SECOND YEAR FOURTH SEMESTER

1. Architectural Design – IV (Code – 210413)

Objectives –

The course aims to obtain knowledge of Architecture as responding to Social issues such as community, Culture, religion, politics etc, designing for special groups such as the villagers, elderly, and the handicapped.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
1.	**210413**	Architectural Design – IV	DC- 10	100	20	20	20	50	30	10	250	6	2	2	2*(1.5)	**7**	AO	Offline**

PROJECT 1(Prototype): VILLAGE SURVEY & RURAL HOUSING

Study of the physical, socio economic and cultural aspects of a selected village by conducting various surveys to understand the settlement pattern, housing stock and amenities that are existing or required – To understand the linkages between Occupation, Social structure and Religious beliefs and its physical manifestation in the form of the settlement – Identification of a suitable Design intervention that would improve the quality of life – Ex. Design of housing prototypes for a particular community / occupation using rural building materials & cost effective technology. Design exercise may include the design of any facility required such as Primary health center / Community hall / Farm training center, etc.

PROJECT 2(Prototype): DESIGN OF COMMUNITY FACILITIES

Community facilities –Design of Community hall, Nursing home, Youth hostel, Old age home etc., encourage the student to explore concepts of an agglomeration of simple spaces with particular emphasis on the special needs of elderly, handicapped etc. It also focuses on the bioclimatic approach to the design of the building envelope i.e. articulation of openings, choice of materials for roof & walls of different orientations etc. Concepts integrating the use of passive, active & hybrid solar technologies with the design proposals are encouraged.

PROJECT 3 (Prototype): Time bound Problems of 6 hours to 48 hours.

COs & LOs for Architectural Design – IV (Code –210401)

Overall Course Outcome: The course aims to obtain knowledge of Architecture as responding to Social issues such as community, culture, religion, politics etc, designing for special groups such as the villagers, elderly, and the handicapped.

CO1	Students will be able to **analyze** data collected with relevance to the project by identification of a suitable design intervention that would improve the quality of life.	**LO1**	**Explain** the Settlement pattern in village and socio-cultural, geographic and economic aspects that shape the built environment.
		LO2	**Analyse** design of any rural settlement that evolved organically over a period.
		LO3	**Analyse** housing typology, locally available materials, artisanship and integration of landscape with the built environment.
		LO4	**Explore** concepts of agglomeration of simple spaces with particular emphasis on the special needs of elderly, handicapped, etc.
		LO5	**Develop** presentation of concepts through 2D and 3D presentation including sketches and models.
CO2	Students will be able to **explore** concepts and agglomeration of simple spaces with particular emphasis on the special needs of elderly, handicapped, etc.	**LO1**	**Demonstrate** the learning of the previous study.
		LO2	**Collect** data from standards, case studies and site visits for the current project.
		LO3	**Analyse** data collected with relevance to the current project
		LO4	**Integrate** learning from other allied subjects to the design proposal
		LO5	**Complete** the architectural project with all given requirements for the given project.
CO3/CO4	Students will be able to **maximize** the potential of designing within the period.	**LO1**	**Understand** the application of the architectural design process for adequate scale projects of human habitat
		LO2	**Transform** the human behavioural needs into architectural program requirements
		LO3	**Analyse** the information on context and the human-space relationship
		LO4	**Compose** the architectural spaces in a design project in a given period.
		LO5	**Communicate** architectural drawings with the help of various mediums in a given period.

REFERENCES:

1. Time saver standards for building types, DeChiara and Callender, Mc Grawhill Company.
2. Neufert Architect's data, Bousmaha Baiche& Nicholas Walliman, Blackwell science ltd.
3. National Building Code – ISI.
4. Time saver standards for landscape architecture – Charles W Harris – McGraw Hill.
5. New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press.

Note: Design exercises that explore Architecture as responding to Social issues such as community, culture, religion, politics etc. Students familiarize themselves with designing for special groups such as the villagers, elderly, and the handicapped.

Note: One design problem shall be given in the End Semester Examination. 6X2 hours examination.

2. Building Construction – III (Code – 210414)

Objectives –

The course aims to obtain knowledge of the preparation of concrete, construction methods, special concrete and concreting methods, the properties and its use in foundation, beams and slabs, various exterior finishes and advanced structural systems.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
2.	**210414**	Building Construction –III	BSAE-	50	10	20	20	50	30	20	200	5	2	1	2*(1.5)	**6**	PP	Offline

UNIT-1 BUILDING MATERIALS

Concrete: Various types of cement concrete, its properties, and uses. Proportioning of concrete, grading of aggregates, water-cement ratio, and workability of concrete, Estimating yield concreting. Formwork for concreting, mixing, transporting and placing, consolidating and curing of concrete. Types of Special concrete and concreting method, concrete block and its uses. Glass: Curtain walls & glass block construction

UNIT -2 RCC FOUNDATION

• Introduction to RCC framed structures, concrete foundation: Types of footing – Isolated, combined, continuous, strip raft & piles.

•Pile foundation: Definition, functions, and Design factors. Tool equipment and plants for piling.

•Precast pile – timber, concrete, and steel Friction pile and bearing pile bore pile. Cast in situ & Steel and Concrete, Pile Cap

UNIT-3 TEMPORARY SUPPORTING STRUCTURE

• Scaffolding, shoring and underpinning.

• Formwork and shuttering for different types of RCC elements.

UNIT-4 BEAMS, SLABS, COLUMN, RCC STAIRS

• Concrete slabs: One-way, two ways, continuous & cantilever. Detailing of Slabs: One-way slabs, 2-way slab, continuous, flat slab.

•Concrete beams: Singly reinforced, doubly reinforced, cantilever & continuous beams.

•R.C.C: Column, beams, slabs, lintel, chhajja, staircase, canopy, coffer slab & pergola.

•RCC staircase, and its details.

UNIT-5 RETAINING WALL, EXPANSION JOINTS

• Detailing of R.C.C. retaining wall. Expansion Joints: Walls, roofs, and flooring.

• Study of Various types of precast concrete blocks, their extensive uses in Building construction. Exercises of the above through case studies and drawings of selected building types.

COs & LOs for Building Construction –III

Overall Course Outcome: Students will be able to **understand** the preparation of concrete, construction methods, special concrete and concreting methods, the properties and its use in foundation, beams and slabs, various exterior finishes and advanced structural systems.

CO1	Students will be able to **understand** the role of concrete in structure technology .	LO1	**Remember** basic concepts: Various types of cement concrete, its properties, and uses.
		LO2	**Learn** the proportioning of concrete, grading of aggregates, water-cement ratio, and workability of concrete,
		LO3	**Understand** the estimating yield concreting. Formwork for concreting, mixing, transporting and placing, consolidating and curing of concrete.
		LO4	**Analyze** the types of Special concrete and concreting method, concrete block and its uses.

		LO5	**Evaluating** role of concrete on site investigations, layout, site organization.
CO2	Students will be able to **understand** the technicality behind the foundation of a structure and its type.	LO1	**Learn** basic concepts regarding RCC framed structures, concrete foundations.
		LO2	**Understand** the types of footing – Isolated, combined, continuous, strip raft & piles.
		LO3	**Apply** the techniques of foundation on site investigations, layout, site organization.
		LO4	**Analyze** the types of footing – Isolated, combined, continuous, strip raft & piles on a project.
		LO5	**Draw** all the elements of footing and its type**.**
CO3	Students will be able to **understand** the temporary supporting structure in buildings.	LO1	**Learn** basic concepts regarding temporary supporting structure.
		LO2	**Understand** the types of formwork and shuttering for different types of RCC elements
		LO3	**Study** and produce drawing and detail of scaffolding used for buildings.
		LO4	**Analyze** the detailed drawing for timbering in trenches , shoring and underpinning.
		LO5	**Draw** sheets of all the elements of temporary supporting structure.
CO4	Students will be able to **analyze** different types of beams, slab, column and its different types on a structure.	LO1	**Learn** basic concepts concrete slabs in a structure.
		LO2	**Understand** the detailing of Slabs and its type - One-way slabs, 2-way slab, continuous, flat slab.
		LO3	**Apply** the detailing of Slabs on site investigations, layout, and site organization.
		LO4	**Analyze** the types of RCC Beam and column .
		LO5	**Draw** all the elements of slab and its type.
CO5	Students will be able to **demonstrate** their understanding through application in working drawing of basements ,retaining wall expansion joints.	LO1	**Remember** basic concepts regarding detailing of R.C.C. retaining wall..
		LO2	**Learn** the expansion Joints: Walls, roofs, and flooring..
		LO3	**Understand** the details of the joints through drawing.
		LO4	**Analyze** the various types of precast concrete blocks, their extensive uses in Building construction.
		LO5	**Evaluating** through case studies and drawings of selected building types.

REFERENCES:

1. Dr. B.C Punmia – Building construction (10th edition) - Laxmi Publications
2. Roy Chudley (Author), Roger Greeno (Author) -construction Technology, 4th Edition
3. Francis D.K.Ching – Building **p**Construction illustrated, 4th edition, 2015
4. M.S Shetty, concrete Technology, S.Chand publishing
5.

Note: Total five questions shall be asked. Each question will consist of two parts, one of which will be of 7 marks (which shall be compulsory) and another with 3 marks(which shall be optional).

3. Building Services-I (Water supply & Sanitation) (Code – 210415)

Objectives –

The course aims to obtain knowledge of water supply and waste water management, in residential units, small campus, and commercial buildings, plumbing layouts for various building typology, and best practices for Solid waste management.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
3.	**210415**	Building Services-I (Water Supply & Sanitation)	BSAE-	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Offline***

UNIT-1 WATER SUPPLY

Sources of water supply – Water Quality - Water requirements for different types of buildings and for town, simple method of removal of impurities, pit. System of supply - continuous and intermittent supply, sump, overhead tanks, pumps, distribution pipes, cold water and hot water supply for single and multi-storied buildings. Pipes sizes, types – GI, CPVC, Copper, Cast Iron (CI) Pipes, Steel Pipes, Asbestos Cement (AC) Pipe, Concrete Pipes fittings, valves, and types of taps.

Rainwater harvesting to include roof top harvesting, type of spouts, sizes of rainwater pipes and typical detail of a water harvesting. Surface water runoff

UNIT-2 DRAINAGE AND SEWAGE DISPOSAL

Recycling/Reuse of Wastewater, Systems of drainage – separate, combined and partially separate system, surface drainage, sizes and construction, system of plumbing - single stack, one pipe system, one pipe partially ventilating system and two pipe system.

House drainage – principles, traps-floor trap, multi-trap, gully trap, grease and oil trap,: Anti Siphonage pipe, Types of fixtures and materials, Arrangements of fixtures in a bathroom. Design of Septic tank, Treatment and disposal of septic tank effluents – Design of soak pit and dispersion trench, Biological filter, up flow anaerobic reactors

Sewage treatment technologies: Activated sludge process, Membrane bioreactors, packaged treatment plants, Root zone treatment system, Decentralized Wastewater Treatment Systems (DEWATS), Soil Bio technology

UNIT-3 SOLID WASTE DISPOSAL

Solid waste management: Generation of Solid waste, Collection & Transportation of solid waste to the secondary/ locality storage/community bins, Storage of solid waste at locality level, Transport of solid waste to dumping sites and treatment plants, Treatment and Dumping of Solid Waste, Methods of Disposal of solid waste

Approaches to Solid Waste Management: Waste minimization / reduction at source, recycling, waste processing (with recovery of resources and energy), waste transformation (without recovery of resources) and disposal on land.

UNIT-4 EMERGING PROCESSING TECHNOLOGIES

Emerging processing technologies : Vermicomposting, Biogas from MSW, Pyrolysis (including plasma arc technology), refuse derived fuel, Bioreactor landfill - Biomethanation plant at koyambedu, wholesale vegetable market Chennai, Door-to-door collection, transportation and waste processing services by Exnora Green pammal.

UNIT-5 PLUMBING LAYOUT OF SIMPLE BUILDINGS

Designing of toilet blocks in residential and public buildings, showing complete details of fittings and plumbing required for water supply and drainage.

Designing and preparing a complete water supply and drainage layout of an academic Architectural design project, with all required calculations.

COs & LOs for BUILDING SERVICES-I			
Overall Course Outcome: The overall aim of the course is to introduce students to the various water supply and sanitation systems in building of various scales and also to make them understand plumbing layouts, knowledge of plumbing and sanitation fixtures and their sustainable applications in buildings.			
CO1	Students will be able to **identify** the significance of water supply in urban and rural areas, its methods and requirements.	LO1	**Define** the need of water supply and water requirements in different types of buildings.
		LO2	**Observe** the methods of water supply in metropolitan areas, methods of rainwater harvesting in buildings.
		LO3	**Identify** the types of apparatus required for water supply, sizes, availability, capacity and energy required to install water supply systems in a building.
		LO4	**Evaluate** the sustainable methods in the process.
CO2	Students will be able to **develop** the understanding of drainage systems in buildings and its application	LO1	**Define** the types of sanitary wastes generated in various types of building and methods of disposal,
		LO2	**Observe** the types of drainage systems, and methods of recycling various types of wastes (dry or wet)
		LO3	**Identify** the types of apparatus required for drainage and sanitation fixtures, sizes, availability, capacity and energy required to install drainage systems in a building.
		LO4	**Evaluate** the requirements of septic tanks, waste water recycling systems
CO3	Students will be able to **analyse** the significance of solid waste management in cities and their sustainable methods	LO1	**Define** the types of solid wastes generated in various types of buildings
		LO2	**Observe** the methods of waste segregation, their classification and methods of disposal.
		LO3	**Identify** process of waste at city level, locality and approaches to waste management
		LO4	**Analyse** sustainable methods of waste management in cities.
CO4	Students will be able to **evaluate** the sustainable methods of processing solid waste and strategies for waste management at city level	LO1	**Compare** the existing trends in waste recycling and waste disposal in cities
		LO2	**Analyse** the significance of vermin composting, biogas, recycling units etc. and their application
		LO3	**Evaluate** the strategies for waste management at metropolitan level through case studies
CO5	Students will be able to **compare** and develop the plumbing layout of various types of building.	LO1	**Evaluate** the plumbing layout of any existing building
		LO2	**Evaluate** the drainage layout of any existing building
		LO3	**Prepare** the sanitation and plumbing layout for buildings of various scales

REFERENCES:

1. Birdie G. Sand Birdie J. S Water Supply & Sanitary Engineering, Dhanpat Rai Publishing Company (p) Ltd (2010)
2. Sanitary Engineering by R S Deshpande
3. S. K. Garg , Water Supply Engineering: Environmental Engineering v. khanna publishers 2010
4. Charangith shah, Water supply and sanitary engineering, Galgotia publishers.
5. Kamala & DL Kanth Rao, Environmental Engineering, Tata McGraw – Hill publishing company Limited.
6. Technical teachers Training Institute (Madras), Environmental Engineering, Tata McGraw Hill publishing Company Limited.
7. M.David Egan, Concepts in Building Fire Safety.
8. V.K.Jain, Fire Safety in Building 43
9. National Building Code 2005.
10. Toolkit for Solid Waste Management, Jawaharlal Nehru National Urban Renewal Mission, November 2012, Ministry of Urban Development Government of India.

4. History of Architecture-IV (Code- 210416)

Objectives –

The course aims to obtain knowledge of Design philosophies of colonial, post independent and contemporary architecture in Indian context, modern design philosophies in the evolution of innovative architectural forms and designs, the effect of industrial revolution on architecture.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
4.	**210416**	History of Architecture-IV	DC- 11	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Blended* (2/1)

UNIT-1 INDUSTRIAL REVOLUTION

Impact of the Industrial Revolution on Architectural practices. Transformation from iron to steel and the demand for a new Architecture.

UNIT -2 MODERNISM

Context of Origin; Characteristics; Key Movements – Arts and Crafts, Constructivism, Bauhaus, Expressionism, International Style, Minimalism, Brutalism. Works of notable conforming Architects: Frank Lloyd Wright, Ludwig Mies van der Rohe, Le Corbusier, Walter Gropius, Oscar Niemeyer and Alvar Aalto.

UNIT-3 DECONSTRUCTIVISM

Origin and influences breaking away from Modernism and Postmodernism, Deconstructivist philosophy. Influence on Architectural practice; Works of notable conforming Architects: Frank Gehry, Daniel Libeskind, Rem Koolhaas, Peter Eisenman, etc.

UNIT-4 NEO-MODERNISM AND OTHER POST-MODERN REACTIONS

Origin and Characteristics, Other associated movements: Metamodernism, Re-modernism, Neo-futurism, Neo- Historicism. Works of Richard Meier, I.M. Pei, Tadao Ando, Zaha Hadid, and Santiago Calatrava, etc.

UNIT-5 COLONIAL, POST COLONIAL CONTEMPORARY INDIAN ARCHITECTURE

Architecture in colonial India and post independence, Indo-Saracenic Architecture, Modernism and Works of notable contemporary Architects.

COs & LOs for HOA – IV			
Overall Course Outcome: Students will be able to **develop** an appreciation of various architectural movements, revolutions & styles across the globe, its chronology, typology and the resulting architectural forms that are unique in time and place.			
CO1	Students will be able to **apply** Industrial revolution architectural expressions in their own design.	LO1	**Learn the evolution** of the Industrial revolution and its relation with architecture.
		LO2	**Understand** diverse artistic and architectural expressions in various periods of Industrial revolution.
		LO3	**Illustrate** visual and verbal vocabularies of Industrial revolution.
		LO4	**Analyze** Industrial revolution forms and space through various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various architectural forms and styles of Industrial revolution.
CO2	Students will be able to **apply** elements of modernism style in Architecture in their own design.	LO1	**Learn** evolution of modernism style in Architecture.
		LO2	**Understand** diverse artistic and architectural character in modernism style in Architecture.
		LO3	**Illustrate** visual and verbal vocabularies of modernism style in Architecture.
		LO4	**Analyze** modernism style in architecture through forms and space and various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various architectural forms of modernism style in Architecture.
CO3	Students will be able to **apply** elements of Deconstructivist style in Architecture in their own design.	LO1	**Learn** evolution of Deconstructivist style in Architecture.
		LO2	**Understand** diverse artistic and architectural character in De-constructivism style in Architecture.
		LO3	**Illustrate** visual and verbal vocabularies of De-constructivism style in Architecture.
		LO4	**Analyze** De-constructivism style in Architecture through forms and space and various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various architectural forms of De-constructivism style in Architecture.
CO4	Students will be able to **apply** elements and concepts of Neo-modernism & Postmodernism reactions in Architecture in their own design.	LO1	**Learn** evolution of Neo-modernism & Postmodernism reactions in Architecture.
		LO2	**Understand** diverse artistic and architectural character in Neo-modernism & Postmodernism reactions in Architecture.
		LO3	**Illustrate** visual and verbal vocabularies of Neo-modernism & Postmodernism reactions in Architecture.
		LO4	**Analyze** Neo-modernism & Postmodernism reactions in architecture through forms and space and various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various forms of Neo-modernism & Postmodernism reactions in Architecture.
CO5	Students will be able to **apply** elements of Colonial, Post-Colonial & Contemporary style in Indian Architecture in their own design.	LO1	**Learn** evolution of Colonial, Post-Colonial & Contemporary style in Indian Architecture.
		LO2	**Understand** diverse artistic and architectural character in Colonial, Post-Colonial & Contemporary style in Indian Architecture.
		LO3	**Illustrate** visual and verbal vocabularies of Colonial, Post-Colonial & Contemporary style in Indian Architecture.
		LO4	**Analyze** Colonial, Post-Colonial & Contemporary style in Indian Architecture through forms and space and various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various architectural Colonial, Post-Colonial & Contemporary style in Indian Architecture.

REFERENCES:

1. Kenneth Frampton, Modern Architecture: A Critical History, Thames and Hudson, London.
2. Sigfriedgiedion, .Space time and Architecture: The Grwoth of a New Tradition, Harvard University Press.
3. Tzonis Alexander, Santiago calatrova , International Publications, January 2005, New York.
4. Steele James, Hassan fathy - The complete works , London : Thames and Hudson.

5. Structures-IV (Code – 210417)

Objectives –

The course aims to obtain knowledge about the structural behavior of various types of steel structural systems those are commonly employed in the building construction industry presently, methods those are used to design a steel structural system for a specific condition & loading. Interpretation of structural detail drawings in the site is also intended.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
5.	**210417**	Structure -IV	BSAE-10	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Offline***

UNIT- 1 PROPERTIES OF STEEL SECTIONS & TYPES OF CONNECTIONS

Introduction Properties of Indian standard rolled steel section – Use of IS 800 and steel tables – Permissible and stresses in tension, compression and shear. Connections: Welded and bolted connections – Types of failure – Design of welded and bolted connections for members subjected to axial forces. Site visit to a steel fabrication unit.

UNIT-2 TENSION AND COMPRESSION MEMBERS

Steel structures – Identification of tension and compression members in trusses & girders– Understanding the process of design of single angle and double angle sections in tension– understanding the method to design compression members – signify chance of Slenderness ratio– Design of simple and compound sections (Theory only) – Design of lacings and battens.

