SECOND YEAR THIRD SEMESTER

1. Architectural Design – III (Code – 210311)

Objectives –

The course aims to obtain knowledge of Architecture as responding to site conditions, the designing process, spaces and relationship of architecture with personal traits, information and choices such as occupation, life style, religion etc.

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.	**210311**	Architectural Design – III	DC- 8	100	20	20	20	50	30	10	250	6	2	2	2*(1.5)	**7**	AO	Offline**

PROJECT 1(Prototype): TOWNHOUSE / VILLA

Study of contemporary practices & design for townhouses and villas in urban areas, to sensitize the students towards life style, individual preferences, space – activity relationship and exploration of how material, color, texture and light affect the quality of spaces is the main focus. It is also intended as an exercise in massing & configuration of façade elements such as the balancing of solids & voids, adoption of a system of proportioning and elements of contemporary detailing. This design exercise will also attempt to involve the student in the built form / open space relationship & explore the connectivity between indoor & outdoor spaces.

PROJECT 2(Prototype): NURSERY / PRIMARY / SECONDARY SCHOOL

Case studies on contemporary trends in school design to know how various architects have responded to the design program, site conditions, student age group etc. The project aims to enlighten the student on how the school design responds to various education philosophy and grooming methods. The analysis of important functional aspects such as space adequacy, circulation in the built form and play areas, locating the various spaces according to functional adjacency and careful design of toilet areas is intended. The objective is to also optimize the variables of the physical environment such as thermal comfort, daylighting and noise control in design.

PROJECT 3 & 4(Prototype): Time bound Problems of 6 hours to 48 hours.

COs & LOs for Architectural Design – III

Overall Course Outcome: The course aims to obtain knowledge of Architecture as responding to site conditions, the designing process, spaces and relationship of architecture with personal traits, information and choices such as occupation, life style, religion etc.

CO1	Students will be able to **design** townhouses and villas	LO1	**Identify** spaces responding to site condition and personal issues such as occupation, lifestyle, religion etc.
		LO2	**Map** gathered information of visited physical setting
		LO3	**Explore** the integration of indoor and outdoor areas.
		LO4	**Produce** sketches, models and photographs for analysis and design.
		LO5	**Analyze** the materials, construction techniques and structural systems used in the elements of built forms.
CO2	Students will be able to **design** buildings related to education philosophy.	LO1	**Develop** sensitivity towards existing habitat spaces with its building elements
		LO2	**Analyze** how school designs respond to various education philosophy and grooming methods with help of case studies.
		LO3	**Explore** the integration of classroom spaces with outdoor play areas in school buildings.
		LO4	**Produce** sketches, models and photographs for analysis and design.
		LO5	**Design** school buildings that respond to a particular educational philosophy.
CO3/CO4	Students will be able to maximize the potential of their designing skills within the period.	LO1	**Understand** the application of the architectural design process for medium scale projects of human habitat
		LO2	**Transform** the human behavioural needs into architectural program requirements
		LO3	**Analyze** 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 given period.

REFERENCES:

1. Time saver standards for building types, De Chiara and Callender, Mc Grawhill company.
2. Neufert Architect's data, Bousmaha Baiche& Nicholas Walliman, Blackwell science ltd.

Note: minimum four design problems shall be introduced in the semester out of which, one major problem, one small problem and two shall be time bound problems**.**

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

2. Building Construction – II (Code - 210312)

Objectives –

The course aims to obtain knowledge about doors, windows, different types of materials and their use in construction, the different waterproofing, damp proofing materials & technology available & their application, the vertical transportation designing & detailing.

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.	**210312**	Building Construction -II	BSAE-	50	10	20	20	20	20	10	150	5	2	1	2*(1.5)	**6**	PP	Blended** (3/3)

UNIT-1 BUILDING MATERIALS

Ferrous and Non-Ferrous metals & Plastics

• Properties and uses: Aluminum, zinc, lead, copper.

• Properties and Architectural uses of plastics: Thermoplastics, thermosetting plastics and, Structural plastics – Reinforced plastics and Decorative laminates-plastic coatings, Adhesives, and sealants – Modifiers and Plasticizers – Fabrications of plastics.

