



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

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SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

**LIST OF COURSES OFFERED IN B.ARCH FROM 2016 – 2021 WITH A
THRUST ON EMPLOYABILITY , SKILL DEVELOPMENT &
ENTREPRENEURSHIP**

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.

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-DIMENSIONAL VISUALISATION**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.

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.
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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. Pramur 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

SARA2201	MATERIALS AND CONSTRUCTION STUDIO - I	L	T	P	Credits	Total Marks
		1	1	3	3	200
Continuous Assessment	End Semester Examination	Min Pass Marks				
		Continuous Assessment		End Semester Examination		
150	50	75		25		

COURSE OBJECTIVES

- To comprehend the types of building materials and the appropriate applications in the built form and environment.
- To explore the fundamental components of the buildings, the role and purpose in the built forms including the necessary thumb rules for designing temporary shelters and single storied buildings.
- To incorporate appropriate materials while designing space enclosures.

MODULE I INTRODUCTION TO BUILDING MATERIALS**30 Hrs.**

Introduction to building materials - Natural building materials – renewable and nonrenewable resources - Definitions, types and applications - soil, sand, aggregate, clay, gravel, timber, coconut leaf, reed, bamboo, Palmyra leaf, lime – Fencing and temporary shelters

Manufactured building materials - Definitions, types and applications - glass, paint/ polish, brick, terracotta products, stabilized mud blocks, polymer, steel, Basics of DPC.

MODULE II INTRODUCTION TO FUNDAMENTALS OF COMPONENTS OF BUILDINGS**45 Hrs.**

Introduction to fundamental components of buildings (sub structure & super structure) – definitions and thumb rules based on soil types as well as the number of floors and height of the structure

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

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

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

Max. 75 Hours

Modules	Assignments	Suggestive Outdoor / hands on Workshop	Construction plates	No.	Remarks
I	Collection of brochures, BM and applications in buildings, Case study presentation of temporary structures, specific to building materials and applications - Eraser models to explore types of Bonding	Handling Mud Brick bonding Bamboo Workshop	Construction techniques for temporary structures	1	Facilitates Architectural design III
			Brick bonding	2	
			Stone masonry	1	
			Compound wall section	1	
II	Sketches and pictures – rammed mud wall, stabilized mud wall		Building components (Shallow foundations, flooring, wall, sill, openings, lintel, slab, roof, parapet)	2	

COURSE OUTCOME:**On completion of the course the student will be able to**

- CO1** Classify the building materials based on properties and applications in built forms and environment.
- CO2** Explain the applications of building materials in the sub and super structures.
- CO3** Design temporary as well as permanent elements for enclosing spaces both physically and visually.
- CO4** Devise ways to incorporate natural and manufactured materials in buildings.
- CO5** Generate ways to utilize diverse materials for temporary structures as well as single storied buildings.

TEXT / REFERENCE BOOKS

1. Arora S.P. and Bindra S.P.,(2012). Text book of Building Construction, Dhanpat Rai & Sons, New Delhi.
2. Chudley R., (1999). Construction Technology (Volume 1), Longman publications 3rd Edition.
3. Ching,F.D.K. (2000).Building Construction Illustrated, John Wiley & Sons
4. McKay W.B. (1981). Building construction, Volume 1 and 2, Longman UK
5. Rangwala S.C. (2000). Building Construction, AnandCharat Publishing House, India
6. KlansDukeeborg, Bambus - Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000

SARA2202	ARCHITECTURAL GRAPHICS - II	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 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 Foster 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 Pitman 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

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 / wood etc. 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 (thermocool) / 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.

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.

SARA9202	DESIGN STUDIO II		L	T	P	Credits	Total Marks
			0	1	9	6	300
Continuous Assessment	End Semester Examination	Min Pass Marks					
		Continuous Assessment	End Semester Examination			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.
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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. Prammar 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

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
10. Nobert, M.L, "Plumbing, Electricity, Acoustics- Sustainable design methods for Architecture", John Wiley & Sons, Inc, 2012.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A : 2 questions each from unit 1 to unit 4, each carrying 5 marks****PART B : 1 question each from unit 1 to unit 4 with an internal choice, each carrying 15 marks****Exam Duration: 3 Hrs.****: 08 x 05 = 40 Marks****: 04 x 15 = 60 Marks**

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

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

WEBSITES

- <https://law.resource.org/pub/in/bis/S03/is.sp.41.1987.pdf> - SP 41 (1987): Handbook on Functional Requirements of Buildings (Other than Industrial Buildings)
- <http://koeppen-geiger.vu-wien.ac.at/>
- <http://plea-arch.org/wp-content/uploads/PLEA-NOTE-1-SOLAR-GEOMETRY.pdf>
- <https://nptel.ac.in/courses/105107156/>

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A : 2 questions each from unit 1 to unit 4, each carrying 5 marks****PART B : 1 question each from unit 1 to unit 4 with an internal choice, each carrying 15 marks****Exam Duration: 3 Hrs.****: 08 x 05 = 40 Marks****: 04 x 15 = 60 Marks**

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. 45 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.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****Exam Duration: 3 Hrs.****PART A : 2 questions each from unit 1 to unit 4, each carrying 5 marks****: 08 x 05 = 40 Marks****PART B : 1 question each from unit 1 to unit 4 with an internal choice, each carrying 15 marks****: 04 x 15 = 60 Marks**

SARA2301	MATERIALS AND CONSTRUCTION STUDIO - II	L	T	P	Credits	Total Marks
		1	1	3	3	200
Continuous Assessment	End Semester Examination	Min Pass Marks				
		Continuous Assessment		End Semester Examination		
150	50	75		25		

COURSE OBJECTIVES:

- To trace the various stages involved in timber processing and the associated defects.
- To comprehend the various types of timber joinery adopted in the movable and fixed barriers in the external walls.
- To figure out the ways through which timber is utilized in the built environment.

MODULE I TIMBER AS A BUILDING MATERIAL**30 Hrs.**

Introduction to timber, types of trees for timber production, processing of timber, defects of timber, conservation and preservation of timber, timber as a building material construction (types, seasoning, defects), manufactured timber - Mangalore tiles, madras terrace roofing, applications of timber in contemporary architecture

MODULE II TIMBER JOINERY**45 Hrs.**

Timber joinery details – doors, Drawings on Methods of construction using natural timber in joinery works including methods of fixing and options for finishing, fixing details. - Different types and methods of fixing - Windows (paneled, louvered, glazed, pivoted and sliding windows) - Doors (paneled, glazed, sliding, folding, louvered and pivoted) - Ventilators (top hung, louvered, and glazed) - Hardware for doors, windows and ventilators and application for a simple structure with schedule of joinery windows, partitions, paneling, truss, simple staircase – thumb rules

Max. 75 Hours

Modules	Assignments	Suggestive Outdoor / hands on Workshop	Construction plates	No.	Remarks
I	Applications of timber in building, Timber in vernacular and contemporary architecture -case studies	Carpentry Workshop Understanding of joineries (doors, windows, chairs, tables)	Types of timber trusses and Madras terrace roofing	1	Facilitates Architectural design IV
II	Sketching of various joineries in timber Sketching –trusses, staircase in vernacular houses	Report – Observe the activity of a carpenter who is in the process of making a joinery and document the same	Timber joinery details	1	
			Types of timber joinery in doors, windows and ventilators	3	
			Partitions and paneling	1	
			Design and develop joinery details for the outcome of Architectural design II.	1	

COURSE OUTCOME:**On completion of the course the student will be able to**

- CO1** Explain the treatment of timber the various applications in buildings.
- CO2** Demonstrate the types of joinery adopted in doors, windows and furniture
- CO3** Design timber partitions and paneling.
- CO4** Illustrate the utilization of timber in roofs and simple staircases.
- CO5** Design and develop timber joineries in architectural designs.

TEXT / REFERENCE BOOKS

- Arora, S. P., Arora, S. P., & Bindra, S. P. (1984). Text Book of Building Construction: Including Engineering Materials. Dhanpat Rai and Sons.
- Chudley R., (1999). Construction Technology (Volume 1), Longman publications 3rd Edition.
- Watson, D.A. (1972). Construction Materials and Processes, McGraw Hill.
- Ching, F.D.K. (2000). Building Construction Illustrated, John Wiley & Sons
- McKay W.B. (1981). Building construction, Volume 1 and 2, Longman UK
- Rangwala S.C. (2000). Building Construction, AnandCharotar Publishing House, India
- Sharma S.K. (1998). A Text book of Building Construction, S. Chand and company, New Delhi
- Bayliss R. (1969). Carpentry and Joinery (Volume 1), Hutchinson Technical Education Publishers
- Kumar, S. (2010). Building Construction, Standard Publishers Distributors
- Herzog, T., Natterer, J., Schweitzer, R., Volz, M., & Winter, W. (2012). Timber construction manual. Walter de Gruyter.

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.

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.
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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

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

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 Tregenza, and David Loe, The Design of Lighting, E & FN Spon, London, 2nd edition, 2004,
8. B.Raja rao, Electricity for architects.
9. Energy Conservation Building Code user guide – ECBC, Bureau of Energy Efficiency, New Delhi, India

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****Exam Duration: 3 Hrs.****PART A : 2 questions each from unit 1 to unit 4, each carrying 5 marks****: 08 x 05 = 40 Marks****PART B : 1 question each from unit 1 to unit 4 with an internal choice, each carrying 15 marks****: 04 x 15 = 60 Marks**

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, deserts 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, deserts 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 DESERTS 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

- 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
- Fathy, H. (1986). Natural energy and vernacular architecture, University of Chicago Press, Chicago and London, 1986
- Fry M. & Drew J., (1964) Tropical Architecture in the Dry and Humid Zones. Londres: Bestford
- Jain. K & Jain.M. (1992), Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad
- Auroville Charter, Auroville Architecture: Towards New forms, Second Edition, Prisma Publications, 2003
- Pramar V.S.(1989) Haveli - Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad,
- 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.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****Exam Duration: 3 Hrs.****PART A : 2 questions each from unit 1 to unit 4, each carrying 5 marks****: 08 x 05 = 40 Marks****PART B : 1 question each from unit 1 to unit 4 with an internal choice, each carrying 15 marks****: 04 x 15 = 60 Marks**

SARA2401	MATERIALS AND CONSTRUCTION STUDIO - III	L	T	P	Credits	Total Marks
		1	1	3	3	200
Continuous Assessment	End Semester Examination	Min Pass Marks				
		Continuous Assessment		End Semester Examination		
150	50	75		25		

COURSE OBJECTIVES:

- To explore the types of concrete and the applications in the built forms.
- To understand the various contexts in which concrete is used in constructing walls, roofs and foundations along thumb rules.
- To comprehend the ways to prevent the entry of water and dampness in buildings.

MODULE I APPLICATIONS OF CONCRETE IN CONSTRUCTION**40 Hrs.**

Introduction to reinforced cement concrete, suitability requirements for aggregates, grading of aggregates, reinforcement, admixture - Mix proportioning, batching, mixing, transporting, placing, compaction, Ready Mix Concrete, curing formwork - Quality control, tests for concrete, joints in concrete including role of expansion joint, vacuum dewatering, concrete finishes, Centering, Scaffolding, formwork.

Introduction to concrete and its applications – deep foundations, framed structure, expansion joints, slab, WPC, DPC, staircase, cold storage, RCC Columns and Foundations - Different Types of foundations - Detailing of columns - Shallow (Mat and Raft foundation), spread (Square, rectangle, circle, combined, strip and ring foundation), deep (pile, piers, caissons) .Super Structure - Beams, sill level, detailing of apertures (lintels, sunshades, arches etc.,) - Roofs (one way slabs, 2-wayslab, continuous, flat slab, coffer slab etc.) – Staircases – thumb rules

MODULE II SPECIAL CONCRETE AND APPLICATIONS IN CONSTRUCTION**35 Hrs.**

Introduction to special concrete and its applications – light weight, foam, ferrocement, Construction methods for different types of Special Concrete like Pre and post tensioning and precast concrete - Ferro cement, Lightweight concrete, high density, fiber reinforced polymer concrete. Detailing of Ferro cement water tanks, toilet units, slabs, waffle slab, filler slab, funicular shell, and other precast systems. Design and detailing of building materials and components developed by research organizations like CBRI, SERC, NBO, and BMTPC.

Max. 75 Hours

Modules	Assignments	Suggestive Outdoor / hands on Workshop	Construction plates	No .	Remarks
I	Applications of concrete in buildings – foundation, flooring, shear walls, sill, lintels, slabs, planter box, retaining wall	Report – students have to visit and study the building in construction with respect to the thrust area and give a brief report with sketches and photographs.	Deep foundation – types, grouping	1	Facilitates Architectural design V
			Types of slabs – one way, two way, coffered, flat slab	2	
			Staircase – dog legged staircase	1	
			WPC, DPC, cold storage, expansion joint	1	
II	Sketching – types of staircases, domes and shells	Emphasis is on the details related to barrier free environment. Ferrocement Workshop	Swimming pool and terrace gardening	1	
			Application of concrete in the outcome of Architectural design III	1	

COURSE OUTCOME:**On completion of the course the student will be able to**

- CO1** Explain the applications of concrete in the built forms along with the thumb rules.
- CO2** Categorize the types of special concrete and the respective utilization in building construction.
- CO3** Explain the components of the concrete staircase and the design thumb rules.
- CO4** Develop the details for cold storage, swimming pool and terrace gardens.
- CO5** Integrate the applications of concrete and special concrete in architectural design studios.