UNIT -3 STEEL BEAMS

Identification of principal & secondary beams in a structural system - Allowable stresses in Principal beams, General specifications for steel beams, Understanding the design process for simply supported & cantilevered beams – Comprehending the design of laterally supported beams.(Simple problems).

UNIT-4 STEEL TRUSSES & GIRDERS

Study of the various types of roof trusses & where a particular truss can be used – Selection of trusses according to the span – Estimation of gravity loads and wind loads on roof – Use of BIS and book SP-38 in analyzing and design of trusses – gusseted plate connections (Theory Only).

UNIT-5 INTRODUCTION TO LONG SPAN STEEL STRUCTURAL SYSTEMS

Space frame structural system in tubular steel – various types of connectors – single / double & triple grid space frames and the span for which they can be employed – various types of space frame configurations. Tensile structural systems using steel cables – Examples of space frame & tensile structural systems.

COs & LOs for Structure - III			
Overall Course Outcome: Students will be able to understand the structural behaviour of steel in construction of buildings and their methods of designing.			
CO1	Student will be able to **understand** the behaviour of steel in construction, its forms and use in different structures	LO1	**Learn** the common properties of structural steel
		LO2	**Identify** the types of stresses in steel construction
		LO3	**Outline** the features of IS code provisions regarding use of steel in construction
		LO4	**Evaluate** the details for welded connections in steel construction and types of failures in design of steel structure
		LO5	**Asses** the working of structural details through site visit
CO2	Student will be able to **understand** the methods of designing angle sections, single and compound sections, compression members, lacings and battens	LO1	**Identify** the types of tension and compression members in steel trusses and girders
		LO2	**Analyse** the methods of designing angle sections in tension members, compression members and design of lacing and battens
		LO3	**Outline** the features of IS code provisions for designing with steel members
		LO4	**Interpret** the working details of tension and compression members in steel construction
		LO5	**Asses** the working of design through site visit
CO3	Student will be able to **comprehend** the design of principle and secondary beams in steel construction	LO1	**Learn** the principle and secondary beams in structural systems
		LO2	**Outline** the general specifications for steel beams
		LO3	**Evaluate** the load considerations for design of beams and lintel in RCC structures
		LO4	**Interpret** the design process for cantilever and simply supported beams in steel construction and design of laterally supported beams through solving simple problems
		LO5	**Asses** the working of structural details through site visit
CO4	Student will be able to **comprehend** the types, selection, estimation of load and designing of steel trusses and girders for construction	LO1	**Understand** the use of steel girders and its types
		LO2	**Analyse** selection of trusses on the basis of span of roof
		LO3	**Outline** the features of IS code provisions for design of trusses
		LO4	**Evaluate** the various loads and typical structural details for design of steel trusses and girders along with load considerations
		LO5	**Asses** the working of structural details through site visit
CO5	Student will be able to **learn** about the use of steel in construction of various long span structures	LO1	**Classify** the types of long span structural systems in steel
		LO2	**Identify** the connectors in space frame structures and types of space frame configurations
		LO3	**Evaluate** the applications of space frame structures and tensile structures through examples
		LO4	**Interpret** the typical structural details for tubular steel and steel cables
		LO5	**Asses** the working of structural details through site visit

REFERENCES:

1. Ramachandra .S Design of steel structures Vol. I, Standard publication, New Delhi, 1992
2. Vazirani V.N, and Ratwani M.M, Steel structures, Khan
3. Handbook of Typified Designs for Structures with steel roof trusses, SP 38 (S&T) – 1987, BIS, New Delhi, 1987
4. Code of practice for Earthquake Resistant Design and Construction of Buildings IS4326-1976, BIS, New Delhi.

6. Elective – I ECOLOGY & ENVIRONMENT (210421) & SOCIETY, CULTURE & ARCHITECTURE (210422)

Objectives –

The course aims to obtain knowledge about ecology, society, culture, environment, the use of ecology, etc. in architecture design and site planning.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
6.	-	ELECTIVE –I	DE- 1	50	10	20	20	-	-		100	4	2	-	2	**3**	PP	Blended* (2/1)

(i) ECOLOGY & ENVIRONMENT (210421)

UNIT-1 INTRODUCTION TO THE STUDY OF ECOLOGY & ENVIRONMENT

Introduction, Structure and Function: Introduction to ecology, its meaning and growing importance in daily life. Basic terms used in ecology and their meanings. Fundamental concepts of ecology. Ecology – Environment relationship. Concept of spaceship as earth. Structure and function of eco- system, Eco- system equilibrium, natural cycles, ecological footprint, climate change

UNIT-2 RELATIONSHIP WITH NATURE:

Man's relationship with nature in the present: Industrial activities, urbanization, deforestation, mining and similar incursions on nature for technological progress. Environmental impacts of these activities. The ecological crisis.

UNIT-3 IMPORTANCE OF ECOLOGY

Importance of Ecology: Relevance and growing importance of ecology in a highly urbanized and technological world with reference to dwindling resources, increasing demands and advancing technology. Adaptation of life- styles, and adoption of alternate technologies to harmonize with the natural environment. Discussion on alternatives available. Guiding environmental principles

UNIT-4 ECOLOGICAL APPLICATIONS TO ARCHITECTURE AND PLANNING

Ecological applications to Architecture and Planning. Preserving and improving human settlement in harmony with nature. Conservation of natural resources for improving the quality of life on earth and attempting to ensure its continuity for the future of humanity. Eco cities, eco- communities and eco buildings: Archeology.

Designing settlements and other man-made eco- systems. Ecological and environmental cities for a sustainable future.

UNIT-5 ECOLOGY AND ENVIRONMENT FOR SUSTAINABLE FUTURE.

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

COs & LOs for Ecology & Environment			
Overall Course Outcome: The basic objective of this course is to develop the student's understanding towards the importance of ecological studies and environmental protection from rapidly growing anthropogenic activities. This course would let the students explore various architectural techniques in mitigating environmental degradation and achieving sustainable living.			
CO1	Students will be able to **summarize** elementary knowledge to earth's natural environment	LO1	**Define** basic terms used in Ecology and Environmental Science.
		LO2	**Outline** the relationship between Ecology and Environment.
		LO3	**Analyze** the concept of Spaceship as Earth with the context of existing scenarios.
		LO4	**Conclude** the various factors impacting environmental degradation, climate change, carbon footprint, etc.
CO2	Students will be able to **highlight** emerging human activities creating serious environmental degradation.	LO1	**List** various human activities since industrialization till date impacting nature.
		LO2	**Demonstrate** impact of such activities with the help of suitable case examples
		LO3	**Analyze** the relationship between man and its natural surroundings, focusing on negative impacts of manmade activities on the environment.
		LO4	**Evaluate** the need of environmental protection and economic activities
CO3	Students will be able to **relate** urban ecology with sustainable technologies.	LO1	**Define** ecology in terms of growing urbanization and technological advancement
		LO2	**Summarize** the need of alternative technologies to harmonize nature.
		LO3	**Develop** environmental sensitivity
		LO4	**Examine** application of available alternatives
CO4	Students will be able to **perceive** the role of an architect/planner in sustainable development	LO1	**Recall** harmony with nature in order to preserve and improve human settlement
		LO2	**Illustrate** the application of ecology by explaining man-made ecosystem and re/designing settlements
		LO3	**Apply** various practical applications of ecology in the field of architecture and planning
		LO4	**Inspect** the terms- Eco cities, eco- communities and eco buildings for sustainable future
CO5	Students will be able to **adapt** various green/sustainable architectural techniques in one of the student's design problem	LO1	**List** various eco-building materials and construction techniques
		LO2	**Design** with innovative methods by using sustainable materials/techniques to reduce the impacts of construction and urbanization.

REFERENCES:

1. Fundamentals of Ecology by E.P. Odum
2. The Ecology of Man: An Ecosystem Approach by Robert Leo Smith
3. Introduction to Ecology by Kurmundi
4. Review Our Dying Planet by Sarala Devi
5. Ecological Crisis: Reading for Survival by G. A. Love & R.M. Love

(ii) SOCIETY, CULTURE & ARCHITECTURE (210422)

UNIT-1 CULTURE

Fundamentals of sociology and its relationship to architecture. Culture and social identity with reference to architecture. Fundamentals of society, culture and politics with reference to architectural history. Forms of social organization in history. Various definitions of culture and civilizations

UNIT-2 ARCHITECTURAL TRADITIONS

Cosmological models and architectural form. Articulation of people and built environments. House form and communication. Asian traditions in architecture. Concept of vernacular Architecture

UNIT-3 SOCIETY AND CIVILISATION

Architecture and its context. Social and cultural aspects of building practices. Architecture-expression of power. Architecture as an agent of change. Architecture as an identity

UNIT-4 INDIGENIZATION AND CULTURAL CHANGE

Transformations and changes in forms of historical architecture. Localization and globalization –cases and examples. Loss of architectural identify and role of culture

UNIT-5 ARCHITECTURAL REJUVENATION

Definition of Renewal, transformation, redevelopment, rejuvenation in architectural context and basic concepts

COs & LOs for Society, Culture And Architecture (210412)

Overall Course Outcome: The course aims to obtain knowledge about society, culture, environment, etc. in architecture design and site planning.

CO1	Students will be able to **relate** sociology with architecture and planning	LO1	**Define** various cultures and civilizations
		LO2	**Explain** fundamentals of society, culture and politics with reference to architectural history
		LO3	**Discover** forms of historical social organization
		LO4	**Identify** relationship of sociology and architecture
CO2	Students will be able to **inspect** basics of traditional architecture	LO1	**Define** different architectural forms and models
		LO2	**Illustrate** the supremacy of people on their neighboring built environment
		LO3	**Inspect** the influence of asian tradition on its architectural style
		LO4	**Analyze** the concept of traditional architecture
CO3	Students will be able to **illustrate** the site specific nature of architectural design	LO1	**Recall** architecture and its context
		LO2	**Outline** social and cultural aspects of building practices
		LO3	**Determine** architecture as an powerful agent to bring changes in society and culture
		LO4	**Conclude** architecture as an identity of a place/site
CO4	Students will be able to **distinguish** cultural change and indigenous architectural practices	LO1	**Illustrate** transformation of architectural form over a period
		LO2	**Analyze** globalization and localization with the help of suitable examples
		LO3	**Interpret** the role of culture and its impact on architectural identify
CO5	Students will be able to **apply** rejuvenation in architecture	LO1	**Define** basic terms of architectural rejuvenation
		LO2	**Categorize** concept of renewal, transformation, redevelopment, rejuvenation in architectural context

REFERENCES:

1. Conformity and Conflict: Readings in Cultural Anthropology by McCurdy, David W., Dianna Shandy, and James Spradley, eds.
2. Case examples of research on cultural anthropology
3. Field studies of communities
4. House, Form and Culture by Amos Rapoport
5. Case studies of various examples on social and cultural issues relating to architectural history in India and world.
6. Architecture in Cultural Change: Essays in Built Form and Culture Research by David G. (ed). Saile (Author)

7. Tour/ Seminar / Workshop/ NASA Training during winter break (Code – 210419)

S. No.	Subject Cod	Subject Name	Categor y	Maximum Marks Allotted							Total Mark s	CT HRS	Contact Periods per week			Total Credi ts	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficienc y in subject/ course	Mid Sem.	Quiz/ Assign ment /Session al		Lab work & Sessional	Skill based mini project								
8.	**210419**	our/ Seminar / Vorkshop/ NASA raining during wint reak	SEC- 5	-	-	-	-	50	-		50	2	-	-	2	**1**	SO	Offline

8. INDIAN CONSTITUTION (Code – 100001)

S. No.	Subject Cod	Subject Name	Catego ry	Maximum Marks Allotted							Total Mark s	CT HRS	Contact Periods per week			Total Credi ts	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficienc y in subject/ course	Mid Sem.	Quiz/ Assign ment /Session al		Lab work & Sessional	Skill based mini project								
9.	[$]**100001**	Indian constitution	MAC- 2	50	10	20	20	-	-	-	100	2	2	-		Grad e	MCQ	Online

THIRD YEAR FIFTH SEMESTER

1. Architectural Design – V (Code – 210514)

Objectives –

The course aims to obtain knowledge Architecture as a design response to the culture of a place, artistic expressions with common building materials such as brick, concrete, steel & glass, building components using the same building material, designing various services and spaces required specifically for a particular use.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
1.	**210514**	Architectural Design – V	DC- 12	100	20	20	20	50	30	10	250	8	2	3	2*(1.5)	**8**	AO	Offline**

PROJECT I: MATERIAL STUDIO

Studio project: Cultural Center / Multiplex with mall. The cultural center project exposes the student to the design issues such as effects by manipulating day light in the art gallery space, designing for clear sight lines and sound in the auditorium space & optimizing day light for reading in the library space. The additional challenge is to create spaces for fine arts & performing arts by creating artistic expressions with building materials such as brick, concrete etc. The multiplex project expects the student to the design issues involved in entertainment spaces such as cinema halls and the challenges in creating commercial spaces such as food courts, shops, gaming parlours etc. Moreover, it exposes the student to contemporary materials such as steel, aluminum & glass.

PROJECT II: HEALTHCARE BUILDINGS

Hospitals and Nursing homes are a special category of buildings where functional aspects such as planning, building services & the creation of a sterile environment become important design issues. This project aims to familiarize the student with the design of critical health care spaces such as operation theatres, diagnostic facilities, outpatient department and inpatient rooms. The modern trends in hospital design challenge the architect to create world class ambience.

PROJECT 3 (Prototype): Time bound Problems of 6 hours to 48 hours.

COs & LOs for Architectural Design – V (210501)

Overall Course Outcome: The course aims to obtain knowledge Architecture as a design response to the culture of a place, artistic expressions with common building materials such as brick, concrete, steel & glass, building components using the same building material, designing various services and spaces required specifically for a particular use.

CO's	The course should enable the student to: • Familiarize with given topic of design by choosing appropriate	LO1	Analyze the culture of a place – building types such as the cultural center comprising of spaces such as the art gallery, auditorium for performing arts, library etc.
		LO2	Identify the various common building materials such as brick, concrete, steel & glass.

	case studies through visits and documentation. ● Understand the resources available at National and international level through books, literatures and websites. ● Develop design ideas and create them.	LO3	Examine the same building material through Material studio.
		LO4	Illustrate with materials to find suitable artistic & commercial expressions and the learning of design methods for healthcare buildings.
		LO5	Design commercial buildings integrating entertainment spaces, where the student is given exposure to the finer aspects of auditorium design.
		LO6	Express the design with drawings and model to support the concept.

REFERENCES:

1. Richard Weston, Plan sections & elevations of key buildings of the 20th century, Lawrence king publishing, London,2004.
2. Time saver standards for building types, De Chiara and Callender, McGraw hill company
3. Neufert Architect's data, Bousmaha Baiche& Nicholas Walliman, Blackwell science ltd.
4. National Building Code – ISI
5. Time saver standards for landscape architecture – Charles W Harris – McGraw Hi

2. Building Construction –IV (Code – 210515)

Objectives –

The course aims to obtain knowledge of detail the various materials used in construction, various advanced structural components, modern masonry units, and its components, types of insulation and temporary structures.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
2.	**210515**	Building Construction –IV	BSAE-11	50	10	20	20	20	20	10	150	5	2	1	2*(1.5)	**6**	PP	Blended** (3/3)

UNIT-1 BUILDING MATERIALS –IV

• Steel: Properties and uses of cast iron, wrought iron, pig iron, and steel.

• Market forms of steel: Structural steel, stainless steel, steel alloys – properties and uses.

UNIT -2 STEEL

• Steel trusses – Sawtooth roof truss with north light glazing, simple trusses in steel, and types of connections – to foundations, steel stanchion, and beams.

• Space frames:-Single, double & triple-layered tubular space frames, Gates: collapsible gate, entrance gate, rolling shutter.

• Steel components: Steel doors, (hinged, fixed sliding, sliding &folding& Revolving door. steel windows (casement window & sliding window) Steel stairs (dog-legged, spiral stair) steel handrails and balustrade grill designs for windows, main gate design.

UNIT-3 WALL & FLOOR

• Wall: Modern masonry units - Fly ash brick, Aerated concrete blocks, Hollow concrete blocks & Hollow clay blocks

• Floor finishes– Indian patent stone (IPS), Terrazzo flooring, Granolithic flooring stone flooring, Resilient flooring & Carpeting.

UNIT-4 PARTITIONS & FALSE CEILING:

• Simple paneled and glazed partitions: Timber, Glass, Aluminium & PVC.

• Falseceiling: False ceiling of interior spaces using wood panels, glass, Thermacol, gypsum board, plaster of Paris, aluminum strips & perforated metal sheets.

• Jam casing, skirting, molding, architrave & pelmet

UNIT-5 THERMAL INSULATION AND ACOUSTICS INSULATION

• Thermal insulation: vapor barriers and rigid insulations, blanket, poured and reflective insulation– properties and uses of spun glass foamed glass, cork, vegetable fibers Gypsum plaster of Paris, hydride gypsum properties and their uses.

• Acoustics insulation: porous, baffle and perforated materials such as Acoustic plastic, Acoustic tiles,wood, partition board, fiberboard, cook, quilts and mats – their properties and uses – current developments. Applications of the above insulations in seminar hall, theatre, and cold storage.

COs & LOs for Building Construction – IV (210502) Overall Course Outcome: The course aims to obtain knowledge of detail the various materials used in construction, various advanced structural components, modern masonry units, and its components, types of insulation and temporary structures.			
CO1	As a result of studying properties and uses of cast iron, wrought iron, pig iron and steel, student will be able to understand market forms of steel in depth.	LO1	**Learn** Properties and used of cast iron, wrought iron, pig iron and steel.
		LO2	**Understand** the material and construction techniques through site visit and market surveys
		LO3	**Develop** a fundamental understanding of the relationship of materiality to construction systems and techniques
		LO4	**Analyze** The detail of materials with different combinations in buildings.
		LO5	**Produce** construction detail of Steel sections and connections.
CO2	As a result of studying about steel, student will be able to understand the components of steel used in building in various forms with respect to the design.	LO1	**Learn** the terminology of trusses, frames and other steel components in building.
		LO2	**Understand** the need of various types of trusses and frames in building.
		LO3	**Develop** a fundamental understanding of types of trusses and frames in steel in a building.
		LO4	**Analyze** the details of various trusses and frames in building.
		LO5	**Produce** details of various trusses, frames, doors and windows.
CO3	As a result of studying about modern masonry units and floor finishes, student will be able to make use of these details in building construction.	LO1	**Learn** types modern masonry units and floor finishes.
		LO2	**Understand** the difference between the materials used for modern masonry units and floor finishes.
		LO3	**Analyze** types of masonry units and floor finishes.
		LO4	**Understand** the details of the above.
		LO5	**Produce** construction details of walls with modern masonry units and floor finishes.
CO4	As a result of Studying about false ceiling, student will be able to understand how wires can be concealed, sound proofing and energy efficiency.	LO1	**Understand** simple panelled, glazed partitions and false ceiling.
		LO2	**Identify** suitable material required for the construction of doors, windows, ventilator, arches etc.
		LO3	**Classify** the components based on their arrangements, method or manner of construction.
		LO4	**Design** interior wall panelling and suspended ceiling detail drawings
		LO5	**Produce** the drawings of simple panelled and glazed partitions.
CO5	As a result of studying about thermal ad acoustics insulation, student will be able to make use of various material wrt to building type.	LO1	**Understand** thermal insulation and acoustics insulation.
		LO2	**Identify** methods in which thermal and acoustics can be achieved.
		LO3	**Classify** the components and terminology.
		LO4	**Summarize** thermal insulation techniques, acoustical treatment details for different spaces.

REFERENCES:

1. W.B. Mckay – Building construction Vol. 1 (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition)
2. R.Chudley &R. Greeno – Building Construction Handbook, ninth edition
3. Francis D.K. Ching – Building Construction illustrated, 4th edition, 2015
4. R.Chudley &R. Greeno – Building Construction Handbook, ninth edition
5. Arthur Lyons, Materials for Architects and Builders – Oxfordshire, England, New York : Routledge, 2014
6. Don A.Watson, construction materials and process, McGraw Hill Co, 1972
7. Stephen Emmitt, Christopher A. Gorse - Barry's Advanced Construction of Buildings, 3rd Edition
8. The American Institute of Architects - Architectural Graphics standards – 11th edition

Note: Total five questions shall be asked. Each question will consist of two parts, one of which will be of 7 marks (which shall be compulsory) and another with 3 marks(which shall be optional).

3. Building Services-II (Electrical & Mechanical) (Code – 210516)

Objectives –

The course aims to obtain knowledge of various services in a building such as electrical, illumination, etc., an understanding of layouts of electrical, plumbing, AC ducts, lighting, etc., Air conditioning system and its working.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
3.	**210516**	Building Services-II (Electrical & Mechanical)	BSAE-12	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Blended* (2/1)

UNIT-1 ELECTRICAL SERVICES

Electrical systems – Basic of electricity – single/Three phase supply , Electrical installations in buildings – Types of wires, Wiring systems and their choice, planning electrical wiring for building – Main and distribution boards, HT transformers, electrical panel rooms, cable trenches, controls, Circuits, fuses, main switch box, meter box, circuit breakers. Uninterrupted power supply, inverters, protective devices in electrical installation – Earthing for safety – Types of earthing – ISI Specifications, Lighting protection Electrical installations in various building types, Residential bungalow, apartments, commercial recreational buildings and factory buildings etc. Market survey of Electrical materials and electrical appliances.

