

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: <ul style="list-style-type: none"> Familiarize with given topic of design by choosing appropriate case studies through visits and documentation. Understand the resources available at National and international 	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.
		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.

	level through books, literatures and websites. <ul style="list-style-type: none"> • Develop design ideas and create them. 	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, cork, 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 materials and 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 light fixtures. 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 Elevating 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 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								
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 of 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 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					
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 of 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 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)
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				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.	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
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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
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CO4	Influence the integration of natural elements as part of built environment	LO1	Illustrate stack effect for passive air movement throughout a building
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		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 Vernacular 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 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								
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 for Basics 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	Construct 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 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						
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 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 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													
7.	-	Novel engaging courses	CLC	-	-	-	-	-	50		50	2	-	-	2	1	SO	Interactive		

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

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 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													
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 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 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													
7.	1000005	Disaster management	MAC-7	50	10	20	20	-	-	-	100	2	2	-	-	Grade	SO	Online		

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 Standard (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 – 210601) 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					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.	210612	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