

School of Building and Environment

Department of Architecture

1.1.3 Courses having focus on employability/ entrepreneurship/ skill development in 2023- 2024

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.

- Grabowski, R. (2001). The Illustrated AutoCAD 2002 Quick Reference. Gengage Learning.
- SketchUp Hands-on: Student Coursebook. (2016). 3dvinci.
- Tickoo, S. (1999). AutoCAD 2000: A Problem Solving Approach. Delmar Learning; 1 edition .
- Watt, A. (1991). Fundamentals of three-dimensional computer graphics. Computers and Geosciences.

Employability

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

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

Employability

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

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					
150	50	Continuous Assessment	End Semester Examination				
		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

Rangwala S.C. (1982). Engineering Materials, AnandCharotar Publishing House
 Ahuja T. D and Birdie G.S., Fundamentals of Building Construction, Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1999
 Punmia B.C, A Text book of Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 2004.
 Boyne, Architects working details, Volumes I, II, III, IV, & V, The Architectural Press, London, 1959

Skill Development

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.
- Degenhart, C., Heiss, O., Ebe, J., & Fran Ford. (2010). *Barrier-free Design: Principles, Planning, Examples*. Birkhauser.
- Bassler, B. (2008). *Architectural graphic standards*. Hoboken, N.J.: John Wiley & Sons.
- Ching, F. (2011). *Visual dictionary of architecture* (2nd ed.). John Wiley & Sons

Skill Development

SARA2601	MATERIALS AND CONSTRUCTION STUDIO V		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 identify the various directions through which steel is effectively used in the built forms and environment.
- To understand the basic components of steel movable barriers in the external walls.
- To discuss the principles of utilizing steel in truss and space frames.

MODULE I**STEEL IN CONSTRUCTION****40 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.

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 fiber sheets etc.

MODULE II**LONG SPAN STRUCTURES****35 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, thumb rules

Max. 75 Hours

Modules	Assignments	Outdoor / hands on	Construction plates	No	Remarks
I	Container architecture	Report – students have to visit and study steel construction techniques give a brief report with sketches and photographs. Wire Model Fabric	Steel sections and foundation and column layout	1	Facilitates Architectural design VII
			Steel windows	1	
			Steel doors and rolling shutters	1	
			Steel truss and space frames	1	
II	International case studies with different roof forms and detail the steel joineries		Architectural detailing in public spaces	1	
			Application of concrete in the outcome of Architectural design V.	1	

COURSE OUTCOME:

On completion of the course the student will be able to

- CO1** Categorize the ways through which steel is used in conventional as well as large span structures.
- CO2** Explain the various components of steel doors and rolling shutters and the thumb rules
- CO3** Integrate the steel members for structural and non-structural purposes in design.
- CO4** Devise and detail the applications of steel in public realms
- CO5** Combine steel with other materials for architectural applications

TEXT / REFERENCE BOOKS

- Punmia B C, Jain.A.K. Jain,A.K. (1998). Comprehensive design of steel structures, Laxmi Publications Pvt. Ltd.
- Boyne (1959). Architects working details, Vol. I, II, III, IV, & V, The Architectural Press, London
- Ramaswamy G.S. (1984). Design and Construction of Concrete shell roofs, Krieger
- Ahmad.M.H., Haji,M.T&Rasdi.M, (2000). Design Principles of Atrium Buildings for the Tropics, University Technology Malaysia.

Skill Development

SARA9601	DESIGN STUDIO VI		L	T	P	Credits	Total Marks
			0	0	13	7	400
Continuous Assessment	End Semester Examination	Min Pass Marks					
		Continuous Assessment	End Semester Examination				
250	150	125	75				

COURSE OBJECTIVES:

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

METHODOLOGY PROPOSED

STAGE I

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

STAGE II

Phase I

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

Iteration and Ideation (Phase II)

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

Phase II

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

DESIGN INTEGRATION

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

Max. 195 Hours

SUGGESTED TYPOLOGIES:

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

COURSE OUTCOME

On completion of the course the student will be able to

- CO1** Analyze a multi-functional, multi storied, multi-use-built environments and render the needed spatial qualities
- CO2** Develop a knowledge repository to understand the importance of spatial proximities and connections
- CO3** Solve complex building structural systems in an efficient way and explore various combinations in structural systems
- CO4** Analyze and apply integration of specialized building services in multilevel planning of buildings.
- CO5** Evolve design focusing on Integrating sustainable energy concepts and techniques.
- CO6** Create an innovative built environment using various new age materials and advanced construction technology.

TEXT / REFERENCE BOOKS

1. De Chiara, J., & Crosbie, M. (2017). *Time-saver standards for building types* (4th ed.). McGraw-Hill Education.
2. Neufert, E. (2019). *Architects' data* (5th ed.). Wiley Blackwell.
3. Bureau of Indian Standards. (2016). *National building code of India 2016*.
4. Gauzin-Muller, D. (2002). *Sustainable architecture and urbanism: Concepts, Technologies, Examples*. BirkhauserVerlag AG.
5. Parker, D. And Wood, A. (2013). *The Tall Buildings Reference Book*. New York: Routledge.
6. Kloft, E. and Johann, E. (2003). *High-rise Manual: Typology and Design, Construction and Technology*, 1st Ed. Basel: BirkhauserVerlag AG.
7. Giedion, S. (2009). *Space, Time and Architecture*, rev. Ed. Cambridge: Harvard University Press.
8. Lawson, F. (2007). *Congress, convention and exhibition facilities*. Oxford u.a.: Architectural Press.
- Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). *The professional practice of architectural working drawings*. 4th Ed. Hoboken: John Wiley & Sons

Skill Development

SARA3504	ENVIRONMENT AND PSYCHOLOGY	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To expose the relationship between man and his larger environment, with special emphasis on aspects that are likely to affect intervention in or creation of the built environment.
- To familiarize the students with basic concepts/ theories of psychology as relevant to architecture.
- To analyse the human dimension of environmental sustainability from psychological perspectives

UNIT 1 INTRODUCTION

8 Hrs.

Introduction to the discipline 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. Emotional Relationships to Place: Attachment & Identity

UNIT 2 BASIC ATTENTION PROCESSES AND MEMORY

7 Hrs.

Models of Attention - Automization and Attention. The Use of Knowledge - Memory and built environment- theories on different types of memories - Retrieval from Long-Term Memory - Models of Semantic Memory - Basics of Visual Memory - Object Transformation in Visual Memory

UNIT 3 PERCEPTION

8 Hrs.

Sensory Mechanisms and Concept of perception, Role of Culture in Perception - visual perception, theories on environmental perception- Gestalt Principles - environmental perception and design. Concepts of cognition. Environmental cognition and design. Environment and human response in relation to different environmental variables. Classical Theory of Decision Making and Prospect Theory of Decision Making

UNIT 4 SPACE AND HUMAN BEHAVIOR

7 Hrs.

The Density/Crowding Distinction - Crowding and Density Human Experimental Studies –Physiological reactions – Task performance, Social-affective responses - Crowding in everyday settings – The residence - Recreational areas - Hospitals - Prisons. 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, Workplace environment and behavior. Application of the knowledge in design of a residence, community neighborhood and other built environments.

UNIT 5 COMPREHENSIVE LEARNING

Documentation of Human Preferences in public spaces through various survey techniques.

Max. 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

- CO1 Explore and understand various perspectives on human-environment interrelationships
- CO2 Relate the impact of space on human behaviour
- CO3 Develop clear knowledge on memory and attention
- CO4 Evaluate the role of perception and cognition in shaping human responses
- CO5 Build a systematic evaluation of the built environment in relationship to the act of socialising
- CO6 Apply the acquired knowledge through case evaluations.

TEXT / REFERENCE BOOKS

1. Morgan, T., & Clifford, Introduction to Psychology, Tata McGraw-Hill Publications, New York, 2001
2. Robert, G. (2002). Environmental Psychology: Principles and Practice, Optimal books, 2002.
3. Devlin, A. S. (2018). Environmental Psychology and Human Well-being: Effects of Built and Natural Settings. Academic Press.
4. Bell, P. A., Greene, T. C., Fisher, J. D., & Baum, A. (1996). *Environmental psychology*. Harcourt.
5. Mehrabian, A., & Russell, J. A. (1974). An approach to environmental psychology. the MIT Press.

Skill Development

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.

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				

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

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

Skill Development

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 Khoul, 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

Skill Development

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, 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 sciography 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

Skill Development

SARA9102	DESIGN STUDIO I		L	T	P	Credits	Total Marks
			1	2	9	7	300
Continuous Assessment	End Semester Examination	Min Pass Marks					
		Continuous Assessment	End Semester Examination				
200	100	100	50				

COURSE OBJECTIVES:

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

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

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

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

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

MODULE III FORM AND ITS COMPONENTS AND DERIVATION 48 Hrs.

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

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

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

TUTORIAL SESSION INTRODUCTION TO COMMUNICATION 14 Hrs.

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

Max. 165 Hours**COURSE OUTCOME:****On completion of the course the student will be able to**

- CO1** Understand the basic characteristics of different techniques, mediums and its practical applications.
- CO2** Ability to comprehend the elements of space making through understanding the configuration of elements which can be unified as a whole in a composition.
- CO3** Apply the basic elements and principles of design and implement them in design compositions
- CO4** Analyze, visualize, communicate and represent design
- CO5** Create models /sculptures to understand the evolution of three-dimensional forms from two dimensional shapes
- CO6** Develop an insight towards sensibility and aesthetic appreciation.

TEXT / REFERENCE BOOKS

1. Prammar 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: McGraw Hill.
6. Baker, M & Brown G.Z. (2014). Sun, wind and Light: Architectural design strategies, John Wiley and sons, 3rd edition

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. Pramara 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: McGraw Hill.
8. 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, Vitrified 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

- Arora S.P. and Bindra S.P., (2012). Text book of Building Construction, Dhanpat Rai & Sons, New Delhi.
- Chudley R., (1999). Construction Technology (Volume 1), Longman publications 3rd Edition.
- 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, Anand Charat Publishing House, India
- KlansDukeeborg, Bambus - Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000

Skill Development

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. DhanpatRai and Sons.

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

Skill Development

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. Emphasis is on the details related to barrier free environment. Ferrocement Workshop	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		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

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

Skill Development

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.

Skill Development

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

COURSE OBJECTIVES:

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

UNIT 1 CLIMATE: FACTORS AND CLASSIFICATION 6 Hrs.

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

UNIT 2 VENTILATION AND DAYLIGHTING 6 Hrs.

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

UNIT 3 SOLAR CHARTS AND SHADING DEVICES 8 Hrs.

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

UNIT 4 DESIGN WITH CLIMATE 6 Hrs.

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

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

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

Max. 30 Hours

COURSE OUTCOME:

On completion of the course the student will be able to

- CO1** Comprehend the role of climate in architecture and the factors affecting the climate.
- CO2** Acquire knowledge on the climate classification based on the influencing factors.
- CO3** Understand the importance of natural ventilation and day lighting in building design and analyzing their designing strategies.
- CO4** Familiarize the sun as a main design element and understanding the sun path diagram in detail for calculating the heating and cooling hours of a region.
- CO5** Marking the angle of incidence for equinox, summer and winter solstices for arriving the shadow mask and overshadowing in sun path diagram for the design of shading devices.
- CO6** Creating a data base of passive design strategies adapted for different climate zones through a comparative analysis of traditional and contemporary buildings.

TEXT / REFERENCE BOOKS

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

WEBSITES

1. <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)
2. <http://koeppen-geiger.vu-wien.ac.at/>
3. <http://plea-arch.org/wp-content/uploads/PLEA-NOTE-1-SOLAR-GEOMETRY.pdf>
4. <https://nptel.ac.in/courses/105107156/>

Skill Development

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

COURSE OBJECTIVES:

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

UNIT 1 SITE LAYOUT AND PLANNING PRINCIPLES**8 Hrs.**

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

UNIT 2 SURVEYING AND SITE ANALYSIS**10 Hrs.**

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

UNIT 3 SITE SELECTION AND REGULATIONS**6 Hrs.**

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

UNIT 4 SITE DESIGN AND DEVELOPMENT TECHNIQUES**12 Hrs.**

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

UNIT 5 COMPREHENSIVE LEARNING**9 Hrs.**

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

Max. 30 Hours**COURSE OUTCOME:**

On completion of the course the student will be able to

- CO1** Familiarize knowledge on the site layout and planning principles that govern the proposed development
- CO2** Students able to understand the importance of surveying and the different methods of surveying with hands on exercise.
- CO3** Preparation of site drawings and analysis of the site for preparing the feasibility of the proposed project
- CO4** Skill development on the site selection criteria with the context and typology specific
- CO5** Preparation of the matrix diagram with the available factors of site context and design development techniques.
- CO6** Exercise on site analysis, site design and development for the given land parcel.

TEXT / REFERENCE BOOKS

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

Skill Development

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

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

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

COURSE OBJECTIVES:

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

UNIT 1 UNDERSTANDING VERNACULAR ARCHITECTURE**10 Hrs.**

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

UNIT 2 APPROACHES AND CONCEPTS IN DIFFERENT REGIONS**10 Hrs.**

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

UNIT 3 VERNACULAR ARCHITECTURE IN THE TROPICS**10 Hrs.**

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

UNIT 4 VERNACULAR ARCHITECTURE IN 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.
- 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.

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.

Skill Development

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

1. Joseph DeChiara, 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 DeChiara; 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. Peter Sturzebecher and Ulrich, Architecture for Sport, Wiley - Academy, 2002
7. Franziska Nauck, edited by Van Uffelen, Chris, Stadiums, Page One, 2006
8. James B., Fundamentals of Landscaping and Site Planning, the Avi Publications, 2005
9. Joseph N. Sabatini, Building & Safety Codes for Industrial Facilities, Brikhauser, 2004
10. Booqs, Green Living: Sustainable Houses, Booqs, 2009

Skill Development

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

COURSE OBJECTIVES:

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

UNIT I INTRODUCTION TO CONSERVATION

6 Hrs.

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

UNIT 2 CONSERVATION LEGISLATION

8 Hrs.

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

UNIT 3 CONSERVATION OF HISTORIC BUILDINGS

8 Hrs.

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

UNIT 4 CASE STUDIES

8 Hrs.

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

COURSE OUTCOMES:

On completion of the course the student will be able to

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

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

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

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

CO5: Examine architectural and historical intervention in conservation process.

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

Max. 30 Hours

TEXT / REFERENCE BOOKS

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

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, fire load, 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.

- C02** Develop comprehensive knowledge on various types of Air conditioning systems and expertise on selection of appropriate system for a specific building typology
- C03** Develop comprehensive knowledge of architectural space planning for air conditioning systems.
- C04** Understand design strategies involved in planning and sizing of electromechanical conveyance systems.
- C05** Develop comprehensive knowledge on fire behavior, principles of firefighting, fire detection system, its integration with building and its importance in space planning.
- C06** Develop comprehensive knowledge on service core design in multistoried buildings.

TEXT / REFERENCE BOOKS

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

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

COURSE OBJECTIVES:

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

UNIT 1 INTRODUCTION TO SOUND**4 Hrs.**

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

UNIT 2 ACOUSTICS**8 Hrs.**

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

UNIT 3 DESIGN OF PERFORMING SPACES**8 Hrs.**

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

UNIT 4 SECURITY SYSTEMS AND SERVICES INTEGRATION**6 Hrs.**

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

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

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

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

- CO1** Understand the fundamental principles of acoustics and its importance in architectural design.
- CO2** Describe the different types of noise, their transmission and the measures to isolate / control them
- CO3** Analyze the various behavior of sound in indoor and outdoor space.
- CO4** Solve the acoustical design problems in a space by acoustic treatments.
- CO5** Design architectural spaces with respect to acoustic principles
- CO6** Understand the need of service integration and automated control

TEXT / REFERENCE BOOKS:

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

SARA3501	BIOMIMICRY	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To explore, understand and recognize the relation between nature and human.
- To comprehend and appreciate the natural construction by the organisms in nature.
- To generate similar approaches from nature in the built forms.