UNIT-2 ILLUMINATION AND LIGHTING DESIGN

Principles of Illumination: Basics of Lighting Technology and Terminology, Classification of lighting–Artificial light sources. Systems of lighting such as direct, indirect, diffused etc.,

Design of modern lighting: Lighting for stores, offices, schools, hospitals and house lighting.Elementary idea of special features required and minimum level of illumination required for physically handicapped and elderly in building types. Seeing light: learn about vision and perception, color, and - understanding shade and shadow Light fixture :Controlling light, luminaire optics and distributions - introduction to light fixture materialsand construction, and components Light in Architecture and the Psychology of Light,

Lighting Design Concepts, Lighting in terms of energy efficiency, ergonomic aspects and aesthetic aspects. Light a surface: Horizontal and vertical - present various approaches and techniques - finding lightfixtures. For a Task - present various approaches and techniques, simple lighting effects.

Calculating Light: learn light metrics and calculation methods - review energy and the environment Lighting calculations Lighting Design :Residential lighting, Office and Corporate Lighting, Hospitality Lighting Design, Health Care/Institutional Lighting Design, Lighting for Stores, Lighting Common Spaces

UNIT-3 AIR CONDITIONING

Components of an air-conditioning system & their function-Refrigeration cycle, different systems of AC, window, split, small standalone unit, and air cooled direct expansion system used for auditorium spaces, chill water systems with air handling units, estimating the cooling load of different spaces in a building with simple calculation, duct lay out for both types of systems. Intelligent building systems in air conditioning, Sick building syndrome, effect of pollutants, improving air quality in air-conditioned buildings.

UNIT-4 PUMPS AND MACHINERIES

Pumps: Different types of Pumps, working, applications. Water pumps, sewage pumps, Centrifugal,Reciprocating pump, turbine (diagrams & functioning only)
Compressors: Different types of Compressors and their applications.
Lifts And Escalators : Elevators (Lifts) and escalators–Brief history-types of Elevators like traction,Hydraulic etc., Double-decker, sky lobby, lift lobby, lift interiors etc., Definition and components Elevatoring a building: environmental considerations i.e., location in building, serving floors, grouping, size, shape of passenger car, door arrangement etc., Service requirements: Quality of service, quantity of service, time, passenger handling capacity, space and physical requirements, machine room spaces and its typical layout Escalators – Definition, Application. Location and arrangement in buildings. Space requirement, Conveyor belts-movement of passengers and goods

UNIT-5 ELECTRICAL AND AC DUCT LAYOUT OF SIMPLE BUILDINGS

Fixtures and accessories used in electrical installation –Preparing an electrical layout for part of design project, with simple load calculations. Design consideration for AC plant location and size. Ac ducting layout for an office building, shopping complex etc.

COs & LOs for BUILDING SERVICES-II

Overall Course Outcome: The overall aim of the course is to introduce students to the various electrical and mechanical systems in building of various scales and also to make them understand electric layouts, fixtures and their sustainable applications in buildings.

CO1	To understand the basics of electric supply in buildings, guidelines for electric installations and safety measures	LO1	**Understand** the principles of electricity, installation and safety in electricity supply
		LO2	**Observe** the methods of electricity supply in metropolitan areas, methods of wiring and earthing etc
		LO3	**Analyse** the guidelines for electric installations in various buildings
		LO4	**Survey** on electric materials and appliances.
CO2	To learn the application of lighting design principles in design and evaluate lighting requirements using light metrics	LO1	**Understand** the principles of lighting design, classification and systems of lighting in buildings.
		LO2	**Observe** the lighting design requirements for various buildings based on function, occupants and usage.
		LO3	**Analyse** the psychology of lighting design and concepts based on efficiency, ergonomics and aesthetics
		LO4	**Survey** on electric materials and appliances.
		LO5	**Evaluate** lighting requirement based on light metrics and calculations
CO3	To evaluate the HVAC systems in buildings, their principles and methods of air conditioning	LO1	**Define** the principles of air conditioning in buildings, types and methods of air conditioning.
		LO2	**Analyse** air conditioning requirements in different types of enclosed spaces, load calculation and
		LO3	**Identify** various systems of air conditioning in buildings and their sustainable application

		LO4	**Evaluate** the effects of air conditioning such as sick building syndrome and pollutants.
CO4	To understand the functioning of various mechanical systems and their installation in buildings	LO1	**Understand** the working of various mechanical systems in building, its classification, design considerations
		LO2	**Analyse** the environmental considerations and service requirements in installation of mechanical devices.
		LO3	**Evaluate** the space requirements, location and arrangement of mechanical devices in buildings
CO5	To prepare electric layouts and HVAC layouts for large buildings	LO1	**Evaluate** the air conditioning layout of any existing building
		LO2	**Evaluate** the electrical layout of any existing building
		LO3	**Prepare** the electric layout for buildings of various scales
		LO4	**Prepare** the air conditioning layout for large buildings
		LO5	**Calculate** the power load and cooling load for various buildings

REFERENCES:

1. Heating, Cooling, Lighting: Sustainable Design Methods for Architects Oct 13, 2014 by NorbertLechner DEWALT Plumbing Code Reference: Based on the 2015 International Plumbing and Residential Codes (DEWALT Series)

2. Electrical Wiring Residential Jan 1, 2011by Ray C. Mullin and Phil Simmons

3. Architectural Lighting: Designing with Light and Space (Architecture Briefs),May 4, 2011 by Hervé Descottes and Cecilia Ramos.

4. HVAC Design Sourcebook Oct 26, 2011, by W. Larsen Angel

4. Building Sciences & Energy Conservation (Code – 210517)

Objectives –

The course aims to obtain knowledge of building sciences such as design methodology, resource optimization and innovative approaches to eco-design, the acclaimed sustainable buildings designed within the past decade, energy conservation through building design, designing an eco-building.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
4.	**210517**	Building Sciences & Energy Conservation	BSAE-1	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Blended* (2/1)

UNIT-1 CLIMATE &THERMAL COMFORT

Global climatic factors, elements of climate, classification & characteristics of tropical climates, site climate and Urban climate - Thermal balance of the human body, Thermal comfort indices – Effective temperature, CET, calculation of comfort zone & determination of overheated& under heated periods.

UNIT-2 SOLAR GEOMETRY &DESIGN OF SUNSHADING DEVICES

Apparent movement of the sun, sun path diagrams (solar chart) - Solar angles, Shadow angles, solar shading masks. etc - Exercises on plotting isopleths, transfer of isopleths to solar chart, fitting a shading mask over the overheated period & design of sun shading devices for different orientations.

UNIT-3 PRINCIPLES OF THERMAL DESIGN IN BUILDINGS

Thermal quantities – heat flow rate, conductivity (k–value)& resistivity, conductance through a multilayered body, surface conductance, transmittance – U value of different materials – convection , radiation , concept of sol-air temperature & solar gain factor - heat loss & heat gain .Periodic heat flow in building – time lag & decrement factor & its application in selection of appropriate materials for walls & roof. Effect of Insulation & cavity on time-lag.

UNIT-4 VENTILATION & DAY LIGHTING

Functions of ventilation – stack effect due to the thermal forces, wind velocity – wind rose diagram, wind pressure - Air movement through building & around buildings – factors affecting indoor air flow, wind shadow etc. - The nature of light , its transmission , reflection – colored light, the Munsell system
Photometric quantities – illumination, day lighting prediction – the daylight design graph.

UNIT-5 DESIGN FOR CLIMATIC TYPES

Building design & layout planning consideration for warm humid, hot dry, composite & tropical upland climates, climatic data sets – analysis – climate graph – the Mahoney tables & its recommended specification - Exercises on design of small Buildings for various climates.

COs & LOs for Building Sciences & Energy Conservation (210504)			
Overall Course Outcome: The basic objective of this course is to make students learn about human thermal comfort along with required construction techniques and designing strategies to achieve it. It would deal with the study of climate and its relation with the built environment.			
CO1	**Label** various climatic factors affecting human body	LO1	**Define** global climatic factors and elements
		LO2	**Classify** various climatic parameters on micro and macro level of site (tropical climates, site climates and urban climate)
		LO3	**Examine** thermal comfort indices for thermal balance in human body
		LO4	**Identify** overheated and under heated periods
CO2	**Evaluate** characteristics of building openings according to its orientation	LO1	**Relate** sun path and its dynamics to site planning and building designing
		LO2	**Illustrate** winter & summer solar angles per day for designing proper shading devices
		LO3	**Experiment with** heliodon device used to simulate the sun and shadow patterns that occur at various locations and times across the surface of the earth
		LO4	**Analyze** various aspects of solar geometry in building orientation
CO3	**Assess** various building materials in order to achieve thermal comfort inside a building	LO1	**Define** thermal quantities
		LO2	**Outline** U values of different building materials to identify their extent of thermal insulation
		LO3	**Make use** of dry bulb and wet bulb thermometers, rain gauge, etc.
		LO4	**Determine** appropriate materials for walls & roof according to periodic heat flow in building
CO4	**Influence** the integration natural elements as part of built environment	LO1	**Illustrate** stack effect for passive air movement throughout a building
		LO2	**Analyze** natural light transmission, day lighting penetration inside a building
		LO3	**Make use** of anemometers to identify wind direction and speed during site analysis
		LO4	**Test** stack effect and natural light transmission on any of the student's design problem
CO5	**Adapt** climate specific building design strategies in one of the student's design problem	LO1	**Know** all climatic zones exists and their climate data sets
		LO2	**Categorize** various building design & layout planning for different climatic conditions
		LO3	**Adapt** building design strategies of different climatic zones in one of the student's design

REFERENCES:

1. O.H. Koenigsberger, Manual of Tropical housing and building – Climatic Design, Orient Longman, Chennai, 1975.
2. M .Evans – Housing, Climate &Comfort , Architectural Press, London ,1980.
3. E.Schild &M. Finbow – Environmental Physics in construction & its application in Architectural Design Granadar , London, 1981.
4. B.Givoni - Man, Climate & Architecture, Applied Science, Essex 1982.
5. Donald Watson & Kenneth labs – Climatic Design – Mcgraw hill NewYork 1983.
6. A.Konya- Design Primer for Hot Climates, Architectural Press, London, 1980.

5.ELECTIVE- II

a. ARCHITECTURAL PHOTOGRAPHY & JOURNALISM (210521)

Objectives –
To provide the skills relevant to the practice of professional journalism, and to introduce students to· the fundamentals of writing, explaining various strategies and their criticism.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation				L	T	P			
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
5.	**210521**	Architectural Photography & Journalism	DE-2	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Blended* (2/1)

UNIT -1 INTRODUCTION TO ARCHITECTURAL PHOTOGRAPHY
General introduction to the art of photography; concept of color; concepts of lighting, distance, visual angle, frames; media. Technical definitions, types of lighting fixtures, types of flashes, controlling lighting levels with flash photography.Color rendering in photographic medium, color rendering in photographs under different lighting condition, lighting colors and its effect on a photograph, color filters in a camera. Exercise in lighting photography with artificial light and black and white photos.

UNIT-2 PHOTOGRAPHIC TECHNIQUES AND COMPOSITION
Equipment: cameras and lenses – techniques: film speed, exposure measurement, gray scale– photofinishing and editing digital images. Perspectives: Single Point, Two- Point, Three- Point and methods of correcting distortions – Lighting: External and Interior

UNIT-3 JOURNALISM

Introduction to journalism, key concepts and objectives of Journalism – Specialized journalism: with emphasis on architectural journalism - Journalism skills: research, reporting, writing, editing, criticism.

UNIT- 4 DISCUSSIONS AND ISSUES

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

UNIT-5 FIELD PROGRAM

Exercise on integrating photography in architectural journalism.

COs & LOs for Building Sciences & Energy Conservation (210504)

Overall Course Outcome: The basic objective of this course is to make students learn about human thermal comfort along with required construction techniques and designing strategies to achieve it. It would deal with the study of climate and its relation with the built environment.

CO1	**Label** various climatic factors affecting human body	LO1	**Define** global climatic factors and elements
		LO2	**Classify** various climatic parameters on micro and macro level of site (tropical climates, site climates and urban climate)
		LO3	**Examine** thermal comfort indices for thermal balance in human body
		LO4	**Identify** overheated and under heated periods
CO2	**Evaluate** characteristics of building openings according to its orientation	LO1	**Relate** sun path and its dynamics to site planning and building designing
		LO2	**Illustrate** winter & summer solar angles per day for designing proper shading devices
		LO3	**Experiment with** heliodon device used to simulate the sun and shadow patterns that occur at various locations and times across the surface of the earth
		LO4	**Analyze** various aspects of solar geometry in building orientation
CO3	**Assess** various building materials in order to achieve thermal comfort inside a building	LO1	**Define** thermal quantities
		LO2	**Outline** U values of different building materials to identify their extent of thermal insulation
		LO3	**Make use** of dry bulb and wet bulb thermometers, rain gauge, etc.
		LO4	**Determine** appropriate materials for walls & roof according to periodic heat flow in building
CO4	**Influence** the integration natural elements as part of built environment	LO1	**Illustrate** stack effect for passive air movement throughout a building
		LO2	**Analyze** natural light transmission, day lighting penetration inside a building
		LO3	**Make use** of anemometers to identify wind direction and speed during site analysis
		LO4	**Test** stack effect and natural light transmission on any of the student's design problem
CO5	**Adapt** climate specific building design strategies in one of the student's design problem	LO1	**Know** all climatic zones exists and their climate data sets
		LO2	**Categorize** various building design & layout planning for different climatic conditions
		LO3	**Adapt** building design strategies of different climatic zones in one of the student's design

REFERENCES:

1. Julian Calder and john Garrett, The 35mm Photographer's Handbook, Pan Books, London 1999

2. Julie Adair King, Digital Photography for Dummies, COMDEX, New Delhi 1998

3. Professional photography –photographing buildings, David Wilson, Rotovision

4. Point view- The art of architectural photography , E.Manny A Ballan, VNR

5. Huckerby, Martin., The Net for Journalists: A Practical Guide to the Internet for Journalists in Developing Countries. UNESCO/Thomson Foundation/ Common wealth Broadcasting Association, 2005. 6. Ward, S. J. A. "Philosophical Foundations of Global Journalism Ethics." Journal of Mass Media Ethics., Vol. 20, No. 1, 3-21, 2005

b. VERNACULAR ARCHITECTURE (210522)

Objectives -

Introduce traditions of building structures for habitation, made without the intervention of professional architects. Anticipated Learning

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation				L	T	P			
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
5.	**210522**	Vernacular Architecture	DE-2	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Blended* (2/1)

Unit 1: Introduction to the field of Vernacular Architecture Defining and differentiating vernacular architecture from contemporary architecture, Scope of Vernacular Architecture in Indian Context , Factors Influencing Vernacular Architecture, Building Material and Construction Techniques in Indian Vernacular Architecture, Vernacular Architecture in 21st Century

Unit2: Vernacular Architecture of Rajasthan Local Community rural Houses and havelis from Rajasthan, Shekhawati Haveli of Rajasthan, Construction techniques and materials of the region.

UNIT 3: Vernacular Architecture of Gujarat, Sociology and Planning, Woodwork Details of Gujarat, and Construction techniques and materials of the region.

UNIT 4: Vernacular Architecture of East and North their settlement pattern and Construction techniques and materials of the region.

UNIT 5: Vernacular Architecture of the South Regional topography, local climate, variation in settlement pattern and architecture in different parts of the region and construction techniques and materials of the region.

COs & LOs for Building Sciences & Energy Conservation (210504)			
Overall Course Outcome: The basic objective of this course is to make students learn about human thermal comfort along with required construction techniques and designing strategies to achieve it. It would deal with the study of climate and its relation with the built environment.			
CO1	**Label** various climatic factors affecting human body	LO1	**Define** global climatic factors and elements
		LO2	**Classify** various climatic parameters on micro and macro level of site (tropical climates, site climates and urban climate)
		LO3	**Examine** thermal comfort indices for thermal balance in human body
		LO4	**Identify** overheated and under heated periods
CO2	**Evaluate** characteristics of building openings according to its orientation	LO1	**Relate** sun path and its dynamics to site planning and building designing
		LO2	**Illustrate** winter & summer solar angles per day for designing proper shading devices
		LO3	**Experiment with** heliodon device used to simulate the sun and shadow patterns that occur at various locations and times across the surface of the earth
		LO4	**Analyze** various aspects of solar geometry in building orientation
CO3	**Assess** various building materials in order to achieve thermal comfort inside a building	LO1	**Define** thermal quantities
		LO2	**Outline** U values of different building materials to identify their extent of thermal insulation
		LO3	**Make use** of dry bulb and wet bulb thermometers, rain gauge, etc.
		LO4	**Determine** appropriate materials for walls & roof according to periodic heat flow in building
CO4	**Influence** the integration natural elements as part of built environment	LO1	**Illustrate** stack effect for passive air movement throughout a building
		LO2	**Analyze** natural light transmission, day lighting penetration inside a building
		LO3	**Make use** of anemometers to identify wind direction and speed during site analysis
		LO4	**Test** stack effect and natural light transmission on any of the student's design problem
CO5	**Adapt** climate specific building design strategies in one of the student's design problem	LO1	**Know** all climatic zones exists and their climate data sets
		LO2	**Categorize** various building design & layout planning for different climatic conditions
		LO3	**Adapt** building design strategies of different climatic zones in one of the student's design

REFERENCES:

1. Dawson Bary, Cooper Ilay : Traditional Buildings of India,1998
2. Michell, G., Penguin Guide to the Monuments of India, Vol I, Viking, London 1989.
3. Tadgell, The History of Indian Architecture, Design and Technology Press, London 1990.
4. Paul Oliver, Encyclopedia of Vermacular Architecture of the World, Cambridge University Press, 1997.
5. V.S. Praman, Havali – Wooden Houses & Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
6. Kullrishan Jain & Minakshi Jain – Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad, 1992.
7. G.H.R. Tillotsum ;The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.
8. Richardson,Vickey; New Vernacular Architecture: Laurance King Publishing,2001

c. BASICS OF WEB DEVELOPMENT (210523)

Objectives -

Gaining foundational knowledge in web development, HTML, CSS, and JavaScript to enhance digital design skills and employability in architectural firms with a focus on online platforms and interactive web-based projects.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
5.	**210523**	Basics of Web Development	DE-2	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Blended* (2/1)

Unit 1: Introduction to Web Development

- Understanding the basics of websites and the internet
- Exploring the role of HTML and CSS in web development
- Creating a simple webpage using HTML and CSS

Unit2: Introduction to JavaScript

- Introduction to JavaScript and its role in web development
- Basic JavaScript syntax and variables
- Adding interactivity to webpages using JavaScript

UNIT 3: Responsive Web Design

- Understanding the concept of responsive web design
- Creating responsive layouts using CSS media queries
- Implementing responsive design principles in web development

UNIT 4: Introduction to Front-End Frameworks

- Overview of popular front-end frameworks (e.g., Bootstrap, Foundation)
- Utilizing pre-built components and grid systems in web development
- Creating responsive and visually appealing websites using front-end frameworks

UNIT 5: Introduction to Web Hosting and Deployment

- Understanding web hosting and domain registration
- Deploying a website to a web server
- Testing and optimizing the performance of a website

COs & LOs forBasics of Web Development (210523)			
Overall Course Outcome: The basic objective of this course is to make students learn about web development, JAVA and web hosting so that they are able to deploy a website and optimize the performance of a website.			
CO1	**Compare** different web development frameworks and their advantages.	LO1	Recall the key steps involved in the web development process.
		LO2	Explain the roles and functions of web browsers in rendering web pages.
		LO3	Organize and manage files and project structure for effective web development.
		LO4	Compare different web development frameworks and their advantages.
CO2	**Construc**t hyperlinks, images, and multimedia elements within HTML documents.	LO1	Recognize and apply HTML tags, elements, and attributes to structure web content.
		LO2	Construct hyperlinks, images, and multimedia elements within HTML documents.
CO3	**Apply** color, backgrounds, and typography to enhance web design.	LO1	Implement CSS syntax and selectors to style HTML elements.
		LO2	Apply color, backgrounds, and typography to enhance web design.
CO4	**Modify** the Document Object Model (DOM) using JavaScript functions and events.	LO1	Utilize JavaScript syntax and variables to create interactive web elements.
		LO2	Modify the Document Object Model (DOM) using JavaScript functions and events.
CO5	**Deploy** a website to a web server and optimize its performance for efficient web publishing.	LO1	Develop responsive web designs that adapt to different devices and screen sizes.
		LO2	Deploy a website to a web server and optimize its performance for efficient web publishing.

