harper and Row, New York,
8. Gosling, G. (1994). Concepts of Urban Design, Academy Editions, St. Martin's Press, New York
9. Alexander R.C. (2003). Designing Cities - Critical readings in Urban design, Blackwell Publishers Ltd

SAR4066	DESIGN STUDIO VIII	L	T	P	Credits	Total Marks
		0	0	18	12	600

COURSE OBJECTIVES

- To facilitate the students to explore issues, challenges in the design of Industrial buildings and large built forms involving alternative construction materials and technology.
- To orient the students on the need for creating sustainable urban environment through sound Green building Principles.

FOCUS

Urban Design factors which have an influencing effect on Architecture and the impact of construction technology on urban context will be the focus.

METHODOLOGY PROPOSED

- To conduct a joint studio with institutions willing to partner.
- Special lectures from Urban Designers/ Planners, Practitioners / Construction Technology Experts

DESIGN INTEGRATION

- All services for high rise building along with the structure shall be integrated with the design.
- All Urban planning principles shall be integrated with any selected urban context for renewal.

SUGGESTED TYPOLOGIES

- Design of High rise / High density buildings
- Detailed investigation of a part of an urban area

Max. 270 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Fostering the young minds to familiarize the construction techniques alternate construction materials.
CO2: Facilitating the students to gain knowledge on theories related to urban design constructively.
CO3: Holistic understanding of data collection, mapping and analysis of a part of an urban area.
CO4: Integration of structural system, parking, services and landscape in the identified / proposed typology in a specific context.
CO5: Identify and design a typology appropriate to the context.

TEXT / REFERENCE BOOKS

1. Joseph De Chiara, Time Saver Standard for building types, McGraw Hill, 2nd Edition, 1980
2. Donald Watson and Crosbie, Time Saver Standards for Architectural Design, MGH, 2005
3. Joseph De Chiara, Julius, Time-Saver Standards for Housing And Residential Development, MGH, 2005
4. National Building Code of India, Bureau of Indian Standards, 2005
5. Ernst and Peter, Neufert's Architect's Data, Blackwell publishing professional, 2005
6. Antony Wood, Best Tall Buildings, Elsevier, 2008
7. Viswanath H.R., Tolloczk J. and Clarke J.N., Multi Purpose Highrise Towers And Tall Buildings, E & FN Spon, London, 2005
8. Ken Yeang, Eco Skyscrapers, Images Publishing, 2007
9. Ken Yeang, Service Cores: Detail in Building, Wiley - Academy, 2005

SARA 9901	DESIGN STUDIO VIII	L	T	P	Credits	Total Marks
		0	0	16	8	400

Continuous Assessment	End Semester Examination	Min Pass Marks	
		Continuous Assessment	End Semester Examination
250	150	125	75

COURSE OBJECTIVES

- To understand the complexities in resolving large sites involving multiple buildings and varied uses.
- To envision and create a master plan and understand the dialogue between the built and the unbuilt.
- To integrate the infrastructure and services according to the calculated footfall of the proposed design

METHODOLOGY PROPOSED

STAGE I

Research on the principles of resolving large sites as laid out in literature by various books and online verified content. A case analysis of large campuses and institutions designed by eminent architects by decoding the various factors that influenced the thought process encoded in the project. Workshops/seminars/Special lectures on the design and infra-structure aspects of large sites.

STAGE II

Phase I

Analyze the site as a set of active networks and envision the overall master plan by solving the proximities between buildings and its function and create a responsive built environment. Develop an architectural program by understanding the density of users and formulate the spatial requirements according to established guidelines.

Iteration and Ideation (Phase II)

Resolving the given design program by experimentation and multiple iterations leading to a meaningful organization of built forms and their symbiotic relationships by understanding the layers of master planning.

Phase III

Develop and finalize the master plan and present the same through legible drawings, models and walk-through presentations. According to the scope of the project, conceptualize and detail the individual built forms by exploring building materials, services and construction techniques

DESIGN INTEGRATION

Application of the knowledge gained by the students from core courses like urban design, advanced construction techniques building structures and building services in developing the design.

SUGGESTED TYPOLOGIES:

Built environments like large campuses, housing, small neighbourhood, special economic zones, Townships etc.,

Max. 240 Hours

COURSE OUTCOMES

CO1 Integrate the site as a set of active networks and envision the overall master plan

CO2 Evaluate the quality of space between buildings, judicious use of such spaces and understand their interrelationships

CO3 Develop an Architectural program by following certain norms and standards, Identify and design a typology appropriate to the context.

CO4 Integrate of structural system, parking, services and landscape in the identified / proposed typology in a specific context

CO5 Resolve large campuses and institutions by understanding various factors that influenced the thought process

CO6 Explore the use of digital medium in effectively communicating projects which are large in scale.

TEXT / REFERENCE BOOKS

1. Watson, D. (2004). Time-saver standards for architectural design.
2. J De Chiara, J. (2009). Time-saver Standards for Housing and Residential Development: Time Saver Standards.
3. National Building Code of India, Bureau of Indian Standards, 2005
4. Neufert.E (2005). Architect's Data, Blackwell publishing professional
5. Stürzebecher, P., & Ulrich, S. (2002). Architecture for sport: new concepts and international projects for sport and leisure. Academy Press.
6. James B. (2005). Fundamentals of Landscaping and Site Planning, the Avi Publications
7. Sabatini, J.N. (2004). Building & Safety Codes for Industrial Facilities, Brikhauser
8. Vidiella, À. S., &Vidiella, A. S. (2009). Green Living: Sustainable Houses. BooQs.

S21 PROJ1	DISSERTATION AND PRE THESIS	L	T	P	Credits	Total Marks
		0	0	4	3	200

COURSE OBJECTIVES

- To do a Research and document different aspects of architectural program- Method of construction, advance technology (concrete and steel), advances building services, climatology, theory of structures studied till the previous semester.

METHODOLOGY PROPOSED

1.Dissertation on a topic (project) will be approved for each student and each student shall carry out dissertation considering the following aspect: Method of construction, advance technology (concrete and steel), advances in building services, climatology, theory of structures studied till the previous semester.
2.Students shall submit the choices of their topic (three topics to be given by the Student) for dissertation in consultation with the Coordinator
3.An internal guide to each student will be allotted for supervising His/ Her dissertation work. The students with the approval of the guide may commence their dissertation work during this semester. The Schedule / Mode of presentation of their work at Preliminary, Intermediate and Final stage with the split-up of Continuous assessment marks pertaining to each stage shall be published. The students under the guidance of their respective guides shall independently carry out their dissertation.
4.The Pre thesis study may also be in continuation of the Dissertation done or a new topic approved from the selected list of synopsis submitted by the student through the review panel.
5.The study shall be derived from a Book review, Special study, Literature Study, Case Study & Standards Study, Architect's interview, etc.
6.The students need to do detailed analysis and inference of different design approaches by various Architects in different contexts.
7.The final Design Program for the Thesis need to be finalized along with the Site Analysis. The concise report (A3 sheets - max of 25 sheets spiral bounded) need to be submitted. This would be reviewed and evaluated by examiners appointed by the University.
8. For detail split up of marks refer clause 12c (viii) in the regulations.