TEXT / REFERENCE BOOKS

- Arora S.P. & Bindra S.P. (1990) A Text Book of Building Construction, Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1990
- Punmia B.C. (2005). A Text book of Building Construction, Laxmi Publications Pvt. Ltd., New Delhi
- Chudley R. (1999). Construction Technology, Volume 1, Longman publications 3rd Edition.
- McKay W.B (1981). Building Construction, Volumes 1,2 and 3, Orient Longman, UK, 1981
- Rangwala S.C. (1982). Engineering Materials, Anand Charotar Publishing House
- Kumar, S, (2010). Building Construction, Standard Publishers Distributors, 2010
- Kind-Barkauskas, F., Kauhsen, B., Polónyi, S., & Brandt, J. (2013). Concrete construction manual. Walter de Gruyter.

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.

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.

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****Perustration 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.
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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. Precise 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.

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-ecofriendly 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 SAFETY 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 –Firefighting services-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 - John Wiley and Sons, London - 1988
Andrew H. Buchanan - Design for fire safety - John Wiley and Sons Ltd., New York.
8. Bureau of Indian standards - National building Code of India.
9. Energy Conservation Building Code user guide – ECBC, Bureau of Energy Efficiency, New Delhi, India.

END SEMESTER EXAM QUESTION PAPER PATTERN

SARA2501	MATERIALS AND CONSTRUCTION STUDIO IV		L	T	P	Credits	Total Marks
			1	1	3	3	200
Continuous Assessment	End Semester Examination	Min Pass Marks					
		Continuous Assessment	End Semester Examination				
150	50	75	25				

COURSE OBJECTIVES:

To comprehend the properties and the types of nonferrous materials.

To synthesize the ways through which the nonferrous materials are used in fixed as well as movable barriers in the built form as well as the environment.

To develop ways to adopt nonferrous materials in architectural design.

MODULE I GLASS AND PLASTICS FOR ARCHITECTURAL APPLICATIONS**35 Hrs.**

Classification of glass - Composition of glass, its properties and uses - Various types of glass e.g., plate glass, figured glass, float glass (toughened glass, laminated glass), tinted glass, reflective glass, wired glass, foam glass, glass block, fiberglass, float glass, obscured glass etc. - Decorative glass, insulated glass (sound, heat) - properties and application in building industry, glazing and energy conservation measures.

Thermal Insulation- Heat transfer and heat gain by materials -vapor barriers and rigid insulation. Blanket, poured and reflective insulation - properties and uses of (spun glass, foamed glass, vegetable fibers, mineral fibers, foamed plastics, and vermiculite and glass fibers)

Plastic: Properties, types and uses as building material - Polymerization, thermoplastics, thermosetting plastics, elastomers-Plastics in construction (polythene, polypropylene, polyvinyl chloride, PVC poly-structure, Polyethylene (Low density and high density), polycarbonate, acrylic flooring, PVC tiles, roof lights, domes, and handrails, curtain wall, jali work, applications of uPVC

MODULE II ALUMINIUM FOR ARCHITECTURAL APPLICATIONS**40 Hrs.**

Aluminium, windows and ventilators - Methods of construction - typical details showing fixing of framing members, glass panes, roller position (in case of sliding window), hinge arrangement (in casement window), locking arrangement and related hardware, thumb rules

Cladding - Construction methods using Aluminum cladding (includes other ACP materials), shop front handrails - Structural Glazing, curtain walls.

Max. 75 Hours

Modules	Assignments	Outdoor / hands on	Construction plates	No.	Remarks
I	Collection of brochures for different types of glass	Report – student have to visit and study the applications of glass and plastics for architectural applications	Thermal insulation and expansion joints	1	Facilitates Architectural design VI
II	Collection of brochures for various aluminium sections and applications, Case studies for application of aluminum in buildings	Report – students have to visit and study aluminum installations in the interiors with respect to the thrust area and give a brief report with sketches and photographs.	Aluminium joinery	1	
			Aluminium door & windows	3	
			Partitions and false ceilings	1	
			Curtain wall and ACP	1	
	Sketches – fixing details, wall systems, doors and windows for uPVC, glass and plastics wall systems		Application of concrete in the outcome of Architectural design III / IV.	1	

COURSE OUTCOME:

On completion of the course the student will be able to

CO1 Categorize the applications of nonferrous materials in buildings.

CO2 Explain the various types of aluminium joinery in movable barriers in load bearing and non-load bearing

CO3 Develop aluminium joinery for space dividers and false ceilings in the interiors.

CO4 Explain the utilization of plastics and glass for appropriate applications in buildings.

CO5 Devise ways to incorporate nonferrous materials in architectural design studios.

TEXT / REFERENCE BOOKS

1. Rangwala S.C. (1982). Engineering Materials, AnandCharotar Publishing House
2. Ahuja T. D and Birdie G.S., Fundamentals of Building Construction, Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1999

3. Punmia B.C, A Text book of Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 2004.

4. Boyne, Architects working details, Volumes I, II, III, IV, & V, The Architectural Press, London, 1959

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.
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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.

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
7. Pramod V.S., Haveli - Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989
8. Joseph F. Kennedy, The Art of Natural Building, Design, Construction, and Resources. Gabriola Island, BC: New Society Publishers, 2001

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

SAR 1104	ART AND AESTHETICS	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To understand that Aesthetics, or the philosophy of art, is a theoretical endeavor to explicate the essence of art by defining its nature, its specific function, and the grounds for its recognition and appreciation.

UNIT 1 ART**6 HRS.**

Definition of Art, Theory of origin and evolution, Different Art Forms, Elements of Art-Line, Form, Colour, Composition, Texture, Material, Medium, Content and Style.

UNIT 2 AESTHETICS**10 Hrs.**

Historical development of Art, Traditional Theories-Imitation, Representation and Expression Aesthetics; Contemporary Theories- Marxist, Institutional, Existential and Phenomenal, Romantic Individualism and Art Movements- Realism, Impressionism, Expressionism, Cubism, Futurism, Constructivism, Abstract Art-Theory of Abstraction by Kandinsky and Mondrian, Surrealism.

UNIT 3 ART CRITICISM**6 Hrs.**

Different art critiques, Art, Imagination and beauty, study of the powerful, recurrent ideas concerning art, critical method and the nature of representation.

UNIT 4 INDIAN ART AND AESTHETICS**8 Hrs.**

Nature of Indian Art and Aesthetics, The Emergence of New Trends in Indian art: Raja Ravi Varma and Amrita Sher-Gil, Kolkata School: Havell and Abanindranath, The Revivalist Trend in India and the Role of Bengal School, Art Circles of 20th Century: Progressive Artists Group- Mumbai and Kolkata, Shilpi Chakra- Delhi, Cholamandala- Chennai form.

Max. 30 Hours**COURSE OUTCOMES**

On completion of the course the student will be able to

CO1: Produce creative works that demonstrate innovation in concepts, formal language and/or materials

CO2: Describe, analyze and interpret created artwork

CO3: Recognize elements of design in works of art

CO4: Analyze, interpret and evaluate the form and content of works of art

CO5: Handle materials effectively

CO6: Create original objects of art in a specific medium

TEXT / REFERENCE BOOKS

1. Malcom Gee, Art criticism since 1900, Manchester University Press, 1993
2. Peter Lamarque and Stein Haugom, Aesthetics and the philosophy of art: The analytic tradition an anthology, Blackwell publishing Ltd., 2004
3. Paul Crowther, Defining art creating the canon: artistic value in an era of doubt, Oxford publishers, 2011
4. Rathan Parimoo and Sandip Sarkar, Historical development of contemporary Indian art, 1880 - 1947, Lalit kala akademii publishers, 2009
5. Zerffi G.G., A manual of the historical development to art, Hardwick & Bogue Publishers, 1876

**End semester examination question paper pattern
(To be distributed uniformly among all the units)**

Max. Marks: 100**Exam Duration: 3 Hrs.**

PART A: 2 questions from each unit, each carrying 5 marks

:08 x 05 = 40 Marks

PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.

: 04 x 15 = 60 Marks

SAR 1105	MATERIALS AND CONSTRUCTION I	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To introduce the natural materials used for basic shelters.
- To comprehend the potential of load bearing structures in construction industry
- To familiarize the students with flooring materials.

UNIT 1 BASIC SHELTERS**6 Hrs.**

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

UNIT 2 SIMPLE LOAD BEARING STRUCTURES - BRICK MASONRY**12 Hrs.**

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

UNIT 3 SIMPLE LOAD BEARING STRUCTURES - STONE MASONRY**4 Hrs.**

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

UNIT 4 FLOORING**8 Hrs.**

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

Max. 30 Hours**COURSE OUTCOMES****On completion of the course the student will be able to**

- CO1:** Identify suitable materials for use in building construction.
- CO2:** Acquire knowledge about different components and elements of buildings.
- CO3:** Gain a comparative knowledge of material and possible applications in construction.
- CO4:** Construct knowledge on various construction techniques.
- CO5:** Produce detailed drawings in order to communicate the design better
- CO6:** Interpret site visits and outline details graphically.

TEXT / REFERENCE BOOKS

1. Arora S.P. and Bindra S.P., Text book of Building Construction, Dhanpat Rai & Sons, New Delhi, 2012
2. Chudley R., Construction Technology (Volume 1), Longman publications 3rd Edition, 1999
3. Don A. Watson, Construction Materials and Processes, McGraw Hill, 1972
4. Francis D.K Ching, Building Construction Illustrated, John Wiley & Sons, 2000
5. All you wanted to know about soil stabilized mud blocks, HUDCO, New Delhi, 1989
6. McKay W.B., Building construction, Volume 1 and 2, Longman UK, 1981
7. Rangwala S.C., Building Construction, Anand Charotar Publishing House, India, 2000
8. Sharma S.K., A Text book of Building Construction, S. Chand and company, New Delhi, 1998

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

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 SUPPLY 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
10. Manual on water and treatment, 2nd Edition, CPHEEO, Ministry of works and Housing, New Delhi, 1980
11. Rangwala S.C., water supply and sanitary Engineering, Anand Charotar publishing house, 1981
12. Venugopala Rao P., Textbook of Environmental Engineering, Prentice Hall of India Pvt. Ltd., 2002
13. Husian S.K., Textbook of Water Supply and Sanitary Engineering, Oxford & IBH, 2006

END SEMESTER EXAMINATION QUESTION PAPER PATTERN
(To be distributed uniformly among all the units)

Max. Marks: 100**Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Mark**

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 DeChiara 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

END SEMESTER EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A: 2 questions from each unit, each carrying 5 marks

:08 x 05 = 40 Marks

PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.

: 04 x 15 = 60 Marks

SAR 1205	MATERIAL AND CONSTRUCTION II	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To introduce the student to various assembly systems and explore possibilities in timber construction
- To prepare the student to utilize the basic fundamentals and apply a modern day approach to building problems
- To provide an understanding of various materials and its applications in the industry

UNIT 1 MANUFACTURED BUILDING MATERIALS**8 Hrs.**

Classification of glass - Composition of glass, its properties and uses - Various types of glass e.g. plate glass, figured glass, float glass (toughened glass, laminated glass), tinted glass, reflective glass, wired glass, foam glass, glass block, fiber glass, float glass, obscured glass etc - Decorative glass, insulated glass (Sound, Heat) - properties and application in building industry, glazing and energy conservation measures.

UNIT 2 TIMBER IN CONSTRUCTION**6 Hrs.**

Timbers - Methods of construction using natural timber in joinery works including methods of fixing and options for finishing - Exercises involving the above through drawings - Introduction to simple trusses - Mangalore tiles, madras terrace roofing, - fixing details.

UNIT 3 TIMBER JOINERIES**12 Hrs.**

Different types and methods of fixing - Windows (panelled, louvered, glazed, pivoted and sliding windows) - Doors (panelled, glazed, sliding, folding, louvered and pivoted) - Ventilators (top hung, louvered, and glazed) - Hardware for doors, windows and ventilators and application for a simple structure with schedule of joinery.

UNIT 4 PROTECTIVE COATINGS**4 Hrs.**

Paints and Varnishes - Composition, manufacture and properties and uses of ordinary paints, enamels, distemper, plastic emulsion, special paints- fire retardant, luminous and bituminous paints, defects in paints- Varnishes and wood preservatives, method of distempering wall surfaces, painting of timber and iron work. Composition, characteristics, preparation, Primer, Painting different surfaces.

Max. 30 Hours**COURSE OUTCOMES****On completion of the course the student will be able to**

- CO1:** Holistic understanding of types of joinery used in timber construction and their method of construction
- CO2:** Construct knowledge on various roofing techniques
- CO3:** Exploring timber joinery details related with openings such as doors and windows
- CO4:** Criticize the various methods of timber construction depending on strength and application
- CO5:** Generate detailed drawings in order to communicate the design better

TEXT / REFERENCE BOOKS

1. Arora. S.P and Bindra S.R, A text Book of Building Construction, Dhanpat Rai & Sons, New Delhi 1994
2. Bayliss R., Carpentry and Joinery (Volume 1), Hutchinson Technical Education Publishers, 1969
3. Chudley R., Construction Technology (Volume 1), Longman publications 3rd Edition, 1999
4. Francis D.K Ching, Building Construction illustrated, John Willey & Sons, 2008
5. Klans Dukeeberg, Bambus - Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000
6. McKay W.B., Building Construction, Volume 1, 2 and 3, Orient Longman, UK, 1981
7. Rangwala .S.C., Engineering Materials, Anand Charotar Publishing House, 1982
8. Sushil Kumar, Building Construction, Standard Publishers Distributors, 2010

End semester examination question paper pattern
(To be distributed uniformly among all the units)

Max. Marks: 100**PART A: 2 questions from each unit, each carrying 5 marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****Exam Duration: 3 Hrs.****:08 x 05 = 40 Marks****: 04 x 15 = 60 Marks**

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- Earthing: 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.