REFERENCES:

1. "HTML and CSS: Design and Build Websites" by Jon Duckett
2. "JavaScript and JQuery: Interactive Front-End Web Development" by Jon Duckett
3. "Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics" by Jennifer Niederst Robbins
4. "Web Development and Design Foundations with HTML5" by Terry Felke-Morris
5. "Eloquent JavaScript: A Modern Introduction to Programming" by Marijn Haverbeke
6. "Responsive Web Design with HTML5 and CSS3" by Ben Frain
7. "Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5" by Robin Nixon
8. "CSS Secrets: Better Solutions to Everyday Web Design Problems" by Lea Verou
9. "Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics" by Jennifer Niederst Robbins
10. "The Principles of Beautiful Web Design" by Jason Beaird

6. Self-study, Seminar (SWAYAM/NPTEL & MOOC) (Code – 210518)

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
6.	-	Self study, Seminar (SWAYAM/NPTEL & MOOC)	SEC-6	-	-	-	-	-	100		100	4	-	-	4	**2**	SO	Offline

Note: Any one of the course available on SWAYAM shall be opted and shall not be repeated throughout the course (B.Arch.)

7. Novel engaging courses

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
7.	-	Novel engaging courses	CLC	-	-	-	-	-	50		50	2	-	-	2	**1**	SO	Interactive

8. Summer Internship Project- II (Code – 210519)

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
7.	210519	Summer Internship Project- II	SEC-7	-	-	-	-	50	-	-	50	2	-	-	2	**1**	SO	Offline

Seminar / Workshop/ Training during previous Summer break will be evaluated

9. Disaster management – 100005

OBJECTIVE -The objective of the subject is to introduce the students about reduce or avoid the potential losses from hazards, assure prompt and appropriate assistance to the victims of a disaster, and achieve a rapid and effective recovery.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
7.	1000005	Disaster management	MAC-1	50	10	20	20	-	-	-	100	2	2	-	-	Grade	PP	Online

UNIT- 1 NATURAL HAZARDS AND DISASTER MANAGEMENT

Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity – Disaster and Development, Disaster management and Disaster Management cycle Understanding the Causes and effects of natural calamities - floods, tropical cyclones, landslides, heat waves & Tsunami. Institutional and Financial Mechanism National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national),Non-Government and Inter-Governmental Agencies

UNIT- 2 ELEMENTARY SEISMOLOGY, EARTHQUAKE EFFECT AND SEISMIC DESIGN PRINCIPLES

Major Historic Earthquakes in the World, earthquake hazard map of India, Causes of Earthquakes: Elastic Rebound theory, Continental Drift and Plate Tectonics, Types of Plate Boundaries, types Of faults, seismic waves – classification of body waves and surface waves, magnitude, intensity, epicenter and energy release, Introduction to Seismic zones, Need for Seismic Zonation, Types of Zonation and Seismic Zonation scales

Earthquake Effects:- On ground, soil rupture, liquefaction and landslides, Behaviors of various types of buildings, lifelines and collapse patterns, Behavior of Non Structural Elements like services, fixtures, mountings etc., Social & Economic Consequences of earthquakes

Concept of seismic design, stiffness, strength, period, ductility, damping, hysteric energy dissipation, center of mass, center of rigidity, torsion, design eccentricities, Seismic effects related to building configuration. Plan & vertical irregularities, Ductility based design: Design of energy absorbing devices, Seismic base isolation and seismic active control.

UNIT- 3 EARTHQUAKE RESISTANT CONSTRUCTION DETAILS AND DESIGN GUIDELINES

Various Types and construction details of Foundations, soil stabilization, retaining walls, plinth fill, flooring, walls, openings, roofs, terraces, parapets, boundary walls, underground and overhead tanks, staircases and isolation of structures. Local practices: traditional regional responses.

Design guidelines for disaster resistant construction at appropriate situations - Engineering, architectural, landscape & planning solutions for floods, tropical cyclones & Tsunami

UNIT- 4 REHABILITATION AND RECONSTRUCTION

Concept of Rehabilitation and Reconstruction, Types of Rehabilitation, Architecture at Risk, Guiding Principles of Rehabilitation and Reconstruction, Different Case Examples of Post Disaster Recovery in and Around India. Problem Areas in Disaster Recovery, Inter-linkages between Recovery and Development.

UNIT- 5 FIRE SAFETY, RESISTANCE & HAZARD MANAGEMENT IN BUILDINGS

Fire, Causes of Fire and Spread of Fire, Fire Fighting, Protection and Fire Resistance, Equipments and Methods of Fighting Fire, Code of Fire Safety, Fire Regulations, Combustibility of Materials. Structural material and Fire Resistance, Planning and Design of Fire Escape Routes and Elements, Wet Risers, Sprinklers, Smoke Detectors, Fire Dampers, Fire Doors & Water Curtains etc.

COs & LOs for Disaster management (100007)

Overall Course Outcome: The basic objective of this course is to introduce the students about reducing and avoiding the potential losses from hazards, assure prompt and appropriate assistance to the victims of a disaster, and achieve a rapid and effective recovery.

CO1	**Define** disaster management and its implementation	LO1	**Define** hazard, disaster, vulnerability and capacity building
		LO2	**Classify** causes and effects of natural calamities
		LO3	**Examine** the disaster management processes
		LO4	**Identify** the role of various institutions in disaster management
CO2	**Summaries** the cause of the earthquake and various seismic zones.	LO1	**List** major Historic Earthquakes in the World
		LO2	**Illustrate** the cause of earthquake and basic terminologies
		LO3	**Analyse** the concepts of response spectrum
		LO4	**Determine** the use of different Seismological Instruments
CO3	**Identify** physical aspect affecting design principles at different seismic locations	LO1	**Recall** the physical effects of Earthquake
		LO2	**Outline** the behavior of Non Structural Elements and Social & Economic Consequences of earthquakes
		LO3	**Illustrate** building configuration based on seismic characteristics of the sites
		LO4	**Perceive** seismic design principles
CO4	**Perceive** different construction techniques to make structure earthquake resistant	LO1	**Recall** building elements where seismic risk reduction intervention could be done
		LO2	**Summarize** the construction details and various types of building elements specific to earthquake resistance
		LO3	**Appraise** local and traditional earthquake response practices
CO5	**Conclude** existing design guidelines as solution to adverse impact of disasters	LO1	**Infer** case studies of disaster management - earthquake, cyclone, landslides, floods, tsunamis, droughts, etc
		LO2	**Categorize** design guidelines for disaster resistant construction at appropriate situations

REFERENCES:

1. Agarwal Pankaj, Shrikhande Manish , Earthquake Resistant Design Of Structures, Prentice-Hall of India, New Delhi, 2006
2. S. K. Duggal, Earthquake Resistant Design Of Structures, Oxford University Press, 2007
3. Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management
4. Guidelines For Reconstruction Of Houses Affected By Tsunami, UNDP India, & Government Of Tamil Nadu, 2004
5. Manual on natural disaster management in India, M C Gupta, NIDM, New Delhi
6. Disaster Management Act 2005, Publisher by Govt. of India
7. SERC Guidelines for Design and Construction of buildings and structures in cyclone-prone areas, SERC, CSIR, Government of India, 1998,
8. IS 1893(Part 1):2002 'Criteria for Earthquake Resistant Design of Structures: Part 1 General provisions and Buildings'
9. Ramachandran G. , Charter D. (2011) Fire Safety and Risk Management, SPON Press, NewYork.
10. Martin Muckett, Andrew Furness (2007) Introduction to Fire Safety Management, Taylor & Francis. NewYork.
11. Bureau of Indian Standerd (2005)
12. National Building Code (2016)
13. Taranath B.S. (2004). Wind and Earthquake Resistant Buildings: Structural Analysis and Design. CRC Press.
14. World Bank (2009). Handbook for Reconstructing after Natural Disasters.

THIRD YEAR SIXTH SEMESTER

Architectural Design – VI (Code – 210621)

Objectives –

The course aims to obtain knowledge of Architecture as a design response to Technology, hospitality industry in the first project & requires the student, large scale building with Innovation & experimentations.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation				L	T	P			
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
1.	210621	Architectural Design VI	DC- 13	100	20	20	20	50	30	10	250	7	2	3	2*(1.5)	**8**	AO	Offline**

PROJECT I: DESIGN FOR HOSPITALITY INDUSTRY

The project requires the understanding of the special nature and functioning of the hotel industry and to respond with suitable concepts of space planning, circulation, interior design, materials and lighting. Example: Hotels- Business, resort, heritage, boutique etc. The student needs to concentrate on site planning, space planning, circulation, services and the various aspects of interior design such as furniture, flooring, ceiling, lighting etc. Students get exposure to the difference between a business hotel & a resort as well as the special needs of heritage and Boutique hotels. Exercises in interior space visualization using computer software is attempted.

PROJECT II: URBAN INFRASTRUCTURE PROJECTS

Contemporary transportation terminals and stadiums are large buildings with multiple entries & exits dealing with large crowds and having multiple levels with large spans, complex services & demanding environmental conditions. Function, convenience and security will become the basic design parameters. Example - Bus terminal / Railway station / Indoor sports complex / Aquatic complex etc. This studio challenges the designer to come up with a feasible structural solution after undertaking a study of large span structural systems. Moreover planning for transport terminals requires understanding of safety norms & to design sport facilities understanding of optimum environmental parameters is the requisite.

<table>
<tr><th colspan="4"><u>COs & LOs for Architectural Design – VI (210601)</u>
Overall Course Outcome: The course aims to obtain knowledge of Architecture as a design response to Technology, hospitality industry in the first project & requires the student, large scale building with Innovation & experimentations.</th></tr>
<tr><td rowspan="7">CO 1, 2, 3, 4, 5</td><td rowspan="7">The course should enable the student to:
• Train the student to gather knowledge on the given design project based on books / literature and websites.
• Make the student understand the complexity, functioning and salient features of the design project through organizing field visit, train them to document and present the findings.
• Develop design ideas and create them.</td><td>LO1</td><td>Summarize basic concept of spatial planning of different types of buildings such as Hospitality and Infrastructure projects</td></tr>
<tr><td>LO2</td><td>Apply large span structural systems in design</td></tr>
<tr><td>LO3</td><td>Apply building bye laws in building design.</td></tr>
<tr><td>LO4</td><td>Apply various essential services in complex buildings.</td></tr>
<tr><td>LO5</td><td>Analyze the project with respect to various environmental parameters.</td></tr>
<tr><td rowspan="2">LO6</td><td rowspan="2">Design Hospitality and Infrastructure projects</td></tr>
</table>

REFERENCES:

1. Time saver standards for building types, De Chiara and Callender, McGraw hill company
2. Neufert Architect's data, Bousmaha Baiche& Nicholas Walliman, Blackwell science ltd
3. National Building Code - ISI
4. New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press

Note: One design problem shall be given in End Semester Examination. 6X3 hours examination.

2. Building Services-III (Acoustic & Fire Fighting) (Code – 210622)

Objectives –

The course aims to obtain knowledge of the basic principles of acoustics in buildings and their integration with architectural design, suitable materials in the design of auditoria and the method to achieve noise control in built spaces, firefighting services and design alteration for it, Layout of firefighting integrated system in building design.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
2.	210622	Building Services III (Acoustic & Fire Fighting)	BSAE-14	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Blended*** (2/2)

UNIT-1 INTRODUCTION TO THE STUDY OF ACOUSTICS & SOUND TRANSMISSION, ABSORPTION, INSULATION

Acoustics-Definition, terms related to acoustics. Theory of sound: generation, propagation, transmission, reception of sound, sound waves, frequency, intensity wavelength, sound pressure, measurement of sound scales-decibel scale. Calculation of reverberation time using Sabine's formula, Recommended RT/Volume for different spaces. Acoustical defects-echoes, focusing of sound, dead spots, flutter echo. Room resonances, small enclosures, standing waves, proportioning of room dimensions. Room acoustic phenomena: Reflection (plane, concave and convex surfaces), diffusion, reverberation, absorption. Acoustical requirements of different types of building, sound absorption, absorption co-efficient and their measurements, Sound insulation, materials, STC ratings, sound isolation. Sound absorptive materials and their choices, absorption coefficients and their measurements, NRC value.

UNIT-2 NOISE CONTROL AND SOUND REINFORCEMENT & ACOUSTICS IN BUILDING DESIGN AND CONSTRUCTION

Sources and types of noise, characteristics and effect of noise impact on human beings/behavior, noise curves, transmission of noise – airborne and structure borne, transmission loss, Means of noise control- source (enclosures), path (Barriers and insulations) and receiver (personal controls).Measure of noise control for different constructions – construction details of cavity walls, composite walls, floating floor, wood-joist floors, plenum barriers.

Design: Site selection, shape, volume, treatment for interior surface, basic principles in designing open air theatres, cinemas, broadcasting studios, concert halls, class rooms, lecture halls, theatres – Auditorium.

Construction: Constructional detailing, relation to walls/ partition, floor / ceiling/ opening/ windows/ doors. Acoustical requirement of different types of buildings.

UNIT-3 FIRE FIGHTING SERVICES

Fire extinction / suppression technology: constituents of fire, methods of fire extinguishment, Extinguishing agents / media Fire suppression equipment & installations (active fire protection measures) : fire detection and alarm systems (automatic fire alarm systems), Heat Detectors, Smoke detectors, flame detectors, Choice / Selection of Fire Detectors

Hydrant systems / installations- stand post and Underground type of hydrants (Sluice Valve Type). Internal Hydrant Systems - Dry-riser system, Wet-riser system, Wet-riser-cum -down-comer system and Down-comer-system. Sprinkler system types. Early Suppression Fast Response Sprinklers (ESFR), water spray systems, automatic drencher systems.

UNIT-4 FIRE FIGHTING SYSTEMS & BUILDING NORMS

Extinguishing Systems - Foam, CO2 and Halon Fire System, first aid firefighting equipment: portable fire extinguishers and its types, graphic symbols for fire protection plans, fire protection - safety signs. Building fire hazards: Relationship of Building Fire Hazards with Life Safety, Hazards from Building Contents, Fire Load and Fire Effects, Exposure Hazard, Hazards from Interior Finish and services. Hazards in Buildings from Collapse, Explosion. Life hazards in buildings and means of escape / egress / exit : Factors affecting Life Safety of Occupants, Growth and Spread of Fire and Smoke, Design Considerations of Means of Exit, Exit Requirements, Lifts and Escalators as Means of Exit, Occupant load, capacities of exits, internal staircases, fire lifts, Firefighting Shafts, external stairs, horizontal exit, illumination of exits ,fire compartmentation, fire tower, refuge areas and ramps.

UNIT-5 FIRE FIGHTING LAYOUT OF BUILDINGS & DESIGN AND DETAILING FOR ACOUSTICS OF MULTIPURPOSE HALLS

Analyze a Fire fighting layout for a commercial building, Reflected ceiling plan of smoke detectors / sprinklers, etc. for a multistoried building.
Discuss and analyses fire accident case studies.

Case studies of acoustically designed and treated multipurpose halls. Onsite measurement with Sound measurement equipment's. Design of a multipurpose hall for optimum acoustics - drawings and construction details of acoustical treatment on walls, ceilings and floors.

COs & LOs for BUILDING SERVICES-III			
Overall Course Outcome: The overall aim of the course is to introduce students to acoustical treatments in building and also to make them understand the significance of fire safety in buildings and its standard norms.			
CO1	To understand the principles of sound and acoustical requirements of various buildings	LO1	**Understand** the theory of sound transmission in enclosed spaces
		LO2	**Observe** the properties of sound in enclosed space and phenomena of room acoustics
		LO3	**Calculate** the reverberation time using Sabine's formula and acoustical requirements
		LO4	**Survey** on acoustical materials and techniques
CO2	To analyse the methods of sound reinforcement and noise control methods in enclosed space	LO1	**Define** the principles of sound reinforcement and Noise, sources and types.
		LO2	**Understand** the behaviour of noise and means of noise control
		LO3	**Analyse** measures of noise control
		LO4	**Evaluate** design requirements for noise control and sound reinforcement in various enclosed spaces (theatres, lecture hall. Studio etc.)
		LO5	**Develop** construction details for acoustical treatment in enclosed spaces.
CO3	To learn the application of firefighting equipments in buildings	LO1	**Understand** the significance of firefighting services in building,
		LO2	**Analyse** the working and installation of firefighting equipment in buildings
		LO3	**Analyse** the application fire hydrant systems in buildings
		LO4	**Evaluate** the installation of sprinkler systems through examples from existing building applications.
CO4	To determine the significance of norms and standards in firefighting systems and its application	LO1	**Learn** the standards and norms for firefighting services
		LO2	**Understand** the relationship between fire hazard and life safety in buildings
		LO3	**Analyse** the application of these norms through existing case examples
		LO4	**Evaluate** the space requirements, location and arrangement of firefighting equipment in building.
CO5	To apply the principles of acoustics and firefighting systems in various building by developing construction details and layouts for the same	LO1	**Evaluate** the construction details for acoustical treatment of any existing building
		LO2	**Evaluate** design of an auditorium/theatre/studio etc for acoustical treatment through existing building examples
		LO3	**Design** a multipurpose hall for optimum acoustics
		LO4	**Evaluate** the application of firefighting services in existing buildings
		LO5	**Design** a layout for firefighting services for commercial/institutional buildings

REFERENCES:

1. Architectural Acoustics- David Egan, J. Ross Publishing Classics
2. Acoustical Designing in Architecture- Vern.O Knudsen and Cyril M. Harris, Wiley Publisher
3. Acoustics, noise and buildings- Peter.H. Parkins and H.R. Humphreys, Pitman *publishing* corporation, New York, Chicago
4. Master Handbook of Acoustics–F. Alton Everest and Ken.C. Pohlmann Paper back *Publisher*

3. Site Planning &Landscaping (Code – 210623)

Objectives –

The course aims to obtain understanding of environment, human interventions and its impacts on nature and knowledge about various measures of protecting it, various concepts, ideas and techniques prevalent in landscape architecture, concepts of site planning and effective measures of doing it, the historic development of landscaping and site planning to students.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
3.	210623	Site Planning and Landscaping Architecture	DC- 14	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Blended* (2/1)

UNIT-1 INTRODUCTION & ELEMENTS OF LANDSCAPE ARCHITECTURE AND LANDSCAPE DESIGN

Introduction to landscape architecture, ecology, ecological balance, landscape conservation, reclamation and landscaping of derelict lands, environmental impact assessment. Elements of landscape – land elements, land form plants and planting, water, lighting etc. characteristics and classification of plant materials, basic principles of landscape design; Factors to be considered, Use and application of plant materials in landscape design, and other components involved

UNIT-2 HISTORY OF LANDSCAPE ARCHITECTURE & URBAN LANDSCAPE

Development of landscape design: Detailed study of selected examples from Eastern, Central and Western traditions; Ancient Heritage - Mesopotamia, Egypt, Greece, Rome; Western Civilization – Europe: Italy, France, and England; The middle-east - The Persian tradition and its far reaching influence Eastern Civilization: China and Japan Ancient and medieval period in India; Mughal and Rajput Landscapes and study of contemporary landscape architecture.

Basic principles and elements of Urban landscape, Significance of landscape in urban areas, introduction to street furniture, road landscaping, waterfront development, landscaping of residential areas, Industrial Landscaping.

UNIT-3 INTRODUCTION TO SITE ANALYSIS & SITE INFLUENCING FACTORS

Introduction to Site analysis, Importance of site analysis; interrelationship between nature and human interventions , thematic traditions in site design, history of site design as a source for precedent analysis

On site and off site factors; Analysis of natural, cultural and aesthetic factors; topography, hydrology, soils, landforms, vegetation, climate, microclimate. Influence of water bodies

UNIT-4 DESIGN OF LANDFORMS IN A SITE & SITE PLANNING PRINCIPLES AND TECHNIQUES

Contours - representation of landforms and landform design, interpolation of contours, slope analysis, uses and function. Grading - Symbols and grading and alignment of paths/roads, angle of repose and use of retaining walls. Grading terraces. Drainage - surface drainage, functional and aesthetic considerations. Site Zoning. Organization of vehicular and pedestrian circulation; parking; street widths; turning radii; street intersections; steps and ramps. Site planning considerations in relation to water systems, sewage disposal, outdoor electrical systems.