S21APROJ1	DISSERTATION AND PRE-THESIS	L	T	P	Credits	Total Marks
		0	2	4	4	200

Continuous Assessment	End Semester Examination	Min Pass Marks	
		Continuous Assessment	End Semester Examination
100	100	50	50

COURSE OBJECTIVES

- To pursue organized research in his or her area of interest
- To formulate a research question based on the area of research
- To develop a strong theoretical basis through analysis of available literature and experimentation
- To enable the critical appraisal skill of a student and to promote writing original research documents.

METHODOLOGY PROPOSED

1. **Dissertation** on a topic (project) will be approved for each student and each student shall carry out dissertation on topics related to Architecture and allied subjects.
2. Students shall submit the choices of their topic (three topics to be given by the Student) for dissertation in consultation with the assigned Coordinator. Emphasis must be on critical understanding, logical reasoning and novelty.
3. An internal guide to each student will be allotted for supervising his/ her dissertation work. The students with the approval of the guide may commence their dissertation work during this semester. The schedule / mode of presentation of their work at preliminary, intermediate and final stage with the split-up of Continuous Assessment marks pertaining to each stage shall be published. The students under the guidance of their respective guides shall independently carry out their dissertation. Students may be encouraged to select the topic which may eventually culminate in the Architectural Design Thesis of the subsequent semester.
4. The **Pre thesis study** may also be in continuation of the Dissertation done or a new topic approved from the selected list of synopsis submitted by the student through the review panel.
5. The study shall be derived from a Book review, Special study, Literature Study, Case Study & Standards Study, Architect's interview, etc.
6. The students need to do detailed analysis and inference of different design approaches by various Architects in different contexts.
7. The final Design Program for the Thesis needs to be finalized along with the Site Analysis. The concise report needs to be submitted. This would be reviewed and evaluated by examiners appointed by the University.
8. For detail split up of marks refer clause 12c (vi) in the regulations.

TUTORIAL	RESEARCH WRITING	8 Hrs.

Basic research issues and concepts - Orientation to research process - Types of research - Research writing in general - Review of literature and research publications - Case studies and analysis - referencing - Writing the bibliography

Max. 90 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1 Ability to gather, analyze and collate information in a systematic manner from a number of resources in a systematic manner

CO2 Synthesize the data effectively in order to arrive at certain conclusions which may lead to further research.

CO3 Develop skills for presenting information in written format in the form of a report

CO4 Formulate clear methodology for conducting independent research and present the same

CO5 Critique, Interpret and evaluate live case study

CO6 Construct a strong foundation study for forthcoming thesis session

SAR 1504	PROFESSIONAL PRACTICE AND ETHICS II	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To develop a comprehensive knowledge about architectural competitions.
- To construct knowledge on various practices related to easement and tender documents.
- To familiarize the students with an overview of new trends in project execution.

UNIT I ARCHITECTURAL COMPETITIONS 6 Hrs

Importance of Architectural competitions - Types of competitions (open, limited, ideas competition) - Single and two stage competitions - Council of Architecture guidelines for conducting Architectural competitions - Code of Conduct for Assessors and Participants - Case studies.

UNIT 2 EASEMENTS & TENDER 8Hrs

Easements - r

EMD - Submission of tender -Tender scrutiny - Tender analysis - Recommendations - Work order - E-tendering (Advantages, procedure, conditions).

UNIT 3 CONTRACT & CERTIFICATES 8 Hrs

Definition - Necessity of contract - Contents of Contract Document (Articles of Agreement, Terms and Conditions, Bills of Quantities and specification, drawings, Appendix), types of contracts - Certification of Contractors' Bills - Various types of certificates and procedures to be adopted, importance of Final bill. Defects - Liability period - penalty Clauses.

UNIT 4 LIABILITY, ARBITRATION AND NEW TRENDS IN PROJECT EXECUTION 8 Hrs

Types of Liability, Professional Duties and Conduct of architects as per Council of Architecture, Professional Negligence, Deficient service and Exceptions, Insurance, Examples of Cases, Arbitration (Definition, Advantages of arbitration, Sole and joint arbitrators, Role of umpires, Award, Conduct of arbitration proceedings) - Arbitration clause in contract agreement (role of architect, excepted matters).New trends in Project Execution - Understanding of BOT,BOLT,DBOT,BOOT - Role of project Managers -charging role of architect in large projects.

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: To understand the importance of architectural competitions in the field of architecture profession.
CO2: To comprehend and appreciate the rights of easement in architectural design.
CO3: To be familiar with the tender documents.
CO4: Synthesize the need and necessity of contract document and types of contract in architecture profession.
CO5: To interpret and analyze the professional duties and conduct as per guidelines of COA
CO6: Acquiring skill relating to new trends and role of architects in large projects.

TEXT / REFERENCE BOOKS

1. Handbook of Professional Practice, IIA Publications, India
2. Roshan Namavati, Professional practice, Lakhani Book Depot, Mumbai 1984
3. Apte V.S., Architectural Practice and Procedure, Mrs. Padmaja Bhide, 2008
4. CMDA, Second Master Plan, 2026, CMDA Publications, 2008
5. Architects Act 1972, Council of Architecture, 2011
6. Krishnamurthy K.G. and Rvindra S.V., Professional Practice, PHI Learning Pvt Ltd, Delhi, 2014
7. Handbook of professional Documents, Council of Architecture, 2011

SARA1901	PROFESSIONAL PRACTICE AND ETHICS - II	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To develop a comprehensive knowledge about architectural competitions.
- To construct knowledge on various practices related to easement and tender documents.
- To familiarize the students with an overview of new trends in project execution.

UNIT 1 ARCHITECTURAL COMPETITIONS 6 Hrs.

Importance of Architectural competitions - Types of competitions (open, limited, ideas competition) - Single and two stage competitions - Council of Architecture guidelines for conducting Architectural competitions -Code of Conduct for Assessors and Participants - Case studies.

UNIT 2 EASEMENTS & TENDER 8 Hrs.

Easements - meaning, types of easements, bearing of easements in architectural design - acquisition, extinction and protection of easements. Tender - Definition - Types of Tenders - Open and closed tenders - Conditions of tender- Tender Notice - Tender documents - Concept of EMD - Submission of tender -Tender scrutiny - Tender analysis - Recommendations - Work order - E-tendering (Advantages, procedure, conditions).

UNIT 3 CONTRACT & CERTIFICATES 8 Hrs.

Definition - Necessity of contract - Contents of Contract Document (Articles of Agreement, Terms and Conditions, Bills of Quantities and specification, drawings, Appendix), types of contracts - Certification of Contractors' Bills - Various types of certificates and procedures to be adopted, importance of Final bill. Defects -Liability period - penalty Clauses.

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UNIT 4 LIABILITY, ARBITRATION AND NEW TRENDS IN PROJECT EXECUTION 4 Hrs.

Types of Liability, Professional Duties and Conduct of architects as per Council of Architecture, Professional Negligence, Deficient service and Exceptions, Insurance, Examples of Cases, Arbitration (Definition, Advantages of arbitration, Sole and joint arbitrators, Role of umpires, Award, Conduct of arbitration proceedings) - Arbitration clause in contract agreement (role of architect, excepted matters).New trends in Project Execution - Understanding of BOT,BOLT,DBOT,BOOT - Role of project Managers -charging role of architect in large projects.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Exercise to prepare a contract document for architectural assignment and present in detail the contents of architectural contract agreement explaining the various terms and fiscal conditions.