TEXT / REFERENCE BOOKS

1. Benjamin Evans, Day light in Architecture, McGraw-Hill Book Company, New York, 1981
2. Hopkinson R.G., Architectural Physics-Lighting, H.M. Stationery Office, London, 1963
3. Millet Marietta, Light Revealing Architecture, Van Nostrand Reinhold, London, 1996
4. Pritchard D.C., Lighting, Longman scientific & Technical, Harlow, 1995
5. Peter Trezenza, and David Loe, The Design of Lighting, E & FN Spon, London, 1998

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

SAR1208	CLIMATIC DESIGN	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To integrate the climate data in the design of built environment.
- To understand and evaluate built form based on climate parameters
- To understand the various passive heating and cooling techniques

UNIT 1 SOLAR CHARTS AND SHADING DEVICES**10 Hrs.**

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

UNIT 2 DESIGN STRATEGY FOR FLOORS, WALLS AND ROOFS**6 Hrs.**

Building skin thickness - mass surface absorptance - daylight reflecting surfaces - exterior surface colour - floors, walls and roofs- size and orientation, location, materials, shape and colours and layers (windows) - insulation outside - external and internal shading - glass types.

UNIT 3 PASSIVE DESIGN STRATEGIES**7 Hrs.**

Passive heating design strategies - heat loss control - passive solar heating - windows - glazed walls - roof space collectors - transitional spaces - glazed atriums - Passive cooling design strategies - wall and roof openings for convective cooling - natural and architectural means of evaporative cooling - radiative cooling through roof - ground cooling and building underground - transitional spaces - courtyards, patio, veranda.

UNIT 4 DESIGN WITH CLIMATE**7 Hrs.**

Climate data analysis for various zones - hot and dry - hot and humid - warm and humid - moderate - cold and cloudy - cold and dry - composite - climatic context - landscape and vegetation - solar radiation - mean temperature - relative humidity - precipitation - winds - sky conditions - miscellaneous.

Max. 30 Hours**COURSE OUTCOMES**

On completion of the course the student will be able to

CO1: Familiarize with the sun as a main design element and imparting knowledge on the sun path diagrams.

CO2: Upgrade the knowledge on heat transfer and the building elements involved in heat transfer of buildings.

CO3: Understand the materials and design strategies involved in design of the roof, walls and flooring.

CO4: Impart knowledge on the passive design strategies for climate responsive and environmentally sensitive buildings.

CO5: Analyse with the climate data and its components for various regions and design strategies implemented in different climatic zones.

TEXT / REFERENCE BOOKS

1. Koenigsberger O.H., Ingersol T. G., Mayhew A. and Szokolay S.V., Manual of Tropical Housing and Building Part1 - Climatic Design, Orient Longman Pvt. Ltd., Chennai, 2004.
2. Martin Evans, Housing, Climate and Comfort, Architectural Press, London, 1980
3. 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.
4. Mark Dekay and Brown G.Z., Sun, wind and Light: Architectural design strategies, 3rd edition, John Wiley and sons, 2014
5. Richard Hyde, Climate Responsive Design: A study of buildings in moderate and hot humid climates, E & FN Spon, London, 2000
6. Vinod Gupta, Energy and Habitat: Town Planning and Building Design for Energy Conservation, John Wiley and sons, 1984
7. David Wright, The Passive Solar Primer: Sustainable Architecture, Schiffer Publishing Ltd., 2008

**End semester examination question paper pattern
(To be distributed uniformly among all the units)**

Max. Marks: 100**Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****: 08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

SAR1209	MATERIALS AND CONSTRUCTION III	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To understand the basic requisites of RCC structures and their construction techniques
- To appraise the importance of construction methods on damp and water proofing of concrete structures.
- To construct knowledge on the special types of concrete and exposure on building materials and components.

UNIT 1 CONCRETE AND ITS APPLICATIONS**8 Hrs.**

Introduction to reinforced cement concrete, suitability requirements for aggregates, grading of aggregates, reinforcement, admixture - Mix proportioning, batching, mixing, transporting, placing, compaction, Ready Mix Concrete, curing formwork - Quality control, tests for concrete, joints in concrete including role of expansion joint, vacuum dewatering, concrete finishes, Centring, Scaffolding, formwork.

UNIT 2 FRAMED STRUCTURES**10Hrs.**

RCC Columns and Foundations - Different Types of foundations - Detailing of columns - Shallow (Mat and Raft foundation), spread (Square, rectangle, circle, combined, strip and ring foundation), deep (pile, piers, caissons) .Super Structure - Beams, sill level, detailing of apertures (lintels, sunshades, arches etc.,) - Roofs (one way slabs, 2-wayslab, continuous, flat slab, coffer slab etc.) – Staircases.

UNIT 3 DAMP AND WATER PROOFING OF CONCRETE STRUCTURE**6 Hrs.**

Construction methods for damp-proofing and water proofing for walls, roofs, basements, retaining walls, swimming pools, sump, terrace floor details - Water tanks, terrace gardening, etc. -Exercises of the above through case studies and drawings. Emulsified asphalt, vinyl, epoxy resins, chemical admixtures, bentonite clay etc.- properties.

UNIT 4 SPECIAL CONCRETE AND ITS APPLICATIONS**6Hrs.**

Construction methods for different types of Special Concrete like Pre and post tensioning and precast concrete - Ferro cement, Lightweight concrete, high density, fiber reinforced polymer concrete. Detailing of Ferro cement water tanks, toilet units, slabs, waffle slab, filler slab, funicular shell, and other precast systems. Design and detailing of building materials and components developed by research organizations like CBRI, SERC, NBO, and BMTPC

Max. 30 Hours**COURSE OUTCOMES**

On completion of the course the student will be able to

CO1:Acquire the skills and techniques on concrete structures in construction practice.

CO2:Obtain more knowledge about concrete mix proportion processes.

CO3:Recognize suitable foundations used in building construction.

CO4:To interpret the construction methods for damp-proofing and water proofing in various building components.

CO5:Appreciate the uses of special concrete structure and its applications in construction industry

TEXT / REFERENCE BOOKS

Arora S.P. and Bindra S.P, A Text Book of Building Construction, Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1990

Punmia B.C., A Text book of Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 2005

Chudley R., Construction Technology, Volume 1, Longman publications 3rd Edition, 1999

McKay W.B, Building Construction, Volumes 1,2 and 3, Orient Longman, UK, 1981

Rangwala S.C, Engineering Materials, Anand Charotar Publishing House, 1982

Shetty M.S, Concrete Technology, S. Chand and company, New Delhi, 1986

Sushil Kumar, Building Construction, Standard Publishers Distributors, 2010

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****PART A: 2 questions from each unit, each carrying 5 marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****Exam Duration: 3 Hrs.****:08 x 05 = 40 Marks****: 04 x 15 = 60 Marks**

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

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****PART A: 2 questions from each unit, each carrying 5 marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****Exam Duration: 3 Hrs.****:08 x 05 = 40 Marks****: 04 x 15 = 60 Marks**

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

**End semester examination question paper pattern
(To be distributed uniformly among all the units)**

Max. Marks: 100**Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

SAR 1304	MATERIAL AND CONSTRUCTION IV	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To introduce the basic concepts of manufactured building materials and their applications in built environment including the techniques of thermal and sound insulation.
- To get an understanding on the terminology and materials used in false ceiling along with details for incorporating lighting and air conditioning.
- To familiarize the students with the methods of construction for a staircase using various materials like timber, steel, glass and composite materials.

UNIT 1 MANUFACTURED BUILDING MATERIALS**08 Hrs**

Plastic: Properties, types and uses as building material - Polymerisation, thermoplastics, thermosetting plastics, elastomers,- Plastics in construction (polythene, poly propylene, polyvinyl chloride, PVC poly-structure, Poly ethylene (Low density and high density), polycarbonate, acrylic flooring, PVC tiles), roof lights, domes, and handrails. Timber: Man-made timber products such as plywood, block boards, engineered wood etc. - Non Ferrous Metals - Different uses of Aluminium - Properties, Finishes (powder coating and anodizing) - Copper Alloys: Properties and uses of Brass & Bronze.

UNIT 2 JOINERY USING ALUMINIUM AND UPVC**06 Hrs.**

Aluminium, and UPVC doors, windows and ventilators - Methods of construction - typical details showing fixing of framing members, glass panes, roller position (in case of sliding window), hinge arrangement (in casement window), locking arrangement and related hardware. Cladding - Construction methods using Aluminium cladding (includes other ACP materials), shop front handrails - Structural Glazing, curtain walls.

UNIT 3 PARTITIONS AND PANELLING**08 Hrs.**

Partitions And Panelling (Timber, Aluminium, UPVC) - fixed partitions, sliding/folding partitions, wall panelling - Exercises of the above through drawings and case studies. Thermal Insulation- Heat transfer and heat gain by materials -vapour barriers and rigid insulation. Blanket, poured and reflective insulation - properties and uses of (spun glass, foamed glass, vegetable fibers, mineral fibers, foamed plastics, and vermiculite and glass fibres) - Cold Storage. Sound insulating and isolating materials, its types and properties - treatment for interior surfaces (Wall, Floor and ceiling) in Auditorium and other sound sensitive spaces.

UNIT 4 FALSE CEILING AND STAIRCASES (COMPOSITE MATERIALS)**08 Hrs.**

False Ceiling - terminology and details - soft boards, acoustic boards, Gypsum (manufacture, properties and uses, hybrid gypsum) on timber and steel or aluminium frame work, details of lighting and air conditioning grid panels, concealed lighting - under deck insulation Staircase - Methods of construction of staircases (timber, steel, glass, composite materials) - basic principles, finishes for staircases.

Max. 30 Hours**COURSE OUTCOMES****On completion of the course the student will be able to**

CO1: A thorough understanding on various types of manufactured building materials including their manufacturing processes and their applications in building construction.

CO2: Ability to choose appropriate manufactured materials for various joineries in buildings including the fixing details.

CO3: Understanding the detailing of various types of partitions and paneling systems using manufactured materials.

CO4: Knowledge on detailing for thermal and sound insulation and its application in interior environment.

CO5: Complete understanding of the false ceiling systems in using manufactured materials including the fixing details incorporation of air conditioning and light systems

CO6: Design of staircases using materials like steel, glass and timber including the design standards and detail.

TEXT / REFERENCE BOOKS

1. Ahuja T. D and Birdie G.S., Fundamentals of Building Construction, Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1999
2. Punmia B.C, A Text book of Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 2004.
3. Boyne, Architects working details, Volumes I, II, III, IV, & V, The Architectural Press, London, 1959
4. Amos Rapoport, Human aspects of urban form: Towards a Man - Environment approach to urban form and design, Oxford Pergamon press, 1997

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

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

End semester examination question paper pattern
(To be distributed uniformly among all the units)

Max. Marks: 100**Exam Duration: 3 Hrs.****PART A : 2 questions from each unit, each carrying 5 marks.****: 08 x 05 = 40 Marks****PART B : 2 questions from each unit with an internal choice, each carrying 15 marks****: 04 x 15 = 60 Marks**

SAR1308	MATERIALS AND CONSTRUCTION V	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To introduce different steel components and the applications of steel in building construction.
- To outline the weather proofing in the current scenario.
- To understand architectonics of long span structures

UNIT 1 MANUFACTURED BUILDING MATERIALS - STEEL**6 Hrs.**

Iron: brief study on manufacture, composition, properties and uses of cast iron, wrought iron, pig iron - Steel: Composition, Properties, anticorrosive measures, mechanical and heat treatment of steel - Market forms of steel : Steel for Reinforcement - Hot rolled bars, CTD Bars, TMT bars , Welded wire fabrics; Steel for Pre stressed concrete; Structural steel; Stainless steel, steel alloys, current developments.

UNIT 2 STEEL DOORS/ WINDOWS/ VENTILATORS & TRUSSES**8 Hrs.**

Different types of doors and windows (open able, sliding etc., methods of construction using steel)- Design and detailing of steel rolling shutter. Design and detailing of steel roof trusses (north-light, tubular, butterfly truss etc.,) including construction methods for roof covering using steel, FRP, polycarbonate, cement fibre sheets etc. Visit to steel structure fabrication site.

UNIT 3 LONG SPAN STRUCTURES**8 Hrs.**

Long span roofs using different types and materials (stadium and auditoriums) .Methods of construction using cable structure- principle of cable stayed bridges -space frame structures. Methods of construction using Shell structures and folded plates - various forms and classification of shells and types of folded plates.

UNIT 4 ARCHITECTURAL DETAILING - LARGE GATHERING SPACES**8 HRS.**

Architectural Detailing in public spaces - Fundamentals Geometry Simple Types: Complex Types: Natural Lighting Envelope Landscaping Thermal Control Thermal Control Pressurization and Air Balance Fire Protection/Smoke Control.