• Primary plastic building products for walls, roof, and partitions.

UNIT- 2 DETAILS OF DOORS, WINDOWS & VENTILATORS

• Timber Doors and its Joints: Single, double-leaf, ledged braced & battened door, framed ledged braced battened door, Paneled door, flush door, and Composite door.

• Timbers Windows & ventilators: Casement(side hug & top hug), Sliding pivoted (horizontal and vertical) folding and bay windows, fixed light of different sizes and shapes.

• Combined doors and windows and ventilators.

UNIT-3 STAIRCASES AND LIFT

• Staircases: Types according to profile–straight flight, dog legged, quarter-turn half-turn, bifurcated, spiral & Helical.

• Lift: Vertical transportation. Types and details.

UNIT-4 DAMP PROOFING AND WATERPROOFING

• Damp proofing: Hot applied and cold-applied–Emulsified asphalt, Bentonite clay. Butyl rubber, silicones, Vinyl's, Epoxy resins and metallic waterproofing materials, their properties, and uses. Waterproofing: waterproofing membranes such as rag, asbestos, glass felt, plastic and synthetic rubber vinyl, butyl rubber, neoprene, polyvinyl chloride – prefabricated membranes sheet lead, asphalt their properties and uses.

• Application: Application of the above in the basement floor, swimming pool, and terraces.

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-II

Overall Course Outcome: Students will be able to **understand** the knowledge about doors, windows, different types of materials and their use in construction, the different waterproofing, damp proofing materials & technology available & their application, the vertical transportation designing & detailing.

CO1	Students will be able to **understand** the role of metal in structure technology .	LO1	**Remember** basic concepts metal, and its uses.
		LO2	**Learn** the properties of different metals.
		LO3	**Understand** its uses in the architecture industry.
		LO4	**Analyze** the types of Reinforced plastics and Decorative laminates-plastic coatings, Adhesives, and its uses.
		LO5	**Evaluating** its role for rooms, windows, roof lights, domes, gutters, and handrails..
CO2	Students will be able to **demonstrate** their understanding through application in design and detailing of doors, windows & ventilators.	LO1	**Remember** basic concepts regarding detailing of doors, windows & ventilators.
		LO2	**Learn** its types according to uses.
		LO3	**Understand** the detailing of doors, windows & ventilators.
		LO4	**Analyze** the various types of doors, windows & ventilators, their extensive uses in building construction.
		LO5	**Draw** all the elements of doors, windows & ventilators.
CO3	Students will be able to **demonstrate** their understanding through application in design and detailing of staircase & lifts.	LO1	**Remember** basic concepts regarding detailing of R.C.C staircases and masonry.
		LO2	**Learn** its types according to profile.
		LO3	**Understand** the detailing of staircases and Lift.
		LO4	**Analyze** the various types of staircases and masonry, their extensive uses in Building construction.
		LO5	**Draw** all the elements of staircases and lifts.
CO4	Students will be able to **analyze** damp proofing and waterproofing in the building with its application.	LO1	**Learn** basic concepts about damp roofing & waterproofing.
		LO2	**Understand** its various types of damp roofing.
		LO3	**Apply** it on a given live project.
		LO4	**Analyze** the market survey of different types of damp roofing & waterproofing material available in the market.
		LO5	**Evaluating** through case studies and drawings of selected building types.
CO5	Students will be able to **analyze different** cladding systems and finishes for the building.	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 . 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. S.C. Rangwala – Engineering materials (Fortieth edition) – Charotar Publishing pvt.ltd
4. P.C Varghese, “Building Materials”, Prentice Hall of India Pvt. Ltd., New Delhi, 2005
5. Use of Bamboo and Reeds in building Construction – UNO Publications

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. Graphics –III (Code – 210313)

Objectives –

The course aims to obtain knowledge of various softwares used for drafting, 3D model making, rendering and presentation, such as AutoCAD, Revit, 3Ds MAX, Photoshop, CorelDraw, etc. according to the availability of experts.