Max. 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 To understand the importance of architectural competitions in the field of architecture profession.
CO2 To comprehend and appreciate the rights of easement in architectural design.
CO3 To be familiar with the tender documents.
CO4 Synthesize the need and necessity of contract document and types of contract in architecture profession.
CO5 To interpret and analyze the professional duties and conduct as per guidelines of COA
CO6 Acquiring skill relating to new trends and role of architects in large projects.

TEXT / REFERENCE BOOKS

1. Namavati, R. (1984). Professional practice, Lakhani Book Depot, Mumbai
2. Apte V.S. (2008). Architectural Practice and Procedure, Mrs. Padmaja Bhide, 2008
3. CMDA, Second Master Plan, 2026, CMDA Publications, 2008
4. Architects Act 1972, Council of Architecture, 2011
5. Krishnamurthy K.G. & Ravindra S.V. (2014) Professional Practice, PHI Learning Pvt Ltd, Delhi,
6. Handbook of professional Documents, Council of Architecture, 2011
7. Handbook of Professional Practice, IIA Publications, India

S21 PROJ2	THESIS	L	T	P	Credits	Total Marks
		0	0	26	17	800

COURSE OBJECTIVES:

To deal the design problem in a real life like situation.

METHODOLOGY PROPOSED

- Students will be encouraged to approach the design problem identified by him/her in a systematic way with guidance from a Supervisor on a one to one basis.
- There shall be five continuous assessments during the semester by the review committee comprising of The Internal thesis coordinator, internal guide and External guide. The stages are:

STAGE I: Concept and Site Zoning along with the previous semester Pre Thesis report and study sheets to be presented.

STAGE II: Conceptual sketches, models, plans, sections, elevations.

STAGE III: Scheme I of the Architectural Drawings

STAGE IV: Scheme II of the Architectural Drawings

STAGE V: Pre- Final stage

STAGE VI: Final University Viva Voce

- The review marks obtained in the five assessments shall be taken into account for the internal marks. A jury comprising of internal and external examiners shall conduct the final Viva-Voce examination of the Architectural Thesis/Project in the institution at the end of the Tenth semester as a University Viva Voice. The total marks scored shall be the sum of marks secured in the continuous assessments and the final university viva-voce examination. For detail split up of marks refer clause 12c (ix) in the regulations.
- Each student is required to submit two hard copies of the report along with a soft copy of the report and sheets. The report shall be based on the literature review, Case Study analysis and inferences, Standards, Site Analysis, Requirements and area statements along with the concepts, design processes and the final design.

S21A PROJ2	THESIS	L	T	P	Credits	Total Marks
		0	0	24	12	600

Continuous Assessment	End Semester Examination	Min Pass Marks	
		Continuous Assessment	End Semester Examination
300	300	150	150

COURSE OBJECTIVES

- To enable the students to develop an Architectural program of their choice and demonstrate their collective wisdom of architecture, engineering systems, social sciences and humanities
- To resolve the Architectural program through creative and critical thinking abilities and skills and communicate effectively the novelty in the architectural creation.

METHODOLOGY PROPOSED

1. Students will be encouraged to approach the design problem identified by him/her in a systematic way with guidance from a Supervisor on a one-to-one basis.
2. There shall be five continuous assessments during the semester by the review committee comprising of the Internal thesis coordinator, internal guide and External guide. The stages are:

STAGE I

1	Concept and Site Zoning along with the previous semester Pre-Thesis report and study sheets to be presented.
2	Conceptual Drawings - sketches, study models, plans, sections, elevations
3	**Iteration and Ideation** Resolving the selected architectural program by experimentation and multiple iterations

STAGE II

4	Details Drawings of the final design proposal including structural system and service network.
5	Pre final drawings of the design proposal with model
	Final University Viva Voce

3. The review marks obtained in the five assessments shall be taken into account for the internal marks. A jury consisting of internal and external examiners shall conduct the final Viva-Voce examination of the Architectural Thesis/Project in the institution at the end of the Tenth semester as a University Viva Voce. The total marks scored shall be the sum of marks secured in the continuous assessments and the final university viva-voce examination. For detail split up of marks refer clause 12c (vii) in the regulations.
4. Each student is required to submit two hard copies of the report along with a soft copy of the report and sheets. The report shall be based on the literature review, Case Study analysis and inferences, Standards, Site Analysis, architectural program along with the concepts, design processes and the final design.

COURSE OUTCOMES

On completion of the course the student will be able to

CO1 Research the requirements of a project, Prepare a detailed brief
CO2 Iterate and try alternative approaches/ concepts, and evaluate them in a way to make a final comprehensive proposition.
CO3 Derive Architectural solutions through creative and analytical skills
CO4 Create a functional design by integrating knowledge on allied fields of Architecture.
CO5 Communicate the final outcome effectively through drawings and miniature models based on logical reasoning
CO6 Ability to independently handle an Architectural Design Project

SAR 1609	ENERGY EFFICIENT ARCHITECTURE	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To enable the students understand the importance of energy efficiency in the built environment through the basic energy efficiency principles, building materials, technologies and policies.
- To understand role of embodied energy in achieving efficiency.
- To comprehend the overall structure of green rating systems.

UNIT 1 ENERGY EFFICIENCY IN BUILDINGS 6 Hrs.

Introduction and need for energy efficiency - Historic buildings, preindustrial, post-industrial, and modern architecture - Basic Principles - land form, vegetation type, and pattern, water bodies, open spaces, and built form, colour, texture, openings, and design strategies - passive techniques.

UNIT 2 SUSTAINABILITY AND MATERIALS 8 Hrs.

Various building materials and techniques used for energy efficiency. Building materials role in improving energy efficiency. Embodied energy of materials - Reduce, reuse, and recycling of materials - "e" labelling of materials like energy star etc.

UNIT 3
TECHNOLOGIES FOR ENERGY EFFICIENT BUILDINGS 8 Hrs.

Renewable energy systems. - Solar active, thermal and photovoltaic systems, wind, tidal, biomass, biogas, Ventilation and day lighting techniques - cross ventilation, stack effect, courtyard effect and shading principles, HVAC technologies, building automation system.

UNIT 4 ENERGY POLICY AND BUILDING ENERGY STANDARDS 8 Hrs.

Green buildings - before and after rating systems - LEED, BREEAM, BEPAC,LEED INDIA etc -Concepts of green buildings.-sustainable site, water efficiency, materials and resources, energy and atmosphere, indoor environmental quality, and innovation in design- case studies and examples.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Understanding Energy Efficiency practiced from the history till the current scenario

CO2: Interpreting the role of building materials in Energy Efficiency

CO3: Exploring the concept of Reduce, Reuse and Recycling of Materials.

CO4: Application of the renewable resources in Energy Efficiency

CO5: Integration of passive and active techniques in the creation of Energy Efficient Architecture

CO6: Inferring the role played by green rating systems in the creation of energy efficient structures.