UNIT-5 SITE CHARACTERISTICS AND DESIGN REQUIREMENTS& LANDSCAPE EXERCISE

Landscape design of a neighborhood open space (area of 2000 to 3000 sq. meters)

Exploration of site planning options for residential, commercial, office, industrial and mixed-use projects; street network, civic space, and open space planning; emphasis on walkable, mixed-use, transit-oriented sustainable development

COs & LOs for Site planning & Landscaping Architecture			
Student will be able to apply different methods in landscape practice and incorporate site planning for a specific land use.			
CO1	**Understanding** role and importance of site planning in enhancing quality of building environment	LO1	**Defining** various parameters of site analysis and its importance
		LO2	**Gathering** past information site design, theories
		LO3	**Summarizing** on site and off site factors,
		LO4	**Analysing** different layers of site planning for better design process
		LO5	**Programme** a zoning plan for a given site
CO2	**Learning** about the interrelationship between nature and humans. Role of natural elements in environment	LO1	**Defining** environment terminologies such as ecological balance, eco system, etc.
		LO2	**Extending** the role of environment in construction
		LO3	**Summarizing** elements and principles of landscape
		LO4	**Applying** elements and plant material in design process
		LO5	**Categorizing** plant material & understand their benefits
CO3	**Understanding** the construction techniques of hardscape, contours, landforms and its application on site.	LO1	**Expressing** landform through contour lines
		LO2	**Determining** slope percentage
		LO3	**Calculating** various physical characteristics like grading, drainage pattern
		LO4	**Reflecting** knowledge on techniques of retaining walls, steps, ramps
		LO5	**Managing** to propose plan of water systems, electrical, disposal
CO4	**Awareness** about characteristic of various historical gardens and concepts of urban landscape in design	LO1	**Understanding** the design philosophy behind history of landscape
		LO2	**Analysing** characteristics & features garden styles of different eras
		LO3	**Explaining** various design elements of urban landscape
		LO4	**Reflecting** on different usage of landscaping according to site context
		LO5	**Creating** presentation on historical gardens and example of urban landscape
CO5	**Application** of different methods in landscape practice which incorporate site planning for a specific land use	LO1	**Searching** for a land for landscape development
		LO2	**Exploring** the site by site visits and available secondary data
		LO3	**Applying** the various site planning options to given site
		LO4	**Criticizing** and appraising the existing site and design
		LO5	**Proposing** a site plan with landscape features on given land

REFERENCES:

1. T S S for Landscape Architecture, Mc Graw Hill,Inc, 1995 .
2. Grant W Reid, From Concept to Form in Landscape Design, Van Nostrand Reinhold Company,1993 .
3. Brian Hacket, Planting Design .
4. T.K. Bose and Chowdhury, Tropical Garden Plants in Colour, Horticulture And Allied Publishers,Calcutta, 1991.
5. Motloch, J.L., "Introduction to Landscape Design", Van Nostrand Reinhold Publishing Co., New York, 1991.., McGraw Hill Book Co., New York, 1981.Sam kubba, " Green construction project management and cost oversight", Elseiver, 2010
6. Kevin Lynch , "Site Planning", MIT Press, 1967
7. Time Savers Standards for Site Planning, McGraw Hill, Inc, 1995
8. Richard Untermann and Robert Small, "Site planning for cluster housing", Van NostrandReinholdCompany, 1977
9. Michael Laurie, "An Introduction to Landscape Architecture", Elsevier, 1986
10. TSS for Landscape Architecture, McGraw Hill, Inc, 1995
11. John Ormsbee Simonds, "Landscape Architecture: A manual of site planning & design", McGra

4 . Working Drawing (Code – 210624)

Objectives –

The course aims to obtain understanding of standards and conventions used for preparation of architectural drawings to develop the skills of preparing various architectural drawings and details used for construction of buildings, drawings in sufficient details such that the contractor is able to construct a building as per the design, Graphical presentation of all the components of a building along with dimensioning and annotations, application of IS Codes, Conventions/ methods of preparing a working drawing along with tabulation of schedules of materials, finishes and hardware/ Linking up working drawings / specifications in an architectural project.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
4.	210624	Working Drawing	PAEC-2	-	-	-	-	50	30	20	100	5	1	1	6	**5**	PP	Offline**

UNIT- 1 BUILDING DRAWING

Centre line plan, Foundation plan, Structural grid plan (in case of framed structures), Basement floor plan, Ground floor plan, Typical floor plan, All elevations, All sections: one at least through staircase and one through toilet, Terrace floor plan giving details of surface drawing etc.

UNIT- 2 SERVICES

Sanitation drawings showing fixtures etc, Electrical layout plan, typical wall profiles sections, detailed drawings of special rooms like kitchens, toilets, staircase etc.

UNIT- 3 SPECIFICATION

In addition to the above, students are expected to prepare a detailed clause by chance specifications for at least one of the 3 projects Specifications writing include the following aspects: Materials, Pre and post installation work., Test if any, Mode of measurements, Knowledge of manufacturers specifications as a database for writing specifications for the following materials, based on surveys:

UNIT- 4 MATERIALS

Glass Plywood and laminates Hardware Electrical wires and accessories Water supply and plumbing: fittings and fixtures flooring and cladding.

UNIT- 5 EXERCISE

One working drawing of a previous year architectural design project having load bearing structure with Minimum 150 sq. m. carpet area not exceeding 2 stories. Two details such as doors/windows/railings/kitchen etc.

COs & LOs for Working Drawing **Overall Course Outcome:** Students will be able to develop, draw various architectural drawings and details used for construction of buildings, drawings in sufficient details such that the contractor is able to construct a building as per the design.			
CO1	Student will able to understand the various building drawings.	LO1	**Learn** various building drawing use in working drawing.
		LO2	**Understand** the use of various building drawing.
		LO3	**Apply** various building drawing to own project.
		LO4	**Analyze** the necessity of various building drawing in architectural project.
		LO5	**Draw** various building drawing**.**
CO2	Student will be able to understand and draw various services plan used in architectural project.	LO1	**Study** the various services used in architectural project.
		LO2	**Understand** use of services in architectural project.
		LO3	**Draw** various services plan used in architectural project.
CO3	Student will able to understand and write various specification of material required during execution of a project.	LO1	**Study** the detailed specifications for Materials used Pre and post installation work in architectural project.
		LO2	**Understand** the need of specifications.
		LO3	**Formulate** detailed specifications for any architectural project.
CO4	Students will understand various materials, finishing material used in architectural project.	LO1	**Learn** various building materials used in architectural project.
		LO2	**Understand** use of materials in architectural project.
		LO3	**Analyze** the fitting of materials in project.
CO5	Students will be able to develop working drawing sets for load bearing and a frame structure architectural Design project.	LO1	**Study** about working drawing sets for load bearing and a frame structure architectural Design project.
		LO2	**Understand** use of working drawing sets for architectural project.
		LO3	**Draw** working drawing sets for load bearing and a frame structure architectural Design project.

REFERENCES:

1. Building construction specification – Jack Lerrs
2. Standard specification of state governments
3. Specification in detail –Frank W. Makay
4. Building Drawing – M.G. Shah, CM, Kale, S.Y. Paoui
5. Architectural Working Drawings –Ralph W. Liebing, Mimi Ford.

5 ELECTIVE-III

Objectives –

The course aims to obtain knowledge of fundamental concepts and theories of Housing and apply them in their design projects, various types of Housing and its components, the vocabulary of interior design, interior and furniture design and design movements through history, components of interior space and treatment and finishes for the same, the various components of interior design like lighting, landscaping and furniture.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
5.	210611	Housing (Elective - III)	DE- 1	50	10	20	20	-	-		100	3	1	2	2	**3**	PP	Blended* (2/1)

(i) HOUS

INGUNIT- 1 INTRODUCTION TO HOUSING AND HOUSING ISSUES.

Housing demand and need, Role of Government and public agencies in Housing development, National housing policy, comparison of housing policies and programmes of developed and developing country, Housing agencies, housing programmes and resources, Housing finance.

UNIT- 2 SOCIO ECONOMIC ASPECTS.

Social factors influencing Housing Design – identity, safety, convenience, access, amenities etc, economic factors -affordability and its relationship to house income, incremental housing concept, Slum Upgrading and sites and services schemes and reconstruction process.

UNIT- 3 HOUSING STANDARDS.

Different types of housing standards – spatial standards, safety standards, standards for amenities, Methodology of formulating standards, UD PFI – guide lines, standard and regulations – DCR – performance standards for housing, TCPO, New norms and amenities

UNIT- 4 MODERN TECHNIQUES IN HOUSING CONSTRUCTION.

Prefabrication techniques –modular house, panelized and precast homes, sustainable practices – zero energy home, eco housing, green homes - Teri – Griha and its rating system, Recent advancement in materials, Design guidelines, Environmental impact of Building materials, Environmental quality.

UNIT- 5 HOUSING DESIGN AND PROCESS.

Traditional housing, row housing, cluster housing – apartments and high-rise housing, gated community, Government housing – HUDCO financed project for economically weaker section, their Advantages and disadvantages. Methods and approaches to housing design. Various stages and tasks in project development – feasibility study, detailed study.

COs & LOs for Housing (210611)

Overall Course Outcome: The course aims to obtain knowledge of fundamental concepts and theories of Housing and apply them in their design projects, various types of Housing and its components, the vocabulary of interior design, interior and furniture design and design movements through history, components of interior space and treatment and finishes for the same, the various components of interior design like lighting, landscaping and furniture.

CO1	**Understand** the housing issues and importance of housing development	LO1	**Relate** housing demand & need with its availability
		LO2	**Interpret** the role of government and public agencies in housing development
		LO3	**Analyse** housing policies and programmes
		LO4	**Define** necessary resources and housing finance
CO2	**Relate** the socio economic aspects of site with its housing characteristics	LO1	**List** social factors influencing Housing Design
		LO2	**Demonstrate** the relationship between affordability and household income
		LO3	**Examine** incremental housing concept
		LO4	**Justify** the need of slum rehabilitation
CO3	**Identify** various housing standards, guidelines, regulations, norms, amenities, etc.	LO1	**Define** different types of housing standards
		LO2	**Outline** the methodology of formulating standards
		LO3	**Illustrate** different housing guidelines, standard and regulations- URDPFI, DCR, TCPO,etc
CO4	**Discover** modern techniques for efficient and sustainable housing	LO1	**Define** modern construction techniques
		LO2	**List** sustainable practices and recent advancement building materials
		LO3	**Appraise** different green rating system specific to housing
		LO4	**Summarise** modern housing construction techniques in context of changing scenario and globalization
CO5	**Categorise** different housing design process as per desired requirements	LO1	**Define** types of housing
		LO2	**Analyse** housing project for economically weaker section
		LO4	**Elaborate** design process, stages, tasks, methods, approaches to different type of housing projects

REFERENCES:

1. Kavita Datta and GA. Jones,' Housing and Finance in Developing Countries',Routledge,London,1999.
2. Housing Design –Eugene Henry Klaber – Reinhold publishing corp.
3. Daniel Vallero and Chris Brasier, Sustainable Design – The science of sustainability and Green Engineering;Wiley;2008
4. Thomas E Glavinich; Green Building Constction; Wiley;2008
5. GeofreyK.Payne, Low Income Housing in the Development World, John Wiley and Sons, Chichester,1984.
6. Martin Evans, Housing, Climate and Comfort, Architectural Press, London, 1980
7. An introduction to Urban Housing Design –Graham Towers.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
5.	210619	Design Thinking in Architecture(Elective - III)	DE- 1	50	10	20	20	-	-		100	3	1	2	2	**3**	PP	Blended* (2/1)

(ii) DESIGN THINKING IN ARCHITECTURE

UNIT-1 Introduction

Introduction to Design thinking, who are clients, what is customer centric approach of Design, Customer Journey mapping, Brainstorming.

UNIT- 2 Perspectives of Design Thinking

Introduction Lenses for Design Thinking, Ecologically Sensitive Design Solutions, Empathetic Design Solutions, Community Solutions, Post COVID Considerations, Learning from Past, Technological Inputs, Universal Design

UNIT- 3 Tools for Design Thinking

Tools for design thinking, solutions of How to conduct a case study, to do survey, to do research in architecture, to frame the brief/problem, to strategize the brief.

UNIT – 4 Design Setups in Architecture

Introduction Setups in Architecture, Collaborations in Architecture, Scales of setups, Innovations in Business Strategies.

UNIT- 5 Communication, Elevator Pitch and Growth

Introduction Communication, Elevator Pitch and Growth, Branding, Building connections, people skills, Elevator Pitches, Use of Social Media and Website.

COs & LOs for Society, Culture And Architecture (210412)			
Overall Course Outcome: The course aims to obtain knowledge about society, culture, environment, etc. in architecture design and site planning.			
CO 1	Students will be able to **Develop** innovative design solutions using brainstorming methods.	LO1	**Recall** the fundamental principles of design thinking.
		LO2	**Understand** the significance of customer journey mapping in design.
		LO3	**Apply** brainstorming techniques to generate innovative design concepts
		LO4	**Analyze** the components of successful customer journey mapping
		LO5	**Develop** innovative design solutions using brainstorming methods.
CO 2	Students will be able to **Create** universal design solutions catering to diverse user groups	LO1	**Identify** examples of ecologically sensitive design solutions
		LO2	**Comprehend** the impact of technological inputs on design thinking.
		LO3	**Analyze** the influence of past architectural designs on present practices
		LO4	**Create** universal design solutions catering to diverse user groups
CO 3	Students will be able to **Develop** a well-framed architectural brief for a complex design problem.	LO1	**Recognize** the steps involved in conducting case studies, surveys, and research in architecture.
		LO2	**Understand** the significance of each tool in the design thinking process.
		LO3	**Apply** strategic approaches to framing architectural briefs for different design challenges.
		LO4	**Develop** a well-framed architectural brief for a complex design problem.
CO 4	Students will be able to **Design** a collaborative setup suitable for a specific architectural project.es	LO1	**Identify** the elements and components of collaborations in architecture.
		LO2	**Comprehend** the significance of innovation in business strategies for architectural firms.
		LO3	**Analyze** the advantages and disadvantages of collaborations in architectural practices.
		LO4	**Design** a collaborative setup suitable for a specific architectural project.
CO 5	Students will be able to **Create** an effective branding strategy for an architectural firm & a compelling elevator pitch for a specific architectural project or design concept.	LO1	**Recognize** the components of an elevator pitch.
		LO2	**Understand** the role of branding and building connections in architectural growth.
		LO3	**Analyze** the impact of branding and social media use on architectural firms' growth.
		LO4	**Create** an effective branding strategy for an architectural firm & a compelling elevator pitch for a specific architectural project or design concept.

REFERENCES:

Huckerby, Martin., The Net for Journalists: A Practical Guide to the Internet for Journalists in Developing Countries. UNESCO/Thomson Foundation/ Common wealth Broadcasting Association, 2005.

6. ELECTIVE –IV (Opted from NPTEL)

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted									Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot			MOOC				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation											
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project	Assignment	Exam								
6.	-	ELECTIVE –IV	DE- 4	-	-	-	-	-	-		25	75	100	3	2	1	-	**3**	Offline *	MCQ

S no	Elective	Sub code	Sub Name
2	ELECTIVE IV# (Opted from NPTEL platform)	210651	Strategies for Sustainable Design
		210652	Environmental Impact Assessment
		210653	Urban Services Planning

7. Novel Engaging Course

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
7.		Novel engagin courses	CLC					50			50	2			2	**1**	SO	Interactive

8. Tour/ Seminar / Workshop/ NASA Training during winter break (Code – 210419)

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
8.	210607	Tour/ seminar / Workshop/ Train during winter br	SEC- 8	-	-	-	-	50	-		8.	2	-	-	2	**1**	SO	Offline

Study Tour/ Seminar / Workshop/ Training during previous winter break will be evaluated

1.INTELLECTUAL PROPERTY RIGHT (Code – 210610)

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation				L	T	P			
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
9.	**210610**	**Intellectual Property Rights**	**MAC-4**	50	10	20	20	-	-	-	100	2	2	-		Grade	PP	Offline

UNIT – I: Introduction

Introduction to IPRs, Basic concepts and need for Intellectual Property – Meaning and practical aspects of Patents, Copyrights, Geographical Indications, IPR in India and Abroad. Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

UNIT – II: Intellectual Property Rights

The IPR tool kit, Patents, the patenting process, Patent cooperation treaties: International Treaties and conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.

UNIT – III: Intellectual Property Protections

IPR of Living Species, protecting inventions in biotechnology, protections of traditional knowledge, biopiracy and documenting traditional knowledge, Digital Innovations and Developments as Knowledge Assets – IP Laws, Cyber Law and Digital Content Protection. Case studies: The basmati rice issue, revocations of turmeric patent, revocation of neem patent.

UNIT – IV: Exercising and Enforcing of Intellectual Property Rights

Rights of an IPR owner, licensing agreements, criteria for patent infringement. Case studies of patent infringement, IPR – a contract, unfair competitions and control, provisions in TRIPs,

UNIT- V: Role of Patents in Product Development & Commercialization

Recent changes in IPR laws impacting patents and copy

COs & LOs for Intellectual property Rights- (Code – 210707)			
Overall Course Outcome: Students will be able to **understand** the basic concepts of Intellectual Property Rights and to develop expertise in the learners in IPR related issues and sensitize the learners with emerging issues in IPR and the rationale for the protection of IPR.			
CO1	Students will be able to understand the importance of it in architectural services.	LO1	**Remember** basic concepts of Intellectual Property Rights and to develop expertise in the learners in IPR related issues
		LO2	**Learn** the practical aspects of Patents, Copyrights, Geographical Indications in the practice.
		LO3	**Understand** the IPR in India and Abroad. Nature of Intellectual Property, Industrial Property, technological as per norms.
		LO4	**Analyze the** research, inventions and innovations in IPR.
		LO5	**Evaluating** role of an IPR in comprehensive architectural services.
CO2	Students will be able to apply IPR in architectural services.	LO1	**Remember** basic IPR tool kit, Patents, the patenting process, Patent cooperation treaties among the parties.
		LO2	**Learn** the different legislation in IPR.
		LO3	**Understand** the different acts in IPR.
		LO4	**Analyze** the legislation and acts in architectural practices.
		LO5	**Evaluating** role of IPR legislation and acts in architectural services.
CO3	Students will be able to understand inventions in biotechnology, protections of traditional knowledge, biopiracy and documenting traditional knowledge.	LO1	**Remember** the IPR of Living Species, protecting inventions in biotechnology, protections of traditional knowledge.
		LO2	**Understand** bio piracy and documenting traditional knowledge, Digital Innovations.
		LO3	**Learn** various IP Laws, Cyber Law and Digital Content Protection.
		LO4	**Analyze** the case studies in IPR .
		LO5	**Evaluating** the case studies of IPR in architectural services.
CO4	Students will be able to understand the different legislations applicable to architects, in IPR.	LO1	**Remember** the Rights of an IPR owner, licensing agreements.
		LO2	**Understand** the criteria for patent infringement.
		LO3	**Learn** the role of licensing agreements in architectural service.
		LO4	**Analyze** the case studies of patent infringement.
		LO5	**Evaluating** the case studies of patent infringement in architectural services.
CO5	Students will be able to understand the running of an architect's office and applicable laws, rules and regulations, pitching for projects .	LO1	**Remember** basic recent changes in IPR laws impacting patents and copyrights.
		LO2	**Understand** the intellectual cooperation in the science and allied industry.
		LO3	**Learn** patentable and non-patentable research.
		LO4	**Analyze** the case studies of Patents in Product Development & Commercialization
		LO5	**Evaluating** the case studies of Patents in Product Development & Commercialization in architectural services.

FOURTH YEAR VII SEMESTER

1. Architectural Design VII (210711)

OBJECTIVE: The objective of the subject is to Understand design as a function of specific agenda of complex services, acoustics, building byelaws and structure and to understand design as a process: of problem identification, space analysis, formulation of requirements, evolution of design criteria and design, to incorporate elements of site planning and landscape in the design process, to prepare computer aided presentation drawings.

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
1.	**210711**	**Architectural Design VII**	**DC- 15**	-	-		-	100	80	20	200	6	-	-	6*(1.5)	**9**	Offline**	AO

Problem -1

The range of design problems shall include projects of progressively increasing complexity. Exercises related to public buildings i.e. Commercial center, hospital, Study and incorporation of building bye-laws should be complete in this Sem.

Problem -2

The range of design problems shall include projects of progressively increasing complexity.
Exercises related to public buildings i.e. Auditorium, sports cinema, sports complex & educational buildings on sloping/ flat sites. Simultaneously, stress should be given on the interior treatment of small and large spaces.
Freedom in design is to be given with preliminary introduction of importance and role of bye laws in building design.

Note: The sessional will be in the form of drawings and models along with technical report for the design dealt with. The evaluation should be done in intermediate review consisting of internal /external experts. There should be regular site visits to the building types dealt in the studio problems of which audio - visual should be prepared. The various aspects of the design problem shall be dealt with lectures, group discussions and library research so as to provide the necessary philosophical and attitudinal background to a rational design approach.

COs & LOs for Architectural Design VII (210711)

<table>
<tr><td colspan="4">Overall Course Outcome: Understand design as a function of specific agenda of complex services, acoustics, building byelaws and structure, understand design as a process: of problem identification, space analysis, formulation of requirements, evolution of design criteria and design, incorporate elements of site planning and landscape in the design process, prepare computer aided presentation drawings.</td></tr>
<tr><td rowspan="5">CO 1, 2, 3, 4, 5</td><td rowspan="5">The course should enable the student to:
● Train the student to gather knowledge on the given design project based on books / literature and websites.
● Make the student understand the complexity, functioning and salient features of the design project through organizing field visit, train them to document and present the findings.
● Develop design ideas and create them.</td><td>LO1</td><td>Analyze and study, pre-design process, design process & conceptualization stages in design.</td></tr>
<tr><td>LO2</td><td>Understand the materials and technology required to build the same.</td></tr>
<tr><td>LO3</td><td>Understand the building byelaws and apply them to the project.</td></tr>
<tr><td>LO4</td><td>Handle large scale buildings such as projects of progressively increasing complexity.</td></tr>
<tr><td>LO5</td><td>Design the projects based on the concept of space and form, Innovate Visualization of projects using computer software is also acquired.</td></tr>
</table>

REFERENCES

1. “Planning by E. & O.E”. Lliffe book Ltd., London.
2. D.E. CHIRAIRA & CALLENDAR, “Times Saver Standard for Building Types”.
3. RUDOLF HERGE, “Nuferts Architects Data”, Cross By Lockwood & Sons Ltd.
4. EDWARD D. MILLS, “Planning the Architects Hand Book”.
5. National Building Code

2. Adv Building Construction (210712)

OBJECTIVE: The objective of the subject is to introduce the students about the implementation of new technology concepts which are applied in field of advanced construction and also to study different methods of construction in the field of architecture.