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.	**210313**	Graphics -III	PAEC-1	-	-	-	-	20	20	10	50	6	-	-	6	**3**	SO	Offline**

UNIT-1 COMPUTER AS A DRAFTING TOOL

- Productivity tools in CAD, organization of layers for working drawings, use of blocks and symbols hatch patterns.
- Dimensioning systems extracting of areas from drawings, concept of paper space plotting the drawings

UNIT-2 COMPUTER AS A DESIGN TOOL

- Repetition of forms mirroring, coping and array, etc. calculation of areas, volumes.
- Creating and using templates, blocks, and symbols and using them in architectural drawings. - Managements of large drawing files.
- Working in a network environment-Security systems-converting drawing files into Internet compatible files.

UNIT-3 MEASUREMENT DRAWING WITH THE HELP OF CAD

- Exercise will be a group activity; to measure and draw the floor plan along with the plot boundaries, four side elevations, four sections and block plan, site plan of a large building or a settlement with the help of CAD.
- In addition to this drawing shall be prepared based on examples of buildings by giving a sketch design. Drawings shall be detailed enough to explain the complete design.

UNIT-4 VISUAL COMMUNICATION

- Photoshop: Creating and saving images, basic image editing, Photoshop toolbox and tools, using layers, special effects.

UNIT-5 INTRODUCTION TO 3-D Software

- 3-D Max/Sketchup: Creating simple models of buildings, basic editing, tools, effects, etc.

COs & LOs for Graphics III			
Overall Course Outcome: Students will be able to draft plans, elevations, sections, views and other details and render them to make them look professional.			
CO1	Students will be able to **apply basic** commands in AutoCAD to draw objects.	LO1	**Learn** about computer-aided drawing.
		LO2	**Understand** the objects, blocks, symbols, hatch patterns in AutoCAD.
		LO3	**Apply** various tools in AutoCAD with reference to drawings.
		LO4	**Draw** objects using basic dimensioning, patterns, plotting, etc.
CO2	Students will be able to **draw** complex objects using complex commands in AutoCAD.	LO1	**Learn** various further complex commands in AutoCAD to design.
		LO2	**Understand** management of files, working in a network environment, etc.
		LO3	**Design & Draw** complex objects using commands learned.
CO3	Students will be able to **draw** measured drawings.	LO1	**Learn** the concept of measured drawing and details to be considered while doing measured drawing.
		LO2	**Understand** how AutoCAD can be used to measure drawings.
		LO3	**Apply** various commands of AutoCAD in measured drawings.
		LO4	**Draw** measured drawing of a building includes plans, elevations, sections etc.
CO4	Students will be able to use Photoshop to **illustrate** building plans, elevations, etc. professionally.	LO1	**Learn** various tools in Photoshop & 3D software.
		LO2	**Understand** use of commands in Photoshop & 3D software.
		LO3	**Apply** various commands to draw in Photoshop & 3D software.
		LO4	**Draw** components, complex composition, rendering of Plans, elevations, sections in Photoshop & 3D software.

Note: Exercises of measurement drawings may be clubbed with study tours.

REFERENCES:

1. User manual & tutorials of Google Sketch Up software.
2. Auto CAD reference manual – Autodesk UNC, 1998
3. Auto CAD architectural user's guide – Autodesk Inc. 1998
4. Sham Tickoo, Advanced Technique in AutoCAD Re.14 – 1977 6. Sham Tickoo, Understanding AutoCAD – 14 (windows) – 1977
5. Photoshop CS Bible – Deke McClelland.
6. Adobe Photoshop 7.0 classroom in a book – Adobe creative team.

4. Surveying and Leveling (Code – 210314)

Objectives –

The course aims to obtain knowledge of the basic process of land surveying and fundamentals of various types of surveys adopted in architecture and civil, use various surveying methods in practice, field survey and to prepare a layout for understanding.

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.	**210314**	Surveying & Leveling	BSAE-	50	10	20	20	-	-		100	3	1	2	-	**3**	PP	Blended*** (2/1)

UNIT-1 SURVEYING

Aspects of surveying for the Architect. Surveying instruments classification by function. Useful data and formulae.

UNIT-2 SCALES

Scales-Plain scale, diagonal scale, comparative scale, shrunk scale, vernier scale.

UNIT-3 ACCURACY TEST AND INSTRUMENTS

Study, test, degree of accuracy, use and care of surveying instruments and accessories.