TEXT / REFERENCE BOOKS

Walter F. Wagner, Energy Efficient Building, MGH Publisher, 1980
Majumdar M., TERI Publications, Energy Efficient buildings in India, 2001
Gupta V., Energy and habitat, John Wiley & Sons, 1984
LEED GREEN BUILDING Rating System version 2.1, June 2001
Chaman L. Gupta, Renewable Energy - Basics and Technology, Auroville Foundation, 1998

SARA1604	ENERGY EFFICIENT ARCHITECTURE	L	T	P	Credits	Total Marks
		2	1	0	3	100

COURSE OBJECTIVES:

- To impart knowledge on the issues related to environment.
- To understand the strategies and codes related to energy efficient and climate responsive buildings.
- To gain knowledge on different parameters and design strategies involved in the design of building components
- To realise the concepts of energy efficiency and green building rating systems for new construction and existing buildings.

UNIT 1 INTRODUCTION 6 Hrs.

Introduction and need for energy efficiency – Overview of energy efficiency in Vernacular buildings - Energy conservation through site planning, design and development - relationship between open spaces and built form - land form, vegetation type and pattern, water bodies; Integration of building and site - passive strategies in built environment. Renewable energy system - Solar active, thermal and photovoltaic systems, wind, tidal, biomass, biogas.

UNIT 2 ENERGY EFFICIENT TECHNIQUES AND TECHNOLOGIES 10 Hrs.

Factors that affect energy use in buildings - functional factors, environmental factors, envelope factors, air-conditioning systems factors, energy source factors and electrical systems factors. Building management systems – Access control, artificial lighting.

UNIT 3 DESIGN OF BUILDING ENVELOPE 12 Hrs.

Thermal quantities - heat flow rate, conductivity (k-value) & resistivity - conductance through a multi-layered body, surface conductance - transmittance - calculation of U-value - convection, radiation, concept of sol-air temperature & solar gain factor - introduction to periodic heat flow in building, time lag & decrement factor. Glazing types, properties, glass layers, external and internal shading devices. Building envelope design determinants: indoor temperatures, thermal comfort, and sensible cooling/heating demand.

UNIT 4 SUSTAINABILE PRACTICES AND RATING SYSTEMS 12 Hrs.

Various building materials and techniques used for energy efficiency. Role of Building materials in improving energy efficiency. Life Cycle Analysis, Embodied energy of materials - Reduce, reuse, and recycling of materials - "e" labelling of materials like energy star etc. Overview of Energy Conservation Building Code (ECBC) -Concepts of green buildings - sustainable site, water efficiency, materials and resources, energy and atmosphere, indoor environmental quality, and innovation in design- case studies and examples. – Green Building Rating System- BREEAM, LEED, IGBC, GRIHA. Energy Audit of Buildings

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 5 Hrs.

Comparative analysis of thermal properties of building materials to enhance practical knowledge in achieving energy efficiency in buildings. Case studies presentation by students on the energy efficient techniques and technologies adopted in buildings. Deriving design strategies for day lighting and ventilation from ECBC guidelinesand finding out lighting levels and air movement through simulation analysis - e-quest, IES-VE, etc

MAX.45 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Illustrate with examples of different environmental issues

CO2 Inferring the energy efficiency concepts practiced in vernacular buildings.

CO3 Categorization of the various Passive (solar) strategies applicable in different contexts and exploring the various Active Strategies in increasing the energy efficiency.

CO4 Appraise the performance of building envelope on the heat transfer from external to the indoor environment through the analysis of thermal property of selected building materials.

CO5 Impart knowledge on the material properties for various building components and design strategies involved in design of the roof, walls and flooring.

CO6 Relating the role of Building material (U value) to energy efficiency and criticising energy policy and standards

TEXT / REFERENCE BOOKS

1. Arvind Krishan, N. B. (2001). CLIMATE RESPONSIVE ARCHITECTURE: A Design Handbook for Energy Efficient Buildings. New Delhi: Tata McGraw-Hill Education India.
2. A.Ravikrishnan. (2008). Environmental Science & Engineering, 3rd Edition. Sri Krishna Publications, Chennai.
3. Cottrell, M. (2014). Guide to the LEED Green Associate V4 .
4. David Wright, J. C. (2008). *The Passive Solar Primer: Sustainable Architecture.* Schiffer Pub.
5. Majumdar, M. (2001). Energy-efficient buildings in India. TERI Press.
6. N. Arumugam, V. K. (2014). Environmental Science and Engineering. Saras Publication.

7. O H Koenigsberger, T. G. (2013). Manual of Tropical Housing and Building: Climate Design. Hyderabad: Universities Press India Pvt. Ltd.
Richard. (2006). Environmental science-towards a sustainable future. 8th edition, Prentice Hall of India, NewDelhi

SAR 1101	SOCIETY CULTURE AND ENVIRONMENT	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To introduce the basic concepts / theories of formation of society, role of architecture in built environment and the relationship between man and the environment.
- To construct knowledge on the fundamentals of art and its reflection in culture, theories and solutions related to society and culture.
- To familiarize the students with community, various factors influencing various communities in a society and its impact on environment.

UNIT 1 CULTURE AND ARTS 6 HRS.

Role of art, art reality, perception, representation categories of art in terms of media and technique, paintings, sculpture, film- basic characteristics and development of each field, aspects of literature, performing arts - theatre, dance, music with examples from different cultural contexts.

UNIT 2 CULTURE AND SOCIETY 8 HRS.

Evolution of civilization and cultures, groups, society, culture, environment and time, Levels of social organization & the evolution of various social groups over time, human habitat to be related with culture and various contexts with examples in different eras.

UNIT 3 CONSTRUCTION AND CULTURE 8 HRS.

Role of intuition, innovation, inventiveness, creativity and ingenuity in construction, the origin of the Architect and the master builder, emergence of the specialist, designer and builder relationship, culture of construction workers.

UNIT 4 BUILT ENVIRONMENT 8 HRS.

Introduction to history and theory of built forms - Geographical location, politics, religion, materials and construction techniques with examples in different contexts. Understanding human cultural development, built form and cultural context, expression of the under lying value systems and relationship with the built form.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Map the relationship between community, art, architecture and the environment.
CO2: Understand various cultural contexts and development of various art forms and its representation during different time period.
CO3: Compare various social groups over different time period and human habitat related with various context and culture.
CO4: Identify and appraise the emergence of the Architect – the master builder.
CO5 Analyse & Interpret different cultural context, its development and their relationship with built forms.
CO6: Interrelate the role of culture and human behaviour in a society and their response to environment.

TEXT / REFERENCE BOOKS

1. Jeff Lewis , Cultural studies: The basics, Sage Publications, India Pvt. Ltd., 2008
2. Donald E. Mulligan, Kraig Knutson, Construction and Culture: A Built Environment, Stipes Pub, 2004
3. Kathy S. Stolley, The Basics of Sociology, Greenwood press, 2005
4. Amos Rapoport, The Meaning of the Built Environment: A Nonverbal Communication Approach, University of Arizona Press, 1990
5. Amos Rapoport, Culture, Architecture and design, Locke Science Publishing Company, Inc, 2003

SARA 1101	HISTORY CULTURE AND BUILT ENVIRONMENT -I	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To construct knowledge on the fundamentals of art and its reflection in culture, theories and solutions related to society and culture.
- To understand the basic concepts / theories of formation of society, role of architecture in the built environment and the relationship between man and the environment.
- To familiarize the students with the community, various factors influence various communities in a society and its impact on the environment.