UNIT1 INTRODUCTION**6 Hrs.**

Introduction- what is biomimicry - bionics - biomimetics - origins of biomimicry - Biomimicry vs biophilic -nature's laws, strategies, and principles - Nature as a model, measure and mentor, changing metaphor and approach organic architecture - animal architecture - complexity of natural organisms and systems - Relationship between nature and architecture.

UNIT2 BIOMIMICRY CONCEPTS**8 Hrs.**

Nostos Erda: Returning Home to Earth - Natural materials manufacture principles - Inorganic materials - crystallized version of Earth derived materials - Natural construction - adaptation for human use (mud-dauber wasp compass termites, Eastern tent caterpillars, female bauble spiders and the extraordinary Namibian fog-basking beetle, beaver dam construction).

3 Skill Development BIOMIMICRY IN ARCHITECTURE**6Hrs.**

Biomimicry in architecture - overlap between biology and architecture - living building - biomimetics concepts - emerging biomimetics- technologies - nanotechnology in architecture - biomimetics products.

UNIT4 BIOMIMICRY AND SUSTAINABILITY**6Hrs.**

Examples of Buildings - works of Douglas Cardinal, Imre Makovecz, Daniel Liebermann, Eugene Tsui, Jacques Gillet, Petra Gruber - Biomimetic Cities-Biomimetic future Approach- Levels of Biomimicry (organisms level, behaviour level, ecosystem level) - Nature model - New applications of biological life into Architecture.

UNIT5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

Assignment on the concepts of biomimicry by reviewing journal papers. Documenting the influence of Biomimicry in Architecture. Analysis of case studies of various architects- Ar. Michael Pawlyn, Ar. Mick Pearce, Ar. Santiago Calatrava.

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

- CO1** Understanding the origin and principles of biomimicry and able to distinguish its application in architecture
- CO2** Understanding the origin and principles of biomimicry and able to distinguish its application in architecture.
- CO3** Exploration and critical analysis of the principles, design approaches of biomimicry adopted in architecture.
- CO4** Ability to outline the technologies and design strategies by adopted by pioneers in the built form.
- CO5** Skill to interpret philosophies in a sustainable approach adopted by architects in different contexts.
- CO6** Constructing knowledge on the role of nature as a model, measure and mentor in architecture.

TEXT / REFERENCE BOOKS

1. Benyus, J. M. (2002). Biomimicry: Innovation Inspired by Nature. William Morrow.
2. Gruber, P. (2011). Biomimetics in Architecture: Architecture of Life and Buildings. Springer.
3. Hansell, M. (2005). Animal Architecture (Oxford Animal Biology Series). OUP Oxford.
4. Mazzoleni, I. (2013). Architecture Follows Nature-Biomimetic Principles for Innovative Design (Biomimetics). CRC Press.
5. Pawlyn, M. (2011). Biomimicry in Architecture. RIBA Publishing.

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

COURSE OBJECTIVES:

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

UNIT 1 INTRODUCTION**6 Hrs.**

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

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

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

UNIT 3 ARCHITECTURAL PROVISIONS**8 Hrs.**

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

UNIT 4 EMERGING TRENDS**4 Hrs.**

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

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

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

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

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

TEXT / REFERENCE BOOKS

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

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

COURSE OBJECTIVES:

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

UNIT 1 URBAN DESIGN THEORY**8 Hrs.**

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

UNIT 2 INTRODUCTION AND HISTORY OF URBAN SPACES**12 Hrs.**

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

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

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

UNIT 4 TOOLS & TECHNIQUES IN URBAN DESIGN**8 Hrs.**

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

UNIT 5 COMPREHENSIVE LEARNING**5 Hrs.**

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

Max. 45 Hours**COURSE OUTCOME:****On completion of the course the student will be able to**

- CO1** Understanding the evolution of urban form over the years with relevant theories and case studies
- CO2** Understanding the relationship between various aspects of Architecture, Urban Design, Town Planning and the Environment
- CO3** Resolving and understanding complex urban issues and map the dimensions of urban space
- CO4** Compare and contrast different urban design theories and concepts and understand its application in real world scenarios in development of urban spaces
- CO5** Develop an understanding of factors effecting built and open spaces at urban scale and methods to perceive, record and analyze them
- CO6** Apprehend the various concept of urban form, community spaces and development, the role of public participation in building the urban environment.

TEXT / REFERENCE BOOKS

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

SARA2701	ADVANCED CONSTRUCTION STUDIO		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 synthesize the knowledge gained in all the materials and construction studios to develop drawings for an architectural design suitable for construction purpose.
- To detail the architectural elements and components to suitable scales.

Content	Plates	No	Remarks
Preparation of working drawings (plans, elevations, sections and other detailed drawings) to suitable scales.	Site marking and foundation layout	1	Bearing on Architectural design V
	Column layout plan	1	
	Floor plans with internal finishes (ground floor, first floor, typical floor)	3	
	Terrace and roof plan	1	
	Two elevations	1	
	Three sections (one through staircase and toilet, one showing the skin one in 1:50)	2	
	Basic electrical and plumbing drawing	2	
	Toilet detail (1:20)	1	

Max. 75 Hours**COURSE OUTCOME:****On completion of the course the student will be able to**

- CO1** Generate drawings like foundation layout, floor plans with internal finishes incorporating basic electrical and plumbing details, terrace and roof plan suitable for construction purpose.
- CO2** Develop elevations and sections evolved during the ideation phase to suitable scale so as to be used in the construction phase.
- CO3** Construct the details of the architectural elements and components.

 Skill Development

Skill Development

SARA9701	DESIGN STUDIO VII		L	T	P	Credits	Total Marks
			0	0	14	7	400
Continuous Assessment	End Semester Examination	Min Pass Marks					
		Continuous Assessment	End Semester Examination				
250	150	125	75				

COURSE OBJECTIVES

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

METHODOLOGY PROPOSED**STAGE I****Perlustration and Social Audit (Phase I)**

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

Inquisition and Mapping (Phase II)

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

STAGE II

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

Max. 210 Hours**DESIGN INTEGRATION**

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

SUGGESTED TYPOLOGIES

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

COURSE OUTCOMES.

On completion of the course the student will be able to

- CO1** Comprehend the evolution and morphological development of urban settlements
- CO2** Understand and apply the concepts of urban design and methodological approaches
- CO3** Integrate multiple computation techniques and applications for analysis, conceptualization, representation and communication of Urban Design schemes.
- CO4** Assess the complexity of urban phenomena & decode, analyze and interpret the related issues and challenges
- CO5** Develop and formulate strategies for desirable development plan of an urban area.
- CO6** Identify and propose architectural design solutions addressing the requirements and needs of an urban area.

TEXT / REFERENCE BOOKS

1. Watson, D., Plattus, A. J., Shibley, R. G., & Watson, D. (2003). Time-saver standards for urban design. New York: McGraw-Hill.
2. Morris, E. S. (1997). British town planning and urban design. Harlow, UK: Longman.
3. Friedmann, J. (2012). Varieties of Planning Experience: Toward a Globalized Planning Culture? In the Oxford Handbook of Urban Planning.
4. De Chiara, J., & Hancock, J. (1980). Time Saver Standard for Building Types, McGraw Hill, 2nd Edition.
5. Watson, D. (2004). Time-saver standards for architectural design.
6. De Chiara, J. (2009). Time-saver Standards for Housing and Residential Development: Time Saver Standards.
7. Gehl, J. (2013). Cities for people. Island press.
8. Gehl, J. (2011). Life between buildings: using public space. Island press.
9. American Planning Association. (2006). Planning and urban design standards. John Wiley & Sons.

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

COURSE OBJECTIVES

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

METHODOLOGY PROPOSED

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

COURSE OUTCOMES

On completion of the course the student will be able to

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

 Skill Development

SARA2801	EDUCATIONAL TOUR		L	T	P	Credits	Total Marks
			0	0	0	2	100
Continuous Assessment	End Semester Examination	Min Pass Marks					
		Continuous Assessment	End Semester Examination				
50	50	25	25				

COURSE OBJECTIVES

- To enable experiential learning through live case study of contemporary and historical buildings in order to comprehend the Architectural manifestation by documenting the inter relationship between the historical, social, cultural and economic aspects and its influence on selected works of master architects and visionaries

METHODOLOGY PROPOSED

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 either choice based or 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. Refer clause 12c (v) in the regulations for assessment procedure.

COURSE OUTCOMES

On completion of the course the student will be able to

- CO1** Ability to understand and analyze the influence of historical, social, cultural and economic aspects on Architectural manifestations.
- CO2** Research and understand the role of scale and proportion in defining the character of a built form
- CO3** Critique and decode the fineness in construction techniques and judicious use of materials.
- CO4** Assess the architectural character and detailing in both historical and contemporary buildings

Employability

SARA5301	CONSTRUCTION OPERATIONS MANAGEMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES:

- To acquire vital competencies in production, operations & distribution management, leading to an improvement in job skills.
- Apply concepts of operations management such as Warehouse Planning, Operations & Supply Chain Strategies, and New Product Development.
- Learn to create a balance between operations and supply expertise and general business knowledge by disseminating new techniques in the area of operations management.

UNIT 1	OPERATIONS PLANNING	9 Hrs
Introduction to OM, facilities and capacity planning plant lay-out design SLP, ALDEP, CORELAP, learning curves and location analysis; Production shop - types, assembly line, and theory of constraints; Material requirement planning (MRP) - master production schedule (MPS), bill of material (BOM), and planning process; Aggregate planning - medium term capacity management, manipulation of demand and supply, chase and level strategies; Business Economics.		
UNIT 2	OPERATIONS SCHEDULING	12 Hrs
Operations scheduling - job order scheduling, heuristics for decision rules, Decision Analysis & Modelling, Moore's, Johnson's procedure, Economic Common Cycle Scheduling (ECC scheduling).		
UNIT 3	INVENTORY MANAGEMENT	9 Hrs
Introduction to inventory management - ABC analysis, Economic Order Quantity (EOQ) Models and its variants, inventory control under uncertainty; Logistics Management, Supply Chain Management, Warehouse Management, Value Engineering Concepts.		
UNIT 4	PRODUCTIVITY	9 Hrs
Productivity and work-study - time study, Just in Time (JIT), Kanban System, method study, wage incentive plans, work sampling; Break even analysis; Forecasting.		
UNIT 5	CONSTRUCTIVE ASSIGNMENTS	6 Hrs
ABC analysis for a small project and logistics planning with application of relevant concepts.		

Max. 45 Hours

COURSE OUTCOMES

CO1	Interpret the planning of operations as per demand and supply.
CO2	Predict the flow of materials and effectively take decisions for streamlining operations.
CO3	Skillfully plan and control the process of transformed resources as they move through supply networks, and operations.
CO4	Demonstrate the application of the strategic concepts from the perspective of an organization or business unit level.
CO5	Assess productivity with different methods and analysis.
CO6	Analyze and evaluate business operations using basic quantitative analysis techniques.

TEXT / REFERENCE BOOKS

1. Stephen P. Adams, E., Ebert, R. (1994). *Production and operations management*. Delhi: Prentice Hall of India.

2. Bedi, K. (2004). *Production and operation management*. New Delhi : Oxford University Press.
3. Buffa, E., Sarin, R. (2007). *Modern production / Operations management*. New Delhi : John Wiley & Sons.
4. Chase, R., Jacobs, R. and Aquilano, N. (2012). *Operations Management or Competitive Advantage*, New Delhi : Tata McGraw -Hill.
5. Goldratt, E., Cox, J. (1992), *The Goal*. Barrington: North River Press.
6. Krajewski, L., Ritzman, L. (2005). *Operations management-Strategy and analysis*. New Delhi : Pearson Education.
7. Mahadevan, B. (2015). *Operations Management: Theory and Practice*, New Delhi : Pearson India Education Services Pvt. Ltd.
8. Panneerselvam, R. (2012). *Productions and Operations Management*, New Delhi: PHI Learning Pvt. Ltd.
9. Stevenson, W. (2012). *Operations management*. New York : McGraw-Hill.

Employability

SARA5333	GREEN BUILDING RATING SYSTEMS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES:

- To get a complete overview of various kinds of green building rating systems and application in the industry.
- To understand the purpose, benefits and application of green building rating system.
- To enable students to evaluate the type of green rating system most suitable for a particular project

UNIT 1 INTRODUCTION TO GREEN RATING SYSTEMS

9 Hrs.

History of green Rating systems- LEED, GRIHA, BREEAM, IGBC- Need and use of green rating systems - Structure of the rating systems- Design parameters that affect Green building ,Market response to various rating systems

UNIT 2 GREEN RATING SYSTEMS IN INDIA

12 Hrs.

In-depth study of the requirements of IGBC, LEED and GRIHA rating systems - Cross comparisons between the various requirements, their intents and ability of a project to meet the requirements - Other rating systems such as Eco House, Green Mark, Pearl, Living Building Challenge, **Selection of the appropriate rating system for project.**

UNIT 3 APPLICATION OF RATING SYSTEM REQUIREMENTS

9 Hrs.

Applying the Green rating systems in a project – Calculations involved in rating system, Role of Green building consultant- Determining the various green points- Green Accreditation examination and the procedure to apply

UNIT 4 THE FUTURE OF RATING SYSTEMS

9 Hrs.

Upcoming rating systems- Auditing after rating, Material certifications and stewardships, Audit - Green Audit, Energy modeling and energy auditing in green building ratings - **Consultancy scope and services for green rating systems.**

UNIT 5 COMPREHENSIVE LEARNING

6 Hrs.

Exploring and documenting case studies on Green Buildings **highlighting various techniques and strategies adopted to achieve credits for LEED and GRIHA rated buildings. Preparing document for evaluating important credits that can be adopted to achieve**

Max.45 Hours

COURSE OUTCOME:

- CO1** Understanding of the various green rating systems and practices across the globe and Indian Context
- CO2** Critically inquire the merits and demerits of Green rating Systems, Material Certification & stewardship, and their necessity
- CO3** Understanding Green Rating Systems application in projects and analytical knowledge of various green points required for projects towards achieving Green Rating
- CO4** Appraising the role of a green building consultant and the process of Green accreditation examination.
- CO5** Analyzing and evaluating the basics of energy modelling and auditing.
- CO6** Outlining the consultancy scope and services for green rating systems.

TEXT / REFERENCE BOOKS

1. Micheal Bauer, Peter Mosle, Micheal Schwarz (2010), *Green building guide book for Sustainable Architecture*, Springer
2. Sam Kubba, (2012). *Handbook of Green building design and construction*, Elsevier Inc
3. Reeder, L. (2010). *Guide to Green Building Rating Systems: Understanding LEED, Green Globes, Energy Star, the National Green Building Standard, and More*. (Wiley Series in Sustainable Design).
4. Yudelsohn, J. (2007). *The Green Building Revolution*. Island Press.

WEBSITES

1. www.usgbc.org
2. www.igbc.org
3. www.grihaindia.org

SARA7301	ADVANCED STRUCTURAL SYSTEMS & MAINTENANCE AND REHABILITATION OF STRUCTURES	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES:

- To address the design factors pertaining to various building structure typologies and to explore new techniques in construction such as pre-engineered and prefabricated buildings.
- To understand the need and importance of structural maintenance and extending the serviceability and durability of structures. And to explore the techniques for repairing structures, selection and use of suitable materials for maintenance to enhance the life of structure.

