

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 Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	C T H R S	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	7	2	3	2*(1.5)	8	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. N o.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	C T H R S	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 - 8	50	10	20	20	50	30	20	200	5	2	1	2*(1.5)	6	PP	2.

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 BEAMS AND SLABS

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, chajja, staircase, canopy, coffer slab & pergola.

UNIT-4 RETAINING WALL, EXPANSION JOINTS, AND

Detailing of R.C.C. retaining wall. Expansion Joints: Walls, roofs, and flooring. Detailing of apertures (lintels, sunshades, arches). 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.

UNIT-5 CLADDING SYSTEMS & FINISHES

- Types of Cladding systems – Stone, timber, weatherboard, Fiber cement, Brick, Vinyl, Metal (aluminum composite panels (ACP), Precast concrete cladding panel, Curtain wall, Rain screen wall system. Exterior insulation & Finishes.

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	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,

	concrete in structure technology .	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 analyze different types of slab 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 slabs one-way slabs, 2-way slab, continuous, flat slab on a project.
		LO5	Draw all the elements of slab and its type.
CO4	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 detailing of apertures (lintels, sunshades, arches).
		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.
CO5	Students will be able to analyze different finishing material in a project	LO1	Learn basic types of cladding material.
		LO2	Understand its uses on a project.
		LO3	Apply it on a given live project.
		LO4	Analyze the market survey of different types of cladding material available in the market.
		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 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 Code	Subject Name	Category	Maximum Marks Allotted						Total Marks	C T H R S	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/Online)		
				Theory Slot			Practical Slot					End Sem. Exam	Continuous Evaluation	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 - 9	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 Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	C T H R S	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)		
				Theory Slot				Practical Slot					End Sem. Exam	Continuous Evaluation	L				T	P
				End Term Evaluation		Continuous Evaluation		Lab work & Sessional	Skill based mini project											
				End Sem.	Proficiency in subject / course	Mid Sem.	Quiz / Assignment / Sessional													
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, Coop Himmelb(l)au, and Bernard Tschumi.

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

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

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. Sigfried Giedion, Space time and Architecture: The Growth of a New Tradition, Harvard University Press.
3. Tzonis Alexander, Santiago Calatrava, 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. N o.	Subject Code	Subject Name	Cate gory	Maximum Marks Allotted							To tal M ar ks	C T H R S	Contact Periods per week			To tal Cr ed its	Mode of Exam	Mode of Teaching (Offline/ Online)		
				Theory Slot				Practical Slot					End Sem. Exam	Continuous Evaluation	L				T	P
				End Term Evaluation		Continuous Evaluation		Lab work & Sessional	Skill based mini project											
				End Sem.	Proficiency in subject / course	Mid Sem.	Quiz / Assignment /Sessional													
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	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

	and use in different structures	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 Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	C T H R S	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	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.

	knowledge to earth's natural environment	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. 7. 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 Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	C T H R S	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)		
				Theory Slot				Practical Slot					End Sem. Exam	Continuous Evaluation	L				T	P
				End Term Evaluation		Continuous Evaluation		Lab work & Sessional	Skill based mini project											
				End Sem.	Proficiency in subject / course	Mid Sem.	Quiz / Assignment /Sessional													
8.	210419	Tour/ Seminar / Workshop/ NASA Training during winter break	SEC- 5	-	-	-	-	50	-		50	2	-	-	2	1	SO	Offline		

8. INDIAN CONSTITUTION (Code – 100006)

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted							Total Marks	C T H R S	Contact Periods per week			Total Credits	Mode of Exam	Mode of Teaching (Offline/ Online)		
				Theory Slot				Practical Slot					End Sem. Exam	Continuous Evaluation	L				T	P
				End Term Evaluation		Continuous Evaluation		Lab work & Sessional	Skill based mini project											
				End Sem.	Proficiency in subject / course	Mid Sem.	Quiz / Assignment /Sessional													
9.	\$100006	Indian constitution	MA C-2	50	10	20	20	-	-	-	100	2	2	-		Grade	MC Q	Online		