Max. 30 Hours**COURSE OUTCOMES:**

On completion of the course the student will be able to

CO1: Exploring the knowledge in steel, creating awareness and applications with various finished materials.

CO2: Comprehending the various types of joineries in steel doors, windows, ventilators and trusses.

CO3: Ability to understand the construction techniques adopted in modern roof covering materials

CO4: Understanding of the construction practices of shell and folded plates.

CO5: Acquiring skill to develop architectural details for building envelopes incorporating lighting, landscape and thermal control measures in public gathering spaces.

TEXT / REFERENCE BOOKS

Punmia B C, Ashok Kumar Jain, Arun Kumar Jain, Comprehensive design of steel structures, Laxmi Publications Pvt. Ltd. 1998

Boyne, Architects working details, Vol. I, II, III, IV, & V, The Architectural Press, London, 1959

Ramaswamy G.S., Design and Construction of Concrete shell roofs, Krieger, 1984

Mohd. Hamdan Ahmad, Mohamad Tajuddin Haji Mohamad Rasdi, Design Principles of Atrium Buildings for the Tropics, University Technology Malaysia, 2000

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

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

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

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

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****PART A: 2 questions from each unit, each carrying 5 marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****Exam Duration: 3 Hrs.****:08 x 05 = 40 Marks****: 04 x 15 = 60 Marks**

SAR 1404	CONSTRUCTION MANAGEMENT	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVE

To introduce the principles, and techniques of construction management and its significance in construction management planning, scheduling and project costing. The study on management principles relating to Quality, Resource and Safety in construction of projects.

UNIT 1 CONSTRUCTION MANAGEMENT AND STAKEHOLDERS 6 Hrs.

Definition-Objectives & Scope of Construction Management- Stakeholders & Responsibilities in construction projects - client, consultant, contractor, financial institutions, regulators, Private Public Partnership, Environmental Impact Assessment, Defining the project, project life cycles for different residential, infrastructure, industrial etc. Project Phases, Project Planning, scheduling, monitoring & control - Infrastructure detailing and management, construction work scheduling - construction documents.

UNIT 2 SCHEDULING AND PROJECT COSTING 8 Hrs.

Project work break down - development of schedule - time control tools and techniques- CPM, PERT network analysis - precedence network analysis - line of balance. Project Finance - Sources of finance - Cost benefit analysis - computer based planning.

UNIT 3 QUALITY AND RESOURCE MANAGEMENT 8 Hrs.

Introduction - Definitions and objectives - Factors influencing construction quality - Responsibilities and authority - Quality plan - Quality Management Guidelines - Quality circles. Basics of Resource management - materials, equipment and labour - Materials Management, Material Procurement and Delivery - Construction Equipment, its operation & maintenance - Labour Productivity, Factors Affecting Job-Site Productivity and Labour Relations in Construction.

UNIT 4 SAFETY PLANNING AND MANAGEMENT 8 Hrs.

Meaning and objective of safety planning, Construction accidents and their causes-Human factors in construction safety- common hazards-safety check list at construction site, alteration and demolition works-life saving equipment's. Safety culture- Job site Safety -Role of supervisors in safety measures-Safety and Middle Managers-Project Coordination and Safety Procedures and training - material and machinery handling safety - Workers Compensation.

Max. 30 Hours**TEXT / REFERENCE BOOKS**

1. Chitkara K.K, Construction Project Management, Tata Mc Graw Hill Publishing Company, 2014
2. Joy P.K., Total Project Management - The Indian Context, Macmillan India Publications, 1994
3. Willis E.M., Scheduling Construction projects, John Wiley and Sons 1986
4. Halpin D.W., Financial and cost concepts for construction Management, John Wiley and Sons, New York, 1985.
5. Paul Watson, Tim Howarth, Construction Quality Management: Principles and Practice, 2011
6. Dwivedi R.S., Human Relations and Organisational Behaviour, 2001
7. Davies V.J. and Tomasin K., Construction Safety Handbook, Thomas Telford Publishing, London, 1996

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**(To be distributed uniformly among all the units)****Max. Marks : 80****Exam Duration : 3 Hrs.****PART A : 2 questions from each unit, each carrying 4 marks.****08 x 04 = 32 Marks****PART B : 2 questions from each unit with an internal choice, each carrying 12 marks.****04 x 12 = 48 Marks**

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, Koenigsberger, 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

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100**

PART A: 2 questions from each unit, each carrying 5 marks

PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.

Exam Duration: 3 Hrs.

:08 x 05 = 40 Marks

: 04 x 15 = 60 Marks

NINTH SEMESTER

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

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

TENTH SEMESTER

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 - 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.

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.

Max. 30 Hours**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

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****PART A: 2 questions from each unit, each carrying 5 marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****Exam Duration: 3 Hrs.****:08 x 05 = 40 Marks****: 04 x 15 = 60 Marks**

LIST OF ELECTIVES DEPARTMENT ELECTIVES

SAR1601	ARCHITECTURAL JOURNALISM	L	T	P	Credits	Total Marks
		2	0	0	2	100

Course objectives:

- To introduce the fundamentals of journalism.
- To understand the role of technologies and presentation techniques in architectural journalism.
- To outline various works of architectural journalists, interpret the strategies adopted and develop new directions.

UNIT 1 INTRODUCTION**6 Hrs**

Introduction to journalism, Subfields within Journalism, Key concepts and objectives of Journalism - Introduction to architectural journalism, skills needed, reporting, writing, editing, photography, columnists, public relationships, criticism.

UNIT 2 TECHNOLOGIES IN JOURNALISM**8 HRS.**

Environment, Social Change, Persuasion Interviewing techniques, Argument and debate as a technique in the investigation of social problems; evidence, proof, refutation, persuasion; training in argumentative speaking, theories of journalism, Introduction to architectural software needed in journalism and photography, Video coverage, walk through of buildings, production of contemporary architectural journalism. Understanding the individual demands in the context of newspapers, radio, film, and television.

UNIT 3 PRESENTATION TECHNIQUES**8 HRS.**

Text preparations, Mode of presentation, Standards and Guidelines for documentation, Code of ethics, Basic knowledge on Press laws, Press Council of India, Public Debate, Navigating Information Networks for Mass Media with relevance to searches on Architectural topics, User generated contents for analysis of various issues on Architecture, creating an online forum and platform for exchange of ideas and information, to critically contrast outputs of selected individual pieces of journalism.

UNIT 4 IMPLICATIONS FOR ARCHITECTURAL DESIGN**8 HRS.**

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

Max. 30 Hours**Course Outcomes:****On completion of the course the student will be able to**

CO1: Understanding the objectives of journalism and skills required for the same.

CO2: Analysing and critically thinking about the effects of architecture on society as well as the tools to enable recording of the same.

CO3: Illustrating the fundamentals of writing and presentation, explain different strategies and their criticism

CO4: Interpret the ideologies of the architects, interior designers and comprehend the various schools of thought.

CO5: Analysing recent historical and contemporary examples of written and journalistic criticism of architecture.

CO4: Analysing major critical themes, thematic categories in architectural writing over the past three centuries.

TEXT / REFERENCE BOOKS

1. Somerset Maugham, Summing up, Penguin Books, 1992
2. Stephen Leacock, How to write, Dodd Newyork, 1943
3. Tony Horcup, Journalism: principles and practice, Sage Publications, 2004
4. Mohammad al-Asad w/ Majd Musa, Architectural Criticism and Journalism, Umberto Allemandi, 2007

End semester examination question paper pattern
(To be distributed uniformly among all the units)

Max. Marks: 100**Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

SAR1602	ARCHITECTURAL PHOTOGRAPHY	L	T	P	Credits	Total Marks
		2	0	0	2	100

Course objectives:

- To give an insight to the fundamentals of general photography.
- To foster knowledge on the importance of lighting and associated psychological effects.
- To give an overview of the principles and laws involved in framing views.

UNIT 1 INTRODUCTION**6 HRS.**

Introduction to architectural photography, interpretation and creation, Recording mediums - film and digital, specialist hard ware for image capture, black and white, colour photography, basics of composition.

UNIT 2 FUNDAMENTAL OF PHOTOGRAPHY**8 HRS.**

Fundamentals- focal length, aperture, exposure, aperture, shutter speed, recording medium, exposure meters, automatic & Techniques, film speed, contrast, Characteristics of lenses-viewing angle, Types of lens, depth of field, resolution and distortion, multiple exposures.,

UNIT 3 EXTERNAL LIGHTING**8 HRS.**

Understanding light and photography, External lighting- Direction of lighting - front, side, back, shadows, texture, and effects of clouds, light modification, psychological effects, and types of artificial lighting, combined daylight and flash.

UNIT 4 FRAMING VIEWS**8 HRS.**

Single point and two point perspective- examples, distortions, emphasizing architectural elements, effect of camera to subject distance, oblique angles, three point perspective- applications in interiors and exteriors -composition, symmetric composition, applying the law of thirds - examples, image capture to publication

Max. 30 Hours**Course Outcomes:****On completion of the course the student will be able to**

CO1:Studying the equipment, processes, and procedures necessary for the photography of building exteriors and interiors

CO2:Understanding the various photography techniques of the past.

CO3:Utilizing light, structure and colour to create various feelings for the viewer of the photograph

CO4:Analysing the contributions of photography in the architectural profession.

CO5:Interpreting the various principles of composition used in famous architecture photographs.

CO6:Learning post processing and developing proficiency in modern photography techniques.

TEXT / REFERENCE BOOKS

1. Schulz A., Architectural Photography: Composition, Capture, and Digital Image Processing, O'Reilly Media Inc., 2010
2. Michael Heinrich, Architectural photography, Birkhauser, 2009
3. Michael G. Harris, Professional Architectural Photography, Taylor & Francis, 2002
4. Kopelow A., Architectural Photography the Digital Way, Princeton Architectural Press, 2007

End semester examination question paper pattern
(To be distributed uniformly among all the units)

Max. Marks: 100**PART A: 2 questions from each unit, each carrying 5 marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****Exam Duration: 3 Hrs.****:08 x 05 = 40 Marks****: 04 x 15 = 60 Marks**

SAR1603	FILM SET AND TEMPORARY STRUCTURES DESIGN	L	T	P	Credits	Total Marks
		2	0	0	2	100

Course objectives:

- To explore and synthesize the various elements involved in a set.
- To give an insight to approached to art direction.
- To understand the process of designing and creating a set.

UNIT 1 ELEMENTS OF A SET**6 Hrs.**

Elements of Image Making - stage craft, Accessories, Props, Design of Space - elements of Form, Colour, Light, Sound, Time, Graphic, Location, themes and materials, graphics design, reuse and set design.

UNIT 2 THEORY OF ART DIRECTION**8 Hrs**

Drawing and Design, Theory for Art Direction, Relations between Scene vs Characters, Scene vs Painting, Scene vs Script, Scene vs Drama, translation from 2D to 3D.

UNIT 3 PROCESS OF DESIGNING AND CREATING A SET**8 Hrs**

Analyze scripts to determine theme, concept, mood, location, style, period, special needs, Character, setting of the drama/ movie, initial sketches of the design, materials and construction of the set and execution.

UNIT 4 CASE STUDIES**8 Hrs.**

Diverse concepts, philosophies and set designs of known art directors, movie reviews, case studies of different film cities in different contexts.

Max. 30 Hours**Course Outcomes:****On completion of the course the student will be able to**

- CO1:** Exploring the various elements to be included while designing sets.
- CO2:** Comprehending the relationship between the various aspects involved in art direction.
- CO3:** Ability to understand and sequence the processes involved in the designing and creation of sets.
- CO4:** Constructing knowledge to review the sets created in movies.
- CO5:** Critically analyze the philosophies of know art directors in documenting cities, buildings etc.

TEXT / REFERENCE BOOKS

1. Neumann D., Film Architecture: Set Designs from "Metropolis" to "Blade Runner", Prestel, 1997
2. Fear B., Architecture + Film II, Architectural Design, Wiley Academy, 2000
3. Lamster M., Architecture and Film, Princeton Architectural Press, 2013
4. Nystorm H., Creativity and Innovation, John Wiley & Sons, 1979

**End semester examination question paper pattern
(To be distributed uniformly among all the units)**

Max. Marks: 100**Exam Duration: 3 Hrs.****PART A: 2 questions from each unit, each carrying 5 marks****:08 x 05 = 40 Marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****: 04 x 15 = 60 Marks**

SAR1605	INTERIOR DESIGN	L	T	P	Credits	Total Marks
		2	0	0	2	100

Course objectives:

- To introduce the process of Interior Design, starting from client discussion to execution at site.
- To outline the various elements of interior spaces, their varied treatments and the impact of elements like color, light, furniture and accessories on the quality of space.
- To understand the elements of interior design and ways through which these can be incorporated in design.

UNIT 1 INTRODUCTION TO INTERIOR DESIGN**6 HRS.**

Interior Design - definition and process. Introduction to Interior Design in terms of typology, function, themes and concepts. Study of Color and color schemes and their psychological and physical impact on space.

UNIT 2 HISTORY OF INTERIOR DESIGN**8 HRS.**

Brief history of Interior Design through ages relating to historical and regional context. Design movements such as minimalism, post and late Modernism, De Constructivism etc. Documentation of any Art/Craft relevant to the context of Interior Design in terms of processes and material from anywhere in India.