UNIT 1 INTRODUCTION TO BUILDING STRUCTURAL SYSTEMS**9 Hrs**

Height analysis, plan shapes, grids and core design - Construction sequencing, building skin and envelope - structural loading, sequential loading, materials, high performance concrete – Fibre reinforced concrete, High strength concrete, Lightweight concrete - Loading and movement Gravity Loading, Dead and Live load - Methods of Live load reduction – impact, gravity loading, construction loads, wind loading – Static and dynamic approach – Earthquake loading – Equivalent lateral force, model analysis, combinations of loading – Working stress design, limit state design, plastic design - Codes & Standards - Tensile structures in high-rise. High rise behaviour.

UNIT 2 PRE- FABRICATED STRUCTURES AND THEIR APPLICATION**12 Hrs**

Specific requirements for planning and layout of prefabricated plant, Design Principles, modular coordination, standardization, disuniting of prefabricated production, transportation and erection, stages of loading, safety factors - Reinforced concrete - Prefabricated structures, wall panel types and two way fabricated slabs, partial and curtain walls, trusses, shells, crane - gantry systems - Floor slabs and roofs, types of floor slabs, cored and panel types and two way systems, staircase slab, insulation requirements, joints, their behaviour and reinforcement requirements – Walls, types of wall panels blocks and large panels, curtain - Partition and load bearing walls, wall joints - Behaviour and design, leak prevention, joint sealant, sandwich wall panels.

UNIT 3 SERVICEABILITY, MAINTENANCE AND REPAIR OF STRUCTURES**9 Hrs**

Effects due to climate, temperature, chemicals, wear and erosion - Design and construction errors, corrosion mechanism - Effects of cover thickness and cracking - Methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings, and cathodic protection. Maintenance, repair and rehabilitation - Facets of Maintenance importance - Maintenance preventive measures on various aspects – Inspection and assessment procedure for evaluating a damaged structure - Causes of deterioration - testing techniques.

UNIT 4 MATERIALS & REPAIRING TECHNIQUES**9 Hrs**

Special concretes and mortar, concrete chemicals - Special elements for accelerated strength gain, expansive cement, polymer concrete, sulphur infiltrated concrete, fibre cement, fibre reinforced concrete. Rust eliminators and polymers coating for rebars during repair foamed concrete, mortar and dry pack, vacuum concrete - Guniting and shotcrete epoxy injection, mortar repair for cracks, shoring and underpinning. Repairs to overcome low member strength - Deflection, cracking, chemical disruption, weathering wear, fire, leakage, marine exposure - Engineered demolition techniques for dilapidated structures - Case studies

UNIT 5 CONSTRUCTIVE ASSESSMENTS**6 Hrs**

Study and propose a building with the suitable structural system and carry out a thorough case study analysis and identify the areas where it could be improved along with the alternative construction techniques. Also identify an old building with the damages and propose a suitable material & techniques for repairing the selected structure to enhance the life span.

Max. 45 Hours**COURSE OUTCOMES:**

- CO1** Get exposure to different types of loads and analysis methods while designing the building structures.
- CO2** Acquire knowledge about different types of special structures, pre-engineered and prefabricated structures.
- CO3** In depth understanding on the requirements of good serviceability and longevity of structures.
- CO4** Acquire knowledge and exposure to damages in the structure and their evaluation and maintenance procedures.
- CO5** Identify suitable materials for repair and selection of appropriate techniques to enhance the life of faulty structures.
- CO6** Comprehensive knowledge in the design and maintenance aspect of all types of structures with suitable materials and techniques to improve the life span of the structure.

TEXTS / REFERENCE BOOKS

1. Wolfgang Schueller, High Rise Building Structures, John Wiley and Sons, 1977
2. Bryan Stafford Smith and Alex Coull, Tall building structures, Analysis and Design, John Wiley and Sons, 1991
3. Lin T.Y. and Sidney D. Stotesbury, Structural Concepts and systems for Architects and Engineers, John Wiley & Sons, 1981
4. Bungalow Taranath, Steel, Concrete and Composite Design of Tall Buildings, McGraw Hill, 1997.
5. Denison Campbell, Allen and Harold Roper, Concrete Structures, Materials, Maintenance and Repair, Longman Scientific and Technical UK, 1991
6. Allen R.T. and Edwards S.C., Repair of Concrete Structures, Blahie and Sons, UK., 1993
7. Shetty M.S., Concrete Technology- Theory and Practice, Chand and Company, New Delhi, 2000
8. Verghese P.C., Maintenance, Repair & Rehabilitation of Buildings, Prentice Hall, 2014
9. Samuel Y. Harris, Building Pathology – Deterioration, Diagnostics and Intervention, John Wiley & Sons, 2001.

SARA7403	LEAN CONSTRUCTION MANAGEMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES:

- To provide exposure to the students on the principles and techniques of lean construction.
- To enhance their skills by training in lean project management software.
- To appreciate Lean management and develop a lean culture.

UNIT 1 INTRODUCTION TO LEAN PRINCIPLES**9 Hrs**

Introduction — productivity measurement in projects and work diagnostics; Mapping of lean principles into construction; Lean construction — fundamental concepts; Lean thinking and culture.

UNIT 2 PROJECT LIFE CYCLE AND LEAN PROJECT DELIVERY SYSTEM**9 Hrs**

Project life cycle and lean project delivery system; Lean tools, techniques and measures; Collaborative planning and last planner system; Location based management system.

UNIT 3 LEAN IN DESIGN AND LEAN TOOLS**12 Hrs**

Lean in design and supply chain management; Lean enablers and integration; Application in lean project management software - Master planning; Value Stream Mapping, Visual Management, 5S

UNIT 4 PLANNING AND PROJECT PERFORMANCE**9 Hrs**

Framework for pull planning and constraint analysis; Look ahead planning, weekly work plans , Standup Meetings, Learning PPP, Key performance indicators for plan reliability and project performance.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**6 Hrs**

Design of pull planning charts, weekly work plans and look ahead charts for display using a case study.

Max. 45 Hours**COURSE OUTCOMES**

- CO1 Develop lean thinking and map lean culture in project delivery.
- CO2 Interpret the Lean delivery systems.
- CO3 Demonstrate skill in applying Lean planning tools.
- CO4 Develop pull planning and other visual charts for follow up of project schedules and targets.
- CO5 Understand Lean in supply chain management.
- CO6 Investigate the key performance indicators and analyze project performance after implementation of lean management techniques.

TEXT / REFERENCE BOOKS

1. Alston, F. (2017), *Lean implementation; Applications & hidden costs*. London: CRC Press.
2. Fidelis, A. Emuze, Tare is io A. Saurin (2015). *Value and waste in lean construction*. London : Routledge, Taylor and Francis.
3. Forbes, L., Ahmed, S. (2011). *Modern construction – Lean project delivery and integrated practices*. CRC Press, New York.
4. Luis Alarc6n (1997). *Lean construction*. New York: Routledge, Taylor and Francis.
5. Shang Gao, Sui Pheng Low (2014). *Lean construction management: The Toyota Way*. Springer.
6. Tapping, D., Luyster, T. and Shuker, T. (2002). *Value stream Management*, New York:Productivity Press.

COURSE OBJECTIVES:

- To understand the financial and economic analysis of projects and concept of individual versus social welfare in large infrastructure and construction projects.
- To understand the various parameters and process for Social Cost benefit Analysis
- To explore the different tools and techniques for financial and economic appraisal.

UNIT 1 SCOPE OF CBA**9 Hrs**

Concept and rationale - social and economic perspective -welfare criterion. Scope of CBA, SCBA, objectives of CBA, steps/procedures of CBA;

UNIT 2 PARAMETERS OF CBA**12 Hrs**

Issues involved in CBA, SCBA -shadow price and externalities, distribution of project net benefits (referent and non-referent groups); Consumer and producer surplus, valuation of rated goods and services, methods of non-market valuation;

UNIT 3 PROCESS OF CBA**9 Hrs**

Process of CBA, SCBA- least cost analysis (Life Cycle Costing); With and without project analysis, Deriving social cost of project using conversion factor; Identifying and deriving benefits to society; Social discount rate.

UNIT 4 FINANCIAL AND ECONOMIC APPRAISAL**9 Hrs**

Calculating ENPV or EIRR; Applying distribution analysis, risk analysis; Case studies -road, power, investment region. Financial and economic appraisal.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**6 Hrs**

Exercises will be in the form of group work/and or individual assignments. Each group shall have its own unique real life ongoing project for study. Groups are encouraged to have diverse projects so that peculiarities in specific projects are explored by entire class. All group members are encouraged to deliver presentations along with written assignments

Max. 45 Hours**COURSE OUTCOMES**

- CO1** Outline the scope of SCBA.
- CO2** Get exposure to the issues in SCBA, its various components and valuation.
- CO3** Understanding the process of SCBA and its benefits to society.
- CO4** Apply quantitative techniques for financial appraisal.
- CO5** Formulate a real analysis model after analysis.
- CO6** Perform an economic appraisal.

TEXT / REFERENCE BOOKS

1. Anthony, E.(2001). *Cost benefit analysis- Concepts and practices*. New Delhi.: Boardman, Prentice-Hall of India,
2. Asian Development Bank (2013) *Cost-benefit analysis for development: A practical guide*. Mandaluyong City, Philippines: Asian Development Bank.
3. Campbell H., Brown, R. (2003). *Benefits-cost analysis- financial and Economic appraisal using spreadsheets*, Singapore: Cambridge,
4. Campbell, H., Brown R.(2016) *Cost- Benefit Analysis - Financial and economic appraisal using spread sheets*, Oxfordshire: Routledge.

Entrepreneurship

SARA5202	RESOURCE MANAGEMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES:

- To understand the necessity of resource like men, materials and equipment management construction industry.
- To familiarize the students with varied equipment commissioned for various activities at site during different phases of a project.
- To impart and train rigorously the students for human resources management and to familiarize the knowledge of labour regulations and laws to manage the construction activities.

UNIT 1	EQUIPMENT PLANNING AND ECONOMICS	9 Hrs
Nature of work in construction projects, site constraints, rate of daily output, equipment suitability, equipment output capability, equipment productivity, future use of equipment; equipment owning costs, equipment operating costs, equipment engineering - standard equipment, minor equipment, operating reliability repair and maintenance considerations, safety features - safety management - equipment acquisition - purchasing plant / equipment, hiring equipment, leasing and hire-purchase equipment, replacing equipment, depreciation analysis.		
UNIT 2	CONSTRUCTION EQUIPMENT MANAGEMENT	12 Hrs
Earth moving equipment - excavation and lifting equipment- earth cutting and moving equipment- transportation equipment - Compacting and finishing equipment. Production Equipment - concrete batching plants, concrete mixers, and		

transportation equipment – concrete placing equipment - Pre-casting special equipment - pre-stressing equipment, GRC equipment, steam curing equipment, shifting equipment, erection equipment - concrete vibrating, repairing and curing equipment, concrete laboratory testing equipment.

Material hoisting plant- cranes - support and utility services equipment's- pumping equipment's, sewage treatment, compressed air equipment, carpentry equipment - special purpose heavy construction plant- aggregate production plant & rock blasting equipment, piles and pile driving equipment.

UNIT 3	CONSTRUCTION MATERIALS MANAGEMENT	9 Hrs
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Importance of material management - classification and codification of materials, Inventory control - managing the inventory and flow of raw materials, work-in-process, finished goods, and supplies for competitiveness and profitability, ABC analysis in inventory control, Inventory management safety stock, stock outs. stores management- quality control, use of materials management systems - purchase order - indents - marketing, registration of sellers - selection, placement of order - follow up - physical training - contract materials - physical inspection and verification - fixation of the re-order level.

UNIT 4	HUMAN RESOURCES AND MANAGEMENT	9 Hrs
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Introduction – organization– management – employees – human resource management - personnel management – manpower planning, recruitment and selection, in-service training – training inputs, principles, types and assessments. Wages and salary administration – wage rate, wage payment methods, incentive plan, fringe benefits, productivity earnings, profit sharing, bonus payment, wage legislation and wage administration. Productivity in construction, measuring productivity, factors affecting productivity, responsibility for productivity. Employee's relation in an organization, motivating employees, hierarchy of motivation; Labour legislation, labour laws in construction, laws regulating wages, social security law, Industrial relations and trade unions.

UNIT 5	CONSTRUCTIVE ASSESSMENTS	6 Hrs
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Prepare and present equipment and material planning schedule, checklist and productivity analysis for various earth moving equipment, production equipment, Material hoisting for a high rise building. Also prepare and justify the requirement of human resources with the help of histogram and organisation chart for the major construction site.

Max. 45 Hours

COURSE OUTCOMES:

- CO1** Understanding the need and importance of equipment management under different task considerations in projects
- CO2** Analysis of the options in selection of equipment and commissioning of the correct type of equipment at project site.
- CO3** In-depth understanding on the different methods of production & material hoisting equipment, working under different site conditions.
- CO4** Exposure towards material management techniques with the inventory control procedures at construction site
- CO5** Surveying the factors influencing the labour productivity and applying the same in the construction site.
- CO6** Comprehending the role of human resources including the various regulations to be followed in construction projects

TEXTS / REFERENCE BOOKS

1. Peurifoy, R.L., Ledbetter, Schexnayder, C.W.B., Construction Planning, Equipment and Methods, 5th Edition, McGraw Hill, Singapore, 1995
2. Sharma S.C. Construction Equipment and Management, Khanna Publishers New Delhi, 1988
3. Mahesh Varma, Construction Equipment and its Planning and Application, Metropolitan Book Company, New Delhi, 1983
4. Frank Harris and Ronald McCaffer, Management of Construction equipment, Macmillan Publication, 1991
5. Chitkara K.K. Construction Project Management: Planning, Scheduling and Controlling, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2014.
6. Mamoria C.B and S. V. Gankar, Personnel Management, Himalaya Publishing House., 2003
7. Stephen E. Condrey, Handbook of Human Resources Administration, Jossey - Bass, 2010
8. Gopalakrishnan, Handbook of Materials management, PHI Learning Pvt. Ltd., 1993.
9. Carlton Coulter and Jill Justice Coulter, The complete standard handbook of construction personnel management, Prentice-Hall, Inc., New Jersey, 1989.
10. Mamoria C.B and S.V. Gankar, Personnel Management, Himalaya Publishing House. 2003.
11. Stephen E. Condrey, Handbook of Human Resources Administration, Jossey – Bass, 2010
12. Dwivedi R.S., Human Relations and Organisational Behaviour, Macmillan 2001.
13. Austen A.D., Managing Construction Projects: A guide to Processes and Procedures, International Labour Organisation, 1984.

14. Geoffrey D.Taylor, Materials in Construction, Longman, 2002.
15. Gopala Krishnan, Handbook of Materials management, PHI Learning Pvt. Ltd., 1993.

SARA9121	BUILDING MANAGEMENT STUDIO I	L	T	P	Credits	Total Marks
		0	0	12	6	300
Continuous Assessment		University Viva			Min Pass Marks	
200		100			150	

COURSE OBJECTIVES:

- To augment the knowledge imparted through lectures by discussion of practical cases to determine practice, critically analyze application of knowledge in the professional context, experience simulated application procedure in a limited context.
- Live case studies are to be undertaken and various aspects of the course to be taken up in the studios. Emphasis is given to interaction with project technical staff and other stakeholders. Application of software and other IT tools on actual real life cases are undertaken to enable hands on experience.

STUDIO BRIEF

The Building Management studio I aims to provide an opportunity for students to get introduced to project management and familiarize with the building project services through studies of project drawings & documents and extracting the inferences for group projects on the various aspects like Project brief - Area Usage - FAR / Area statement - Bye laws - Soil Investigation - Architectural appraisal, Configuration of spaces, plans, sections, elevations, levels, landscaping etc., -Structural appraisal: Foundation system, Structural system, Details on structural members including sizes and material specifications - MEP appraisal: Conceptual drawings, SLDs, and actual drawings showing location of services. Interaction of MEP with other aspects of project in terms of sequencing, layout etc. The study of internal and external co-ordination aspects required in various areas of construction and services to be understood practically through site visits.