UNIT 1 CULTURE AND ARTS 4 Hrs.

Introduction to the elements of culture. Role of art, art reality, perception, representation categories of art in terms of media and technique, paintings, sculpture, film- basic characteristics and development of each field, aspects of literature, performing arts - theatre, dance, music with examples from different cultural contexts.

UNIT 2 CULTURE AND SOCIETY 8 Hrs.

Importance of Culture and social identity with reference to architecture, Evolution of civilization and cultures, groups, society, culture, environment and time, Levels of social organization & the evolution of various social groups over time, human habitat to be related with culture and various contexts with examples in different eras, research on cultural anthropology.

UNIT 3 CONSTRUCTION AND CULTURE 8 Hrs.

Relationship between nature and Architecture. Architecture and its context, Social and cultural aspects of building practices, Role of intuition, innovation, inventiveness, creativity, ingenuity, expression of power in construction and the origin of the Architect and the master builder Construction as an agent of change, emergence of the specialist, designer and builder relationship, culture of construction workers.

UNIT 4 BUILT ENVIRONMENT 6 Hrs.

Introduction to history and theory of built forms - Geographical location, politics, religion, materials and construction techniques with examples in different contexts. Understanding human cultural development, built form and cultural context. Expression of the underlying value systems and relationship with the built form.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Book Review on Culture, Architecture and design by Amas Rapoport. Assignment on the topic - Aspects influencing the experience and expression - place, people, society, culture, history, tradition, time etc. through Case studies of architects' work. Document the existing communities in urban spaces that illustrate the current socioeconomic and cultural pattern, and show the impact of socio-cultural change on age and the built environment.

Max. 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Understand the cultural contexts, development of various art forms and their representation during different time periods.

CO2 Comprehend the relationship between society, culture and the environment.

CO3 Understand the evolution of social groups over time and human habitat related to various contexts and culture.

CO4 Appraise the relationship of construction with respect to society and their culture and also the emergence of the Architect.

CO5 Summarize the different cultural context and analyze their relationship with the design of built forms.

CO6 Relate the role of culture and human behavior in a society and their response to the environment.

TEXT / REFERENCE BOOKS

1. Lewis, Jeff. Cultural Studies - The Basics. SAGE Publications, 2002.
2. Rapoport, Amos. Culture, Architecture, and Design. Locke Science Publishing Company, 2005.
3. The Meaning of the Built Environment: A Nonverbal Communication Approach. University of Arizona Press, 1990.
4. Stolley, Kathy S. The Basics of Sociology. London: Greenwood press, 2005.
5. James W. Spradley Late, D. W. (2015). Conformity and Conflict: Readings in Cultural Anthropology. Pearson; 15 editions.
6. Rapoport, A. (1969). House Form and Culture. Pearson; 1 edition.
7. Saile, D. G. (1986). Architecture in Cultural Change: Essays in Built Form and Culture Research. University of Kansas.

SAR 1201	HISTORY OF ARCHITECTURE I	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To develop an insight into the architecture of prehistoric era and early civilizations
- To impart perception about the social, religious and political character of various indigenous civilizations and how it influenced the built form and settlement
- To emphasize the combined influence of geography, climate, religions, beliefs and culture in shaping the built environment.

UNIT 1 NEOLITHIC ARCHITECTURE 08 Hrs.

Paleolithic & Neolithic - Elements and types of settlements, Nucleus and growth of settlements, Culture, Evolution of shelter, Factors influencing Architecture- Khirokitia, Catal Huyuk, Early Indus settlements, Harappa and Mohenjodaro, Stonehenge, Architectural character - Ziggurat of Ur; Palace of Sargon, Khorsabad.

UNIT 2 BRONZE AGE 06 HRS.

Ancient Egypt, history, religious and funerary beliefs and practices, biomorphism, monumentality, Tomb Architecture: Evolution of the pyramid from Mastaba, Pyramids-Giza, Temple Architecture, Temple of Ammon Ra- Karnak, Temple of Abu Simbel.

UNIT 3 EARLY IRON AGE 08 HRS.

Aryan civilization, Evolution of City States, Greece: The Geometric period, Emergence of Greek Temple, Shape grammar, Theater Epidaurus, orders, optical illusion, Examples: Parthenon, Erecthion, Evolution of Republic states, The founding of Rome, Pompei.

UNIT 4 MIDDLE IRON AGE 08 Hrs.

Mauryan dynasty, Asokan pillar, Development of Mahayana Buddhism, Symbolism, Sanchi complex, Amaravati stupa, Chaitya halls and Viharas, Lomas Rishi Cave, Rani Gumpha- Udaigiri, Takht-i- Bahai, Chaitya halls at Karle, Baja, Ajanta and Ellora caves. **Max. 30 Hours**

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Brief on major monuments and works of art and architecture covered.
CO2: Acquire knowledge of the basic terminology for chronological periods.
CO3:.Distinguish and criticize the role of architecture within the chronological developments across the geographies by executing a comparative analysis
CO4: Evaluate the parameters involved in the formulation of various societies within the civilizations
CO5: Summarize the role of different building materials and constructions techniques used across the globe ancient period in fabricating new built environment.
CO6: Appraising the combined influence of geography, climate, culture and religious beliefs in the formation of various civilizations.

TEXT / REFERENCE BOOKS

1. Mark M.Jarzombek, Vikramaditya Prakash, A global history of architecture, Wiley, 2011
2. Lloyd / H. W. Miller, History of world Architecture series, Faber Ltd., London,1986
3. Sir Bannister Fletcher, A History of Architecture, University of London, The Antholone Press, 1986
4. Spiro Kostof, A history of Architecture - settings and Rituals, Oxford University Press London 1985
5. Christopher Tadgell , The History of Architecture of India from the Dawn of Civilization to the end of the Raj , Longman UK, London,1990
6. Percy Brown , Indian Architecture (Buddhist Period) , Volume I, Taraporevala and Sons, Bombay, 1983
7. Satish Grover , The Architecture of India (Buddhist period), Vikas Publishing House Pvt. Ltd., New Delhi,1981
8. Volwahsen , Living Architecture: India (Buddhist Period), Macdonald & Co, London, 1969

SARA1201	HISTORYCULTURE AND BUILT ENVIRONMENT -II	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To explore the diverse factors that shaped the built forms during Neolithic, bronze and Iron Age.
- To understand the planning principles and the construction techniques adopted in the Early Iron Age.
- To understand the space development and structural quality in roman architecture.

UNIT 1 NEOLITHIC AND BRONZE AGE 6 Hrs.

Shelter in the Neolithic period - Khirokitia, Catal Huyuk, Early Indus settlements, Harappa and Mohenjodaro, Stonehenge. Study of the cultural influences & architectural character of ancient Egypt with relevant examples of Tomb (Pyramid of Cheops) & Temple structures (Temple of Ammon), Study of Mesopotamian architecture with examples of Ziggurat, Sargon palace & Palace of Persepolis

UNIT 2 EARLY IRON AGE 8 Hrs.

Factors influencing Greek Architecture and Evolution of City states in Greece, systems of proportion and scaling- classical orders, the features of the Greek temple, the building of the Acropolis- Doric (Parthenon), Ionic (Erechtheon) & Corinthian. Public architecture: Theatre of Epidaurus and Agora, Optical illusions in Greek architecture. Formation of Roman republic & Empire.