UNIT 3 MATERIAL, CONSTRUCTION AND FINISHES**8 HRS.**

Introduction to various finishes of walls, floors, ceilings and openings. Paint - Enamels, distempers, plastic emulsions, cement based paint - properties, uses and applications. Painting on different surfaces - defects in paintings. Clear coatings and stains - properties, uses and applications. Wallpaper finishes and special purpose paints. Installation detail for false ceilings.

UNIT 4 ELEMENTS OF INTERIOR DESIGN**8 HRS.**

Study of Interior Lighting, their effects, types of lighting fixtures. Accessories used for enhancement of interiors - paintings, objects de art, etc. Interior Landscaping - elements like rocks, plants, water, flowers, fountains, paving, artefacts etc. Furniture Design - Study of relationship of furniture to spaces and human movements, human comfort, function, materials. Case studies and projects on Furniture design. Interior Service Elements - HVAC, Water Supply and Sanitation, Electricity and Acoustics.

Max. 30 Hours**Course Outcomes:****On completion of the course the student will be able to**

CO1: Develop the ability to analyse the design problem, synthesize the response and critically evaluate the design thereby define the cyclic design process.

CO2: Understand the vibrant forms of expression of culture and lifestyle in interior design over the past.

CO3: Overview the recent design movements, widening knowledge in minimalism, sustainability and innovations.

CO4: Understand the properties and uses of natural materials like wood and fabrics, synthetic materials like glass and plastics and their appropriate application techniques.

CO5: Interpret the principles of design using spatial elements and compositions in interior space.

CO6: Comprehend the relationship between form, dimensions of interior space and human dimensions and also between human factors and activity relationships.

TEXT / REFERENCE BOOKS

1. Francis D.K. Ching, Interior Design Illustrated, VNR Pub. New York 1987
2. Steport De VanKness, Logan and Szevely, Introduction to Interior Design Macmillan Publishing Co., New York 1980
3. Kathryn B. Hiesinger and Marcus H., Landmarks of twentieth Century Design; Abbey Ville Press, 1993
4. Slesin S. and Ceiff S., Indian Style, Clarkson N Potter, New York, 1990
5. Massey, World of Art, Interior Design of 20th century, 2005
6. Archi World, Interior Furniture and Lighting Style 1, 2005

End semester examination question paper pattern
(To be distributed uniformly among all the units)

Max. Marks: 100**Exam Duration: 3 Hrs.****PART A : 2 questions from each unit, each carrying 5 marks.****: 08 x 05 = 40 Marks****PART B : 2 questions from each unit with an internal choice, each carrying 15 marks****: 04 x 15 = 60 Marks**

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

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A: 2 questions from each unit, each carrying 5 marks

:08 x 05 = 40 Marks

PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.

: 04 x 15 = 60 Marks

SAR 1611	PROJECT MANAGEMENT	L	T	P	Credits	Total Marks
		2	0	0	2	100

Course objectives:

- To understand the basic requisites of traditional management systems, management skills and project planning.
- To compare and analyze the traditional and modern network techniques and their relationship in project planning.
- To connect and evaluate the project planning with project costing and knowledge on software application in planning of simple projects.

UNIT 1 TRADITIONAL APPROACH AND NETWORK ANALYSIS**8 HRS.**

Traditional Management System - Gantt's approach - load, progress and bar charts - limitations & overcoming - Project programming - work breakdown structure. Introduction to PERT & CPM -Introduction to network concepts, network elements and inter-relationships-Network techniques -Network logic - activity interrelationships - development of CPM network - Identification of critical path - Different float computations - Early start, early finish, late start, and late finish- worked out examples-Network control (updating): Introduction, process of updating, data required for updating, when to update, method of updating, examples.

UNIT 2 PROBABILITY ANALYSIS**6 HRS**

PERT Network - Introduction to theory of probability and statistics - Probabilistic time estimates of activities - Analysis of PERT network.

UNIT 3 PROJECT COST & RESOURCE ALLOCATION**8 HRS.**

Introduction to two-dimensional network analysis - activity cost information - cost time relationship - crashed estimates for activities - compression potential-cost slope - Project direct cost and indirect cost- crashed program, Network compression - least cost, least time, optimum solutions. Resource allocation - Resource levelling and smoothing - Simple examples.

UNIT 4 SOFTWARE APPLICATIONS**8 HRS.**

Introduction to Project Management software's - Applications - Detailed planning of a simple project - Scheduling using M.S. project and Primavera.

Max. 30 Hours**COURSE OUTCOMES**

On completion of the course the student will be able to

CO1: Understand the various management skills and techniques.

CO2: Estimate the duration for a construction project.

CO3: Experiment the calculation of project duration with CPM and PERT analysis and techniques.

CO4: Prioritize work activity in the project with the comparison of project scope and time with project costing.

CO5: Consider the allocation of required human resources for the project according to the project time and cost.

CO6: Create a project plan and schedule for a simple residential project with MS Project software.

TEXT / REFERENCE BOOKS

1. Jerome D. Wiest and Forinord K. Levy, A Management Guide to PERT/CPM, Prentice Hall of India Pub. Ltd., 2012
2. Mukhopadhyay, Project Management for Architects and Civil Engineers, IIT, Kharagpur, 1974
3. Chitkara K.K., Construction Project Management, Tata Mc Graw Hill Publishing Company, 2014
4. Burgess R.A. and White G., Building Production and Project Management, The Construction Press, London, 1979
5. Punmiya B.C. and Khandelwal K.K., Project Planning and Control with PERT/CPM, Laxmi Publications, New Delhi, 1989
6. Harris F.C. and McCaffer R., Modern Construction Management, Croshy Lockwood Staples, 2013.

**End semester examination question paper pattern
(To be distributed uniformly among all the units)**

Max. Marks: 100**Exam Duration: 3 Hrs.**

PART A : 2 questions from each unit, each carrying 5 marks.

: 08 x 05 = 40 Marks

PART B : 2 questions from each unit with an internal choice, each carrying 15 marks

: 04 x 15 = 60 Marks

SAR 1613	STEEL IN ARCHITECTURAL DESIGN	L	T	P	Credits	Total Marks
		3	0	0	3	100

Course objectives:

- Ability to perform analysis and design of steel members
- Ability to design steel structural systems
- Familiarity with professional and contemporary issues

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Identify and compute the design loads on a typical steel building.

CO2: Identify the different failure modes of steel tension and compression members.

CO3: Select the most suitable section shape and size for tension and compression members and beams according to specific design criteria.

CO4: Identify the different failure modes of bolted and welded connections, and determine their design strengths.

CO5: Design bolted and welded connections for tension and comp. members and beams.

UNIT 1 STEEL STRUCTURE**13 Hrs.**

Standard structural steel - thermal properties - Fireproofing Methods - Steel Sheeting - Types of Sheeting Light roofing materials (Recent trends in roofing materials like Corrugated GI Sheets, Pre-coated metal sheets, Polycarbonate sheeting, Teflon coated sheets, PTFE Steel alloys properties and uses) - Long span structures using steel - Steel Roofing namely cable structures - Cable suspended roof, Hyperbolic paraboloid roof, Catenary, Pneumatic & Membrane roof - mention their Concept, Development, Laws of formation, Merits and Demerits- Vertical, Horizontal & Hexagonal joints.

UNIT 2 COMPOSITE CONSTRUCTION USING STRUCTURAL STEEL**8 HRS**

Concept of Composite materials - structural engineering & Material properties - Flitch Beam - Lightweight construction Foam Concrete - Ferro Cement - Fibre Reinforced Concrete Other composite construction materials.

UNIT 3 DESIGN, APPLICATIONS AND CONSTRUCTION OF STEEL BUILDINGS**12 HRS.**

Steel buildings design - Study of innovations in steel industry - Design and construction parameters developed by INSDAG - Concept of Recycled Steel - manufacture and assemble steel framed buildings - factories - multi-storey buildings and car parks - commercial buildings - Industrial and agricultural buildings - Bridges and multi-storey steel framed structures - The Case Studies include KCR Terminal at Hung Hom, Hong Kong, B3 Offices in Stockley Park, Renault Centre and Swindon By Normal Foster, Inmos Microchip Factory, Bridges and Public Bus Stop in St. Gallen, IBM Traveling Exhibition Pavilion

UNIT 4 DOCUMENTATIONS, SEMINARS, WORKSHOP ON INNOVATIVE TECHNOLOGIES**12 HRS.**

Documentation - Innovative Steel Buildings - International & Indian Context - Construction Methods & Techniques - Seminar to present a study of architectural form and structural expression through selected - case studies which will aid understanding of structural philosophy and analysis, building envelope and services and construction sequence - work shop on steel to be organized to give students hands on experience.

Max. 45 Hours**TEXT / REFERENCE BOOKS**

1. Stanley W. Crawley, Robert M. Dillon, Steel Buildings: Analysis and Design, John Wiley & Sons, Inc., 1993
2. Roger Brockenbrough, Frederick Merritt, Merritt Frederick, Structural Steel Designer's Handbook, McGraw Hill Companies, Inc. 1999
3. Michael Barnes, Michael Dickson, Widespan roof structures, Thomas Telford, 2000
4. Martorell, Bohigas & Mackay, Pavilion of the Future, Expo 92, Seville (MBM), 1992.
5. Prada Aoyama Tokyo Herzog and De Meuron. Milan, IT: Progetto Prada Arte Srl, 2003
6. Christopher Beokrem, Material Strategies in Digital Fabrication, Routledge, Taylor & Francis Group, 2012.

WEBSITE

www.steel-insdag.org

End semester examination question paper pattern**Max. Marks: 100****PART A: 2 questions from each unit, each carrying 5 marks****PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.****Exam Duration: 3 Hrs.****:08 x 05 = 40 Marks****: 04 x 15 = 60 Marks**

SAR 1615	BUILDING AUTOMATION SYSTEM	L	T	P	Credits	Total Marks
		3	0	0	3	100

Course objectives:

- Gain knowledge on Building Management System (BMS) and Automation.
- Be familiarized with various transducers and sensors in BMS.
- Be exposed on Control panel and Communication.

UNIT 1 INTRODUCTION 12 HRS.

Introduction and Origins of the Intelligent Buildings Concept - Definition and characteristics of Intelligent Buildings with brief history and contemporary concept. Automated buildings, Responsive buildings, Evaluation of natural ventilation in buildings and indoor wind speed.

UNIT 2 ENERGY MANAGEMENT AND SERVICES 13 HRS

Demands on building and services, Control systems, Study of development of Computer Integrated Building from single function systems to integrated solutions. Use of building intelligence in energy management. Factors that affect energy use in buildings - functional factors, environmental factors, envelope factors, air-conditioning systems factors, energy source factors and electrical systems factors. Fenestration design for optimal day lighting.

UNIT 3 KEY ISSUES OF INTELLIGENT BUILDING 10 HRS.

Multiple activity settings, Generic analysis of space utilization. Models for shared space use. The development of briefing process including design activity and building elements, life cycles, Coordination between life cycle, building technologies. Study of issues related to site, shell, skin, services and technology.

UNIT 4 INTELLIGENT DESIGN AND CONSTRUCTION 10 HRS.

Effective Space utilisation, Energy conservation through site selection, siting & orientation. Energy conservation through integration of building and site, site planning & site design. Expectations of user, effective communication of architectural concepts to user, Locating people and information, Introduction to building efficiency with respect to life cycle costs.

Max. 45 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Understand Building Management system and Automation.

CO2: Describe various Sensors and Transducers - Automation components in BMS

CO3: Explain control panel and communication such as HVAC.

TEXT / REFERENCE BOOKS

1. Henrik Missen, Industrialized Building and Modular Design, C & CA UK, 1972.
2. Konz T, Manual of Precast concrete Construction, Vol, I, II, III, Banverlag GMBH, 1971.
3. William P. Spence, Construction Materials, Methods, and Techniques, 2006.
4. Bansal, N.K., Hauser, G., & Minke, G., Passive Building Design, Elsevier, Amsterdam, 1994
5. Directory of Indian Building Materials Products Building materials and Technology Promotion Council and Centre for Symbiosis of Technology, Environment Management, Bangalore, 2000-2001.

**End semester examination question paper pattern
(To be distributed uniformly among all the units)**

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A: 2 questions from each unit, each carrying 5 marks

:08 x 05 = 40 Marks

PART B: 2 questions from each unit with an internal choice, each carrying 15 marks.

: 04 x 15 = 60 Marks

SAR 1801	CONSTRUCTION STUDIO I	L	T	P	Credits	Total Marks
		0	0	2	2	100

COURSE OBJECTIVES

- To understand technical details of temporary shelters, openings.
- To comprehend and explore the different types of bonds in wall

STUDIO WORK

Drawing Exercises on openings in temporary shelters - articulation of openings, doors and window - openings with brick jalli, bamboo split & mat finishes - Roof in temporary shelters - Thatch roof, pan tiles -Fixing details - fencing - simple brick footing - principles of bonding, English and Flemish bond, rat trap bond, T-Junctions (1 and 1 1 / 2, 2 bricks), L - Junctions, Cross junction (2 bricks), Brick piers, Cavity walls, rat trap bond, plinth and Sill details, brick arches and lintels, compound walls - Stone foundation - random rubble / ashlar, copings, stone piers, plinth and sill details, stone arches and lintels, stone fencing, Dhajji wall construction.