Students shall gather information through their investigation from the live case studies related to the building techniques, building services and analyze the details with respect to industry standards and owner requirements to have better understanding on the key factors determining the process of project management at various stages of the project life cycle. The inferences of the study also to be compared with the building codes and standards and recommend the suitability.

DELIVERABLES

The students shall define and record the case study documentation in project management context with reference buildings and related services, infrastructure with the project phases, project stakeholders and project organization and their roles, responsibilities, scope and services of team. The final report to comprise in-depth analysis of existing building services in the form of drawings, sketches, photographs, relevant details, referral codes, schematic charts, reports, cognitive analysis diagram, empirical documentation, detailed narratives and appraise the suitability and efficiency of design and application. The proposal for modification and enhancement of system based on their case analysis.

TEXT / REFERENCE BOOKS

1. National Building Code of India 2016 (NBC Volume 1 & 2)
2. National Fire Prevention Association standards
3. Bureau of Indian Standards (BIS)
4. British Standards (BS)
5. Energy conservation building code (ECBC)
6. Bureau of Energy Efficiency (BEE)
7. American Society of Heating, Refrigeration and Air conditioning Engineers (ASHRAE)
8. SP 72: National Lighting Code 2010.

 Skill Development

SARA9221	BUILDING MANAGEMENT STUDIO II	L	T	P	Credits	Total Marks
		0	0	11	6	300
Continuous Assessment		University Viva			Min Pass Marks	
200		100			150	

COURSE OBJECTIVES:

- To augment the knowledge acquired through lectures and through live case studies, critically analyze the application of knowledge in the Project Management context with reference to building construction and related infrastructures with topics on project phases, characteristics of the project life cycle, project stakeholders and project organization their roles, responsibilities, scope and services of team members.
- To ensure the logical understanding of the project management procedures and the use of software to prepare, monitor and track the project activities with schedule.
- To understand and devise the quality parameters for the execution of construction activities, services, external infrastructure and co-ordination basis the live case studies and interaction with the construction professionals and consultants.

STUDIO BRIEF

Time Management; Development of Construction Logic; Work out alternatives of construction sequence logic considering project and site constraints, design requirement, services interaction, resource requirement etc.; Study of existing approach to construction logic; Analyse strengths and weaknesses; Preparation of Work Breakdown Structure (WBS).

Visualizing strategic breakdown of project into work packages; Identify approach of work breakdown for the project considering ease of coordination, cost savings etc.; Developing and presenting WBS of respective projects as a hierarchy of deliverables that collectively constitute the project; Presenting WBS in MS-Project with appropriate linkages; Project Planning & Scheduling; Identification of Activities, Milestones and Construction Sequencing considering: Activities, Non work activities, Characteristics of repetitive activities and projects, Typical and non-typical activities, Repetitive and non-repetitive activities.

Development of hierarchy of networks showing detailed activities, milestones using MS project; Calculation of quantities, cost and productivity data; Determine activity durations based on productivity data; Determining activity durations through deterministic and probabilistic durations; Parametric Estimating; Analogous Estimating (Top Down Estimating); Expert Judgement; Three Point Estimates etc.; Determining time duration and labour/equipment resources of all activities in the project using MS project; Utilization of network techniques for project planning, scheduling and control like; Time calculation of AON Network, PERT, PNET, Line of Balance Method and Monte Carlo simulation; Developing Project Schedule on MS Project.

Time Cost Analysis; Calculation of costs related to activities for calculating the cost of crashing a project; Determining costs associated with activities over a time graph; Calculate the costs associated with crashing the activities; Develop project and activity costing schedule on MS Project; Earned Value Management; Developing Planned Value, Actual Cost, Earned Value and Variances; EVM application for project progress; Resource and Material Management; Resource Histograms and Resource levelling; Developing resource histograms for projects; Achieve uniform resource allocation; Application of Multiple Resource Allocation Procedure, PACK method, Branch and Bound Method; Developing a revised resource based schedule; Application of MS Project.

TQM approach for the projects using quality parameters for the project; develop / devise project specific specifications; role of BOQ / contract conditions / special conditions / make of materials; develop quality check parameter for activities / trade packages; activities to be followed for ensuring quality in project execution. Discussion on the current practices and proposal for new techniques to be employed / suggested for quality. Quality test procedures for various construction activities – Site test – Lab test – Interpretation of test results. Procedure for rejecting non-quality / Non-conforming works. NCN procedures etc.

DELIVERABLES

The students shall define and record the case study documentation in project management context with reference to buildings and related services, infrastructure considering different project phases. The final report to comprise in-depth analysis of project management approach and preparation of schedule using MSP, Cost Analysis, EVM, Resource Analysis and balancing, schedule crashing with time cost tradeoff. Students should also analyze and prepare the quality control / quality assurance plan for the selected project & services studied to have better quality standards, compare and infer the quality management system adopted for the investigated project.

TEXT / REFERENCE BOOKS

1. National Building Code of India 2016 (NBC Volume 1 & 2)
2. National Fire Prevention Association standards
3. Bureau of Indian Standards (BIS)
4. British Standards (BS)
5. Energy conservation building code (ECBC)
6. Bureau of Energy Efficiency (BEE)
7. American Society of Heating, Refrigeration and Air conditioning Engineers (ASHRAE)
8. SP 72: National Lighting Code 2010.

SBAA5341	COST MANAGEMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES:

- The objective of the course is to familiarize the fundamentals of cost concepts and their applications in the various phases of the project cycle of construction projects.
- To provide a basic knowledge to carry out the evaluation of projects, computation of Profit on projects, systems and equipment and evaluation of project investment decisions.

UNIT 1	FUNDAMENTALS OF COSTING	9 Hrs
Cost concepts- cost, costing, cost accounting, cost unit, cost centre. Elements of cost, Classification of cost. Methods of costing. Techniques of costing . Cost Sheet.		
UNIT 2	COST ESTIMATES	9 Hrs
Methods of estimating cost of construction for various work, cost indices, rate of labour and material, analysis of rates , preparation of abstract of estimated cost, use of CPWD schedule of rates, Deriving construction cost as per Bill of quantities . Construction Economics-Elasticity of demand, theory of production, costs analysis, contractors costs, perfect competition, monopoly, monopolistic.		
UNIT 3	PREREQUISITES OF CONTRACT COSTING	12 Hrs
Definition, Essential Requirements, Trade usages, Forms of contract, Termination of Contracts, Labour Contract Negotiated Contracts, Schedule of Prices Contracts, Package Deal Contracts, Demolition Contracts, Responsibilities of the Engineer, Contractor and Owner, Earnest Money and Security Deposits, Mobilization Fund, Tender, Opening of Tenders, Scrutiny of Tenders, Acceptance of Tender, Revocation of Tender, Tender form, Unbalance Tender, Liquidated Damages, Advertisement, contract Documents, Qualification of Contractors, Direct and Indirect Costs, Basic price Contracts. Conditions of Contract: Definition, Object, Importance, Peculiarities, General Provisions, Typical Clauses of the Conditions of Contract, Conditions of Contract in Outlines. Rate Analysis: Purposes of Rate Analysis, Factors affecting, importance, Schedule of Rates, Task works per Day, Rate analysis of typical Items.		
UNIT 4	CONTRACT COSTING	9 Hrs
Contract costing- procedure for recording costs, methods of calculating profit on an incomplete contract. Cost plus contract- escalation clause- retention money- -Percentage completion method – completed contract method.		
UNIT 5	CONSTRUCTIVE LEARNING	6 Hrs
Assignments on Risk Associated with national and international contracts.		

Max. 45 Hours

COURSE OUTCOMES

- CO1** Interpret cost component and computation of cost of a service or a project.
CO2 Predict the cost of the component of a project after considering qualitative and quantitative factors.
CO3 Skillfully able to compute the profitability of a project
CO4 Demonstrate how to be a successful entrepreneur
CO5 Assess best and successful project
CO6 Analyse and evaluate domestic and global competition in building management.

TEXT / REFERENCE BOOKS

1. Rangwala S.C. (2004) *Estimating, Costing and Contracts*. Charotar Publications.
2. Dutta B.N. (2006) *Estimating and Costing in Civil Engineering: Theory and Practice, including Specifications and Valuation*. UBS Publication.
3. M. Chakraborty. (2006) *Estimating and Costing*. Authors' Publication.
4. Namavati R. (2010) *Theory & Practice of Valuation*. Lakhani Book Depot.
5. Ramachandran. R. & Srinivasan R. (2004) *Cost Accounting*. Chennai: Sriram publication.
6. Ghosh T. Banerjee & Bansal K. (2001) *Principles and Practice of Accounting*. New Delhi: Galgotia Publishing Company.
7. Hansen, M.. (2007). *Managerial accounting*. Haryana: Thomson Publishing House.
8. Mittal, D. and Luv M. (2001) *Cost accounting*. New Delhi : Galgotia Publishing Company.
9. Shankararayana, H. & Ramanath, H. (2011) *Financial Accounting for management*. New Delhi : Cengage India.
10. Singh H. (1993). *Construction management and accounts*. New Delhi : Tata McGraw Hill.
11. Venkatasivakumar V. (2011) *Cost accounting management*. Chennai : Pearson.

Skill Development

SARA6101	PROJECT MANAGEMENT WORKSHOP I	L	T	P	Credits	Total Marks
		0	1	2	3	100
Continuous Assessment		University Viva			Min Pass Marks	
50		50			50	

COURSE OBJECTIVES:

- To augment the knowledge of software technologies in the areas of project management and familiarize the students on the use of software in a given context.
- To apply the learnings of software technologies in the live case study projects in the applicable areas where possible and compare with the actual scenarios to enable me to get hands-on experience.

WORKSHOP BRIEF

The project management workshop I aims to provide the students with the opportunity to learn the software pertaining to the project management applications like scheduling, tracking, resource optimizing & levelling, MIS management information system, RFI request for information and drawings / submittal approvals, quality checklist of construction, enterprise resource planning, BIM and BMS etc. The software technologies shall be used to create the detailed aspects of scheduling and controlling like creation of WBS and tasks, WBS schedule, milestone schedule, floats, planning resources rates with time, project cost, resource cost, work and material quantity, resource usage, resource graph, update of project progress, earned value analysis, work with multiple projects, critical path etc. And also to explore other areas where the aid of software is key in project management processes.

Students shall gather information from their live case studies related to buildings and use the software to do the project management related functions basis the data gathered. The information shall be discussed / presented among the group to see the relevance to the actual scenario and do the betterment in the process with the help of technologies available. Any open sources of software shall be explored by students to get hands on experience in the process.

DELIVERABLES

The students shall do the learnings in the software and should be aware of using the software for developing the project management functions. A small portion of project management activities or function will be defined to the students to

develop the activities with the help of software basis their case study project. The software outputs of students will be validated with respect to the actual case study scenarios. The report containing the above should be submitted at the end of the semester for the evaluation.

TEXT / REFERENCE BOOKS

1. Dayal,S (2008), Earned value management using microsoft office project – A guide for managing any size project effectively, Cengage, New Delhi.
2. Harris,P.(2011), Planning and Scheduling using Microsoft project 2010. BPB Publications, New Delhi.
3. Stover, T (2004), Microsoft office project 2007, Inside out prentice Hall of India, New Delhi.
4. Harris, P. (2008) Project planning and control using Primavera P6.50 for all engineering and construction. BPB, New Delhi.
5. Harris, P (2012) Oracle Primavera P6 version 8.1 and 8.2 professional and optional client. BPB, New Delhi.
6. Software related books & journals
7. Internet resources

SDEB1203	MATERIALS AND FINISHES	L	T	P	Credits	Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To understand the physical features, properties, application of materials in different spaces, accessories and products.
- To construct knowledge on the fundamentals of different finishes.
- To familiarize various theories and design solutions based on functional and aesthetic properties of wide range of materials.

UNIT I NATURAL MATERIALS AND ITS APPLICATION

8 Hrs.

Introduction to various natural materials - products, accessories and interior spaces – properties – characteristic features – Definition - scope and importance – impact on environment – process involved in manufacturing various products, accessories and interior application – public awareness - Evolution of products and other applications – bamboo, cane – properties – process – application – stones - Igneous, metamorphic & sedimentary – classifications, types – properties –availability – applications – advantages – Wood – properties – seasoning – raw materials – products – advantages – applications - Material and workmanship, specifications-technology- innovation in developing new products, accessories etc.

UNIT II TERRACOTTA, CERAMICS AND GLASS

8 Hrs.

Terracotta art , craft, origin – application – process - properties and application – ceramic – definition – traditional ceramics – earthenware, stoneware, porcelain – history – evolution – properties – process – application as products and in interior spaces – accessories – mosaic – mosaic art – products - Glass and glass products – Composition and fabrication of glass, classification, all types of glass annealed, float, mirrored, tinted, stained, etc. – including wired glass, fiberglass, laminated glass, glass blocks, etc. - their properties and uses - commercial forms available – their physical and behavioural properties.- Application of glass: tools and technology of its application in spaces, accessories, products etc. Material and workmanship, specifications.

UNIT III NATURAL AND SYNTHETIC RUBBERS, PLASTICS

6 Hrs.

Rubber – Natural rubber, latex, coagulation, vulcanizing and synthetic rubber properties - and application – general rubber – special rubber - Plastics – Types, thermosetting and thermo plastics, resins, common types of moldings, fabrication of plastics, polymerization and condensation. Plastic coatings reinforced plastic, plastic laminates, accessories, commercial plastics – properties, uses and applications-advantages and disadvantages – composite materials – Linoleum, PVC and PVA flooring, accessories, products their properties, other uses and applications - Material and workmanship, specifications.

UNIT IV METALS, HARDWARE, RESINS AND ADHESIVES

8 Hrs.

Metals – definition –types - workability – manufacturing process – properties – advantages – its application – coating and finishes – metallic finishes – its process – combination of metal with other materials for spaces and products – innovation and role of technology in innovative products and designs – hardware, accessories and basic tools required for designing small products and accessories – fittings – basic profiles etc. – resin a raw material for various products – its workability – methods and designs – aesthetic component - different resin products – process- properties – advantages- disadvantages. Adhesives -

Natural and Synthetic, their varieties, thermoplastic and thermosetting adhesives, epoxy resin. Method of application, bond strength etc.

CONSTRUCTIVE ASSIGNMENTS

Material exploration through site visits – product information collection visiting expos and vendors – Simple assignments to review existing products, analysing the pros and cons of the products – reviewing works of famous, influential designers their designs, products.

Max. 30

Hrs.

COURSE OUTCOMES

On completion of the course the student will be able to

CO1: Familiarize different materials its properties, uses, advantages and disadvantages.

CO2: Impart knowledge on the evolution of various materials over time and role of technology in the evolution of the products.

CO3: Identify and document various process in developing designs, products and their applications.

CO4: Summarize and elucidate the application of different materials and finishes

CO5: Evaluate different components its properties, advantages and disadvantages of various products in terms of their materials and finishes.