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
2.	**210712**	**Adv Building Construction**	**DC- 16**	50	10	20	20	20	20	10	150	4	2	-	2*(1.5)	**5**	Blended *** (3/2)	PP

UNIT-1 SPECIAL STRUCTURES

Definitions, Types – single, double & multilayered grids – two way & three way space grids, connectors, Grids – Domes - various forms - Geodesic domes, Suspended cable structures – types of cable network systems, shapes of cable suspended systems, examples of tensile membrane structures – types of pneumatic structures. Long Span bridges, Cables Structure.

UNIT- 2 ADVANCE CONSTRUCTION SYSTEM

Advance construction systems and techniques developed by research organization in In dia- Design and detailing of building materials and components developed by research organizations like CBRI, SERC, NBO & BMTPC.

UNIT- 3 PRE STRESSED CONCRETE

Introduction to pre stressed concrete – Pre stressed concrete materials – Methods of pre stressing - Comparison between RCC and pre stressed concrete.

UNIT- 4 TALL BUILDINGS

Tall buildings structural systems – Rigid frames – Braced frames – Shear wall – Buildings – Wall frame buildings – Tubular buildings – Tube-in tube buildings – Outrigger braced system – Brief outline of their behavior and their applicability for various heights of buildings.

UNIT- 5 SHELLS AND FOLDED PLATES

Basic concepts of Shells – Types –Relative merits and applicability.

Folded plates – Types – Comparison with shells – Applicability. Arches & its types

COs & LOs for Adv Building Construction (210712)			
Overall Course Outcome: Students will be able to **understand** about the implementation of new technology concepts which are applied in field of advanced construction and also to study different methods of construction in the field of architecture.			
CO1	CO1 – As a result of studying about of latest materials and building technologies, structural systems , students will be able to understand use of latest technologies in the construction industry with a fair idea of their environmental performance.	LO1	**Remember** basic concepts of single, double & multi-layered grids – two way & three way space grids, connectors.
		LO2	**Learn** about domes - various forms - Geodesic domes, Suspended cable structures
		LO3	**Understand** the types of cable network systems, shapes of cable suspended systems, examples of tensile membrane structures.
		LO4	**Analyze** the types of pneumatic structures. Long Span bridges, Cables Structure.
		LO5	**Evaluating** role of latest materials and building technologies on site investigations, layout, site organization.
CO2	CO2 – As a result of studying about different research organization in India , students will be able to understand the	LO1	**Remember** advance construction systems and techniques developed by research organization in India
		LO2	**Learn** about design and detailing of building materials and components developed by research organizations

	detailing of building materials and components developed by these research organizations.	LO3	**Understand** the methodology of working in research organizations.
		LO4	**Analyze** design and detailing of building materials and components developed by research organizations .
		LO5	**Evaluating** role of latest materials and building technologies developed by research organization on site investigations, layout, site organization.
CO3	CO3 – As a result of studying about Pre stressed concrete materials, students will be able to analyse the use of advanced building construction methods and innovative architectural detailing with new materials.	LO1	**Learn** basic concepts of pre stressed concrete & pre stressed concrete material.
		LO2	**Understand** the methods of pre stressing.
		LO3	**Apply** the pre stressed concrete material on site investigations, layout, site organization.
		LO4	**Analyze** the comparison between RCC and pre stressed concrete..
		LO5	**Evaluating** pre stressed concrete material. through case studies and drawings of selected building types.
CO4	CO4 – As a result of studying about construction details in tall building structure, students will be able to understand the different types of structural methodologies involve in tall building structure.	LO1	**Remember** basic concepts regarding tall buildings structural systems
		LO2	**Learn** the Rigid frames – Braced frames – Shear wall – Buildings – Wall frame buildings – Tubular buildings – Tube-in tube buildings – Outrigger braced system
		LO3	**Understand** their behavior and their applicability for various heights of buildings.
		LO4	**Analyze** their behavior in different location.
		LO5	**Evaluating** their applicability for various heights of buildings through case studies and drawings of selected building types.
CO5	CO5 – As a result of studying basic concepts of Shells structure, students will be able to analyze different shells and folded plates and tensile structure for the space coverage.	LO1	**Remember** basic concept of shell structure.
		LO2	**Learn** its types and applicability.
		LO3	**Understand** folded plates structure.
		LO4	**Analyze** types folded plates structure and its Comparison with shells
		LO5	**Evaluating** their applicability through case studies.

REFERENCES:

1. Salvadori
2. Sinha .N.C and Roy .S.K, Fundamentals of Reinforced Concrete, S.Chand& Co. Ltd., New Delhi, 2001
3. Ramamrutham .S and Narayanan .R, Reinforced Concrete Structures, DhanpatRai Publications, New Delhi, 1997
4. Bryan Stafford and Alex Coull, Tall Building Structures, Analysis and Design John Wiley & Sons, New York, 1991
5. Bandyopadhyay .J.N, Thin Shell Structures Classical and Modern Analysis, New Age International Publishers, New Delhi, 1998
6. Ramaswamy .G.S, Design of Construction of Concrete Shell Roofs, McGraw Hill Publishing Company, New York, 19

Note: Total five questions shall be asked. Each question will consist of two parts, one of which will be of 7 marks (which shall be compulsory) and another with 3 marks(which shall be optional).

3. Project Management & Building Economics (210713)

Objective – The course aims to obtain knowledge of Project planning and project scheduling and project controlling, Role of decision in project management, etc.

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
3.	**210713**	**Project Management & Building economics**	**PAEC-3**	50	10	20	20	-	-		100	3	2	1	-	**3**	Offline***	PP

UNIT- 1 INTRODUCTION.

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. Project management constructional organization, delegation of responsibilities, Role of an Architect, Engineer and Contractor.

UNIT- 2 ELEMENTS OF NETWORK & CPM AND PERT ANALYSIS

Event, Activity, Dummy, Network Rules, Graphical guidelines for network, Numbering of events. CPM network analysis & PERT time estimates, time computation & network analysis

UNIT- 3 PROJECT TIME REDUCTION AND OPTIMIZATION

Project cost, indirect cost, direct project cost, Slope of the direct cost curve, Total project cost & optimum duration, contracting the network for cost optimization, steps in cost-time optimization.

UNIT- 4 PROJECT UPDATING & RESOURCE ALLOCATION

When to update? Data required for updating, steps in the process of updating. Resource usage profile: Histogram, Resource smoothing and Resource leveling.

UNIT- 5 COMPUTERIZED PROJECT MANAGEMENT & PRACTICAL IMPLICATIONS

Introduction: creating a new project, building task. Creating resources and assessing costs, refining your project. Project tracking – understanding tracking, recording actual. Reporting on progress. Analyzing financial progress, Construction site practices, Inspection & quality control.

COs & LOs for Project Management & Building Economics (210713)

Overall Course Outcome: Students will be able to **understand** construction industry practices and project management techniques needed for coordinating building projects professionally.

CO1	CO1 – As a result of studying Project planning, project scheduling and project controlling, students will be able to understand the role of decision making in project management, method of planning and human aspects of project management	LO1	**Remember** basic concepts regarding the Project planning, project scheduling and project controlling.
		LO2	**Learn** the role of decision making in project management, method of planning and human aspects of project management
		LO3	**Understand** the work breakdown structure, Life cycle of a project and disadvantages of traditional management system.
		LO4	**Analyze** project management constructional organization activities and delegation of responsibilities
		LO5	**Evaluating** role of an Architect, Engineer and Contractor in building economics.
CO2	CO2 – As a result of studying Event, Activity, Dummy, Network Rules, Graphical guidelines for network, Numbering of events., students will be able to understand the site investigations, layout, site organization, networking techniques, PERT/CPM, LOB, MS Project	LO1	**Learn** basic concepts regarding Event, Activity, Dummy, Network Rules, Graphical guidelines for network, Numbering of events
		LO2	**Understand** the networking techniques, PERT/CPM, LOB, MS Project
		LO3	**Apply** the networking techniques on site investigations, layout, site organization
		LO4	**Analyze** the Event, Activity, Dummy, Network Rules, Numbering of events on a project.

		LO5	**Draw** all the elements of PERT/CPM **.**
CO3	CO3 – As a result of studying Resource management and value engineering-methods, students will be able to understand the material/ labour estimation, resource scheduling and levelling, construction equipment types and applications	LO1	**Learn** basic concepts regarding Project cost, indirect cost, direct project cost, Slope of the direct cost curve.
		LO2	**Understand** the total project cost & optimum duration, contracting the network for cost optimization, steps in cost-time optimization.
		LO3	**Apply** the cost optimization techniques on site investigations, layout, site organization
		LO4	**Analyze** the total project cost & optimum duration, contracting the network for cost optimization
		LO5	**Evaluating** cost optimization techniques on site investigations, layout, site organization
CO4	CO4 – As a result of studying to Compute the money values and demand forecasting., students will be able to understand the project updating and resource allocation on different steps of a project activities	LO1	**Learn** basic concepts regarding Project monitoring and cost control, manpower management, safety and labour issues.
		LO2	**Understand** the data required for updating, steps in the process of updating.
		LO3	**Apply** project monitoring and cost control, manpower management techniques on site investigations, layout, site organization
		LO4	**Analyze** the Resource usage profile: Histogram, Resource smoothing and Resource levelling.
		LO5	**Evaluating** project monitoring and cost control, manpower management techniques on site investigations, layout, site organization
CO5	CO5 – As a result of studying computerized project management and practical implication , students will be able to understand the on how to enhance the professional ability as an architect in a project	LO1	**Learn** basic concepts regarding new project, building task and creating resources and assessing costs.
		LO2	**Understand** the project tracking activities and to record the progress.
		LO3	**Apply** project tracking activities
		LO4	**Analyze** the financial progress.
		LO5	**Evaluating** construction site practices, Inspection & quality control.

REFERENCES:

1. S.P. Mukhopadyay, “Project Management for architects and Civil Engineers”, IIT, Kharagpur 2. 1974.

3. Jerome D. Wiest and Ferdinand K. Levy, “A Managementuide to PERT/CPM”, prentice hall ofIndian pub. Ltd. New Delhi 1982.
4. SR.A. Burgess and G. White, “ Building production and project management”, the
5. construction press, London 1979.
6. Dr. Punmia and K.K Kandelwal – project planning and control with PERT/CPM, Laxmi publications, New Delhi, 1987
7. Elaine marmel, Microsoft office project 2003 Bible, Wiley Dreamtact (p) Ltd, New Delhi, 2004

4. Estimating and Costing & Specifications (210714)

OBJECTIVE- The objective of the subject is to introduce the students about the successful implementation of the project to know about the material required and cost to be incurred before starting a new project.

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation				L	T	P			
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
4.	**210714**	**Estimation, Costing & Specifications**	**PAEC-4**	50	10	20	20	-	-		100	3	2	1	-	**3**	Blended ** (2/1)	PP

UNIT- 1 INTRODUCTION TO SPECIFICATION

Specification - Definition, purpose, procedure for writing specifications for the purpose of calling tenders, types of specification. General specifications for 1St, 2nd, 3rd and 4th Class buildings. Data base for writing specification.

UNIT- 2 SPECIFICATION FOR DIFFERENT ITEMS

Specifications for the following items – Bricks; sand; cement; coarse aggregate; water; reinforcement; storing and handling of materials; Earth work in foundation; PCC; RCC; First class brick work in cement mortar; half brick thick partition in cement mortar; reinforced brick work; DPC; glazed tiles in skirting and dado; cement plaster; joinery in wood, steel &aluminum; painting to walls –emulsion, enamel paint
; painting to joinery ; varnishing ; French polishing ; based on surveys and Current trends.

UNIT- 3 INTRODUCTION TO ESTIMATION

Estimation – definition; purpose; types of estimate; various methods of approximate estimate of buildings with Introduction of computer applications in estimation.

UNIT- 4 DETAILED ESTIMATE

Detailed estimate – data required, factors to be considered, methodology of preparation, abstract of estimate, contingencies, work-charged establishment, bill of quantities, different methods for estimating building works, methods of measurement of works. – With case studies.

UNIT- 5 RATE ANALYSIS

Rate analysis – definition; method of preparation; quantity and labor estimate for unit work; task or outturn work; rate analysis for: earth work, concrete works, first class brick work, reinforced brick work, cement plastering, DPC with cement mortar/ concrete, finishing (cement paint, distemper, acrylic emulsion, enamel paint) to walls & ceiling. Using the current market rates for the materials, labor, tools and equipment

COs & LOs for Estimation, Costing & Specifications (210714) Overall Course Outcome: Students will be able to calculate and estimate the costing of any building based on the material, measurements and specifications, etc.			
CO1	Studying specification, students will be able to identify various materials based on specification and apply the understanding generated in their own design.	LO1	**Remember** basic definitions in specification.
		LO2	**Observe** the purpose and types of specification
		LO3	**Understand** general specifications, classes of buildings and database for writing specification.
CO2	Studying this, students will be able to analyze and apply specifications of different material and tasks in	LO1	**Understand** specification of basic construction material for substructure and superstructure.

	construction in their own design and profession.	LO2	**Identify** classes in brickwork.
		LO3	**Analyse** specification for basic construction work such as Dado, joiner, painting, etc. based on surveys and current trends.
CO3	Studying this, students will be able to estimate the approximate and basic construction cost of a building and their own design.	LO1	**Learn** the definition, purpose and types of estimation in architecture.
		LO2	**Identify** various methods of approximate estimate of the building.
		LO3	**Understand** basic application of computer software in estimation.
		LO4	**Apply** the formulas learned into calculating basic estimate of a small-scale building.
CO4	Studying this, students will be able to do detailed estimate of the construction cost of a building and their own design and profession.	LO1	**Learn** the definition, different methods, purpose and data required for preparation of detailed estimate of a building.
		LO2	**Identify** various methodologies for the preparation of detailed estimate of buildings.
		LO3	**Understand** abstract, contingencies and charge establishment, bill of quantities and methods of measurements, in estimation.
		LO4	**Illustrate** the different methods of detailed estimate with the help of case studies of buildings.
		LO5	**Apply** the methods learned into calculating detailed estimate of a small-scale building.
CO5	Studying this, students will be able to rate analysis for different construction works and apply them in their own design and profession.	LO1	**Learn** the definition and methods of preparation of rate analysis.
		LO2	**Understand** quantity and labor estimate, task or outturn work, etc.
		LO3	**Analyse** the rates for various construction work with different class of construction.
		LO4	**Calculate** the rate using the current market rates for the materials, labor, tools and equipments.

REFERENCES:

1. M.Chakraborti, .Estimation, Costing, Specification and Valuation in Civil engineering.
2. Dutta, Estimating and Costing, S. Dutta and Co., Lucknow 1983.
3. PWD Specifications of Tamil Nadu State Government.
4. CPWD Specifications of Government of India.

5. Elective- V

OBJECTIVE-The objective of the subject is to introduce the students about the best teaching learning resources and programs initiated by the Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The course is opted from NPTEL platform in traditional mode.

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted									Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot			MOOC				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation											
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project	Assignment	Exam								
5.	-	ELECTIVE V	DE- 5	-	-	-	-	-	-		25	75	100	3	2	1	-	**3**	Offline *	MCQ

S no	Elective	Sub code	Sub Name	Remark
1	ELECTIVE V			opted from NPTEL platform

Opted from NPTEL platform (July- Dec 2023)

6. URBAN & REGIONAL PLANNING (210717)

OBJECTIVES:

To expose the students to the history and development of planning, its relevance & application to modern day principles of town planning.

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation				L	T	P			
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
6.	**210717**	**Urban & Regional Planning**	**DC- 17**	50	10	20	20	-	-		100	3	2	1	-	**3**	Blended * (2/1)	PP

UNIT- 1 PLANNING CONCEPTS

Role and contribution of the following towards contemporary town planning thought – Geddesian Triad and outlook Tower by Patrick Geddes, City Beautiful by Daniel Burnham, Garden city by Ebenezer Howard, Neighbourhood by C.A.Perry, Radburn by Henry Wright and Clearance stein, Ekistics by CA Doxiadis, City for three million habitat, Radiant city and Chandigarh by Le Corbusier and F.L.Wright

UNIT- 2 CONTEMPORARY ISSUES IN URBAN AND REGIONAL PLANNING

Contemporary problems of settlements, Environmental impact of unplanned growth. Socio-economic aspects of urban housing and problems of slums, rationale of urban regulatory controls. Urban redevelopment and renewal, urban traffic and transportation planning

UNIT- 3 URBAN AND REGIONAL PLANNING

Influence of socio-economic factors in the development of human settlements, growth and decay of human settlements. Classification of settlements: Classification based on population, functions, locations, Municipal status. Town and its land uses, graphical representation and color coding of land use, character of a town, categories of a town, densities of a town, Principles, Advantages and types of Zoning. Scope and purpose of Perspective Plan, Regional Plan, Development Plan, Local Area Plan, Special Purpose Plan, Annual Plan, Project.

UNIT- 4 URBAN GOVERNANCE

Schemes, programs by government, Urban management including various schemes for small and medium towns by GOI. Human resource utilization - through schemes and use of PPP

UNIT- 5 EMERGING TRENDS IN URBAN AND REGIONAL PLANNING

New Urbanism, Smart growth, TOD, Form-Based Codes, Rural village, Transect Future of cities and cities of future - Sustainable cities, Intelligent cities, Liveable cities, Resilient cities, Smart Cities, Global city, Eco city, Compact city, Vertical urbanism, MediCity, Sports city**.**

COs & LOs for Urban And Regional Planning (210717)

Overall Course Outcome: Students will be able to identify various challenges of urban areas and suggest sustainable planning methods.

CO1	**Elaborate** the dynamics of city growth and development.	LO1	**Study** the concept of urbanization and growth pattern.
		LO2	**Explain** the impact of cities' scale and complexity on National development.
		LO3	**Identify** the issues and challenges of Peri urban and fringe areas.
		LO4	**Examine** the physical and functional linkage between the city, fringe and periphery
		LO5	**Determine** the principal dimensions of urban transformation (economic, social, cultural, physical, environmental, and spatial) and the key interdependencies among these facets of urban change
CO2	Student will be able to **elaborate** the role of socio-cultural aspects on growth patterns of city and neighbourhood communities	LO1	**Define** Gender Sensitive Planning, Inclusive Planning, Community Participation
		LO2	**Infer** various settlement policies for rural and urban settlements provided by National Commission on Urbanization and Rural Habitat Policy
		LO3	**Identify** social problems of slums and squatter settlements formed as a result of rapid urbanization and industrialization.
		LO4	**Examine** the impact of social transformation on social life, safety and security in rural and urban areas.
		LO5	**Discuss** the experiences from developing countries regarding settlement structure, growth and spatial distribution.

CO3	Student will be able to **propose** sustainable measures of Planning for metro and mega cities.	LO1	**Explain** the concept of Urban Sustainability
		LO2	**Identify** the problems pertaining to urban expansion in metro and mega cities
		LO3	**Examine** the issues and problems of inner city.
		LO4	**Determine** various strategies to achieve inclusivity, equity, improved quality of life and sustainability in metro and mage cities.
		LO5	**Discuss** Transit-Oriented Development as an approach to sustainable development in metro and mega cities.
CO4	**Recommend** effective tools and approach for Human Settlement Planning	LO1	**Study** various Urban Development policies and programs
		LO2	**Outline** the role of different agencies/bodies /authorities at different level
		LO3	**Analyse** policies, norms, byelaws and schemes in Indian context.
		LO4	**Determine** the success and failure of various schemes introduced at different levels
		LO5	**Elaborate** the concept of Human Settlement Planning
CO5	**Explain** land and real estate development impact on Urban land policies, land use and environment.	LO1	**Learn** dynamics of Urban Land market.
		LO2	**Summarize** land management techniques
		LO3	**Identify** legal aspects of development and their impacts on real estate development.
		LO4	**Analyse** impact on Urban land policies, land use and environment.
		LO5	**Perceive** knowledge on various Environmental Legislations and policies.

REFERENCES:

1. John Ratcliffe, An Introduction to Town and Country Planning, Hutchinson 1981
2. Arthur B. Gallion and Simon Eisner, The Urban Pattern – City planning and Design, Van Nostrand Reinhold company
3. Rangwala, Town Planning, Charotar publishing house
4. G.K.Hiraskar, Town Planning
5. Rame Gowda, Urban and Regional planning
6. Town Planning, A.Bandopadhyay, Books and Allied, Calcutta 2000

7. Summer Internship project- III **(04 weeks- Evaluation) (210719)**

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation				L	T	P			
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
7.	**210719**	**Summer Internship Project III**	**SEC- 9**	-	-		-	50	-		50	2	-	-	2	**1**	Offline	SO

Seminar / Workshop/ Training during previous summer break will be evaluated

FOURTH YEAR EIGHTH SEMESTER

1. Architectural Design VIII (210815)

Objectives –

The course aims to obtain knowledge of fundamental concepts and theories of Housing and apply them in their design projects, various types of Housing and its components, the vocabulary of urban design, its components. And utilizing it in design.