Max. 30 Hours

COURSE OUTCOMES

On completion of the course the student will be able to

- CO1:** Analysing the various techniques adopted in the openings for temporary shelters
- CO2:** Construct knowledge on various brick construction techniques.
- CO3:** Acquiring skill relating to application of stone in construction.

TEXT / REFERENCE BOOKS

1. Junnarkar S.B. and Shah H.J., Mechanics of Structures (Volume I), 21st edition, Anand Charotar publishing house, India, 1995
6. Sinha S. N., Reinforce Concrete Design, Tata McGraw-Hill publishing company Limited, New Delhi, 2004
7. Varghese P.C., Limit State Design of Reinforced concrete, Prentice Hall of India Private Limited, New Delhi, 2001
8. Ashok K. Jain, Reinforced Concrete Limit State Design, 4th Edition, Nem Chand, Roorkee, 1993
9. Ramachandra, Limit state design of Concrete Structures, Scientific Publishers, 2007

IS CODES

1. IS 456:2000 Plain and Reinforced Concrete Code of Practice
2. IS 875 (1-5) : 1987 Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures

SAR 1802	CONSTRUCTION STUDIO II	L	T	P	Credits	Total Marks
		0	0	2	2	100

COURSE OBJECTIVES

- To work out various assembly systems and explore possibilities in timber construction
- To understand various roofing materials in the market and its applications in the buildings.

STUDIO WORK

Drawings on Methods of construction using natural timber in joinery works including methods of fixing and options for finishing - Exercises involving the above through drawings - Mangalore tiles, madras terrace roofing, - fixing details. - Different types and methods of fixing - Windows (panelled, louvered, glazed, pivoted and sliding windows) - Doors (panelled, glazed, sliding, folding, louvered and pivoted) - Ventilators (top hung, louvered, and glazed) - Hardware for doors, windows and ventilators and application for a simple structure with schedule of joinery

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Thorough understanding of joinery details by attempting new details.

CO2: Importance of clarity in details in communicating the design

CO3: Comprehensive understanding by preparing schedule of joinery with specifications and hardware.

CO4: Quantifying material requirement through schedule of joinery.

SAR 1803	CONSTRUCTION STUDIO III	L	T	P	Credits	Total Marks
		0	0	2	2	100

COURSE OBJECTIVES

- To sketch and understand the RCC structures and their construction techniques
- To draft and comprehend the various components in staircase
- To develop knowledge on damp proofing and exposure on building materials and components.

STUDIO WORK

Different Types of foundations- Detailing of columns - Shallow (Mat and Raft foundation), spread (Square spread , rectangle , circle , combined , strip and ring foundation) , deep (pile , piers , caissons) .Super Structure - Beams, sill level, detailing of apertures (lintels, sunshades, arches etc.,) - Roofs (one way slabs, 2-wayslab, continuous, flat slab, coffer slab etc.) - Staircases, Exercises of the above through case studies and drawings of selected building types - exercise on damp-proofing and water proofing for walls, roofs, basements, retaining walls, swimming pools , sump, terrace floor details - Water tanks, terrace gardening, etc.

Max. 30 Hours**COURSE OUTCOMES**

On completion of the course the student will be able to

CO1: To sketch the different types of foundation and its details

CO2: Obtain knowledge to draft different types of slabs and its details

CO3: Drafting and labelling the various components in staircase and its details

CO4: To interpret the construction methods for damp-proofing and water proofing in various building components and sketching it to proper scale

CO5: Exercise on various construction details

SAR 1804	CONSTRUCTION STUDIO IV	L	T	P	Credits	Total Marks
		0	0	2	2	100

COURSE OBJECTIVES

- To develop and strengthen the skills, revolving around the applications of nonferrous materials in construction field with technical information.

STUDIO WORK

Typical details showing fixing of framing members, glass panes, roller position (in case of sliding window), hinge arrangement (in casement window), locking arrangement and related hardware. Cladding - Construction methods using Aluminium cladding (includes other ACP materials), shop front handrails - Structural Glazing, curtain walls. Exercises of the above through case studies and drawings - Partitions And Panelling (Timber, Aluminium, UPVC) - fixed partitions, sliding/folding partitions, wall panelling Thermal Insulation- Heat transfer and heat gain by materials -vapour barriers and rigid insulation.- Cold Storage - Sound insulating and isolating - treatment for interior surfaces (Wall, Floor and ceiling) in Auditorium and other sound sensitive spaces.

Max. 30 Hours**COURSE OUTCOMES**

On completion of the course the student will be able to

- CO1:** Illustrate the construction techniques of manufactured materials and their applications in the built environment.
CO2: Ability to sketch the details of various types of partition and panelling using manufactured material.
CO3: Detailing of thermal and sound insulation and its application in interior environment and performance spaces
CO4: Sketch the false ceiling systems using manufactured materials including the fixing details incorporation of air conditioning and light systems and design for specific application.

SAR1805	CONSTRUCTION STUDIO V	L	T	P	Credits	Total Marks
		0	0	2	2	100

COURSE OBJECTIVES:

- To work out various assembly systems and explore possibilities of using steel in construction
- To understand and critically analyse the ways to design space frames, shells and folded plates in through case studies.

STUDIO WORK

Drafting exercise on different types of doors and windows (open able, sliding etc., methods of construction using steel) - Design and detailing of steel rolling shutter. Design and detailing of steel roof trusses (north-light, tubular, butterfly truss etc.,) including construction methods for roof covering using steel, FRP, polycarbonate, cement fibre sheets etc. Visit to steel structure fabrication site. Exercises of the above through case studies and drawings - space frame structures. Methods of construction using Shell structures and folded plates - various forms and classification of shells and types of folded plates-Exercises involving the above through case studies and drawing - Architectural Detailing in public spaces - Fundamentals Geometry Simple Types: Complex Types: Natural Lighting Envelope Landscaping Thermal Control Thermal Control Pressurization and Air Balance Fire Protection/Smoke Control.

Max. 30 Hours**COURSE OUTCOMES**

On completion of the course the student will be able to

CO1:Thorough understanding of joinery details with steel by attempting new details.

CO2:Acquiring knowledge to incorporate FRP, polycarbonate, cement sheets in design.

CO3:Comprehensive understanding of principles and design approaches to be incorporated in shells and folded plates through case studies.

CO4:Analyzing the various construction techniques adopted in the envelope design for large gathering spaces.

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 PRINCIPLES 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. Pramod 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. Sennar 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

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

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 diagramming

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
7. Ian Sideway, Mastering the Art of Drawing, Anness Publishing, 2011
8. John Hamilton, The Complete Book of Sketching, Chancellor Press, 2003

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

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.

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 Foster 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 Pitman 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, Cincinnati, 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

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 as the 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

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

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

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

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

WEBSITES

1. <http://lumion3d.com/>
2. <http://www.sketchup.com/>

SAR4062	DESIGN STUDIO VI	L	T	P	Credits	Total Marks
		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

Max. 210 Hours

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

SEVENTH SEMESTER

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

SAR4064	EDUCATIONAL TOUR	L	T	P	Credits	Total Marks
		0	0	0	2	100

COURSE OBJECTIVES

- To give an opportunity to the students to experience both the contemporary and historical buildings and comprehend the site planning aspects and the context.

FOCUS

An educational tour to the places of architectural interest / building appraisal shall be organized as per the itinerary approved by the department. The documentation shall be done in the form of photographs / slides and sketches, presented in the form of a seminar and written report immediately after the tour / building appraisal. The students will be instructed to submit a Pre-Tour and Post Tour report of the selected zone. The tour will be in the form of choice based anyone state for a group of forty.

There will be a Minimum of two Assessments (pre tour and post tour) for the Educational Tour which carries a total of 50 Marks. Of these 45 marks will be awarded through assignments, documentation which includes drawings, sketches, pictures and report by the tour coordinator. The percentage of attendance secured by the candidate will carry a weightage of 5 Marks, which will be added to the internal assessment Marks of 45 thus making the total of 50 marks. Refer clause 12c (vii) in the regulations for assessment procedure.

COURSE OUTCOMES

On completion of the course the student will be able to

CO1:Appreciating the monumental Architecture

CO2:obtain knowledge in historical construction techniques and materials.

CO3:Understanding and comparing the Architecture of historical and Contemporary buildings

CO4:Analyzing the tangible and intangible factors

CO5:Interpreting the architectural character of the buildings and premises visited.

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

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

SARX1010	URBAN HOUSING	L	T	P	Credits	Total Marks
		2	-	-	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		20	80	-	35	50

COURSE OBJECTIVE:

To make the students familiar with housing policies, issues, process and the method and need of formulating housing design standards.

UNIT II HOUSING ISSUES – INDIAN CONTEXT**8 hrs.**

Need and Demand, Quality & quantitative aspects – National Housing Policy – Housing Agencies, Financing Institutions and their role in housing development – case studies of housing in UK,USA,China, Singapore, Hongkong

UNIT II SOCIO – ECONOMIC ASPECTS & HOUSING STANDARDS**8 hrs.**

Social factors influencing Housing Design, affordability, economic factors and Housing concepts. Slum Up-gradation and Sites and Services. Standards and Regulations for different types of housing – DR relevant to Housing – Methodology of formulating standards – Performance standards, Case studies of various schemes of TNSCB

UNIT III HOUSING DESIGN**8 hrs.**

Traditional patterns – Different forms, housing patterns from tradition to modern times, Row Housing, Cluster Housing etc. Layout concepts – Use of open spaces – Utilities and common facilities – studies – High Rise Housing, Cost effective & sustainable housing, A critical study on housing by Charles Correa, Raj Rewal, Doshi

UNIT IV HOUSING PROCESS**8 hrs.**

Different Surveys, Sources and collection of data, Analysis of data, Formulation of the goals, objectives and standards, Various steps, stages and tasks in Project Development – Housing Management– Community participation – Environmental aspects – Technology- with examples incorporating the modern trends.

Total: 32 hrs.**REFERENCES:**

1. Richard Untermyer & Robert Small, Site Planning for Cluster Housing, Van Nostrand Reinhold Company, London/New York, 1977
2. Joseph de Chiara & Others – Time Saver Standards for Housing and Residential development, McGraw Hill Co., New York, 1955
3. Forbes Davidson and Geoff Payne, Urban Projects Manual, Liverpool University Press, Liverpool, 1983
4. Christopher Alexander, a Pattern Language, Oxford University Press, New York – 1977.
5. Jain A K – Buildings systems for the Low income Housing- Management publishing Co., - 1992.
6. James Steele, An architecture for people- the complete works of Hasan Fathy- Thames and Hudson, London – 1997.
7. Allen, A Global Strategy for housing in third Millennium E & FN Spon, London, 1992.

UNIVERSITY THEORY EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks: 80

Exam Duration: 3 hrs.

Part A: 2 questions from each unit, each carrying 4 marks.

 $8 \times 4 = 32$ marks

Part B: 1 question from each unit with an internal choice, each carrying 12 marks.

 $4 \times 12 = 48$ marks

SARX1014	STEEL IN ARCHITECTURAL DESIGN	L	T	P	Credits	Total Marks
		2	1	-	3	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		20	80	-	35	50

COURSE OBJECTIVE:

To understand the use of steel in large span structures and to develop the sense of structural aesthetics.

UNIT I STEEL STRUCTURE**12 hrs.**

Standard structural steel – thermal properties – Fireproofing- Long span structures using steel - Steel Roofing namely Cable suspended roof, Hyperbolic paraboloid roof, Catenary, Pneumatic & Membrane roof – Vertical, Horizontal & Hexagonal joints.

UNIT II COMPOSITE CONSTRUCTION USING STRUCTURAL STEEL**12 hrs.**

Concept of Composite materials – structural engineering & Material properties – Flitch Beam – Lightweight construction – Other composite construction materials.

UNIT III DESIGN & CONSTRUCTION OF STEEL BUILDINGS**12 hrs.**

Steel buildings design - manufacture and assemble steel framed buildings - factories - multi-storey buildings and car parks - commercial buildings - Industrial and agricultural buildings - Bridges and multi-storey steel framed structures – Case Studies.

UNIT IV APPLICATIONS & INNOVATIVE TECHNOLOGIES**12 hrs.**

General application– **Structural Elements** – **Innovative Technology** - **Construction Methods & Techniques** – Case Studies.

Total: 48 hrs.**REFERENCES:**

1. Stanley W. Crawley, Robert M. Dillon, Steel Buildings: Analysis and Design, John Wiley & Sons, Inc.,1993
2. Roger Brockenbrough, Frederick Merritt, Merritt Frederick, Structural Steel Designer's Handbook, McGraw-Hill Companies, Inc, 1999
3. Michael Barnes, Michael Dickson, Widespan roof structures, Thomas Telford, 2000

UNIVERSITY THEORY EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks: 80

Exam Duration: 3 hrs.

Part A: 2 questions from each unit, each carrying 4 marks.

 $8 \times 4 = 32$ marks

Part B: 1 question from each unit with an internal choice, each carrying 12 marks.

 $4 \times 12 = 48$ marks

SARX1015	URBAN DESIGN	L	T	P	Credits	Total Marks
		2	-	-	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		20	80	-	35	50

COURSE OBJECTIVE:

To expose the students the basics of urban design and to gain understanding of the urban spaces, designing of public areas and theories, solutions and policies related to the urban design principles.