UNIT-4 SURVEY TECHNIQUES

Site survey techniques: Chain surveying, compass surveying, plain table, and theodolite.

UNIT-5 LEVELING AND CONTOURING

Basics of Leveling and contouring. Processes to level a highly undulated sites and contour a plain site.

Note: Class work and field work of the above subject should be oriented towards the layout of buildings. Students should also be taken to site visits for explaining the practical aspects of surveying.

COs & LOs for Surveying and Levelling			
Overall Course Outcome: Students will be able to identify different survey techniques and will be able to use instruments used in survey to develop the layout of the building.			
CO1	Students will be able to understand and apply surveying instruments and useful formulas used in surveying.	LO1	**Learn** various aspects of surveying for the Architect.
		LO2	**Understand s**urveying instruments, useful data and formulae.
		LO3	**Apply** useful data and formula.
CO2	Students will be able to **construct** various scales used in surveying.	LO1	**Study** various scales used in surveying.
		LO2	**Understand** use of different scale**s.**
		LO3	**Construct** various scales based on requirement.
CO3	Students will be able to **apply** surveying instruments for surveys.	LO1	**Study** use of surveying instruments and accessories.
		LO2	**Understand the degree** of accuracy of the surveying instrument.
		LO3	**Apply** surveying instruments and accessories used in different surveys.
CO4	Students will be able to **apply** site survey techniques and will learn how to make layout of buildings.	LO1	**Learn** different site survey techniques.
		LO2	**Understand** chain surveying, compass surveying, plain table, and theodolite.
		LO3	**Apply** different types of surveying for site surveys.
CO5	Students will be able to **apply** levelling and contouring on site surveys.	LO1	**Learn** about Levelling.
		LO2	**Understand** contouring.
		LO3	**Develop** Levelling and contouring on site survey.

REFERENCE BOOKS:

1. T. P. KANETKAR & S.V. KULKARNI, “Surveying & Leveling”, Pune VidyarthiGriha Pub.
2. DR. B.C. PUNAMIA, “Surveying Vol.1”, Laxmi Pub.
3. SHAHANE AND IYENGAR, “A Text book of Surveying & Leveling”, Engineering Book Co.
4. BERNARD H. KNIGHT, “Surveying and leveling for students”.

5. History of Architecture-III (Code – 210315)

Objectives –

The course aims to obtain knowledge about the development of architecture in the ancient Europe and the culture and context which produced it such as climate, religion, social practices & the politics, the evolution of architectural form & space with reference to Technology, Style and Character using sketches as the principal method of learning - about the prehistoric world, Ancient Egypt, West Asia, Greece ,Rome, Medieval times and Renaissance period.

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.	**210315**	History of Architecture-III	DC- 9	50	10	20	20	-	-		100	3	2	1	-	**3**	PP	Blended* (2/1)

UNIT-1 GREEK ARCHITECTURE

Evolution of City states in Greece, the Hellenic & Hellenistic art & architecture, Evolution of the classical orders & the features of the Greek temple, the building of the Acropolis with one outstanding example of Doric (Parthenon), Ionic (Erechtheon) & Corinthian. Public architecture: Theatre of Epidaurus and Agora, Optical illusions in Greek architecture.

UNIT-2 ROMAN ARCHITECTURE

Formation of Roman republic & Empire & influence of geology, culture & lifestyle. Roman architectural character using concrete, marble, travertine etc & masonry types used for walls. Tuscan & Composite orders, Roman forums and basilicas – methods of Vault & Dome construction with examples of Pantheon, Thermae of Caracalla, Colosseum, & Basilica of Constantine.

UNIT-3 EARLY CHRISTIAN & BYZANTINE ARCHITECTURE

Spread of Christianity, the evolution of early Christian Church form from the Roman basilica (St. Clemente), Centralized plan concept (St. San Vitale, Ravenna). The creation of eastern & western Roman Empire, the development of domes & pendentive, Byzantine architectural character with study of St. Sophia (Hagia Sophia) at Istanbul.