S. No.	Subject Cod	Subject Name	Categor y	Maximum Marks Allotted							Total Mark s	CT HRS	Contact Periods per week			Total Credi ts	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficienc y in subject/ course	Mid Sem.	Quiz/ Assign ment /Sessional		Lab work & Sessional	Skill based mini project								
1.	**210815**	**Architectural Design VIII**	**DC- 18**	-	-	-	-	100	100	50	250	8	-	-	8*(1.5)	**12**	Offli ne**	-

PROJECT I: HOUSING

The various types of housing projects in a typical urban scenario can be taken with suitable design parameters that get established after conducting a rigorous study. Analysis of existing design trends & user preferences need to be ascertained. Awareness about special building byelaws applicable for Group housing schemes is essential. In addition to design issues such as security, accessibility, identity, social interaction, comfort, economy etc. that would be investigated. The application of Fractals in design can also be explored. Ex. Housing for the poor /Slum dwellers, Multi-storied apartments for Govt. / corporate employees, Multi-storied condominiums for the rich etc.

PROJECT II: URBAN DESIGN OR URBAN CONSERVATION

Urban design projects could deal with redevelopment of problem areas such as riverfronts, beach fronts, market areas, bazaars or commercial & residential districts that have reached a dead end situation. It could also deal with emerging nodes of transportation with its surrounding areas, the design of city level open spaces such as parks, plazas etc. Alternatively, conservation strategies for heritage areas along with revitalization techniques can also be attempted. The projects thus undertaken as group work will have to ultimately contribute ideas for the improvement of the quality of the urban environment.

COs & LOs for Architectural Design – VI (210815)

Overall Course Outcome: The course aims to obtain knowledge of fundamental concepts and theories of Housing and apply them in their design projects, various types of Housing and its components, the vocabulary of urban design, its components. And utilizing it in design.

CO's	The course should enable the student to: ● Familiarize with given topic of design by choosing appropriate case studies through visits and documentation. ● Understand the resources available at National and international level through books, literatures and websites. ● Develop design ideas and Incorporate them.	LO1	Formulate an intellectual position, explored through architectural design, which reconciles the development of a critical brief with spatial and functional criteria.
		LO2	Conceptualize a brief for a design project, which, through engagement with a series of contexts, seeks to provide a critique of the built environment by proposing alternative spatial, formal, organizational or material solutions.
		LO3	Synthesize a design solution, which combines appropriate architectural expression, cultural response and the fulfillment of the functional requirements of a brief.
		LO4	Produce appropriate drawings, models and other media of an architectural design which explore, test and express its qualities of space, form, organization and response to physical and other contexts.
		LO5	Integrate appropriate technologies concerning structure, materiality and services into the design proposal.
		LO6	Effectively communicate the design or designs through an exhibition incorporating drawings, models, texts and other appropriate media.

REFERENCES:

1. Time saver standards for building types, DeChiara and Callender, McGraw hill company
2. Neufert Architect's data, Bousmaha Baiche& Nicholas Walliman, Blackwell science ltd
3. National Building Code - ISI
4. New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press
5. Time saver standards for landscape architecture – Charles W.Harris – McGraw Hill

2. Urban Design (Code – 210816)

Objective –

The course aims to prepare the students to develop a holistic view of the city as a basis for designing the city/city components in the third dimension.

S. No.	Subject Cod	Subject Name	Categor y	Maximum Marks Allotted							Total Mark s	CT HRS	Contact Periods per week			Total Credi ts	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficienc y in subject/ course	Mid Sem.	Quiz/ Assign ment /Session al		Lab work & Sessional	Skill based mini project								
2.	**210816**	**Urban Design**	**DC- 19**	50	10	20	20	20	30		150	4	1	1	2	**3**	Blen ded* ** (3/1)	**PP**

UNIT- 1 INTRODUCTION

Emergence of urban design as a discipline, need for urban design, Elements of urban design(buildings, streets, public spaces, transports, other elements etc. Principles of urban design- creating form and spatial definition in articulation of urban design expression.

UNIT- 2 STUDY AND ANALYSIS OF URBAN SPACES IN HISTORY AND MODERN CONCEPTS IN URBAN DESIGN

A brief study and analysis of urban spaces in history-in the west(Greek, Roman, Medieval and Renaissance towns)and the east(in India-Vedic towns, temple towns, medieval and Islamic towns). Modern concepts in urban design. Study of Urban design theories of Gordon Cullen and Kevin Lynch. Relevance of historic concepts of urban design in the present context-Critical analysis of Indian cities & understanding the urban design projects of Singapore, China & United States.

UNIT- 3 BASIC PRINCIPLES & TECHNIQUES IN URBAN DESIGN

Components in urban design composition. Urban scale, mass and space, definition of urban fabric, visual surveys and their influence for urban design, various methods of conducting a visual survey. Definition and purpose of open spaces and their hierarchy in urban design-hierarchy of utility spaces for residential, commercial, recreational and industrial use. Special focus on streets-Expressive quality of built forms, spaces in public domain.

UNIT- 4 RENEWAL, RE-DEVELOPMENT AND FORMULATING URBAN DESIGN

Definition and need for urban renewal and redevelopment, scope for urban renewal in India challenges and implementation methods of urban renewal for Indian historic towns and cities, impact of public participation. Analysis and formulation of urban design guidelines for new developments. National and international case studies for urban renewal.

UNIT- 5 URBAN DESIGN SURVEY AND PRESENTATION

Conducting an urban design survey of Conservation of historic cities, open-spaces, development of market spaces, transit oriented developments, waterfront development in India. Analysis of data. Formulating urban design guidelines for area-practical problem solving, understanding various presentation techniques for urban design presentations.

COs & LOs for Urban Design 210816)

Overall Course Outcome: The course aims to obtain knowledge of fundamental concepts and theories of Housing and apply them in their design projects, various types of Housing and its components, the vocabulary of urban design, its components. And utilizing it in design.

CO1	**Understanding** the importance of general morphology of urban space	LO1	**Defining** Urban design as a requirement for public domain
		LO2	**Summarizing** various elements of the subject
		LO3	**Journaling** about public realm
		LO4	**Building** form and spatial definition
CO2	**Understanding** of fundamental concepts and theories of urban design	LO1	**Retrieving** concepts of the west and the east
		LO2	**Categorizing** urban spaces in history
		LO3	**Synthesise** general theoretical models by historians
		LO4	**Assessing** Urban forms of the history and contemporary reform
		LO5	**Creating** presentation of projects from different countries

CO3	**Learning** urban design techniques , components and survey methodology	LO1	**Understanding** components of urban design composition
		LO2	**Examining** methods of visual survey for analysis
		LO3	**Demonstrating** hierarchy of open spaces in urban design context
		LO4	**Programming** on streets and other public spaces
CO4	**Developing** the strategies that can be used to overcome urban issues	LO1	**Defining** urban renewal and urban re-development
		LO2	**Finding** scope in Indian historic towns and cities
		LO3	**Analysing** present documents by governments for new infrastructure and development
		LO4	**Evaluating** urban design guidelines and add new perspectives as required
		LO5	**Presenting** case examples related to urban re-development nationally and internationally
CO5	**Produce a** design process and a design solution to an urban design problem	LO1	**Appraise** a site by learnt survey methods
		LO2	**Analyse** secondary and primary information
		LO3	**Research** relevant developing urban design interventions
		LO4	**Demonstrating** abilities in team work and time management

REFERENCES:

1. The Concise townscape- Gordon Cullen,The Architectural press
2. Image of the city - Kevin Lynch
3. Architecture of town and cities - Paul D.Speriregon, The MIT press
4. Urban design – Ornament and decoration , Cliff Moughtin, Bath Press
5. Urban design – street and square, Cliff Moughtin, Bath Press
6. Town and square - Paul Zucker
7. The urban pattern - Arthur B Gallion, CBS publishers
8. Architecture and the urban experience - Raymond J Curran. Van Nostrand Reinhold Company
9. Indian city in the arid West - KulbashanJain , Aadi Centre
10. Indian mega city and economic reforms - A.K.Jain, Management publishing Company

3. Professional Practice & Ethics (210817)

Objective –

The course aims to obtain understanding of the moral values that ought to guide the Engineering profession, and to resolve the moral issues in the profession, and to justify the moral judgment concerning the profession.

S. No.	Subject Cod	Subject Name	Categor y	Maximum Marks Allotted							Total Mark s	CT HRS	Contact Periods per week			Total Credi ts	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation				L	T	P			
				End Sem.	Proficienc y in subject/ course	Mid Sem.	Quiz/ Assign ment /Session al		Lab work & Sessional	Skill based mini project								
3.	**210817**	**Professional Practice & Ethics**	**PAEC-5**	50	10	20	20	-	-		100	3	2	1	-	**3**	Blen ded*** (2/1)	**PP**

UNIT- 1 THE PROFESSIONAL ROLE OF AN ARCHITECT & SERVICES RENDERED

Architect's role in society, IIA code of conduct, salient features of architect's act 1972, the council of architecture – Architect's office and its management, elementary accountancy required for the same etc. Architectural services- conditions of agreement- scope of work, comprehensive architectural services and architectural competitions, conditions of engagement, remuneration, professional fees and charges as per IIA norms, - copyrights of drawings.

UNIT- 2 ARCHITECTURAL COMPETITIONS & LEGISLATIONS

Regulations governing the conduct of competitions, Types of competition (open & closed competitions), appointment & duties of Assessors, instructions to participants, award of premium. Role of development authorities & urban arts commissions, salient features of the DCR for CMA, important regulations in the MP Govt. Environmental acts & laws, special rules governing hill area development & coastal area management, Heritage act of India etc.

UNIT- 3 EASEMENTS& ARBITRATION

Easement Rights –Definition, characteristics of an easement, Natural Rights ,Various easement rights- Easement of support, Easement of light and air, Easement of right of way, Easement of eave projection, etc . Continuous and Discontinuous easements, extinction of easements, Modes of acquiring easement rights – Need for Arbitration, arbitration agreement, role of arbitrators, umpire etc, excepted matters, arbitral award.

UNIT- 4 TENDER & CONTRACT

Calling for Tenders, tender documents, open & closed tenders, various types such as item rate, lump sum, labour & demolition tenders, conditions of tender, submission, scrutiny, recommendations & award of contract. Conditions of contract, IIA form of contract, articles of agreement, certification of contractor's bills, defects liability. Earnest money deposit, security money deposit etc.

UNIT- 5 VALUATION& RENT

Valuation – purpose of valuation, types of valuation- book value – salvage value- scrap value depreciation- obsolescence- sinking fund- land valuation ,building valuation- mortgage and lease- Annuity- definition, Fixation of rent- out going- gross and net income – year's purchase- capital cost standard rent- market rent- economical rent.

COs & LOs for Professional Practice & Ethics (210817)

Overall Course Outcome: Students will be able to get down in the profession and practice ethically.

CO1	With the understanding of the professional role of an architect & services rendered, the students will be able to practice ethically.	LO1	**Learn** the Architects' role in the society.
		LO2	**Relate** IIA Code of Conduct & Architect's Act, 1972 with architectural practice.
		LO3	**Understand** the working of architecture firm, services, scope of work, conditions of agreement, professional fees, remuneration and other professional charges, etc.
		LO4	**Comprehend** copyrights of drawings and other issues related to it.

CO2	Studying the regulations related to architectural competitions and legislations related to building construction, the students will be able to tackle the issues effectively.	LO1	**Learn** the types of competitions and regulations governing it.
		LO2	**Interpret** role of development authorities, commissions and salient features of DCR for CMA
		LO3	**Appreciate** the rules and the acts applied for specific types of building construction by the state and central governments.
		LO4	**Understand** the various Acts such as Environment Act, special rules governing hill area development, coastal area management, Heritage act of India, etc.
CO3	With the understanding of easement and arbitration, the students will be able to work practically once they enter professional world.	LO1	**Learn** easement rights and the types of easement rights and easements.
		LO2	**Construe** the modes of acquiring easement rights.
		LO3	**Appreciate** the need of Arbitration and its role, agreements, umpire, excepted matters, awards, etc.
CO4	Studying the regulations tenders and contract, the students will be able to put tenders and frame contract effectively.	LO1	**Learn** the definition and types of tender in architecture and building construction.
		LO2	**Interpret** conditions of tender, submission and scrutiny.
		LO3	**Recognize** the rules and regulations related to contract, agreements and certification of contractors' bill.
		LO4	**Understand** the various types of money deposits.
CO5	Studying the valuation and rent system will help the students in their professional practice.	LO1	**Learn** the meaning, purpose and type of valuation in architecture and building construction.
		LO2	**Summarize** the mortgage, lease, annuity, etc.
		LO3	**Understand** the system of renting and types of rent.

REFERENCES:

1. Hand book on Professional Practice by I. I. A, Image systems, Mumbai,1998.
2. Estimating and Costing by Dutta
3. CMDA-Development control rules for CMA.
4. TN cinematograph manual, govt central press, Chennai,1998.
5. Environmental Acts of the Ministry of Environment & forests, GoI.

4. Dissertation (210818)

Objective –

The course aims to obtain understanding of standards and conventions of doing dissertation. , to provide preliminary background information that puts the research in context and to clarify the focus of the study. The subject points out the value of research.

S. No.	Subject Cod	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
4.	**210818**	**Dissertation**	**PAEC-6**	-	-		-	20	30		50	4	-	-	4	**2**	Blended*** (2/2)	**-**

PHASE-1

First phase of dissertation allows students to identify the broad area / field of Architecture of their interest in which they may intend to do the research. This is to be done by studying and reproducing the brief of technical papers in the form of report review.

PHASE-2

Second phase allows the students to do the study of sample example of research already done by choosing the specific aspect / area relevant to broader field they have selected in first phase. This exercise involves the writing of report / review of book / journal dedicated to that specific aspect or area. This review writing is aimed to understand the method of collecting data (survey methods), analysis of data (statistics and mathematical formulas), drawing inferences and conclusion as attempted by the author of the book.

PHASE-3

Third phase is the writing of detailed dissertation report. Students are expected to choose their own topic of research by referring the area / field already identified in other two phases.

NOTE: Sessionals will be submitted in the form of review reports and Dissertation report.

COs & LOs for Dissertation – VI (210818)

Overall Course Outcome: The course aims to obtain knowledge of fundamental concepts and theories and to develop research ideas and Incorporate them in writing, with understanding of research and professional and academic reports.

CO 1, 2, 3	The course should enable the student to: ● Familiarize with given topic of research by choosing appropriate case studies through visits and documentation. ● Understand the resources available at National and international level through books, literatures and websites. ● Develop research ideas and Incorporate them.	LO1	Understand the fundamentals of Research methods before attempting final year Project Thesis.
		LO2	Study and develop basic research principles and research methods.
		LO3	Develop a sustained and coherent argument on an agreed topic, supported by both secondary and primary sources
		LO4	Communicate the result of a systematic programme of research with clear identification of the topic, research issues, the context and the theoretical perspectives.
		LO5	Evaluate significant information sources referred to and draw coherent conclusions relevant to the topic and issues initially identified, from the observations, evidence and arguments presented.
		LO6	Develop the skill of report writing. Prepare a Dissertation report

LIST OF TEXT AND REFERENCE BOOKS:

Instruction Manuals on report writing

5. Elective – VI

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation				L	T	P			
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
5.	-	ELECTIVE VI	DE- 6	50	10	20	20	-	-		100	3	2	1	-	**3**	Blended * (2/1)	**PP**

i) SUSTAINABLE INTERVENTIONS IN HISTORIC BUILDINGS (210814)

Objective –

The course aims to obtain knowledge of the creation and evolution of Architectural Conservation in India as well as in western world. It aims to explore the methods of Documentation as well as analysis for Intervention. This course aims to develop an overall understanding of the process of Historic conservation and Preservation.

UNIT-1 INTRODUCTION TO HISTORIC BUILDINGS

- Definition of Historic Buildings.
- Definition of Heritage.
- Why Intervention? Justification.
- Concepts of Values, Significance, Authenticity and Integrity.
- Conservation. Ethics in Conservation.

UNIT-2 RESEARCH IN INTERVENTIONS & CRITICAL ANALYSIS OF HERITAGE COMPONENTS

- Importance of Research in Heritage Conservation.
- Sources of information like books, archival photographs and maps, folklores, mythology, oral tradition and memories.
- Understanding the Scales of various heritage components: Buildings, Areas, and Towns, Region (Local, National, and International).

UNIT-3 DOCUMENTATION & DEGREES OF INTERVENTION IN HISTORIC BUILDINGS AND MONUMENTS

- Introduction to Heritage Database and Surveys for conservation
- Listing and Inventories
- Measured Drawing: Techniques of Measurement, Drawing and Presentation
- Photographic Documentation
- Degrees - Prevention of deterioration, Preservation of the existing state, Consolidation of the fabric, Restoration, Rehabilitation, Reproduction, Reconstruction

UNIT-4 DECAY AND REMEDIES

- Introduction to Decay in Cultural property, Materials and Structural failures
- Internal and External environment of historic buildings
- Climatic causes of decay
- Botanical, biological and microbiological causes of decay
- Insects and other pests as causes of decay
- Man-made causes of decay

UNIT-5 WHAT IS SUSTAINABLE INTERVENTIONS & DESIGNING IN HISTORIC CONTEXT

- Sustainable Interventions & its steps.
- Concepts of: - Imitation, Inspiration, Innovation, Influence, Evolution, New Design.

COs & LOs for Furniture Design

Overall Course Outcome: The course aims to obtain knowledge of fundamental concepts and theories of Sustainable interventions which can be applied in historic buildings.

CO1	Students will be able to understand the basic terminology of the subject.	LO1	**Understanding** basics of historic buildings
		LO2	**Understanding** definitions of Heritage
		LO3	**Discussing** the need of Interventions
		LO4	**Understanding** the concept of values, significance, authenticity, integrity and ethics

CO2	Students will be able to identify the stylistic characteristics of architecture, theories and importance of research	LO1	**Recalling** importance of research in Heritage Conservation
		LO2	**Relating** the sources of information and research
		LO3	**Reflecting** knowledge on various heritage components
CO3	Students will be able to understand the documentation techniques and degrees of intervention	LO1	**Identifying** various ways of collecting heritage database
		LO2	**Learning** the types of surveys, listing and documentations
		LO3	**Analysing** the type suitable for certain type of heritage
		LO4	**Correlating** the degrees of intervention with the condition of the heritage
		LO5	**Apply** the knowledge in documenting and assessing a heritage
CO4	Students will be able to elaborate concept of & types of Decay in a building and their remedies.	LO1	**Learn** the different types of decays in heritage building and precinct
		LO2	**Judging** effect of the different types of decays in heritage building and precinct
		LO3	**Illustrating** of the different types of decays in heritage building and precinct in a heritage building and precinct
CO5	Students will be able to design in Historic Context keeping in mind the sustainable solutions	LO1	**Associating** sustainability with historic design concepts
		LO2	**Implementing** sustainability in interventions of heritage building and precinct
		LO3	**Assessing** and applying concepts of , Inspiration, Innovation, Influence, Evolution, New Design

REFERENCES:

1. Kenneth Frampton, Modern Architecture: A Critical History, Thames and Hudson, London.
2. Sigfriedgiedion, .Space time and Architecture: The Growth of a new tradition, Harvard University Press.
3. Tzonis Alexander, Santiago calatrova, International Publications, January 2005, New York.
4. Steele James, Hassan Fathy - The complete works,London: Thames and Hudson.
5. Conservation of Historic Buildings by Fielden,Bernard, 2003, Architectural Press.
6. Guidelines for Conservation by Fielden, Bernard, 1989, INTACH, New Delhi.
7. Historic England, Practical Building Conservation: Conservation Basics, 2013, Routledge.
8. Contemporary Theory of Conservation by Salvador Munoz-Vinas, 2005, Elsevier.
9. Recording, Documentation, and Information Management for the Conservation of Heritage Places- Guiding Principles by Letellier, Robin, 2007, Getty Conservation Institute. Los Angeles.

(ii) ENVIRONMENT & ARCHITECTURE (210821)

Objective –

The course aims to obtain knowledge about Environmental studies and protection from rapid growing anthropogenic activities. Exploring various Architecture Techniques to mitigate them.

UNIT-1 INTRODUCTION TO THE STUDY OF ENVIRONMENT & URBAN DEVELOPMENT

Introduction, Concepts and Function: Introduction to environment, its meaning and growing importance in daily life. Built – Environment relationship.

UNIT-2 RELATIONSHIP BETWEEN ARCHITECTURE AND URBAN ENVIRONMENT

Role of Architects and Planners in Building Resilient Cities. Scope and Challenges in Indian Context.

UNIT-3 URBAN CHALLENGES

Urban Challenges to the Environment. Concepts like Waste management, Urban Heat Island Effect, Energy consumption, Climate change etc.