UNIT I INTRODUCTION: CITY FORM AND PATTERN & TOWNSCAPE ELEMENTS**8 hrs.**

Relation ship between Architecture, Urban Design and Town planning. Cities & their evolution. Need for urban design as a separate stream of subject. Raw materials in urban design. Townscape elements based on Optics, Place & Content. City - forms and patterns. Elements of the physical urban environment – streets, city centres, open spaces. Factors deciding city form & pattern – size, density, grain, accessibility, imageability, elements of design

UNIT II THEORIES AND SOLUTIONS IN URBAN DESIGN**8 hrs.**

Concepts brought out in developing different theories in the formation of urban areas and different solutions for the urban problems in context. Examples from contemporary projects in India. Urban design and conservation. Urban renewal- scope need and challenges.

UNIT III ROLE OF SPACE IN HISTORY**8 hrs.**

Comparative analysis of public spaces, their organization, location, distribution in towns Pre historic – Egypt, Sumeria, & Greece. Early - Greek & Roman; Agora, Forum. Medieval - Italy, Renaissance period, Comparative analysis of public spaces, their organization, location, distribution in modern towns. Examples from India- Vedic times to Colonial period.

UNIT IV URBAN ENVIRONMENT&TOOLS**8 hrs.**

Problems, existing legal framework and their limitations. Organization of space: Understanding, organizing and articulation of space for residential, commercial, industrial and recreational areas. Public involvement and townscape policies. Importance of public participation in urban design. Need for new bye – laws and regulations. New urbanism concepts.

Total: 32 hrs.**REFERENCES:**

1. Spreiregen Paul, D. "Urban Design-The Architecture of Towns and Cities", McGraw-Hill Book Company, Newyork, 1965.
2. Gordon Cullen, "The Concise Townscape" Van Nostrand Reinhold, New York, 1961.
3. Lynch Kevin, "Image of the City", MIT Press, 1960.
4. Gosling David, "Concepts of Urban Design", Academy Editions, St. Martins Press, New York, 1994.
5. Bacon Edmund, N. "Design of Cities" Thames and Hudson, London, 1967.
6. Gallion, A. and Esnier, S. "The Urban Pattern", Wiley 1993.
7. Barnett Jonathan, "An Introduction to Urban design", Harper and Row, New York, 1982.
8. Barnett Jonathan, "Urban Design As Public Policy- Practical Methods For Improving Cities", Mc Graw-Hill Publications, 1974.
9. Alexander, R.C. "Designing Cities-Critical readings in Urban design", Blackwell Publishers Ltd, 2003.
10. Rob Krier, "Urban Space", Academy Editions, New York, 1979.
11. Cliff Moughtin, "Urban Design-Street And Square", Architectural Press, Oxford, 2005.

UNIVERSITY THEORY EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks: 80

Part A: 2 questions from each unit, each carrying 4 marks.

Part B: 1 question from each unit with an internal choice, each carrying 12 marks.

Exam Duration: 3 hrs.

 $8 \times 4 = 32$ marks $4 \times 12 = 48$ marks

SARX1016	PROJECT MANAGEMENT	L	T	P	Credits	Total Marks
		2	-	-	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		20	80	-	35	50

COURSE OBJECTIVE:

To understand traditional management system, management skills, project programming, network techniques and to establish relationship between the project cost and project planning. Application of softwares in planning of simple projects

UNIT I RADITIONAL APPROACH AND NETWORK ANALYSIS**8 hrs.**

Traditional Management System - Gantt's approach - load, progress and bar charts - limitations & overcoming - Project programming - work breakdown structure. Introduction to PERT & CPM - Introduction to network concepts, network elements and inter-relationships-Network techniques - Network logic - activity interrelationships - development of CPM network - Identification of critical path - Different float computations – Early start, early finish, late start, and late finish- worked out examples-Network control (updating): Introduction, process of updating, data required for updating, when to update, method of updating, examples.

UNIT II PROBABILITY ANALYSIS**8 hrs.**

PERT Network - Introduction to theory of probability and statistics - Probabilistic time estimates of activities -Analysis of PERT Network.

UNIT III PROJECT COST & RESOURCE ALLOCATION**8 hrs.**

Introduction to two-dimensional network analysis - activity cost information - cost time relationship – crashed estimates for activities - compression potential-cost slope - Project direct cost and indirect cost- crashed program, Network compression - least cost, least time, optimum solutions. Resource allocation - Resource leveling and smoothing - Simple examples.

UNIT IV PROJECT COST & RESOURCE ALLOCATION**8 hrs.**

Introduction to Project Management softwares – Applications – detailed planning of a simple project – scheduling using primavera.

Total: 32 hrs.**REFERENCES:**

1. Jerome D. Wiest and Forinord K. Levy, 'A Management Guide to PERT/CPM', Prentice Hall of India Pub. Ltd., New Delhi, 1982.
2. Mukhopadhyay S.P., 'Project Management for Architects and Civil Engineers', IIT, Kharagpur, 1974.
3. Burgess R.A. and White G., 'Building Production and Project Management', The Construction Press, London, 1979.
4. Punmiya B.C. and K.K. Khandelwal, 'Project Planning and Control with PERT/CPM', Laxmi Publications, New Delhi, 1989.
5. Harris F.C. and R. McCaffer, 'Modern Construction Management', Crosby Lockwood Staples, 1977.

UNIVERSITY THEORY EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks: 80

Exam Duration: 3 hrs.

Part A: 2 questions from each unit, each carrying 4 marks.

 $8 \times 4 = 32$ marks

Part B: 1 question from each unit with an internal choice, each carrying 12 marks.

 $4 \times 12 = 48$ marks**(50% Theory and 50% Problems)**

SARX1017	PROFESSIONAL PRACTICE	L	T	P	Credits	Total Marks
		2	-	-	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		20	80	-	35	50

COURSE OBJECTIVES:

To introduce the issues relating to the architectural profession in India. To understand the Architects Act and COA's regulations. To focus on the issues relating to office management. To understand the implications of various Acts and Regulations.

UNIT I LAWS RELATING TO ARCHITECTURAL PRACTICE**8 hrs.**

The Architects Act – 1972, Council of Architecture's Rules and Regulations. Important Acts and Regulations governing buildings (in detail) Urban Land Ceiling Act, Land Acquisition Act, Town Planning Act. Urban Art Commission. Consumer Protection Act, Copyright Act.

UNIT II ARCHITECTURAL COMPETITIONS & PROFESSIONAL ORGANIZATIONS**8 hrs.**

Types of Competitions, Promotion and Conduct of Competitions, Role of the Assessor, Award of Prizes.

Professional Organizations -IIA, UIA, CAA, ARCASIA, SAARCH, ITP, IID, IV. Globalization, GATS and the Indian Architectural scenari.

UNIT III CONTRACTS, EASEMENTS & ARBITRATION**8 hrs.**

Classification of Building Contracts, Defects Liability Period, Clerk of Works, Sub-Contractors, Liquidated Damages, Breach of Contract and Damages, Interim and Final Certificates. Definition, Types of Easements, Creation, Prevention and Extinction of Easements. Introduction, Arbitration Agreement, Role of Arbitrators and Umpire, Arbitration Award.

UNIT IV LIABILITY OF ARCHITECTS**8 hrs.**

Types of Liabilities, Professional Duties and Conduct of Architects, Professional Negligence, Deficient Service and Exceptions, Insurance, Examples of Cases.

Total: 32 hrs.**REFERENCES:**

1. Roshan H Namavathy, Professional Practice, Anup Lakhani, 1997
2. Gopinath Rao, Manual on Building contracts, 1991
3. Gopinath Rao, Professional Practice for Architects, Consultancy & Engineers, Chennai, 1996
4. Krishnamoorthy K.G., Ravindra S.V., Professional Practice, K.G. Krishnamoorthy, S.V. Ravindra, 2004

UNIVERSITY THEORY EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks: 80

Exam Duration: 3 hrs.

Part A: 2 questions from each unit, each carrying 4 marks.

 $8 \times 4 = 32$ marks

Part B: 1 question from each unit with an internal choice, each carrying 12 marks.

 $4 \times 12 = 48$ marks

SARX3010	BUILDING SERVICES III	L	T	P	Credits	Total Marks
		1	-	2	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		50	50	25	25	50

COURSE OBJECTIVE:

To introduce the basics of lighting, electricity, to work on various lighting schemes along with electrical network for it.

UNIT I INTRODUCTION TO LIGHTING**12 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, daylight factor, Natural lighting in architecture

UNIT II LIGHTING**12 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.

UNIT II INTRODUCTION TO ELECTRICITY**12 hrs.**

Introduction – 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, invertors.

Case studies on electric core

UNIT IV ELECTRICITY IN BUILDINGS**12 hrs.**

Main Boards & sub distribution boards for multistoried buildings, Standby power supply distribution, transformers, safety methods, principles and practices-Earthing: 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

Case studies: Lighting for different types of stores, offices, residential buildings-Electrical layout for different types of buildings.

Total: 48 hrs.**Studio work**

The relevant portions of National Building Code & Indian Standard Codes to be studied

Practical work: Simple lay out diagrams for house wiring, location of points, switches, fittings, ornamental lighting etc. Visits to large buildings to study lighting arrangements & schemes to be arranged

REFERENCES:

1. Pritchard, D.C., "LIGHTING", Longman scientific & Technical, Harlow, 1995.
2. Hopkinson, R.G., " Architectural Physics – Lighting", London. 1963.
3. Benjamin Evans, " Daylight in Architecture", McGraw – Hill Book Company, New York, 1981.
4. Tregenza, Peter & Loe, David, " The Design Of Lighting", E & FN Spon, London, 1998.
5. Millet Marietta, "Light Reaviling Architecture", Van Nostrand Reinhold, London, 1996.

UNIVERSITY THEORY EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks: 50

Exam Duration: 3 hrs.

Part A: 5 questions from the FOUR units, each carrying 2 marks.

$5 \times 2 = 10$ marks

Part B: 1 question from each unit with an internal choice, each carrying 10 marks

$4 \times 10 = 40$ marks

SARX3011	BUILDING CONSTRUCTION IV	L	T	P	Credits	Total Marks
		1	-	2	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		50	50	25	25	50

COURSE OBJECTIVE:

To develop knowledge to the students of steel and their wider application in the building industry.

UNIT I INTRODUCTION STEEL STRUCTURES**12 hrs.**

Understanding types of joints in steel structures, riveted, welded and bolted- Joints - types of steel sections and their properties - types of connections - criteria for selection of steel sections for design

steel structure design and detailing of any small building - visit to steel structure fabrication site.

UNIT II CONSTRUCTION DETAILS IN STEEL**12 hrs.**

Drafting Exercises on Structural steel sections- types of connections - steel in foundations, columns/stanchion and beams, Steel staircases. Drafting Exercises on different types of steel roof trusses including north light truss - materials for roof covering - Steel doors and windows -openable, sliding - collapsible gates - rolling shutters- Case Studies

UNIT III CONSTRUCTION DETAILS IN STAINLESS STEEL**12 hrs.**

Drafting exercises on Stainless steel - Balusters, False ceiling, Wall paneling, Doors. Various joinery details with Stainless steel sections - Case Studies

UNIT IV APPLICATIONS & INNOVATIVE TECHNOLOGIES IN STEEL**12 hrs.**

General application-roof and columns - Structural Elements - Innovative Technology - Construction Methods & Techniques - Case Studies - Documentation of Industrial Buildings

Total: 48 hrs.**REFERENCES:**

1. Arora.S.P&Bindra S.R "A text Book of Building Construction" DhanpatRai& Sons, New Delhi 1994.
2. McKay. W.B., Building Constructon, Vol 1,2,3 Longmans, U.K 1981.
3. Rangwala S.C, Engineering Materials, Charotar Publishing House, Anand, 1982.
4. Sushil Kumar -Building Construction- Standard publishers and Distributors-2010
5. Chudley- Construction Technology (Vol 1)-Longman publications 3rd Edition - 1999

UNIVERSITY THEORY EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks: 50

Exam Duration: 3 hrs.

Part A: 5 questions from the FOUR units, each carrying 2 marks.

$5 \times 2 = 10$ marks

Part B: 1 question from each unit with an internal choice, each carrying 10 marks

$4 \times 10 = 40$ marks

(50% Drafting, 50% Theory)

SARX3012	BUILDING SERVICES IV	L	T	P	Credits	Total Marks
		1	-	2	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		50	50	25	25	50

COURSE OBJECTIVE:

To introduce air conditioning and firefighting& enabling its application in the design and detailing of buildings.

UNIT I INTRODUCTION**12 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 II A/C SYSTEMS**12 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 III INTRODUCTION TO FIRE**12 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 Equipments – 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

UNIT IV SERVICE CORES**12 hrs.**

Definition, design approach, functions of service core, service core types and placements - Service cores - toilets, elevator, electrical, air conditioning, staircases, exits & life safety considerations.

Case studies-Air conditioning for different types of buildings-Fire protection concepts in various buildings-Service core on multistoried buildings

Studio Work

Visits to large buildings to study the air conditioning systems, firefighting modes to be arranged along with the preparation of working drawings.