TEXT / REFERENCE BOOKS

1. The New Science of Strong Materials (or Why You Don't Fall Through the Floor) by J.E. Gordon. Penguin (various editions). This classic, very readable book explains how and why materials such as wood and metals behave as they do. Part III, The Metallic Tradition (Chapters 9–11), covers metals.
2. Alan N. Gent, ed., Engineering with Rubber, A.C.S. Rubber Division, 1992. A practical introduction and theoretical reference.
3. P. B. Lindley, Engineering design with natural rubber, NR Technical Bulletin, The Malaysian Rubber Producers' Research Association, 1984.
4. Maurice Morton, ed., Rubber Technology, Van Nostrand Reinhold, 3rd ed., 1987. A basic introduction to rubber technology.
5. Harry Long, ed., Basic Compounding and Processing of Rubber, A.C.S. Rubber Division, 1985.
6. James M. Margolis, "Elastomeric Polymers 2000 to 2010: Properties, Processes and Products" Report, 2000.
7. KRATON Polymers and Compounds, Typical Properties Guide, Shell Chemical Company, Houston, Texas, 1997.
8. Products, Properties and Processing for PELLETHANE Thermoplastic Polyurethane Elastomers, Dow Plastics, The Dow Chemical Company Midland, Michigan, ca. 1997.
9. Modern Plastics Encyclopedia '99, McGraw-Hill, New York, 1999, pp. B-51, B-52.
10. Engage, A Product of DuPont Dow Elastomers, Wilmington, Delaware, and December 1998.

SDEB1204	COMMUNICATING DESIGN	L	T	P	Credits	Marks
		2	0	0	2	100

COURSE OBJECTIVES

- To understand the process of communication and to develop ways of integrating narrative with design ideas
- To recognize the importance of storytelling and integrate it in design process
- To examine various methods of visual representation of spatial design using various visual principles
- To create convincing design project presentations using visual elements.

UNIT I DESIGN PRESENTATION

6 Hrs.

Process of Communication- Verbal, Text-based Visual representation of design. Types of users to which representation needs to be conveyed- Clients, Designers/Co-Designers, Agencies - Terms and Terminologies used in Interior Design- Elements , Formal vs Informal Communication- strategies for communication.

UNIT II PITCHING AND NARRATIVE

8 Hrs.

Principles of effective storytelling | Imagination and Speculation- Creating scenarios - sales pitch- Preparing a convincing proposal - Context- Emotional, Environmental, Social - Narrative arc - Communicate their ideology and design process - Elements of a good narrative: facts, situation, characters, plot and resolution of a design project

UNIT III VISUAL LANGUAGE AND DRAWINGS

8 Hrs.

Visual language in Design- Diagramming- need and types - Graphics within the design process. Presentation dwgs- Isometrics, Perspective - Rendered dwgs, Line dwgs, Shaded dwgs, Walkthroughs -Models Technical dwgs- Wall elevations, Sections, Details/Shop dwgs, Layouts- Site dimensions, Furniture, Partition dismantling & mounting, Reflected

ceiling, Lighting & Electrical, Plumbing, Air-conditioning, Flooring Methods of representation within the Interior Design Process- Inspiration, Identification, Conceptualization, Exploration, Modelling, Communication & Production.

UNIT IV DESIGN PRESENTATION

8 Hrs.

Graphics- Do's and don'ts - Competitions vs academic work - Mood & Material boards -Presentation boards- Construction, Size, Orientation, Colour, Layout, Grids, Typography - Self profiling - Portfolio & Resume of an Interior Designer - Using new and future-oriented technologies.

CONSTRUCTIVE ASSIGNMENTS

Understanding and expressing the design process through representation at different stages of the design process from brief to build- Inspiration, Identification, Conceptualization, Exploration, Modelling, Communication, Production.

Max. 30 Hrs

COURSE OUTCOMES

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

CO1: Explore various types of communication involving various stakeholders of an Interior design project

CO2: Discuss and apply elements of verbal, text-based, and visual communication

CO3: Evaluate elements of a story to incorporate in an interior design presentation

CO4: Recognize steps required for a successful interior design sales pitch

CO5: Distinguish representation of design used within the different stages of the interior design process

CO6: Prepare professional presentations using graphic design principles

TEXT / REFERENCE BOOKS

1. Design is Storytelling, Ellen Upton

SDEB2205	MODEL MAKING STUDIO	L	T	P	EL	Credits	Marks
		0	2	4	2	4	200

COURSE OBJECTIVES

- To develop an understanding of scope of materials and methods to manipulate them
- To learn the skills of using various tools used in model making
- To broaden a sense of accuracy and precision through manipulating the materials into various meaningful and abstract forms.

MODULE I INTRODUCTION

15 Hrs.

Introduction to concepts of model making | Various styles of models | Materials and tools used for model making | Types of adhesives and their usage | Safety practices | Preparation of base for models using wood or boards | Sketch to Measured drawing to 3D model | Marking and using scale | Practising basics of cutting various types of sheets, making half-cuts for curving and folding flat sheets

MODULE II SURFACES

15 Hrs.

Painting and texture representation of various glossy and matte surface finishes for floor, wall, roof, furniture and fenestration | Brick/stone, Stucco finish, Concrete, Tiles, Marble, Wood, Wallpaper, Carpet, Fabric, Leather, Water, Grass, etc. | Flat vs Curved surfaces.

MODULE III OBJECTS

15 Hrs.

Making detailed scaled model representations of various building elements like Walls, Columns, Steps, Windows/glazing, Sunshades, and Hand rails using materials like Mount/foam board, Snow-white board, cardboard, polystyrene, metal and acrylic sheets. Organic shapes and forms using clay, POP. Representation of landscape- Trees, shrubs, planters, lawn etc. Creating scaled models of various types of furniture and accessories in an interior space like tables, chairs, stools, counters and cabinets.

MODULE IV INSTALLATION ART**15 Hrs.**

Making models of the various interior spaces such as • Residences • Offices • Retail Spaces • Recreational Spaces.
Exposure to advanced techniques such as laser cutting and etching for models.

Max. 60 Hrs.**COURSE OUTCOME:****On completion of the course the student will be able to:****CO1:** Explore the properties of various materials and their appropriate application techniques.**CO2:** Select and specify materials for different models based on the its properties and requirements**CO3:** Familiarize different tools and techniques used for model making**CO4:** Able to develop and design simple objects in different scales based on their application in interior space models**CO5:** Have an overview of the various 3D art forms and developing miniature installations for spaces**TEXT / REFERENCE BOOKS**

1. Haun, L. (1999). Carpentry. United Kingdom: Taunton Press.
2. Taylor, J. D. (1996). Tools of the Trade: The Art and Craft of Carpentry. United States: Chronicle Books.
3. Jannsen, (1973). Constructional Drawings & Architectural models, Karl Kramer Verlag Stuttgart.
4. Smith W.H., (1982). The art of making furniture in miniature, E.P.Dutton Inc., New York.

Employability

SDEB2206	DESIGN PROCESS STUDIO	L	T	P	EL	Credits	Marks
		0	0	12	2	8	400

COURSE OBJECTIVES

- To enable the students to understand the principles of various elements and their role in space.
- To understand the role of transformation of 2-dimensional elements into different forms and products
- To know the importance of spatial qualities and to experiment with the art of spatial arrangement
- To explore and experiment with concepts and themes for different spaces through creative thinking.
- To analyse the functional relationship between a space/form and the user.

MODULE I**30 Hrs.**

Role of various principles and elements of design – application in designing different macro to micro products/spaces – analysing compositions based on elements and principles – application

MODULE II**60 Hrs.**

Concept – theme – context – response to user need – functional units – Anthropometry - Materials, Universal compliance – Small single space, products to complex utilitarian objects. Examples of useful products based on identified issues – are spatial / product-based solutions – small rooms/products for different age groups – redesigning day-to-day products/spaces based on the user's needs and feedback, etc.

MODULE III**70 Hrs.**

Identifying interdisciplinary design problems – solutions – understanding Interrelationship between spaces – scale – proportion – Mastery of various forms – addressing human needs – environmental sensitivity – Examples like various products/furniture/spaces for public gathering spaces – Designer – his needs – spaces – products – furniture, etc.

Max.**160 Hrs****COURSE OUTCOMES**

On completion of the course the student will be able to

CO1: Recollect the knowledge gained in the previous semester and interpret inferences in the design.

CO2: Identify and deliberate the data in a small-scale design project that incorporates functional, technical, psychological, and visual areas of study.

CO3: Appreciate the transformation of ideas through graphical and three-dimensional models

CO4: Evolve design concepts that abide by various standards and confer them to pragmatic design

CO5: Develop and present a single space design project and demonstrate different problem-solving approaches.

TEXT / REFERENCE BOOKS

1. Neufert E, Neufert P, (2012). "Neufert Architect's Data", Wiley Blackwell Publication, UK.
2. Dechiara J., Panero J., Zelnik M., (2011). "Time Saver Standards for Interior design and Space Planning", McGraw Hill, London.
3. Dechiara J., Panero J., (2011) "Standards for Interior Design and Space Planning", McGraw Hill Professional.
4. Jones, J. C. (1992). Design Methods. United Kingdom: Wiley.
5. Lawson, B. (2005). How Designers Think. (n.p.): Taylor & Francis.
6. Laseau, P. (2001). Graphic Thinking for Architects and Designers. United Kingdom: Wiley.
7. Weigand, J., Faimon, P. (2004). The Nature of Design. United States: F+W Media.
8. Pipes, A. (2003). Foundations of Art and Design. United Kingdom: Laurence

SDE9302	MODEL MAKING WORKSHOP	L	T	P	Credits	Total Marks
		1	0	3	3	200

COURSE OBJECTIVES:

- Modelmaking and carpentry as techniques for design
- Models as a way of representation and experimentation

MODULE 1 INTRODUCTION**20Hrs**

To introduce the tools, techniques and finishes used in carpentry using different materials (wood, metal, terracotta, paper and board, thermocol, soap/wax, POP, recycled materials). Introducing the techniques of planning, sawing, chiselling & jointing in timber, Selection of timber for different kinds of joints.

MODULE 2 TOOLS & MACHINERY**30 Hrs.**

Introduction to hand tools – classification, nomenclatures and uses. Material working machines types, sizes, parts and their functions and operations and safety precautions and maintenance. Practical techniques- Sawing, Chiselling, Boring, Joining, Widening, Fixing, Fitting, Carving

MODULE 3 FINISHES**10 Hrs.**

Surface & finishing- sanding, staining, varnishing, polishing, etc. materials & methods. Painting surfaces with various types of finishes. Surface finish materials- Putty, Wax, Sawdust, Colour powders, POP, etc; Laminated sheets, OST sheets, Block boards, Sun mica, Veneers, etc.

Exercises to Hand-on Product designs through carpentry, glass painting & other model making techniques. 3D sculptures involving platonic solids, wooden sculptures applying different types of carpentry joints, design and execution of POP made objects such as: cornices, moldings, brackets, etc., Metal and terracotta sculptures.

Max. 60 Hours**TEXT / REFERENCE BOOKS**

1. Haun, L. (1999). Carpentry. United Kingdom: Taunton Press.
2. Taylor, J. D. (1996). Tools of the Trade: The Art and Craft of Carpentry. United States: Chronicle Books.
3. Jannsen, (1973). Constructional Drawings & Architectural models, Karl Kramer Verlag Stuttgart.
4. Smith W.H., (1982). The art of making furniture in miniature, E.P. Dutton Inc., New York.

Employability

SDE9402	COMPUTER APPLICATIONS I	L	T	P	Credits	Total Marks
		0	0	6	3	100

COURSE OBJECTIVES:

- To provide the student of Interior Design a foundation in the techniques of drafting using computer as a tool.
- To introduce computer operation principles and explore image editing through a visual composition using graphics.
- To impart training in computer aided 2D drafting and 3D modelling.
- To expose the students to visual composition using computer tools.

UNIT 1 2D DRAWING OUTPUT IN AUTOCAD**30 Hrs.**

Understanding the use of various drawing tools and object editing, setting up units, scales, limits, drawing tools, drawing objects, object editing and text, dimensioning in CAD. 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.

UNIT 2 PRODUCTIVE TECHNIQUES USING COMPUTER TOOLS**10 Hrs.**

Introduction to tools of productivity – Blocks, slide facilities, script files and attributes. Understanding concepts of View port, concept of object linking and editing session.

UNIT 3 INTRODUCTION TO 3D MODELLING**30 Hrs.**

Importing AutoCAD drawing File, Introduction to software interface; Basic Tools for Editing and Creating 3d models- Material application, using material editor, material browser, mapping textures, Lighting, cameras and render effects, environment mapping, fogs and atmospheres.

UNIT 4 INTRODUCTION TO IMAGE EDITING**20 Hrs.**

Basic Tools for Editing and Creating Graphics in image editing software - 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). Software Interface, creating and saving images, tool box and tools, special effects.

Max. 90 Hours**COURSE OUTCOME:**

- CO1** Possess the skills and techniques for editing and creating graphics.
- CO2** Visualize complicated forms
- CO3** Understand in producing photo realistic image of 3D forms
- CO4** Demonstrate effective communication of drawings through software techniques
- CO5** Understanding the work flow/design process through Autocad, 3D, and image editing software
- CO6** Apply the knowledge of Computer application for development of projects

TEXT / REFERENCE BOOKS

1. Watt A., (1989). Fundamentals of Three-Dimensional Computer Graphics, Addis Wesley, Massachusetts
2. Tikoo, S., (1999) AutoCAD 2000: A Problem-Solving Approach, Thomson Learning.
3. Mccelland D., (2007) Photoshop 7 Bible Professional Edition, Wiley John & Son INC, New York

Employability

SDE1502	ESTIMATION AND COSTING IN INTERIORS	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To have a detailed understanding of the business principles, practices & procedures for Interior Designers.
- To know of the various facets of design formation and management, professional ethics and organizations, certification and licensing issues, design liability, project management, and portfolio development.

UNIT 1 INTRODUCTION**8 Hrs.**

Estimation – definition, purpose, types of estimate, and procedure for Estimating the cost of work in order to implement an interior design project or to make products related to interior design like furniture, artefacts etc. Specification – Definition, purpose, procedure for writing specification for the purpose of calling tenders, types of specification. Specification for different item related to interior design project – woodwork for furniture window frames & pelmets, partitions etc. also of materials like steel aluminium glass of various kind. Wall panelling & false ceiling of materials like aluminium, steel, wood, electrical, plumbing, airconditioning & firefighting equipment.

UNIT 2 RATE ANALYSIS & ESTIMATION FORMAT**6 Hrs.**

Rate Analysis – definition, method of preparation, quantity & labour estimate for woodwork, steelwork, Aluminium work, glass & its rate for different, thickness & sections, finishing (enamel paint, duco paints, melamine, DU coats, Hand polishing, veneering and laminating) for walls & ceilings. Electrical & plumbing products, wiring, ducting etc., and laying of tiles & wall panelling in the estimate format of the project.

UNIT 3 DETAILED ESTIMATE**6 Hrs.**

Detailed Estimate – data required, factors to be considered, methodology of preparation, abstract of Estimate, contingencies, labour charges, bill of quantities, different methods of estimate for interior design works, methods of measurement of works.

UNIT 4 COSTING OF FIXTURES & FITTINGS**8 Hrs.**

Cost of the following items: electrical fitting like, luminaries, fan, cables, switches etc., tiles in skirting & dado, cement plaster, joinery in wood, steel & aluminium, painting to walls – cement paint, oil paints, distemper acrylic emulsion, enamel paint painting to joinery, varnishing, French polishing plumbing equipment like piping, shower panels, cubicles, tubs, Jacuzzis, taps, motors, fountains, false ceiling of aluminium panels, steel & wooden frame work, thermocol etc. wall panelling of ceramic tiles & other tiles of materials suitable for the same, partitions made of materials like aluminium wood, steel etc.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 30 Hours**COURSE OUTCOME:**

- CO1** Prepare the Estimate in order to foresee the cost of the work to implement an interior design project.
- CO2** Understand the tools and techniques used to monitor / control project cost.
- CO3** Analyse concepts, selection and application of construction processes, materials and finishes including introduction to codes, working drawings and model building.
- CO4** Understand the rate analysis of different work items and the factors affecting rate of an item
- CO5** Prepare detailed specification writing for materials and works used in the built environment.
- CO6** Write specification for works designed for special situation, like non-conventional use of materials

TEXT / REFERENCE BOOKS

1. Allison, D. (2014). Estimating and Costing for Interior Designers: A Step-by-Step Workbook. Philippines: Bloomsbury Academic.
2. Rangwala S.C., Rangwala K.S., (1990). Elements of Estimating and costing, Charoter publishing House, Anand, India
3. Kesavan, R. (2004). Process, Planning And Cost Estimation. India: New Age International (P) Limited.
4. Dodsworth, S., Anderson, S. (2015). The Fundamentals of Interior Design. United Kingdom: Bloomsbury Publishing.
5. Riggs R., (1995). Materials and Components of Interior Architecture - 4th Edition, Prentice Hall Professional Technical

SDE9502	COMPUTER APPLICATIONS II	L	T	P	Credits	Total Marks
		0	0	6	3	100

COURSE OBJECTIVES:

- To enhance the visualizing skills of the students by exposing them to the latest modelling software.