UNIT 3 MIDDLE AGE 4 Hrs.

Introduction to Mauryan empire- life - culture & important rulers.Mauryandynasty-Ashokan pillar- Development of Mahayana Buddhism-Symbolism-Lomas rishi,RaniGumpha, Sanchi complex, Viharas, Chaitya halls at Karle, Baja, Ajanta and Ellora caves.

UNIT 4 LATE IRON AGE 8 Hrs.

Influence of geology, culture & lifestyle of Roman Architecture-Structural and construction technology-Classical Orders-Roman forums, basilicas – Pantheon, Thermae of Caracalla, Colosseum and Circus Maximus. Architecture as a realisation of the ideals of the society and influence on later civilizations.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Map the role of tangible and intangible factors that shaped the architecture in contexts. Scale models and sketches of different ages- built forms, columns, details and architectural developments.

Max. 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Outline the role of tangible and intangible factors that influenced the architecture during the Neolithic and bronze age.
CO2 Appraise the salient characteristics of Greek architecture.
CO3 Comprehend the other factors influencing architecture in India.
CO4 Analyze the contributing factors for the design development of different styles.
CO5 Compare and Contrast various styles on the basis of the contributing factors responsible for their development.
CO6 Discuss the influence of factors in determining the architectural character and features from Neolithic to late iron age.

TEXT / REFERENCE BOOKS

1. Jarzombek,M.M.&Prakash,V. (2011). A global history of architecture, Wiley.
2. Lloyd.S& / Miller,H.W. (1986). History of world Architecture series, Faber Ltd., London.
3. Fletcher,B. (1986). A History of Architecture, University of London, The Athlone Press.
4. Kostof,S. (1985). A history of Architecture - settings and Rituals, Oxford University Press London.
5. Tadgell,C. (1990). The History of Architecture of India from the Dawn of Civilization to the end of the Raj , Longman UK, London.
6. Brown, P. (1983). Indian Architecture (Buddhist Period) , Volume I, Taraporevala and Sons, Bombay
7. Grover,S. (1981). The Architecture of India (Buddhist period), Vikas Publishing House Pvt. Ltd., New Delhi

SAR1206	HISTORY OF ARCHITECTURE II	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To understand the development of Architecture during the late Iron Age and medieval period.
- To introduce the student to Romanesque & gothic architecture and progression through late Iron Age and Early Middle Age.
- To get an insight into the monumental Architecture and the influences, both natural and manmade.

UNIT 1 LATE IRON AGE 6 Hrs.

Republic and empire, Roman religion, Urban planning, Art and Architecture, Forums and Basilicas, principles of reuse in construction, Enclosure, orders and Manipulation of space Examples- Forum Romanum, Pantheon, Colosseum, Circus Maximus, Thermae of Caracalla.

UNIT 2 EARLY MIDDLE AGE 8 Hrs.

Feudalism, Monasticism, Guilds, Medieval monasteries, Medieval Domestic Architecture, Cluny- Romanesque churches, Development of vaulting, Abbaye Aux Homes, Tower of London, Dunham Cathedral, Birth and spread of Christianity, Early Christian Worship and burial, Basilican concept- St. Peters Rome, St. Clement, Rome, Centralised Plan - St.Vitale - Ravena, Hagia Sophia.

UNIT 3 MIDDLE AGE 8 Hrs.

Evolution of temples, fractals in temples, Borobudur temple, Durga temple- Aihole, Ladh Khan Temple, Tigawa temple, Papanatha Temple, Virupaksha Temple, Lingaraja Temple, Jagannath Temple- Puri, Jain Temple- Mt.Abu, Shore temple and Rathas -Mahabalipuram, Brihadeeshwara Temple, Meenakshi Amman Temple - Madurai, Srirangam Temple.

UNIT 4 LATE MIDDLE AGE 8 Hrs.

Political and social changes, Re-Emergence of the city, Crusades, Scholasticism, Development of Gothic Architecture, fractals in cathedrals, Structural developments in France and England- Notre Dame- Amiens, Notre Dame- Paris, Westminster Abbey, Milan Cathedral, Wooden roofs in Churches and Domestic Architecture.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Understanding of utilitarian and monumental Architecture of late Iron Age
CO2: Insight into developments in early middle age, with focus on medieval monasteries and churches
CO3: Understanding of the Architecture of early middle Age with thrust on Romanesque and gothic Architecture.
CO4: Comprehension of the Architecture of middle Iron Age, especially the Dravidian period.
CO5: Appraisal of the combined influence of natural and manmade factors on the Architecture

TEXT / REFERENCE BOOKS

Mark M.Jarzombek, Vikramaditya Prakash, A global history of architecture, Wiley,2011
Lloyd / H. W. Miller, History of world Architecture series, Faber Ltd, London, 1986
Sir Bannister Fletcher, A History of Architecture, University of London, The Antholone Press, 1986
Percy Brown, Indian Architecture (Hindu Period), Taraporevala and Sons, Bombay, 1983
Satish Grover, The Architecture of India (Hindu period), Vikas Publishing House Pvt. Ltd., New Delhi,1981
Volwahsen, Living Architecture – India (Hindu Period), Macdonald & Co, 1969

SARA1301	HISTORY CULTURE AND BUILT ENVIRONMENT -III	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To comprehend the role of tangible and intangible parameters in determining the architectural expressions in diverse contexts of Dravidian architecture.
- To impart knowledge about the development of architecture from early middle age to late middle age.
- To explore the construction techniques adopted in Western and Indian context.

UNIT 1 EARLY MIDDLE AGE **8 Hrs.**

Spread of Christianity - the evolution of early Christian Church form from the Roman basilica- Contribution of Byzantine architecture in the development of structural system with relevant examples-Evolution of artisanal craft and structural principal of Romanesque period- Medieval Monasteries - Influences & architectural character of Romanesque churches in Italy (Pisa complex), France (Abbey Aux Hommes)&Durham cathedral.

UNIT 2 MIDDLE AGE: DRAVIDIAN ARCHITECTURE **8 Hrs.**

Evolution of Hindu Temple-fractals in temples - Early shrines of the Gupta and Chalukyan periods - Sangam Era keezadi-Tigawa temple, Ladh Khan temple and Durga temple - Development of Dravidian style and importance of the rulers, life and culture:Pallava style five Rathas, temple at Mahabalipuram:Chola style with temple examples:Evolution of Gopuram & temple complexes – Example of Pandyan style - Influence of Nayaks.

UNIT 3 MIDDLE AGE: NAGARA ARCHITECTURE **4 Hrs.**

Classification of Indo-Aryan temples, examples of Orissa style - Lingaraja temple at Bhuvaneshwar & Sun temple at Konarak, Example of Gujarat style - Surya temple at Modhera, Madhyapradesh - Dilwara temple, Mt. Abu.

UNIT 4 LATE MIDDLE AGE **6 Hrs.**

Political and social changes- Re-Emergence of the city - Crusades - Scholasticism-Development of Gothic Architecture in France, evolution of Gothic cathedral & structural system using vaulting & flying buttress, the example of Notre Dame cathedral at Paris. Gothic Architecture in Italy & the example of Milan cathedral. Development of English Gothic vaulting & the example of Westminster Abbey at London - wooden roofed churches.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS **4 Hrs.**

Map the role of tangible and intangible factors that shaped the architecture from early to late middle age. Sketches / models of different ages- built forms, columns, details and architectural developments. Comparative studies of Dravidian architecture and Indo -Aryan architecture.