Total: 48 hrs.**REFERENCES:**

1. Arora C.P, Refrigeration and Air Conditioning, Tata Mcgraw Hill, 2000.
2. National Building Code – Bureau of Indian Standards
3. Eastop T.D. Mechanical Services for Buildings, Longman Saiutific & Technical publisher, 1992.
4. Air conditioning for student of architecture – M.H. Lullah
5. Paul Lang, Principles of air conditioning, Delmar Publisher, 1995.

UNIVERSITY THEORY EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks: 50

Exam Duration: 3 hrs.

Part A: 5 questions from the FOUR units, each carrying 2 marks.

5 × 2 = 10 marks

Part B: 1 question from each unit with an internal choice, each carrying 10 marks

4 × 10 = 40 marks

SARX3013	BUILDING CONSTRUCTION V	L	T	P	Credits	Total Marks
		1	-	2	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		50	50	25	25	50

COURSE OBJECTIVE:

To expose the students to the new emerging materials like special glasses, Aluminum, plastics etc. and make them aware of advanced techniques

UNIT I GLASS AND PLASTICS**12 hrs.**

Glass - special types of glass – sheet glass, plate glass, safety glass, tinted coated glass. Glass blocks, curtain walling - properties and applications in the building industry. Plastics - Classification of Plastics (Thermo plastic and Thermo sets) –Cellular plastics – Different types, properties and their uses in buildings - Drafting Exercises on Glass blocks, curtain wall, FRP roofing techniques.

UNIT II CONSTRUCTION DETAILS IN ALUMINIUM**12 hrs.**

Aluminium partitions, false ceiling, shopfront handrails- Aluminium doors - open able, sliding, pivoted. Aluminium windows -openable, sliding, fixed, pivoted. Aluminium ventilators – louvred, pivoted and fixed - Aluminium roofing -northlight glazing bar, aluminium roofing sheets. Drafting Exercises

UNIT III CURTAIN WALLS**12 hrs.**

Drafting Exercises on curtain walls with glass, aluminum composite panels, stainless steel.

UNIT IV ADVANCED FRAMED STRUCTURE**12 hrs.**

Drafting Exercises on Shell structures, domes, shell barred vault, folded plate structures, tensile and pneumatic structures, different types of long span roofs using different materials used in stadiums and auditoriums.

Total: 48 hrs.**REFERENCES:**

1. Huntington W.C. And Robert E. Mickadert, Building Construction, Materials and types of construction: John Wiley and Son, New York, USA, 1981.
2. Michael Devarean, Architects working details revised, Architectural press, London, 1964.
3. Boyne, Architects working details, Vol. I, II, III, IV, & V, The Architectural Press, London, 1959.

UNIVERSITY THEORY EXAM QUESTION PAPER PATTERN

(To be distributed uniformly among all the units)

Max. Marks:50

Exam Duration: 3 hrs.

Part A: 5 questions from the FOUR units, each carrying 2 marks.

 $5 \times 2 = 10$ marks

Part B: 1 question from each unit with an internal choice, each carrying 10 marks

 $4 \times 10 = 40$ marks**(50% Drafting, 50% Theory)**

SARX4011	DESIGN STUDIO V	L	T	P	Credits	Total Marks
		-	-	15	8	200
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		200	-	100	-	100

COURSE OBJECTIVE:

To understand the process of designing for public, involving multiple activities.

The thrust area shall be on structural grid, development regulations, bye-laws and services.

Design Studio V

Studio on creating environments for apartments, commercial complex, auditorium etc, using programmed needs criticism and evaluation of alternative concept

- Use of computers as an aid to Design.

Total: 120 hrs.

REFERENCES:

1. De Chiara and Callender, Time Saver Standard for building types, McGRAW Hill CO., 2nd Edition, 1980.
2. Edward D. Mills, Planning - The Architects Handbook - 10th Edition, British Library Cataloguing in publication Data, 1985.
3. Wakita / Linde, The Professional practice of Architectural working drawing, Jhon Wiley & sons, 1984.
4. Andrew Alpern, Handbook of speciality Elements in Architecture, McGraw Hill Book CO., 1982.
5. Julius Panero & Martin Zelnik, Human Dimension and Interior space. Whitney Library of Design Publication, 1979.
6. Ernst and Peter, Neufert's Architect's Data, Blackwell publishing professional, 2002.

SARX4012	DESIGN STUDIO VI	L	T	P	Credits	Total Marks
		-	-	15	8	200
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		200	-	100	-	100

COURSE OBJECTIVE:

To understand the process of designing buildings involving multiple layers

To innovate the use of materials, intense building services and large span structural systems.

The thrust area shall be on the integration of intelligent service systems in to the design of the building.

DESIGN STUDIO VI

Design problem shall consider the above and planning shall deal with the masses in relation to conservation of spaces, transportation and multiple activities such as regional bus terminal, domestic air- port, 3 star hotel, multi-storied office building, Hospitals, resorts, museum etc.

Total: 120 hrs.

REFERENCES:

1. De Chiara and Callender, Time Saver Standard for building types, McGRAW Hill CO., 2nd Edition, 1980.
2. Edward D. Mills, Planning - The Architects Handbook - 10th Edition, British Library Cataloguing in publication Data, 1985.
3. Wakita / Linde, The Professional practice of Architectural working drawing, Jhon Wiley & sons, 1984.
4. Andrew Alpern, Handbook of speciality Elements in Architecture, McGraw Hill Book CO., 1982.
5. Julius Panero & Martin Zelnik, Human Dimension and Interior space. Whitney Library of Design Publication, 1979.
6. Neufert's Architect's Data, Rudoifherg, Croby Lockwood and Sons Ltd.,

SARX4013	ARCHITECTURAL DESIGN EXAMINATION III	L	T	P	Credits	Total Marks
		-	-	-	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		-	100	-	50	50

COURSE OBJECTIVE:

To understand the process of designing buildings with in given time frame

UNIVERSITY PRACTICAL EXAM QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 18 hrs.

One question with an internal choice on designing public use buildings like Design of shopping mall, nursing homes, office buildings etc.

SARX4014	DESIGN STUDIO VII	L	T	P	Credits	Total Marks
		-	-	15	8	200
		Internal Marks	External Marks	Min Pass Internals	Min Pass External	Min Pass Marks
		200	-	100	-	100

COURSE OBJECTIVE:

To understand the role of architects in creating a sustainable urban environment.

DESIGN STUDIO VII

Study of an urban environment - Urban activities, services and construction methods, social utilization, growth and change shall be the focus of the study centered in a medium sized town poised for major changes in the near

Design program involving the creation of large span structures such as bus terminus, pavilions, conventional center, stadiums etc.

Design problems on housing, campus planning etc.

- Use of computers as an aid to Design.

Total: 120 hrs.

REFERENCES:

1. De Chiara and Callender, Time Saver Standard for building types, McGRAW Hill CO., 2nd Edition, 1980.
2. Edward D. Mills, Planning - The Architects Handbook - 10th Edition, British Library Cataloguing in publication Data, 1985.
3. Wakita / Linde, The Professional practice of Architectural working drawing, Jhon Wiley & sons, 1984.
4. Andrew Alpern, Handbook of speciality Elements in Architecture, McGraw Hill Book CO., 1982.
5. Julius Panero & Martin Zelnik, Human Dimension and Interior space. Whitney Library of Design Publication, 1979.
6. Neufert's Architect's Data, Rudoifherg, Croby Lockwood and Sons Ltd.,

SARX4015	WORKING DRAWING STUDIO	L	T	P	Credits	Total Marks
		-	-	4	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass External	Min Pass Marks
		100	-	50	-	50

OBJECTIVES:

Introduction to need and relevance of Working Drawing set and municipal drawings and their comparison to presentation drawing. Preparation of corporation drawing: Check list as a guide for information in a municipal drawing.

Introduction to various components and their precise function in a set of working drawing, Preparation of check list as guide for list of working drawing, Method of representing various contents and specific information in working drawing, Preparation of details for various building units. Time problem for specified building units (manually or on computer).

SARX4014	DESIGN STUDIO VII	L	T	P	Credits	Total Marks
		-	-	15	8	200
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		200	-	100	-	100

COURSE OBJECTIVE:

To understand the role of architects in creating a sustainable urban environment.

DESIGN STUDIO VII

Study of an urban environment - Urban activities, services and construction methods, social utilization, growth and change shall be the focus of the study centered in a medium sized town poised for major changes in the near

Design program involving the creation of large span structures such as bus terminus, pavilions, conventional center, stadiums etc.

Design problems on housing, campus planning etc.

- Use of computers as an aid to Design.

Total: 120 hrs.

REFERENCES:

1. De Chiara and Callender, Time Saver Standard for building types, McGRAW Hill CO., 2nd Edition, 1980.
2. Edward D. Mills, Planning - The Architects Handbook - 10th Edition, British Library Cataloguing in publication Data, 1985.
3. Wakita / Linde, The Professional practice of Architectural working drawing, Jhon Wiley & sons, 1984.
4. Andrew Alpern, Handbook of speciality Elements in Architecture, McGraw Hill Book CO., 1982.
5. Julius Panero & Martin Zelnik, Human Dimension and Interior space. Whitney Library of Design Publication, 1979.
6. Neufert's Architect's Data, Rudolf Herg, Crosby Lockwood and Sons Ltd.,

SARX4015	WORKING DRAWING STUDIO	L	T	P	Credits	Total Marks
		-	-	4	2	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		100	-	50	-	50

OBJECTIVES:

Introduction to need and relevance of Working Drawing set and municipal drawings and their comparison to presentation drawing. Preparation of corporation drawing: Check list as a guide for information in a municipal drawing.

Introduction to various components and their precise function in a set of working drawing, Preparation of check list as guide for list of working drawing, Method of representing various contents and specific information in working drawing, Preparation of details for various building units. Time problem for specified building units (manually or on computer).

SARX4016	DESIGN STUDIO VIII	L	T	P	Credits	Total Marks
		-	-	-	10	300
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		200	100	100	50	150

As per the norms laid by the Council of Architecture, India, a candidate has to undergo practical training for one year in an approved architectural firm established not less than five years. The practical training consists of two stages; however each stage (VIII & IX semester) should have a minimum of ninety working days. In addition to the training in architectural firms, the stage I also includes the critical analysis and documentation of a building (Historic or Vernacular) reflecting the regional context or a contemporary building designed by an eminent architect.

SARX4017	EDUCATIONAL TOUR	L	T	P	Credits	Total Marks
		-	-	-	3	200
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		150	50	75	25	100

An educational tour to the places of architectural interest / building appraisal shall be organized as per the itinerary approved by the department. The documentation shall be done in the form of photographs / slides and sketches, presented in the form of a seminar and written report immediately after the tour / building appraisal.

SARX4018	SYNOPSIS	L	T	P	Credits	Total Marks
		-	-	-	3	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		50	50	25	25	50

The intent of synopsis is to initiate the selection of Thesis topic in the beginning of the eighth semester itself. The students should work on three alternative topics of which one will be assigned to him/her to proceed to the next phase.

SARX4019	DESIGN STUDIO IX	L	T	P	Credits	Total Marks
		-	-	-	10	300
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		200	100	100	50	150

As per the norms laid by the Council of Architecture, India, a candidate has to undergo practical training for one year in an approved architectural firm established not less than five years. The practical training consists of two stages; however each stage (VIII & IX semester) should have a minimum of ninety working days.

SARX4020	PRE-THESIS STUDY	L	T	P	Credits	Total Marks
		-	-	-	3	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		100	100	50	50	100

The students will proceed for case studies and data collection of their approved synopsis in consultation with their respective supervisor and Head of Department. The findings and outcome of this study will be reviewed and evaluated by examiners appointed by the University

SARX4016	DESIGN STUDIO VIII	L	T	P	Credits	Total Marks
		-	-	-	10	300
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		200	100	100	50	150

As per the norms laid by the Council of Architecture, India, a candidate has to undergo practical training for one year in an approved architectural firm established not less than five years. The practical training consists of two stages; however each stage (VIII & IX semester) should have a minimum of ninety working days. In addition to the training in architectural firms, the stage I also includes the critical analysis and documentation of a building (Historic or Vernacular) reflecting the regional context or a contemporary building designed by an eminent architect.

SARX4017	EDUCATIONAL TOUR	L	T	P	Credits	Total Marks
		-	-	-	3	200
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		150	50	75	25	100

An educational tour to the places of architectural interest / building appraisal shall be organized as per the itinerary approved by the department. The documentation shall be done in the form of photographs / slides and sketches, presented in the form of a seminar and written report immediately after the tour / building appraisal.

SARX4018	SYNOPSIS	L	T	P	Credits	Total Marks
		-	-	-	3	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		50	50	25	25	50

The intent of synopsis is to initiate the selection of Thesis topic in the beginning of the eighth semester itself. The students should work on three alternative topics of which one will be assigned to him/her to proceed to the next phase.

SARX4019	DESIGN STUDIO IX	L	T	P	Credits	Total Marks
		-	-	-	10	300
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		200	100	100	50	150

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SARX4020	PRE-THESIS STUDY	L	T	P	Credits	Total Marks
		-	-	-	3	100
		Internal Marks	External Marks	Min Pass Internals	Min Pass Externals	Min Pass Marks
		100	100	50	50	100

The students will proceed for case studies and data collection of their approved synopsis in consultation with their respective supervisor and Head of Department. The findings and outcome of this study will be reviewed and evaluated by examiners appointed by the University