UNIT 1 VISUALIZATION TECHNIQUES**20 Hrs.**

Photorealistic Visualization Rendering objects by observation, Rapid sketching techniques; Visual compositions of objects

UNIT 2 MATERIALS AND LIGHTING**20 Hrs.**

Using material editor, material browser, mapping textures, Lighting, cameras and render effects, environment mapping, fogs and atmospheres. Interaction with Light Highlights, shadow and reflection study of objects; Direct and indirect illumination;

UNIT 3 ADVANCED 3D SOFTWARE**20 Hrs.**

An overview of GUI, types of modeling, transforming objects, Compound objects, modifiers & modifier stack. Lathing, displacement, lofting, Boolean operations using standard and compound primitives, modeling with lofts, low polygon modeling and nurbsmodeling.

UNIT 4 ADVANCED ILLUSTRATION AND PHOTO MONTAGE**30 Hrs.**

Image Processing Migration of forms and Image manipulation, Manipulation of lighting, exposure and colour of rendered images, Creating cutouts of humans, buildings and objects to add to context of renders, Creating photo montages using cutout images using layers and special effects to enhance the rendered image.

Max. 90 Hours**COURSE OUTCOME:**

- CO1** Develop the ability to quickly visualize ideas
- CO2** Ability to do visual design explorations
- CO3** Ability to create compelling visuals of ideas before they come to reality for every stakeholder's proper understanding
- CO4** Create various effects in atmosphere using lighting effects and material mapping
- CO5** Experiment with forms, rendering and presentation techniques
- CO6** Construct photo montages alongside 3d render to effectively communicate their design ideas

TEXT / REFERENCE BOOKS

- McKim R., (1980). Experiences in Visual Thinking, Brooks/Cole Publishing Company.
- Missal S., (2003) Exploring Drawing for Animation (Design Exploration Series), Thomson Delmar Learning.
- Ching, F. D. K., Juroszek, S. P. (2019). Design Drawing. United States: Wiley.
- Porter T., (1991). Design Drawing techniques for architects, graphic designers and artists, Oxford Architectural Press.
- Dalley T., (1980). The complete guide to illustration & design, Phaidon, Oxford.

SDE3601	COMMERCIAL AND RETAIL INTERIORS	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To learn about the importance, techniques, and design applications for commercial and retail interiors.

UNIT 1 INTRODUCTION**4 Hrs.**

Introduction to commercial interior space design- types of commercial interior spaces – factors influencing designing of commercial interior spaces – materials used in designing commer

cial interior spaces. Collection of materials used for designing interior space. Application of codes, accessibility guidelines, and policies and procedures. Concepts, themes, ambience and aesthetics in designing commercial and retail interiors.

UNIT 2 COMMERCIAL ART

8 Hrs.

Concept of commercial art – Meaning and Definition, Development of commercial art. Art in Commercial space Designing and planning space for various commercial purposes – Restaurants and Hotels. Public utility services – Airport, Educational Institutions, Hospitals, Shopping complex, Exhibition, Schools, Malls, Universities and Trade Fairs.

UNIT 3 COMMERCIAL DISPLAYS

8 Hrs.

Commercial display and Techniques – Interior Display – general Arrangement, principles and factors, types and merchandise display, types of lighting arrangements in commercial buildings. Window display – meaning and concept, Basic principles and techniques, types of window display, window arrangement.

UNIT 4 CONTEMPORARY TRENDS

6 Hrs.

Study of user types, user behaviour concepts relevant to commercial interiors. Functional aspects related to circulation and integration of different spaces. New trends in commercial Architecture- design in commercial building. Basic concepts of commercial buildings. Features of Departmental stores and Shopping complex.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS

4 Hrs.

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 30 Hours

COURSE OUTCOME:

- CO1 Analyse Commercial interior space design using different materials
- CO2 Develop art in commercial space designing and planning based on various purposes.
- CO3 Identify the role of lighting in commercial displays and techniques involved
- CO4 Understand the Concept of window display and window arrangement
- CO5 Synthesize various user behaviour concepts relevant to retail and commercial space.
- CO6 Discuss the Recent trends in commercial architecture.

TEXT / REFERENCE BOOKS

1. Gupta, C.B., Dr. Nair, Rajan (2003), Marketing Management, Sultan Chand & Sons, New Delhi.
2. Joseph, D.C., Julies, P. and Martiv, Z. (1992), Time saver standards for Interior Design and space Planning, New York.
3. Nair, R. (2002), Marketing, Sultan Chand and Sons Publisher, New Delhi.
4. Pattanchetti, C.C. Reddy, P.N. (1995), Marketing, Rainbow publishers, Coimbatore.

SDE 3801	ENERGY EFFICIENT INTERIORS	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To sensitize students about need for environmental design
- To study the various factors involved in environmental and sustainable buildings
- To understand functional approaches in designing sustainable and energy efficient interiors.

UNIT 1 CONTROL OF ENVIRONMENT

6 Hrs.

Environment control – meaning of environment, importance of environment control, advantages, elements to be controlled in the interiors – Temperature, air quality, sound, sanitation, light. Passive strategies and technologies.

UNIT 2 HVAC AND LIGHTING**8 Hrs.**

Ventilation – Definition, importance, Types of ventilation – Natural and mechanical Guidelines for natural ventilation. Heating – Need for room heating, types of heating system – central, radiant, forced air; solar system – Active solar system and passive solar system. Air conditioning – Meaning, Principles, need for conditioning, air conditioning applications, Humidity control, types of air conditioning - central air conditioning, and packaged. Eco lighting - Introduction, types, materials and application of LED and solar. Recommended level of illumination, guidelines for lighting design, lumen method of design

UNIT 3 SUSTAINABLE MATERIALS**8 Hrs.**

Study of sustainable materials available and its application in the building construction. Certification systems and certification authority-IGBC, GRIHA, BEE. For E.g. Mud bricks, AAC, fly ash blocks, UPVC, WPC boards, paints, glass etc.

UNIT 4 CASE STUDIES**4 Hrs.**

Study of existing case studies of green buildings, adapting the principles of sustainable designs to interior design projects, involving market survey, user reviews and experts opinion. Detail study of techniques, methods and limitations involved in designing green spaces, using renewable energy.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 30 Hours**COURSE OUTCOME:**

- CO1** Understand passive design strategies and technologies to help control the quality of interior environment
- CO2** Gain knowledge about the various types of heating and cooling systems that consume less energy
- CO3** Classify the various low energy materials used in interior construction
- CO4** Review the various rating and certification systems for sustainable design
- CO5** Analyse sustainable design principles and techniques used in various green space case studies.
- CO6** Understand tools, materials and techniques adopted in green buildings.

TEXT / REFERENCE BOOKS

1. Abbaszadeh, S, L. Zagreus, D. Lehrer, and C. Huizenga, (2006) "Occupant Satisfaction with Indoor Environmental Quality in Green Buildings", University of California, Berkeley, Center for the Built Environment.
 2. Michael J, (1997) "Biodiversity and Conservation", Routledge Taylor & Francis Group, 2nd edition.
 3. Miles Keeping, David Shiers, (2017) "Sustainable Building Design: Principles and Practice", WileyBlackwell, 1st edition.
 4. Susan M Winchip, (2011) "Sustainable Design for Interior Environment", Fairchild Publication, 2nd revised edition.
 5. Koeinsberger, O.H. and others, (2003) Manual of Tropical Housing and Building. OrientLongman, Chennai.
- Markus, T.A and Morris. E.N. (1986) Buildings. Climate and Energy, Pitman Pub Ltd., London

SDE1601	PROFESSIONAL PRACTICE	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To have a detailed understanding of the business principles, practices & procedures for Interior Designers.
- To know of the various facets of design formation and management, professional ethics and organizations, certification and licensing issues, design liability, project management, and portfolio development.

UNIT 1 ROLE OF INTERIOR DESIGNER IN SOCIETY**6 Hrs.**

Interior Design Profession as compared to other professions. Difference between profession and business. IIID and other organizations related to interior design profession. Interior Designers approach to works, ways of getting works: types of works, works partly executed by other Interior Designers.: various precautions to be taken before taking up the work, conditions of engagement between interior Designer and client: commencement of work.

UNIT 2 PROFESSIONAL CONDUCT**6 Hrs.**

Code of professional conduct: scale of charges: units and mode of measurements, clerk of work and his duties, inspection of work, certificate of payment to contractor, bill of quantities, schedule of rates, tenders, public, limited and negotiated tender documents and allied formalities. Preliminary knowledge of Consumer protection Act and other related acts on Interior Designers.

UNIT 3 ISSUES OF PROFESSIONAL PRACTICE**6 Hrs.**

Issues of professional practice: Professional behaviour, Ethics, Types of clients, Contracts, Tenders, Arbitration etc. as defined in terms of Interior Design field and current day context. Career opportunities, styles of interior design practice, relationship between client and professional, type of fees, process of fees negotiations, billing methods, tax liabilities, contracts – types of contracts – item rate, labour, lump sum, cost plus percentage etc.

UNIT 4 CORRESPONDENCE IN DESIGN**8 Hrs.**

Types of offices for interior design practice: staff structure, filing of records, correspondence and drawings, maintenance of accounts, presentations in meetings, recording minutes of meeting. Knowledge of role of consultants and coordination between different consultants on a big project. Interior Designer's duties : drawings to be prepared : Interior Designer's relation with other parties connected with works such as client, contractor, sub-contractors, consultants and authorities.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 30 Hours**COURSE OUTCOME:**

- CO1** Understand of how modern businesses start and run
- CO2** Supervise and manage live design projects
- CO3** Understand the basic skillset and duties of a design business owner.
- CO4** Record the rules and regulations of professional practice in interior design
- CO5** Compare various types of interior design offices and the needs they cater to
- CO6** Evaluate the importance of correspondence in design with various stakeholders.

TEXT / REFERENCE BOOKS

1. Piotrowski, C. M. (2013). Professional Practice for Interior Designers. Germany: Wiley.
2. How to Run a Successful Design Business: The New Professional Practice. (2012). United Kingdom: Ashgate Publishing Limited.
3. Ravindra, S., Krishnamurthy, K. (2014). PROFESSIONAL PRACTICE. India: PHI Learning.
4. Coleman, C. (2001). Interior Design Handbook of Professional Practice. United States: McGraw-Hill Education.

SDE1602	INTERIOR DESIGN MANAGEMENT	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To provide an insight into management of building involving finance and human resource
- To learn about concepts and application of management in interior design
- To gain knowledge about the methodology of executing a Project

UNIT 1 INTRODUCTION**6 Hrs.**

Project planning and project scheduling and project controlling, Role of Decision in project management, Method of planning and programming, Human aspects of project management, work breakdown structure, Life cycle of a project, disadvantages of traditional management system, defining precedence relationships among activities, estimating activities duration, estimating resource requirement for work activities

UNIT 2 ELEMENTS OF NETWORK**6 Hrs.**

Event, activity, dummy, network rules, graphical guidelines for network, numbering of events; Knowledge Management, Feedbacks, Information loops, Updates; Record Keeping Activity Documentation and Reporting Scope of Work Induction, Work distribution, Task Assignments Time management, Scheduling; Construction schedule (related to interior design field) labour schedule, material schedule, financial schedule, equipment schedule, organization schedule.

UNIT 3 PROJECT TIME REDUCTION AND OPTIMIZATION**8 Hrs.**

Project cost, Indirect project cost, direct project cost, slope of the direct cost curve, total project cost and optimum duration, contracting the network for cost optimization, steps in cost-time optimization, Pre-tender planning, planning during tendering. Post tender advantage, bar chart - advantages and limitations, mile stone chart, CPM network analysis & PERT time estimates, time computation & network analysis

UNIT 4 PROJECT UPDATING AND ALLOCATION**6 Hrs.**

When to update? Data required for updating, steps in the process of updating Resource usage profile: Histogram, Resource smoothing and Resource levelling, Computer applications in project management.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 30 Hours**COURSE OUTCOME:**

- CO1** Understand the currently prevalent techniques in the planning, programming and management of a project.
- CO2** Communicate novel Ideas Briefs, Detailed Briefs and Concept Notes to general stake holders
- CO3** Apply various documentation methods for the smooth organization of a project.
- CO4** Understand system changes to improve cost-effectiveness of a project
- CO5** Discuss and apply usage of various project management tools
- CO6** Ability to Approximate Scale of Work, Cost Estimation, and other skills required in establishing an independent design office

TEXT / REFERENCE BOOKS

1. Punmia et al., (2002). Project Planning and Control with PERT & CPM. India: Laxmi Publications Pvt Limited.,
2. Wiest J., Sevy F, (1982). A Management Guide to PERT, CPM, prentice Hall of India Pub, Ltd., New Delhi
3. Burgess R.A., G.White, (1975). Building production and project Management, The construction press, London.
4. Best K., (2010). The Fundamentals of Design Management, AVA Publishing.
5. Mozota B., (2004). Design Management: Using Design to Build Brand Value and Corporate Innovation, Allworth Press.

SDE2601	ADVANCED COMPUTERS AND FABRICATION DESIGN	L	T	P	Credits	Total Marks
		2	0	4	4	100

COURSE OBJECTIVES:

- To reinforce the concepts of 3D modelling.
- To enable them to experiment with forms, mapping, rendering and presentation techniques.
- To prepare the student for mass production of furniture for various classes of people with the parameters of economy and culture

UNIT 1 MATERIAL AND PROCESSES IN DESIGN**15 Hrs.**

Material Deposition Processes Laser Deposition, Micro-Plasma Powder Deposition, Chemical vapour Deposition, Micro Welding, Powder Casting Metal 3D Printing, Powder Deposition 3D printing;

UNIT 2 SUBTRACTIVE MANUFACTURING

20 Hrs.

Subtractive Processes Electrochemical machining, Electro-Discharge machining, Ultrasonic Machining, Laser Beam Machining, Water jet machining, Abrasive Jet Machining, Plasma Arc machining; Cutting and Removal Water Jet Cutting, Plasma Cutting, Laser Cutting, Electro-Discharge Wire Cutting; Abrasive Jet Cutting

UNIT 3 ADDITIVE MANUFACTURING

20 Hrs.

Additive Extrusion Processes Extruded Filament 3D printing, Clay 3D printing, Stereo lithography; Special Purpose Manufacturing processes- Rot molding, Layer Compression, Sheet contouring, Friction Welding

UNIT 4 SURFACE TREATMENT PROCESSES

20 Hrs.

Surface Treatment Processes Laser Etching, Acid/Base Etching, Electro Chemical Etching, Sand Blast Etching, Ultraviolet Etching, Photochemical Machining Electro Chemical Polishing

UNIT 5 CONSTRUCTIVE ASSIGNMENTS

15Hrs.

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 90 Hours

COURSE OUTCOME:

- CO1** Understand the various subtractive manufacturing processes frequently used in Interior and furniture design.
- CO2** Compare the various new technologies being incorporated into manufacturing processes
- CO3** Comprehend the various subtractive manufacturing processes frequently used in Interior and furniture design.
- CO4** Discuss the various additive manufacturing processes frequently used in Interior and furniture design.
- CO5** Analyse the various surface treatment processes in the manufacturing of interior design elements.
- CO6** Develop systematic design approach and space planning through manufactured furniture as elements of design.