Max. 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Outline the evolution of churches during the early middle ages.

CO2 Discuss the evolution of Dravidian temple architecture.

CO3 Summarize the planning principles and salient features of temples in South India.

CO4 Comprehend the architectural features of Indo Aryan temple styles.

CO5 Appraise the emergence, evolution and construction techniques of Gothic architecture in Italy and Britain.

CO6 Construct structural drawings in details of middle age historic buildings.

TEXT / REFERENCE BOOKS

1. Jarzombek, M.M. & Prakash, V. (2011). A global history of architecture, Wiley.
2. Lloyd.S& / Miller,H.W. (1986). History of world Architecture series, Faber Ltd., London.
3. Fletcher, B. (1986). A History of Architecture, University of London, The Athlone Press.
4. Kostof, S. (1985). A history of Architecture - settings and Rituals, Oxford University Press London.
5. Tadgell, C. (1990). The History of Architecture of India from the Dawn of Civilization to the end of the Raj, Longman UK, London.
6. Brown, P. (1983). Indian Architecture (Buddhist Period) , Volume I, Taraporevala and Sons, Bombay
7. Grover, S. (1981). The Architecture of India (Buddhist period), Vikas Publishing House Pvt. Ltd., New Delhi
8. Volwahsen, A. (1969). Living Architecture: India (Buddhist Period), Macdonald & Co, London.

9. Srinivasan,K.R.(2005),Temples Of South India, National Book Trust, India

SAR 1301	HISTORY OF ARCHITECTURE III	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To study about the growth of Islam in India and the world-and its impact on art and architecture in India with specific reference to monuments built.
- To study the events this led to the emergence of Renaissance in Europe.
- To comprehend the rich vocabulary of structural systems, architectural manifestation and critically analyze the built forms and the limitations of the building process.

UNIT 1 EARLY INDO ISLAMIC PERIOD 8 Hrs.

Advent of Islam in Indian subcontinent, Overview of Development based on political history, Establishment of Delhi Sultanate, Evolution of Architecture under Slave, Khalji, Tughlaq, Sayyed and Lodi dynasties with important examples. Shift of power to the provinces and evolution of Regional Architecture with Examples- Bengal, Gujarat and Malwa, Deccan- Bijapur and Gulbarga with examples.

UNIT 2 INDO ISLAMIC PERIOD 6 Hrs.

Mughals in India, Evolution of Architecture and Outline of Mughal cities, gardens, shape grammar and fractals, Babur, Humayun, Akbar, Jahangir, Shahjahan, Aurangazeb- Important examples, Decline of Mughal Empire - Cross cultural influences across India and Secular Architecture of the princely states like Oudh and Vijayanagar.

UNIT 3 RENAISSANCE 8 Hrs.

The Idea of rebirth and revival of Art, Fractals, Architectural character during Early & High renaissance - Study of the life and contribution of the following Architects in brief - Works of Brunelleschi - 'The Dome' of Florence Cathedral - Works of Alberti - Church of Sant' Andrea- Works of Bramante- St.Peter's Basilica (Vatican city) - Works of Andrea Palladio - Villa Capra (Vicenza) - Works of Inigo Jones - Durham's cathedral.

UNIT 4 RENAISSANCE CLASSICISM 8 Hrs.

Outline the Renaissance in transition, Works of Michael Angelo - Laurentian Library (St Lorenzo, Florence); St. Peter's, Rome Outline the Architectural character - St. Paul's Cathedral; Chateau De Chambord; The Louvre, Paris-Study of the life and contribution of Sir Christopher Wren - Sheldonian Theatre (Oxford); St. Paul's Cathedral (London)- rococo Architecture - interiors – hotels. **Max. 30 Hours**

COURSE OUTCOMES:

On completion of the course the student will be able to

CO1: Construct knowledge on the influence of geography, climate, culture and religious beliefs in eastern and western context.

CO2: Understanding the various architectural terminologies adopted in the Islamic and Renaissance era.

CO3: Acquire the ability to assess and appreciate the evolution of architecture with respect to time around the globe.

CO4: Understanding of how political factors have a bearing on the shape of built forms with particular reference to invasion of Islamic rulers in India and emergence of new architectural style.

CO5: Appreciation of the role of different building materials and constructions techniques used across the globe renaissance period in fabricating new built environment.

CO6: Acquire the ability to comprehend the works of great master during Renaissance period.

TEXT / REFERENCE BOOKS

1. Sir Bannister Fletcher, A History of Architecture, University of London, The Antholone Press, 1986
2. Christopher Tadgell, The History of Architecture of India from the Dawn of Civilization to the end of the Raj, Orient Longman, UK, London,1990
3. Percy Brown, Indian Architecture (Islamic Period), Taraporevala and Sons, Bombay, 1983
4. Satish Grover, The Architecture of India (Islamic period), Vikas Publishing House Pvt. Ltd., New Delhi,1981

5. Volwahsen, Living Architecture, India (Islamic Period), Macdonald & Co, 1969

SARA1401	HISTORY, CULTURE AND BUILT ENVIRONMENT -IV	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To study about the growth of Islam in India and the world-and its impact on art and architecture in India with specific reference to monuments built.
- Develop the understanding of evolution of a temporal building typology through the exhaustive study of a specific type, viz., religious architecture from across the world.
- To study the events this led to the emergence of Renaissance in Europe.
- To comprehend the rich vocabulary of structural systems, architectural manifestation and critically analyze the built forms and the limitations of the building process.
- To study the architectural methods practiced in India are a result of examination and implementation of its established building traditions and outside cultural interactions.

UNIT 1 EARLY INDO ISLAMIC PERIOD 6 Hrs.

Advent of Islam in Indian subcontinent - Overview of Development based on political history - Establishment of Delhi Sultanate - Evolution of Architecture under Slave, Khalji, Tughlaq, Sayyed and Lodi dynasties with important examples focusing on construction techniques. Shift of power to the provinces and evolution of Regional Architecture with Examples- Bengal, Gujarat and Malwa, Deccan- Bijapur and Gulbarga with examples.

UNIT 2 INDO ISLAMIC PERIOD 6 Hrs.

Political history of Mughals- Evolution of Architecture and Urbanism - Mughal gardens - shape grammar and fractal - Babur, Humayun, Akbar, Jahangir, Shahjahan, Aurangzeb- Study of important examples. Decline of Mughal Empire - Cross cultural influences across India - Secular Architecture of the princely states like Oudh and Vijayanagar.

UNIT 3 RENAISSANCE CLASSICISM 10 Hrs.

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

UNIT 4 COLONIAL ARCHITECTURE 4 Hrs.

Colonialism and its impact - Indo-Saracenic Architecture and the works of Chisholm: Senate House- Chennai, Victoria Public hall -Chennai, Napier Museum- Trivandrum, Edwin Lutyens' Planning of New Delhi Showcasing Imperial power.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Map the role of tangible and intangible factors that shaped the architecture during the Islamic and Renaissance era. Sketches / models of different ages-built forms, columns, details and architectural developments. Comparative analysis of provincial style with regional architecture.