UNIT-4 ROMANESQUE & GOTHIC ARCHITECTURE

Romanesque period: Monastic orders & development of Craft and merchant guilds, Influences & architectural character of Romanesque churches in Italy (Pisa complex), France (Abbey Aux Hommes) and England (Tower of London) - Development of vaulting. Development of Gothic architecture in France, evolution of Gothic Cathedral & structural system using vaulting & flying buttress, the example of Notre dame cathedral at Paris.

UNIT-5 RENAISSANCE ARCHITECTURE IN EUROPE

Idea of rebirth and revival of classical architecture & the development of art & science. Italian renaissance character. Early renaissance & urban renaissance style and High renaissance period. Works of various artists and architects during the period (Andrea Palladio, Sir Christopher Wren, Michelangelo, Leonardo

COs & LOs for HOA – III

Overall Course Outcome: Students will be able to **develop** an appreciation of various architectural movements and its chronology across the globe and the resulting architectural productions that are unique in time and place.

CO1	Students will be able to **apply** Greek architectural expressions in their own design.	LO1	**Learn the evolution** of Greek Dynasties & cities.
		LO2	**Understand** diverse artistic and architectural expressions in various periods of Greek Architecture.
		LO3	**Illustrate** visual and verbal vocabularies of Greek Architecture.
		LO4	**Analyze** Greek architectural forms and space through various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various architectural forms and styles of Greek Architecture.
CO2	Students will be able to **apply** elements of Roman architecture in their own design.	LO1	**Learn the evolution** of Roman Empire, its cities and Architecture.
		LO2	**Understand** diverse artistic and architectural character in various parts of Roman Architecture.
		LO3	**Illustrate** visual and verbal vocabularies of Roman Architecture.
		LO4	**Analyze** Roman architectural forms and space through various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various architectural forms and styles of Roman Architecture.
CO3	Students will be able to **apply** elements of Egyptian architecture in their own design.	LO1	**Learn** evolution of both Early Christian & Byzantine Architecture.
		LO2	**Understand** diverse artistic and architectural expressions in various periods of Early Christian & Byzantine Architecture.
		LO3	**Illustrate** visual and verbal vocabularies of Early Christian & Byzantine Architecture.
		LO4	**Analyze** Early Christian & Byzantine architectural forms and space through various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various architectural forms and styles of Early Christian & Byzantine Architecture.
CO4	Students will be able to **apply** elements and concepts of West Asiatic Architecture in their own design.	LO1	**Learn** evolution of both Romanesque & Gothic Architecture.
		LO2	**Understand** diverse artistic and architectural expressions in various periods of Romanesque & Gothic Architecture.
		LO3	**Illustrate** visual and verbal vocabularies of Romanesque & Gothic Architecture.
		LO4	**Analyze** Romanesque & Gothic architectural forms and space through various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various architectural forms and styles of Romanesque & Gothic Architecture.
CO5	Students will be able to **apply** elements of South East & East Asian architecture in their own design.	LO1	**Learn the evolution** of the Renaissance Architectural Movement.
		LO2	**Understand** diverse artistic and architectural expressions in various periods of Renaissance Architectural Movement.
		LO3	**Illustrate** visual and verbal vocabularies of Renaissance Architectural Movement.
		LO4	**Analyze** Renaissance Architectural Movement, its form and space through various examples.
		LO5	**Reproduce** with help of sketches/visuals (softwares)/3D (models) of various architectural forms and styles of Renaissance Architectural Movement.

REFERENCES:

1. Sir Banister Fletcher, A History of Architecture, CBS Publications (Indian Edition), 1999.
2. Spiro Kostof – A History of Architecture – Setting and Rituals, Oxford University Press, London, 1985.
3. Leland M Roth; Understanding Architecture: Its elements, history and meaning; Craftsman House; 1994.
4. Pier Luigi Nervi, General Editor – History of World Architecture – Series, Harry N. Abrams, Inc.Pub., New York, 1972.
5. S. Lloyd and H.W. Muller, History of World Architecture – Series, Faber and Faber Ltd., London, 1986.
6. Gosta, E. Samdstrp, Man the Builder, Mc. Graw Hill Book Company, New York, 1970.
7. Webb and Schaeffer; Western Civilisation Volume I; VNR: NY: 1962.
8. Vincent Scully: Architecture; Architecture – The Natural and the Man Made : Harper Collins Pub: 1991

6. Structures-III (Code – 210316)

Objectives –

The course aims to obtain understanding of the basic principles of limit state design in reinforced concrete structural systems and the interpretation of detail structural drawings for the purpose of construction, the structural behavior of RCC buildings from an architect's perspective and hence does not delve into the process of detailed structural analysis design which is the forte of the structural engineer.