TEXT / REFERENCE BOOKS

1. Jain V., (2007). Advanced Machining Processes. Allied Publishers, New Delhi.
2. P. C. Pandey, H.S. Shan, (2007). Modern Machining Processes, Tata McGraw-Hill, New Delhi.
3. G.F. Benedict, (1987). Nontraditional Manufacturing Processes, Marcel Dekker Inc., New York.
4. McGeough, (1998). Advanced Methods of Machining, Chapman and Hall, London.
5. Garmo P., J.T. Black, Kohser R., (2001) Material and Processes in Manufacturing, Prentice Hall India.

Entrepreneurship

SDE1801	BUSINESS MANAGEMENT & ENTREPRENEURSHIP	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To enable the students to Develop entrepreneurial skills.
- To analyze the environment related to small scale industry and business.
- To understand the process and procedures of setting up small enterprises.
- To develop management skills for entrepreneurship development.

UNIT 1 BUSINESS FOUNDATION

4 Hrs.

Introduction to business and the forms of business enterprises; scope of management process; Set up of an independent design business, Hiring processes, Project Scheduling and work delegation,

UNIT 2 RESPONSIBILITIES OF A BUSINESS**4 Hrs.**

Ethical and social responsibilities of and within a business, with regards to the environment, consumers, workers, investors and business approaches; Contracts and Agreements, Conflict Resolution, Arbitration;

UNIT 3 RUNNING A DESIGN BUSINESS**8 Hrs.**

Business economics; project financing and banking system trends and guidelines within the emerging markets.

Intellectual Property- Registration process of Intellectual property Rights, Design Registration, and Brand/Trademark Registration; Core marketing strategies: branding, positioning, and competitive analysis. Product or service transformation to commodity quickly as competition & duplication of successful products, analysis of competition and advertising to position and brand products and services creation of successful brands

UNIT 4 ENTREPRENEURSHIP**10 Hrs.**

Meaning, need, transition to self-employment and Entrepreneurship, qualities of a good entrepreneur, problems of entrepreneurs. Economic, Legal, Socioeconomic, Psychological and Environmental factors influencing entrepreneurial development. Social Entrepreneurship, Business Entrepreneurship, Trading Entrepreneurship, Corporate Entrepreneurship, and Agricultural Entrepreneurship; Timmons Model of Entrepreneurship, Investment Models, Start-up Business Models, Business Plans, Pitch presentations, Small Business models; Agencies supporting entrepreneurial Development, Institutional Finance to Entrepreneurs.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits. 1. Visit to SIDCO, DIC and TIIIC; 2. Case study of an enterprise and two entrepreneurs; 3. Preparation of a project proposal for funding.

Max. 30 Hours**COURSE OUTCOME:**

- CO1** Understand the foundations of a successful business practice
- CO2** Correlate the theories and concepts of business management from a regional point-of-view
- CO3** Understand the responsibilities of a business contract
- CO4** Evaluate the potential variety of roles of a professional Interior Designer, and the range of projects they may undertake.
- CO5** Examine the various entrepreneurial qualities and factors influencing development
- CO6** Formulate a business plan and project proposal based on own interests and ideas

TEXT / REFERENCE BOOKS

1. Gupta C.B, Srinivasan N.P, (2004). Entrepreneurship development in India, Sultan Chand & Sons, New Delhi.
2. Chunawalla S.A, (1991) Sales Management, Himalayan Publishing House, New Delhi.
3. Desai V., (2000). Project Management and entrepreneurship, Himalaya Publishing House, New Delhi.
4. David H. Moll, (1999) Entrepreneurship, Prentice Hall of India, New Delhi.
5. Jerkins F., (2000) Advertising, Prentice Hall of India, New India.

 Entrepreneurship

S84APT	PROFESSIONAL TRAINING	L	T	P	Credits	Total Marks
		0	0	0	3	100
Continuous Assessment		University Viva			Min Pass Marks	
50		50			50	

COURSE OBJECTIVES:

- To undergo professional training in a project a management firm to get an on-site experience of handling services in under construction high rise projects.
- To utilize the forum to discuss key issues in the projects, keep track of the different scheduled activities and communicate with the stakeholders.
- To get an overall view of the contract administration.

COURSE CONTENT

A candidate has to undergo practical training for 30 working days in an approved Project management organization, reputed in property development or infrastructure and established not less than five years. Companies for practical training are carefully selected.

The organizations train the students in specialised core areas of Building Services / Management and assist the candidates in identifying the area of study for dissertation. During this period the student is advised to study the live projects of the concerned company / industry. The training internship is intended to provide students with practical insights into the world of real business of the construction industry. The Institute looks for meaningful and supervised work experience for the student. The final project report will comprise of an in-depth research and analysis of activities in the form of drawings & relevant details, schematic charts & reports, photographs, documentation of the project, comments, suggestions, etc to appraise the efficiency in progress of work.

COURSE OUTCOMES:

- CO1** Accumulate concepts or skills with access to leading experts with specialized knowledge and experience.
- CO2** Obtain basic knowledge using an effective performance management system in managing technical projects effectively.
- CO3** Manage projects using a proven, effective performance measurement technique.
- CO4** Analyze and recommend project decisions concerning scope, cost and schedule parameters faster, more effectively and more confidently.
- CO5** Stay on top of schedules, budgets, workloads and human resources issues and delegate practically and fairly.
- CO6** Learn to avoid the pitfalls of project management by quickly identifying potential project risks and mitigate them as early as possible.

SDE1301	CREATIVE THINKING PROCESS AND METHODS	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

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

UNIT 1 INTRODUCTION TO DESIGN**6 Hrs.**

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

UNIT 2 DESIGN PROBLEMS AND DIRECTIONS**4 Hrs.**

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

UNIT 3 DESIGN THINKING**8 Hrs.**

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

UNIT 4 CHANNELS TO CREATIVITY**8 Hrs.**

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

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 30 Hours**COURSE OUTCOME:**

- CO1** Understand the types of design problems, need to decode the brief to evolve 'problem driven outcomes.
- CO2** Understand, compare and synthesize mapped design methodologies in various contexts.
- CO3** Critically analyze the different types of thinking.
- CO4** Comprehend the various creative techniques in design related fields
- CO5** Investigate techniques to identify new directions in design thinking.
- CO6** Identify the various channels to creativity and critically analyze the direction through which the ideas are translated in architectural domain

TEXT / REFERENCE BOOKS

1. Alexander C., (1977). Pattern Language, Oxford University Press.
2. De Bono E., (1970) Lateral Thinking: Creativity step by step, Harper & Row.
3. Broadbent G., (1973) Design in Architecture, Architecture & Human Sciences, John Wiley & sons, New York
4. Thackara J., (2005). In the Bubble: Designing in a Complex World, The MIT Press.
5. Hanington B., Martin B., (2012) Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions, Rockport Publishers.
6. Whitten J., Bentley L., (2005). Systems Analysis and Design Methods, McGraw-Hill/Irwin.

SDE1302	COMMUNICATING DESIGN	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To develop methods for critical thinking and analysis.
- To help the students develop opinions on various design related topics.
- To develop new platforms and formats for their writing.
- To examine how space is conceived and conceptualised
- To evaluate texts
- To investigate "visual language", symbolism, and some of the pictorial devices, materials, and techniques employed by designers to tell stories visually

UNIT 1 COMMUNICATION PRINCIPLES**6 Hrs.**

Process of Communication. Transmission of ideas, facts & figures from one person to another. Kinds of Communication: Oral and Written, Verbal and Non-Verbal. Levels of Communication: Intrapersonal, Interpersonal, Group, Mass Communication.

UNIT 2 READING DESIGN**4 Hrs.**

Reading skills: Model of reading to learning, reading tactics and strategies, reading purposes – associated apprehensions, reading for meaning, reading outcomes; Reading Space and its qualities; Presentations and writings of great design theorists

UNIT 3 DESIGN STORYTELLING AND NARRATIVES 8 Hrs.

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

UNIT 4 REPRESENTATION OF SPACE 8 Hrs.

Innovation with orthographic drawings- beyond the plan, elevation, section; Perspectives and Montages; Maps and Models; Interior space and its occupation, experience and perception; Constructing and interpreting layers of meaning within interior spaces.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS 4 Hrs.

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 30 Hours

COURSE OUTCOME:

- CO1 Explore innovative ways of researching and writing about contemporary design and culture.
- CO2 Create valid arguments and to argue for and against ideas
- CO3 Analyse structure of oral and written arguments
- CO4 Critically evaluate design ideas.
- CO5 Understand and apply various spatial representations for their own designs.
- CO6 Produce a booklet of the ideas and themes discussed.

TEXT / REFERENCE BOOKS

1. Cottrell, S. (2005). Critical Thinking Skills: Developing effective analysis and argument. New York: Palgrave McMillan.

Skill Development

SDE2301	MATERIALS AND CONSTRUCTION - I	L	T	P	Credits	Total Marks
		2	0	2	3	200

COURSE OBJECTIVES:

- To identify the components of a building including the structural systems.
- To understand the properties and uses of varied natural, synthetic materials.

UNIT 1 NATURAL MATERIALS 14 Hrs.

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. Wood-Soft and hardwood. Fabrics – textile, Jute, leather etc. different types and their uses.

UNIT 2 SYNTHETIC MATERIALS 16 Hrs.

Synthetic Materials–Different types of Glass, their properties, manufacturing processes and uses. Plastics – injection moulding& other manufacturing methods, etc. Plywood, laminated wood and particleboards–properties, manufacture & uses.

UNIT 3 BUILDING COMPONENTS 20 Hrs.

Introduction to the fundamental components of a building (sub-structure & superstructure) indicating - Foundation –brick footing, stone footing &rcc column footing; concrete flooring, plinth beam & floor finish; superstructure- brickwork with sill, lintel, windows& sunshade, Flat rcc roof with weathering course, parapet & coping.

UNIT 4 STRUCTURAL SYSTEMS 10 Hrs.

Principles of load bearing Construction – Components of a load bearing wall & rcc slab roof system-rcc beams, columns and framed structure - simple brick footing - principles of bonding,

Max. 60 Hours

COURSE OUTCOME:

- CO1** Understand the properties and uses of natural materials like wood and fabrics, synthetic materials like glass and plastics and their appropriate application techniques.
- CO2** Select and specify materials based on the its properties and requirements
- CO3** Understand the components of a building and methods of construction including foundation, plinth, superstructure, floorings, openings, roofs and finishes.
- CO4** Get familiarized with the varied load bearing systems.
- CO5** Able to design interior elements that go with the existing architectural and structural components
- CO6** Have an overview of the various structural systems for architectural and interior spaces.

TEXT / REFERENCE BOOKS

1. Parker, Harry, (1957). Materials and Methods of Architectural Construction, John Wiley & Sons, London
2. Rangwala S.C., (1987). Engineering Materials, Charotar Publishing House, Anand.
3. Reid, E. (2013). Understanding Buildings, a Multidisciplinary Approach. United Kingdom: CRC Press.
4. Spencke R.J., Cook D.J., (1983). Building Materials in Developing Countries, John Wiley and Sons.

Skill Development

SDE2302	INTERIOR SERVICES 1	L	T	P	Credits	Total Marks
		2	0	2	3	200

COURSE OBJECTIVES:

- To develop an understanding of building services such as water supply, drainage and plumbing system.
- To familiarize them with the advanced service integration system and their applications in building.
- Evolving understanding in students to choose appropriate systems and integrate the same in their design projects.

UNIT 1 WATER SUPPLY IN BUILDINGS

10 Hrs.

Standard of portable water and methods of removal of impurities, Consumption order of water for domestic purposes, distribution system, service connection from mains, house-service design, tube well, pumping of water, types of pumps, cisterns for storage

UNIT 2 BUILDING DRAINAGE

10 Hrs.

Layout, Principles of drainage, Trap type, materials and functions, Inspection chambers, Design of Septic tanks and soak pits, Ventilation of house drains; Anti-siphonage or vent pipes, One and two pipe systems Sinks, bath tub, water closets, flushing cisterns, urinals, wash basins, bidet, shower panel etc.

UNIT 3 PLUMBING

20 Hrs.

Common hand tools used for plumbing and their description and uses, Joints for various types of pipes, Sanitary fitting standards for public conveniences; Different types of pipes and accessories for water supply, controlling fixtures like valves, taps, etc. Fittings and Choice of materials for piping: cast iron, steel, wrought iron, galvanized lead, copper, cement; concrete and asbestos pipes, PVC pipes; Sizes of pipes and taps for house drainage.

UNIT 4 SERVICES STUDIO

20 Hrs.

Preparation of plumbing layout of a single storey building & working drawing of various fittings and fixtures of water supply and sanitary installations. Components of Plumbing – sanitary ware -w.c, wash basin, bidet, bathtub, jacuzzi etc Sanitary fittings – taps, mixers, shower units, etc.

COURSE OUTCOME:

- CO1** Understand the basic principles of water supply and sanitation
CO2 Describe the various components in a building drainage system.
CO3 Attain knowledge about the drainage system for different types of buildings.
CO4 Classify various sanitary fixtures and its applications.
CO5 Possess skills and techniques necessary for the selection of various systems and their installation
CO6 Prepare drainage and plumbing layout for a building.

TEXT / REFERENCE BOOKS

1. Water Supply and Sanitary Installations. (2005). India: New Age International (P) Limited.
2. Rangwala, S. C. (2005). Water Supply and Sanitary Engineering. India: Charotar Publishing House.
3. Basak, N. N. (2003). Environmental Engineering. India: Tata McGraw-Hill.

Skill Development

SDE2401	MATERIALS AND CONSTRUCTION II	L	T	P	Credits	Total Marks
		2	0	2	3	200

COURSE OBJECTIVES:

- To introduce the building materials and the construction techniques used for the walls, floors and ceilings.
- To expose the different types of wall panelling systems and false ceilings.
- To give an insight to the various finishes and the applications.

UNIT 1 WALLS-TYPES OF MASONRY 14 Hrs.

Different types-Stonewalls-random rubble, coursed rubble, square rubble, polygonal rubble & Ashlar etc , Brick masonry-Types of bonds-single & double Flemish bond, header bond, stretcher bond, rattrap bond, ornamental bonding

UNIT 2 FLOORS 14 Hrs.

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

Floor coverings - softwood, hardwood-resilient flooring-linoleum, asphalt tile, vinyl, rubber, cork tiles- terrazzo , marble & granite-properties, uses & laying. Floor tiles – ceramic glazed, mosaic and cement tiles - properties, specification for barrier free floors Drawings indicating various types.

UNIT 3 FALSE CEILING & WALLPANELING 16 Hrs.

Construction of various kinds of false ceiling such as thermocol, plaster of paris, gypboard, metal sheets, glass and wood. Construction of domes, vaults, & other special ceilings; Paneling Using wooden planks, laminated plywood, cork sheets, fibre glass wool & fabric for sound insulation and wall paneling for thermal insulation.

UNIT 4 FINISHES 16 Hrs.

Paints- enamels, distempers, plastic emulsions, cement based paints- properties, uses and applications- painting on different surfaces –defects in painting, clear coatings & stains-varnishes, lacquer, shellac, wax polish & stains-properties, uses and applications. Special purpose paints-bituminous, luminous, fire retardant and resisting paints- properties, uses and applications, low VOC paints

COURSE OUTCOME:

- CO1** Gain comprehensive knowledge on various types of masonry walls.
CO2 Classify and understand the different materials for floor finishes in interior design.
CO3 Select and specify flooring materials based on its properties and intended use.
CO4 Understand the construction techniques of false ceiling in interior spaces planning.
CO5 Design and specify appropriate false ceiling and wall panelling materials for the design context.
CO6 Comprehend the various types of finishes and the respective maintenance.