UNIT-4 GREEN RATING SYSTEMS IN ARCHITECTURE

Introduction to Green Rating Systems in India and Abroad. Criteria for listing under GRIHA LEAD, IGBC Etc

UNIT-5 ENVIRONMENTAL IMPACT ASSESSMENT

Introduction to Environmental Impact Assessment (EIA), Process including Scoping, Screening, Establishing Baseline conditions, Case examples.

COs & LOs for Environment & Architecture			
Overall Course Outcome: The basic objective of this course is to develop the student's understanding towards the importance of ecological studies and environmental protection from rapidly growing anthropogenic activities. This course would let the students explore various architectural techniques in mitigating environmental degradation and achieving sustainable living.			
CO1	Students will be able to **summarize** elementary knowledge to earth's natural environment and Urban Development	LO1	**Define** basic terms used in Environmental Stufy.
		LO2	**Outline** the relationship between built and Environment.
		LO3	**Analyze** the concept of Environmental studies.
		LO4	**Conclude** the various factors impacting environmental degradation, climate change, carbon footprint, relationship with human beings and built, Urban Development, etc.
CO2	Students will be able to **highlight** emerging human activities relating architecture & urban environment	LO1	**List** various human activities since industrialization till date impacting nature.
		LO2	**Demonstrate** impact of such activities with the help of suitable case examples
		LO3	**Analyze** the relationship between man and its natural surroundings, focusing on negative impacts of manmade activities on the environment.
		LO4	**Evaluate** the need of environmental protection and economic activities
CO3	Students will be able to **relate** urban ecology with its challenges.	LO1	**Define** ecology in terms of growing urbanization and technological advancement
		LO2	**Summarize** the need of alternative technologies to harmonize nature.
		LO3	**Develop** environmental sensitivity
		LO4	**Examine** application of available alternatives
CO4	Students will be able to **perceive** the role of green rating systems in architecture	LO1	**Recollect** the Green rating systems in India and abroad
		LO2	**Exemplify** the application Green rating systems in Architecture
		LO3	**Relate** various practical purpose of ecology and environment in the field of architecture and planning
		LO4	**Apply** the various Green rating systems
CO5	Students will be able to **assess** the Environmental Impact	LO1	List various factors of EIA and its process
		LO2	Assess the Environmental Impact over an area or specific region.

REFERENCES:

1. Fundamentals of Ecology by E.P. Odum
2. Review Our Dying Planet by Sarala Devi
3. Ecological Crisis: Reading for Survival by G. A. Love & R.M. Love

6. Elective- VII

OBJECTIVE-The objective of the subject is to introduce the students about the best teaching learning resources and programs initiated by the Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The course is opted from NPTEL platform in traditional mode.Elective- V

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted									Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot			MOOC				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation											
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project	Assignment	Exam								
6.	-	ELECTIVE VII	DE- 7	-	-	-	-	-	-		25	75	100	3	2	1	-	**3**	Offline *	MCQ

S no	Elective	Sub code	Sub Name	Remarks
1	ELECTIVE VII#	210861	Urban Services Planning	opted from NPTEL platform (July- Dec 2021)
		210862	Structure, Form, and Architecture: The Synergy	
		210863		

Opted from NPTEL platform (July- Dec 2023)

7. Seminar / Workshop/ Training(210819)

. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
7.	210819	Tour/ seminar / NASA/Workshop/ ining during winte break	SEC- 1	-	-		-	50	-		50	50	-	-	2	**1**	Offline	SO

Tour/ seminar/ Workshop/ Training during winter break will be evaluated in VIII semester

FIFTH YEAR NINTH SEMESTER

1. Professional Training (210911)

. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
1.	210911	Professional Training	PAEC-7	-	-	-	-	400	300	-	700	38	-	-	38	**19**	Off-campus	SO

2.Thesis Project I (210913)

. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
2.	210913	Thesis Project I	PAEC-8	-	-	-	-	50	50	-	100	4	-	-	4	**2**	Online	SO

FIFTH YEAR TENTH SEMESTER

1. Thesis Project II (211011)

. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
1.	211011	Thesis Project	DC-19	-	-	-	-	250	400	-	650	18	-	-	18*(1.5)	**27**	Blended **(14/4)	SO

2. Professional Development (211002)

. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
2.	211002	Professional Development	SEC - 12	-	-	-	-	20	30	-	50	2	-	-	2	**1**	Offline	SO

3. Elective VIII

. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	CT HRS	Contact Periods per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam
				Theory Slot				Practical Slot					L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem.	Proficiency in subject/ course	Mid Sem.	Quiz/ Assignment /Sessional		Lab work & Sessional	Skill based mini project								
3.	-	ELECTIVE - VIII	DE-8	50	-	30	20	-	-	-	100	3	2	1	-	**3**	Blended * (2/1)	PP

(i) Adaptive Reuse and Sustainable Retrofitting (211011)

Objective - Students will acquire a comprehensive understanding of sustainable design principles, practical skills in retrofitting existing structures, and the ability to creatively adapt spaces, preparing them for careers in architecture, urban design, and conservation.

Unit 1: Introduction to Adaptive Reuse

Introduction to adaptive reuse in architecture. Principles and benefits of adaptive reuse in sustainable design, Understanding Adaptive Reuse.

Unit 2: Assessment and Site Analysis for Retrofitting

Methods for site evaluation and analysis for retrofitting projects. Identification of opportunities and constraints in retrofitting existing structures. Site Assessment for Retrofitting.

Unit 3: Sustainable Retrofitting Techniques

Strategies and technologies for energy-efficient retrofitting. Sustainable materials and innovative technologies in retrofitting projects. Techniques for Sustainable Retrofitting.

Unit 4: Design Considerations in Adaptive Reuse

Design considerations and challenges in adapting existing structures. Balancing preservation with modern functionality in adaptive reuse projects. Design Principles in Adaptive Reuse.

Unit 5: Case Studies and Project Implementation

Analysis of successful adaptive reuse and retrofitting projects. Development and presentation of a sustainable retrofitting proposal. Case Studies and Project Implementation.

COs & LOs for Adaptive Reuse and Sustainable Retrofitting

Overall Course Outcome: The course aims to obtain knowledge of fundamental concepts and theories of Adaptive reuse of old or heritage buildings and Sustainable retrofitting interventions which can be applied in historic buildings. Implement sustainable retrofitting strategies to transform existing structures into environmentally efficient spaces.

CO1	Students will comprehend the principles and significance of adaptive reuse in sustainable architectural design.	LO1	**Recall** and explain the concept and benefits of adaptive reuse in architecture.
		LO2	**Understand** the significance of adaptive reuse in achieving sustainability in architectural design.
		LO3	**Apply** principles of adaptive reuse to analyze potential opportunities in existing structures.
		LO4	**Analyze** and compare the environmental benefits of adaptive reuse compared to new construction.
		LO5	**Create** preliminary design concepts demonstrating the potential for adaptive reuse in a given context.
CO2	Students will be able to analyze and assess existing structures for retrofitting opportunities, identifying constraints and possibilities.	LO1	**Recall** and list methods used for site evaluation and analysis in retrofitting projects.
		LO2	**Understand** the importance of thorough site assessment in identifying opportunities for retrofitting.
		LO3	**Apply** site analysis techniques to evaluate a given structure for potential retrofitting opportunities.
		LO4	**Analyze** the constraints and challenges associated with retrofitting existing structures.
		LO5	**Create** a site assessment report highlighting opportunities and constraints for retrofitting.
CO3	Students will evaluate and apply sustainable retrofitting techniques and technologies for energy-efficient design solutions.	LO1	**Recall** and describe sustainable retrofitting techniques and technologies.
		LO2	**Understand** the principles behind energy-efficient retrofitting strategies.
		LO3	**Apply** sustainable retrofitting techniques to propose energy-efficient design solutions.
		LO4	**Analyze** the effectiveness of different sustainable materials and technologies in retrofitting projects.
		LO5	**Create** a sustainable retrofitting plan integrating innovative technologies and materials.
CO4	Students will demonstrate the ability to integrate preservation principles with modern functionality in design considerations for adaptive reuse.	LO1	**Recall** and list design considerations and challenges in adapting existing structures.
		LO2	**Understand** the balance between preservation and modern functionality in adaptive reuse projects.
		LO3	**Apply** preservation principles to propose design solutions for adaptive reuse projects.
		LO4	**Analyze** the architectural integrity of existing structures and its implications in adaptive reuse.
		LO5	**Create** design concepts that harmonize preservation with contemporary design needs.
CO5	Students will present and propose a sustainable retrofitting project, synthesizing the principles learned into a comprehensive proposal.	LO1	**Recall** and summarize key features of successful adaptive reuse and retrofitting projects.
		LO2	**Understand** the factors contributing to the success of sustainable retrofitting projects.
		LO3	**Apply** lessons from case studies to develop a sustainable retrofitting proposal.
		LO4	**Analyze** and evaluate the environmental and economic impacts of implemented retrofitting projects.
		LO5	**Create** and present a comprehensive sustainable retrofitting proposal for an existing structure.

References:

1. Canter, D., & Warren, P. H. (2017). *Sustainable Urban Development Reader*. Routledge.
2. Heerwagen, J., & Loveland, J. (2014). *Adaptive Strategies for Waterfront Structures: Buildings, Infrastructure, and Urban Sites*. W. W. Norton & Company.

3. Roodman, D. M. (2017). *Sustainable Retrofit and Facilities Management*. Routledge.
4. Schmidt, M., & Zundel, M. (2018). *Adaptive Reuse: Extending the Lives of Buildings*. Birkhäuser.
5. Smith, P. A. (2018). *Sustainable Retrofitting of Commercial Buildings: Cool Climates*. Routledge.
6. Steemers, K., & Yannas, S. (2012). *Architecture and Environmental Engineering: Approaches for Energy and Environmental Studies in Building Design*. Routledge.
7. Chatterjee, P. K., & Dutta, K. (2018). *Sustainable Building Design and Construction: Case Studies of LEED*. Springer India.

(ii) Cultural Architecture and Identity (211012)

Objective - Students will acquire a comprehensive understanding of Cultural Identity and importance of Architecture and analyze the influence of cultural identity on architectural forms and styles. also they will be able to apply cultural elements creatively in architectural design to reflect and respect diverse cultural identities.

Unit 1: Understanding Cultural Identity in Architecture

Introduction to Cultural Identity. Exploration of cultural identity and its significance in architectural design. Influence of cultural factors on architectural styles and elements

Unit 2: Vernacular Architecture and Indigenous Building Techniques

Study of Vernacular Architecture. Examination of indigenous building techniques and materials. Analysis of how local culture influences architectural forms and functions

Unit 3: Preservation and Conservation of Cultural Heritage

Heritage Conservation Principles. Principles and methodologies of preserving cultural heritage sites and structures. Importance of adaptive reuse and restoration in maintaining cultural identity

Unit 4: Modern Architecture and Cultural Context

Modern Architectural Movements and Cultural Context. Examination of how modern architectural movements integrate or contrast with cultural identity. Analysis of contemporary design's role in preserving or altering cultural identity

Unit 5: Cultural Expression through Contemporary Architecture

Contemporary Cultural Architecture. Exploration of contemporary architectural expressions reflecting cultural identity. Examination of diverse approaches to integrating cultural elements in modern designs

<table>
<tr><td colspan="4"><u>COs & LOs for Cultural Architecture and Identity</u>
Overall Course Outcome: The course aims to obtain knowledge of Integrating diverse cultural elements into architectural designs, preserving and reflecting cultural identities.</td></tr>
<tr><td rowspan="5">CO1</td><td rowspan="5">Students will comprehend the significance of cultural identity in architectural design, recognizing its influence on architectural styles and elements.</td><td>LO1</td><td>Recall and describe the significance of cultural identity in architectural design.</td></tr>
<tr><td>LO2</td><td>Understand how cultural factors influence architectural styles and elements.</td></tr>
<tr><td>LO3</td><td>Apply knowledge of cultural identity to analyze architectural designs in different cultural contexts.</td></tr>
<tr><td>LO4</td><td>Analyze and compare the influence of culture on various architectural styles.</td></tr>
<tr><td>LO5</td><td>Develop design concepts that integrate cultural identity elements into architectural projects.</td></tr>
<tr><td rowspan="5">CO2</td><td rowspan="5">Students will analyze and differentiate indigenous building techniques and materials, understanding their role in shaping architectural forms.</td><td>LO1</td><td>Recall and list various indigenous building techniques and materials used in vernacular architecture.</td></tr>
<tr><td>LO2</td><td>Understand the relationship between local culture and architectural forms in vernacular architecture.</td></tr>
<tr><td>LO3</td><td>Apply knowledge of indigenous building techniques to propose sustainable design solutions for contemporary architectural projects.</td></tr>
<tr><td>LO4</td><td>Analyze and compare the influences of different cultural elements on the design and construction of vernacular buildings.</td></tr>
<tr><td>LO5</td><td>Create design proposals that incorporate indigenous building techniques, respecting and reflecting cultural traditions.</td></tr>
<tr><td rowspan="2">CO3</td><td rowspan="2">Students will evaluate and apply principles and</td><td>LO1</td><td>Recall and summarize the principles of preserving cultural heritage sites and structures.</td></tr>
<tr><td>LO2</td><td>Understand the importance of adaptive reuse and restoration in maintaining cultural identity in</td></tr>
</table>

	methodologies of preserving cultural heritage, advocating for adaptive reuse.		architectural conservation.
		LO3	**Apply** preservation methodologies to propose restoration strategies for a specific cultural heritage site.
		LO4	**Analyze** the ethical dilemmas and challenges in balancing modern needs with preserving cultural heritage in architecture.
		LO5	**Develop** preservation plans that integrate modern functionality while respecting the cultural significance of heritage structures.
CO4	Students will **assess and critique** the relationship between modern architectural movements and cultural context, analyzing their impact on cultural identity.	LO1	**Recall** and identify key modern architectural movements and their relation to cultural contexts.
		LO2	**Understand** how cultural contexts influence the evolution of architectural styles in modernity.
		LO3	**Apply** knowledge of modern architectural movements to analyze their impact on preserving or altering cultural identity.
		LO4	**Analyze** and compare the ways modern architecture reflects or challenges cultural norms and identities.
		LO5	**Create** design proposals that harmoniously blend modern architectural elements with cultural context.
CO5	Students will demonstrate the ability to **integrate** cultural elements into contemporary architectural designs, reflecting an understanding of diverse cultural expressions in modern architecture.	LO1	**Recall** and list contemporary architectural expressions reflecting cultural identity.
		LO2	**Understand** the diverse approaches used to integrate cultural elements into modern architectural designs.
		LO3	**Apply** various design approaches to propose innovative architectural solutions rooted in cultural identity.
		LO4	**Analyze** and critique the effectiveness of different strategies for integrating cultural elements in contemporary designs.
		LO5	**Create** original design concepts that authentically represent cultural identity in contemporary architectural projects.

References:

1. Ching, F. D. K. (2015). *Architecture: Form, Space, and Order*. John Wiley & Sons.
2. Kostof, S. (1999). *The City Shaped: Urban Patterns and Meanings Through History*. Bulfinch Press.
3. Kubler, G. (1982). *The Shape of Time: Remarks on the History of Things*. Yale University Press.
4. Morris, A. E. J. (1995). *History of Urban Form: Before the Industrial Revolutions*. Wiley-Blackwell.
5. Pile, J. F. (2018). *A History of Interior Design*. Laurence King Publishing.
6. Trachtenberg, M., & Hyman, I. (2002). *Architecture: From Prehistory to Postmodernity*. Prentice Hall.
7. Alsayyad, N., & Mejia-Hernandez, J. (Eds.). (2011). *Transnationalism in Architecture*. Routledge India.

(iii) Social Impact Design and Community Engagement (211013)

Objective - Students will acquire a comprehensive understanding of Social Impact Design and analyze the influence of community on overall design. Also they will be able to apply Community Engagement creatively in urban design to reflect and respect diverse communities.

Unit 1: Introduction to Social Impact Design

Understanding Social Impact Design. Definition and significance of social impact design in architecture. Historical context and evolution of community-engaged design practices. Case studies showcasing successful social impact design projects

Unit 2: Community Engagement Methods and Tools

Methods for Community Engagement. Techniques for effective community engagement in design processes. Participatory design methods and tools for involving stakeholders. Ethical considerations and challenges in community-engaged design

Unit 3: Social Impact Assessment in Design

Assessing Social Impact in Architecture. Principles of assessing social impact in architectural projects. Tools and frameworks for evaluating the social outcomes of designs. Case studies illustrating successful social impact assessments

Unit 4: Designing for Social Change

Design Strategies for Social Change. Strategies for integrating community needs into design solutions. Implementing inclusive design principles for diverse communities. Addressing social inequalities through architectural interventions

Unit 5: Implementation and Project Showcase

Implementation of Social Impact Design. Project planning and execution for social impact initiatives. Showcasing successful projects and their impact on communities. Reflection on the role of architects in fostering social change through design

COs & LOs for Social Impact Design and Community Engagement Overall Course Outcome: The course aims to obtain knowledge of Developing inclusive design strategies that positively impact communities through collaborative engagement and ethical practices.			
CO1	Students will be able to critically **appraise and defend** the significance of social impact design in architecture, evaluating its historical context and evolution.	LO1	**Recall** and summarize key historical milestones and influential movements in social impact design within architecture.
		LO2	**Explain** the evolution of social impact design, analyzing its shifts and influences over different architectural eras.
		LO3	**Apply** historical knowledge to demonstrate how social impact design has evolved and contributed to addressing specific societal challenges.
		LO4	**Break down** and categorize the elements that have led to the success or failure of significant social impact design initiatives.
		LO5	**Develop** a persuasive argument defending the importance of social impact design in modern architecture, integrating historical evidence to support the argument.
CO2	Students will be able to **synthesize and design** comprehensive community engagement strategies using participatory methods and ethical considerations, ensuring effective collaboration.	LO1	**Memorize** ethical considerations and principles that guide architects in engaging with diverse stakeholders.
		LO2	**Describe** the impact of different participatory methods on stakeholder involvement and collaboration in architectural projects.
		LO3	**Apply** various participatory methods to create a community engagement plan for a hypothetical architectural project.
		LO4	**Analyze** and evaluate the effectiveness of different community engagement methods in achieving stakeholder collaboration and inclusivity.
		LO5	**Design** a comprehensive and adaptable community engagement strategy integrating multiple participatory methods for a real-world architectural project.
CO3	Students will be able to **evaluate and appraise** the social impact of architectural designs using appropriate assessment tools and frameworks.	LO1	**Recall** and list different assessment tools commonly used to measure social impact in architectural designs.
		LO2	**Explain** the significance of assessing social impact in architectural designs, elucidating its importance in addressing community needs.
		LO3	**Apply** different assessment tools to evaluate the potential social impact of proposed architectural designs.
		LO4	**Analyze** and interpret the data collected from social impact assessments to determine the potential effects of design interventions.
		LO5	**Develop** a comprehensive social impact assessment plan for a proposed architectural design project, integrating multiple assessment tools and frameworks.
CO4	Students will be able to **create and propose** innovative architectural design strategies that address social inequalities, utilizing inclusive design principles.	LO1	**Recall** and list key principles of inclusive design relevant to addressing social inequalities in architectural projects.
		LO2	**Explain** the relationship between architectural design and social inequalities, demonstrating how design interventions can address these disparities.
		LO3	**Apply** inclusive design principles to propose architectural solutions that aim to address specific social inequalities within communities.
		LO4	**Analyze** and evaluate the potential impact of proposed architectural designs on reducing social inequalities within communities.
		LO5	**Create** innovative architectural design proposals that prioritize addressing social inequalities, integrating inclusive design principles and considering diverse community needs.
CO5	Students will be able to **demonstrate, analyze, and present** successful architectural projects showcasing their positive impact on communities.	LO1	**Recall** and list key elements of successful architectural projects that positively impact communities.
		LO2	**Explain** the role of architects in fostering social change through design interventions, illustrating their impact on communities.
		LO3	**Apply** reflective practices to analyze the impact of architectural projects on communities, considering diverse perspectives and stakeholders.
		LO4	**Analyze** and evaluate the long-term effects of successful architectural projects on the social fabric and well-being of communities.

		LO5	**Create** compelling presentations showcasing the positive impact of architectural projects on communities, incorporating diverse perspectives and stakeholders' feedback.

References:

1. Baer, W. C., & Dirks, S. (2016). *Design for Good: A New Era of Architecture for Everyone*. Island Press.
2. Brown, T. (2009). *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*. HarperCollins.
3. Dubberly, H., & Pangaro, P. (2009). *What is interaction? Are there different types?*.
4. Farrelly, L. (2014). *The Handbook of Design for Sustainability*. Bloomsbury Publishing.
5. Kolarevic, B. (Ed.). (2008). *Design Computing and Cognition '08: Proceedings of the Third International Conference on Design Computing and Cognition*. Springer Science & Business Media.
6. Mankad, S., & Gaucherel, A. (Eds.). (2019). *Sustainability and Social Responsibility in Higher Education: Perspectives and Practices in India*. Springer.
7. Mehta, V. (2019). *Architectural Identity in India: Through Time and Beyond*. Niyogi Books.