Max. 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Outline the planning principles and the construction techniques adopted during the early Islamic period.
CO2 Summarize the evolution of Mughal architecture and the factors that influence the secular buildings of Princely states.
CO3 Discuss the manifestations of fractals and shape grammar in Mughal architecture
CO4 Appreciate the architectural language developed by famous architects during the Renaissance era.
CO5 Explain the salient features of churches constructed during the Renaissance period with a focus on architectonics.
CO6 Appraise the influence of colonial architecture that etched in Indian context.

TEXT / REFERENCE BOOKS

1. Fletcher, B. (1986). A History of Architecture, University of London, The Athlone Press
2. Tadgell, C. (1990). The History of Architecture of India from the Dawn of Civilization to the end of the Raj, Orient Longman, UK, London.
3. Brown, P. (1983). Indian Architecture (Islamic Period), Taraporevala and Sons, Bombay.
4. Grover, S. (1981). The Architecture of India (Islamic period), Vikas Publishing House Pvt. Ltd., New Delhi.

5. Volwahsen, A. (1969). Living Architecture, India (Islamic Period), Macdonald & Co.

SAR1305	MODERN ARCHITECTURE	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To develop an insight into the architecture of Colonial India and the modern era.
- To impart knowledge on the various movements beginning from neo classicism to futurism in architecture.
- To explore the architectural language evolved and developed by various pioneers through well known examples.

UNIT 1 ARCHITECTURE IN COLONIAL INDIA 8 Hrs.

Colonialism and its impact, Early British Neo-classical Architecture, Indo-Saracenic Architecture and the works of Chisholm, Senate House- Chennai, Victoria Public hall -Chennai, Napier Museum- Trivandrum, Edwin Lutyens' Planning of New Delhi Showcasing Imperial power.

UNIT 2 EARLY MODERN ERA 6 Hrs.

Neo classicm- Chiswick House, Chateau de Versailles, Works of Boullee and Ledoux, Salt works of Chaux, Napoleanic Cemetries, Bank of England, Impact of Industrialisation, Construction Materials and Technologies, Industrial Exhibitions, Crystal Palace, Eiffel Tower, Gallery des Machines, Chicago School, Public sector Architecture, Panoptic prisons and London Law Court.

UNIT 3 MODERN ERA 8 Hrs.

Arts and Crafts Movement - Art Nouveau and the works of Gaudi, Horta, Guimard, Macintosh, City Beautiful movement, Garden City movement, Skyscrapers, Bauhaus, CIAM, Cubism, Constructivism and its influence on Architecture, Adolf Loos and the Arguments on Ornamentation, Futurist Movement, Manifestos and the works of Sant'Elia Expressionism and the works of Mendelson, Taut, Polzeig, Destijl: Ideas and works, Utopian ideas of Paulo soleri.

UNIT 4 INSTITUTIONS, PHILOSOPHIES AND THE MASTERS 8 Hrs.

Modernism, F.L.Wright, Alvar Alto, Rockfeller center, Le Corbusier, Architecture of Prestige- Eero Sarinen, SOM, Minoru Yamasaki, Paul Rudolf, Oscar Neimeyer, Kenzo Tange, John Utzon, Sullivan, Mies van der rohe, Toyo Ito.

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Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Acquiring knowledge of Indo Saracenic architecture in Colonial India.

CO2: Ability to understand the ideologies and approaches of neo classicism, arts and crafts movement, art nouveau and industrial revolution.

CO3: Constructing an in depth information on futurism with examples.

CO4: Summarization of the role of different building materials and constructions techniques developed during the modern era.

CO5: Exploring the concepts and approaches adopted by the master architects with examples.

TEXT / REFERENCE BOOKS

1 .Kenneth Frampton, Modern Architecture: A Critical History, Thames and Hudson, London, 1994
2. Leonardo Benevelo, History of Modern Architecture, Routledge and Kegan Paul, London, 1971
3. Manfred Taferi / Francesco dal co., Modern Architecture, Faber and Faber, Electa, 1980
4. Siegfried Gideon, Space, Time and Architecture: The Growth of a New Tradition, Harvard University Press, 1978
5. Thomas Metcalf, An Imperial Vision, Faber and Faber, London, 1989

SARA1501	HISTORY, CULTURE AND BUILT ENVIRONMENT -V	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To explore the architectural marvels constructed during the modern era.
- To comprehend the philosophies of the master architects during the 19th century.
- To study in detail the different post-modern directions in architecture.

UNIT 1 EARLY MODERN ERA **6 Hrs.**

Neo classism-manifestation through works of Boullee and Ledoux, Salt works of Chaux, Napoleonic Cemeteries, Bank of England, Impact of Industrialization, Construction Materials and Technologies, Industrial Exhibitions, Crystal Palace, Eiffel Tower, Gallery des Machines, Chicago School-Louis Sullivan, Public sector Architecture, Panoptic prisons and London Law Court.

UNIT 2 MODERN ERA **8 Hrs.**

Artistic movement of the 20th century-Arts and Crafts Movement - Art Nouveau and the works of Gaudi, Horta, Guimard, Macintosh- Bauhaus-Walter Gropius -CIAM- Cubism- Constructivism and its influence on Architecture, Adolf Loos and the Arguments on Ornamentation- Expressionism and the works of Mendelson - Destijl: Ideas and works.

UNIT 3 INSTITUTIONS, PHILOSOPHIES AND THE MASTERS **8 Hrs.**

Emergence of modern-factors contributing to modern architecture - major architects and buildings of modern architecture through the Design philosophies - Organic Architecture- F.L. Wright: Programmatic Functionalism-Le Corbusier: Development of international style: Mies van der Rohe,Philip Johnson, Louis I Kahn, Eero Saarinen and SOM.

UNIT 4 CRITIQUING MODERNISM **4 Hrs.**

Brutalism - Archigram, Constructivism, Deconstructivism, Writings of Jane Jacobs - Kenneth Frampton, Robert Venturi - Christopher Alexander, Charles Jencks - Deconstructivism as new architectural movement -Ideas and works of Eisenmann,Hadid,Gehry,Libeskind and Tschumi.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS **4 Hrs.**

Map the design philosophies and approaches of British architects in India. Sketches / models of exhibition buildings and the manifestations of art movement in buildings. Comparative studies of buildings constructed by master architects in the 19th century.

MAX. 30 HOURS

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Outline the planning principles and the construction techniques adopted during the indosaracenic era.

CO2 Summarize the architectural exemplars during the Neo Classicism era.

CO3 Outline the salient features and construction techniques adopted in the industrial exhibitions.

CO4 Explain the manifestations of art movements in architecture.

CO5 Discuss the philosophies of master architects with examples

CO6 Explain the transition observed in exemplars of architecture during the modern era.

TEXT / REFERENCE BOOKS

1. Frampton,F. (1994). Modern Architecture: A Critical History, Thames and Hudson, London.
2. Benevelo, L. (1971). History of Modern Architecture, Routledge and Kegan Paul, London.
3. Gideon, S. (1978). Space, Time and Architecture: The Growth of a New Tradition, Harvard University Press,
4. Metcalf, T. (1989). An Imperial Vision, Faber and Faber, London.
5. Gideon.S (1978). Space, Time and Architecture: The Growth of a New Tradition, Harvard University Press