TEXT / REFERENCE BOOKS

1. Punmia, B. C. (2008). Building Construction. India: Laxmi Publications Pvt Limited.
2. Jeffries, D. (2004). The Flooring Handbook: The Complete Guide to Choosing and Installing Floors. United States: Firefly Books.

Skill Development

SDE2402	INTERIOR SERVICES II	L	T	P	Credits	Total Marks
		2	0	2	3	200

COURSE OBJECTIVES:

- To give an insight to basic concepts and various components in air conditioning.
- To introduce the fundamentals of fire safety measure and design principles in the interiors.
- To understand the principles of acoustics and the associated materials.
- To give an overview of electrical wiring systems in interiors.

UNIT 1 BASIC CONCEPTS AND SYSTEM COMPONENTS IN AIR CONDITIONING 16 Hrs.

Vapour compression cycle – Compressors – Evaporators –Refrigerant control devices – Electric motors – Air handling units – Cooling towers. Window type and packaged air conditioners–Chilled water plants–Fan coiled systems–Water piping– Cooling load - Air-conditioning systems for different types of buildings – Duct layout etc.

UNIT 2 FIRE SAFETY AND ELECTRICAL SYSTEMS 18 Hrs.

Mechanism of fire spread in building and prevention – Fire safety standards – Concepts in fire protection – Firefighting installation and requirements - Heat sensitive detectors –Smoke detectors –Automatic water sprinkler system- Foam systems, Single/Three phase supply– Protective devices in electrical installation – ISI Specifications - Types of wires, Wiring systems and their choice –Planning electrical wiring for building interiors – Main and distribution boards- Typical Electrical layout for interiors.

UNIT 3 ACOUSTICS AND SOUND INSULATION 16 Hrs.

Room acoustics - resonance, reverberation, echo, reverberation time, simple exercise using Sabine's formula - Acoustical requirements of different types of building. – Sound absorption, absorption co-efficient and their measurements, Absorbing materials used and their choices, exercises involving reverberation time and absorption co-efficient. Sound insulation materials

UNIT 4 SERVICES STUDIO 10 Hrs.

Preparation of air conditioning layouts and electrical systems in a building.

Max. 60 Hours

COURSE OUTCOME:

- CO1** Classify the different types of air conditioning system and ability to apply the same.
CO2 Understand the need and applications of various electrical systems
CO3 Understand the mechanism of fire safety systems and the respective installation
CO4 Understand the fundamental principles of acoustics and its importance in architectural design
CO5 Solve the acoustical design problems in a space by acoustic treatments
CO6 Exposure to various fixtures and fittings of HVAC, fire protection and acoustical systems

TEXT / REFERENCE BOOKS

1. Langley, B. C. (2000). Fundamentals of Air Conditioning Systems. United States: Fairmont Press.
2. Jain, V. K. (2007). Fire Safety in Buildings. India: New Age International (P) Limited.
3. Lord, P., Templeton, D. (2019). Detailing for Acoustics. United Kingdom: Taylor & Francis.

Skill Development

SDE9401	INTERIOR DESIGN STUDIO IV	L	T	P	Credits	Total Marks
		0	0	14	9	400

COURSE OBJECTIVES:

- To incorporate the various forms of thematic space making with traditional art and crafts from various parts of India.
- To create a thematic space making with Art and craft forms of our own culture in India – East, West, North, Central.

MODULE 1

Design of living units of various geographical locations and culture by involving historical periods, styles and use of craft in its inherent quality and form – craft and living environment. Response to today's situation of urban society – For a given building create contemporary homes of modern society – needs, realities, value system etc.

MODULE 2

Applications of art / craft at public level spaces- lounge (hotel), restaurant of specific ethnic characteristics. Spatial and service standards for star hotels – integration of interior design schemes for rooms, restaurants, bars, health clubs, shopping arcade and other guest areas with the general theme of the hotel. Special ideas for suites and banquet halls – contemporary interior schemes to integrate new concepts in lighting and materials.

Max. 210 Hours

TEXT / REFERENCE BOOKS

1. Karlen, M. (2009). Space Planning Basics, 3rd ed. John Wiley & Sons
2. Dechiara J., Panero J., Zelnik M., (2011). "Time Saver Standards for Interior design and Space Planning", McGraw Hill, London
3. Binggeli, C., Ching, F. D. K. (2018). Interior Design Illustrated. United Kingdom: Wiley.
4. Julius Panero & Martin Zelnick, Human Dimension & Interior Space : A source book of Design Reference standards, Watson – Guptill, 1979.
5. Mitton, M. (2003). Interior Design Visual Presentation: A Guide to Graphics, Models, and Presentation Techniques. Germany: Wiley.
6. Lin M., (1993). Drawing and Designing with Confidence: A step-by-step guide, Wiley and Sons.
7. Rengel R., (2002). Shaping Interior Space, Fairchild Books & Visuals.
8. Pile. J., (2005). A history of interior design, Laurence King Publishing.
9. Jones R., (2008). Interiors of Empire: Objects, Space and Identity within the Indian Subcontinent, Manchester University Press.

Skill Development

SDE1503	VISUAL IDENTITY & BRANDING	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To have a detailed understanding of building successful brands.

UNIT 1 BRANDING

6 Hrs.

What is Branding? Overview of a Framework for Building Iconic Brands (Corporate Mission, Brand Vision, Brand Positioning, Brand Belief, Brand Personality, Brand Values, Brand Iconography, Brand Experience and Innovation Principles); Interior Design and its role in fostering a powerful brand; Challenges of creating global Brands; Brand Dynamics, Effective strategies for increasing brand value.

UNIT 2 POSITIONING

6 Hrs.

Brand Identity- Understanding the Competitive + Cultural Context in Which a Brand Operates (Situational Assessment), Defining + Exploring Consumer Needs, Aspirations + Perceptions, Behaviours (Consumer Discovery), Uncovering Enlightening Thoughts about the Category + the Consumer (Fresh Insights) and Brand Selling Ideas. Brand Ideals- Vision, Meaning, Authenticity, Coherence, Flexibility, Commitment, Value, Differentiation, Sustainability, Differentiating types of brand architecture, brand names, and taglines.

UNIT 3 VISUAL IDENTITY**8 Hrs.**

Visual world of a Brand- Graphics, Typography, Colour Palette, Imagery.Sound, Animation, Presentation. Types of Images- Logo, Packaging, Retail Experience, Advertising (Print, Tv, Digital) and Website. Personality of a brand.Types of Brandmarks, Sequence of Cognition, Identity Design process & Branding tools and techniques; Common industry practices. Standards and guidelines, Design of Interiors to reflect Brand Image- Logo, Surfaces, Colour, Material, Furniture & Layout, Lighting, Case Studies

UNIT 4 STRATEGIES**6 Hrs.**

Consumer Target + Mindset, Competitive Positionings, Primary Research, Positioning Territories, Insights + Perceptual Mapping, Segmentation & Iceberg Model, Brand Innovations, Role of Interior Design in Customer's Perception, Case Studies

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 30 Hours**COURSE OUTCOME:**

- CO1** Communicate the difference between a brand and an identity
- CO2** Assess the tools and techniques used in the brand identity process to develop brand positioning
- CO3** Demonstrate understanding of colour and typographic theory
- CO4** Create effective logos and corporate identities
- CO5** Showcase best practices in creation of an original visual brand identities
- CO6** Categorize the various elements of brand identity through interior space.

TEXT / REFERENCE BOOKS

1. Airey, D. (2019). Identity Designed: The Definitive Guide to Visual Branding. United States: Rockport Publishers.
2. Slade, C. (2016). Creating a Brand Identity: A Guide for Designers. United Kingdom: Laurence King Publishing. Brand Bible: The Complete Guide to Building, Designing and Sustaining Brands- DEBBIE MILLMAN
3. Klanten, R. (2013). Brand Spaces: Branded Architecture and the Future of Retail Design. Germany: Prestel Pub.
4. Internet Links-
 Interbrand: www.interbrand.com
 Landor: www.landor.com
 Prophet: www.prophet.com
 Pentagram: www.pentagram.com
 IDEO: www.ideo.com
 Wolff Olins: www.wolffolins.com

 Skill Development

SDE9501	INTERIOR DESIGN STUDIO V	L	T	P	Credits	Total Marks
		0	0	16	10	400

COURSE OBJECTIVES:

- To introduce the basics of designing for office interiors and to develop skills required for the same.

MODULE 1**80**

Developing visually literate students who are proficient at analytical thinking, conceptualization and the problem-inquiry, solution cycle. Examining the connection between abstract design principles and the physical and visual environments. Consulting office for professional practitioner- Planning for small office – office of architects, interior designers, lawyer, and auditor – individual layouts, Modular units, play with levels. Lighting & colour scheme – natural & artificial light.

MODULE 2**160**

Interior designing for multi-functional, multi-level planning, design and detailing of various work spaces, interactions zones. Design of corporate Environments such as BPO, corporate office.

Max. 240 Hours**TEXT / REFERENCE BOOKS**

1. Meyer B., Klanten R., Lovell S., (2007). *Furnish: Furniture and Interior Design for the 21st Century*. Germany: Prestel Pub.
2. Bennett, W., Diamonstein, B., Diamonstein. (1982). *Interior Design, the New Freedom*. United States: Rizzoli.
3. Forino, I., Postiglione, G., Basso Peressut, L., Scullica, F. (2008). *Places & Themes of Interiors.: Contemporary Research Worldwide*. Italy: Franco Angeli Edizioni.
4. Grieco, L. (2018). *The Other Office 3: Creative Workspace Design*. Netherlands: Frame Publishers.
5. Zhang, C. (2018). *Rethinking Workspace Design: A Workplace Design for Employees to Feel Engaged and Happy*. United States: Boston Architectural College.

Skill Development

SDE9601	INTERIOR DESIGN STUDIO VI	L	T	P	Credits	Total Marks
		0	0	16	10	400

COURSE OBJECTIVES:

- To study and develop innovative schemes for complex interior spaces like hospitals and auditorium. Extensive knowledge of working drawings is also intended.

MODULE 1**100 Hrs.**

Spatial and environmental standards for various types of auditorium spaces- performing arts, cinema, and convention centre. Detail schematics of wall panelling, false ceiling and carpeting to satisfy acoustic requirements. Lighting study to develop ideas for foyer, auditorium and stage requirements.

MODULE 2**140 Hrs.**

Hospital Interior Design- Efficient utilization of space based on study ;Emergency, different wards, pathological rooms, radio logical rooms, operation theatres, etc. keeping in mind Technical requirements, Rigid functional relationships between different medical departments, aspects of psychology of both patients and staff. Managing service requirements- lighting, acoustics, plumbing and drainage, operational flow, etc.

Max. 240 Hours**TEXT / REFERENCE BOOKS**

1. Leslie, F. (2000). *Designs for 20th-century interiors*. London: Harry N. Abrams.
2. Diamonstein., Bennett, W., Diamonstein, B. (1982). *Interior Design, the New Freedom*. United States: Rizzoli.

Skill Development

SDE3502	PRODUCT DESIGN	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To get an insight of various products and accessories used in Interior Spaces.
- To understand relevant products designed according to user's needs.
- To know about the role of accessories in interiors. Integration of accessories in interior design and stylistic development.
- To learn about the practical aspects of product design processes

UNIT 1**INTRODUCTION****4 Hrs.**

An brief introduction to Product Designing – Various elements – History of Product Design – Definition of Product Design, understanding of Product Design - Purpose of Product Design – Role of Product Designers. Design approaches in product and lifestyle accessories design with a focus on functionality, ergonomics, aesthetics, multiple usages etc.

UNIT 2 HUMAN FACTORS**8 Hrs.**

Application of human factors data. Human activities, their nature and effects. Human response to climate. Visual, Auditory, Tactual, Olfactory human mechanisms, Physical space and arrangement. Evolving the strategy of design with integration of technical complexities and lifestyle influences. Development of the design of products and accessories to specific interiors and prevailing trends.

UNIT 3 DESIGN APPROACH**8 Hrs.**

Design approach with limited constraints inherent in accessory products. Broad based approach towards innovative design and application to multi products and multi materials in manufacturing interior products and lifestyle accessories. Study of materials and processes adopted in accessories design. Stylistic development of interior products from the past to present with insight into technological advances and the influences of social, economic and political factors on their design. Form, Colour, Texture, Symbols, User specific criteria, Material, Technology and recyclability, Packaging. Multiple Utility oriented approach to Product Design.

UNIT 4 PRACTICAL ASPECTS**6 Hrs.**

Consumer Motivations Identification of user needs and Driving Factors; Emotional Design, Sensibility, Social Ethics and Concerns; Market Gaps, Market Oriented Innovation; Business Evolution Product Planning for the future, Disruptive Innovation; Basic understanding of construction principles, modelling, rapid prototyping, with broad orientation to socio-cultural and historical context of the sector. Orientation to Indian as well as global context of interiors, trends and market.

UNIT 5 CONSTRUCTIVE ASSIGNMENTS**4 Hrs.**

Demonstrate comprehensive understanding through accompanying assignments, group discussions, and site visits.

Max. 30 Hours**COURSE OUTCOME:**

- CO1** Understand the role of product design and designers for our everyday environment.
- CO2** Analyse the various approaches to Product and accessories design for Interior Environments.
- CO3** Apply various human factors in design of products and accessories.
- CO4** Develop approaches to design keeping practical aspects in mind.
- CO5** Approach towards Product Design in relation with various spaces
- CO6** Distinguish various design trends in the Indian and Global market.

TEXT / REFERENCE BOOKS

1. Slack L., (2008) What is Product Design? Roto Vision publishers.
2. Crochet T., Vleck D., (2008) Designer's Guide to Decorative Accessories, Prentice Hall, 1st edition.
3. Ashby M., Johnson K., (2002). Materials and Design: The Art and Science of material selection in product design, Butter Worth Heinemann, 1st edition.
4. Product Design and Development. (2003). United States: McGraw-Hill Education (India) Pvt Limited.
5. Stark J., (2011) Product Lifecycle Management: 21st Century Paradigm for Product Realisation, Springer.

 Skill Development

 Skill Development

S102APRO1	CAPSTONE PROJECT	L	T	P	Credits	Total Marks
		0	0	28	18	800

COURSE OBJECTIVES:

To evaluate the students to demonstrate the comprehensive understanding and knowledge gained through various semesters in an Architectural project. Students shall be permitted to undertake any live/ competition/ Government projects, which was approved as the pre thesis topic in the previous semester.

FOCUS

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

METHODOLOGY PROPOSED

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

The stages are:

- Concept and Site Zoning along with the previous semester Pre-Thesis report and study sheets to be presented.
- Conceptual sketches, models, plans, sections, elevations.
- Scheme I of the Design Drawings
- Scheme II of the Design Drawings
- Pre- Final stage
- Final University Viva Voce

The review marks obtained in the five assessments shall be taken into account for the internal marks. A jury comprising of internal and external examiners shall conduct the final Viva-Voce examination of the Thesis/Project in the institution at the end of the Eight semester as a final Viva Voice. The total marks scored shall be the sum of marks secured in the continuous assessments and the final university viva-voce examination.

The development of thesis is to enable the students to handle all the phases of building/interior design. It is a subject for scholastic study through analysis and should reflect the knowledge gained from all the courses undertaken by the student in all the previous semesters. It is a development of design and detailing with integration of all the technical aspects. The thesis project shall be submitted in the form of drawings, project report and material charts. Each student is required to submit two hard copies of the report along with a soft copy of the report and sheets. The report shall be based on the literature review, Case Study analysis and inferences, Standards, Site Analysis, Requirements and area statements along with the concepts, design processes and the final design.

Skill Development