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								
6.	**210316**	Structure-III	BSAE- 7	50	10	20	20	-	-		100	3	2	1	-	**3**	pp	Offline***

UNIT- 1 FOUNDATIONS IN BUILDINGS

Soil load bearing capacity – concept of RCC spread footing - Types of R.C.C. foundation – Individual, Combined, Strip footings – Raft foundation (Theory only) – Eccentric footings with projection on one side only- the situations in which the various footings are used – friction pile foundation used in clayey soil (section & understanding of the principle)- pile foundation used in sandy soil & the pile foundation used in multi-storied buildings (section & principle only).Interpretation of typical structural details in foundation drawings .Site visits necessary for understanding the above.

UNIT – 2 ROOF SLABS & STAIRCASE

Exposure to the basic design concepts of Limit state method of design – recommendations in the code book - Classification of slabs – Estimation of loads – Design of one way, two way, circular and continuous slabs using SP – 16(Theory only). Interpretation of reinforcement details in a typical structural drawing for one way, two way slab & continuous slab. Understanding the reinforcement details for a RCC waist slab in dog legged staircase and for a folded slab staircase using typical structural drawings.

UNIT-3 BEAMS & LINTELS

Exposure to the basic design concepts - Estimation of loads on beams – Transfer of load from slab to beam – Understanding the design of simply supported beams, cantilevered & continuous beams using code coefficients & detailing using SP-16 for the design (Theory only). Steel detailing of beams for earthquake proofing (section only) – the function of plinth beam belt & continuous lintel belt –ring beam for RCC dome roof, typical reinforcement detail for waffle (coffer) slab (section only).Site visits to understand typical details in RCC slabs & beams.

UNIT - 4 COLUMNS

Understanding the estimation of loads on columns – Load transfer from slab and beam to columns. Structural behavior of Long and short columns –Distinction between rectangular and circular columns – Difference between columns subjected to uniaxial and those subjected to bi-axial bending. Knowledge about the design of columns using column interaction diagrams (Theory only) – Use of SP-16 for reinforcement detailing. Interpretation of typical structural drawing for columns & footings.

UNIT- 5 FLAT SLABS

Understanding the situations in which flat slabs are used - advantages of flat slab construction. Components of flat slab – Configuration of columns – Design of flat slab by direct design method as per BIS codes (Theory only). Site visit to understand flat slab construction.

COs & LOs for Structure - IV			
Overall Course Outcome: Students will be able to design and interpret the structural systems for all reinforced concrete structures using the limit state design method for structural analysis.			
CO1	To interpret the structural design process and analyse design of RCC foundations for the purpose construction	LO1	**Learn** the principles of structural design process for RCC foundations
		LO2	**Classify** the types of foundations, soil capacity and loads in design of foundations
		LO3	**Outline** the features of IS code provisions regarding limit state method for designing RCC foundations
		LO4	**Interpret** the typical structural details in foundation design
		LO5	**Asses** the working of structural details through site visit
CO2	To analyse the structural design details and reinforcement of RCC slabs and staircase for the purpose of construction	LO1	**Learn** the principles of structural design method for Slabs and staircase
		LO2	**Identify** the types of RCC slabs and RCC staircases and their design considerations
		LO3	**Outline** the features of IS code provisions regarding limit state method for designing slabs and staircases foundations
		LO4	**Interpret** the typical structural and reinforcement details in slab (one way, two way, continuous) /staircase design , (waist slab, folded slab etc)
		LO5	**Asses** the working of reinforcement details through site visit
CO3	To interpret the load calculation for structural design of beams and lintel in RCC structure and analyse their structural design details for the purpose of construction	LO1	**Learn** the principles of structural design method for Beams and lintel
		LO2	**Outline** the features of IS code provisions regarding limit state method for designing beams and lintel in RCC structures
		LO3	**Evaluate** the load considerations for design of beams and lintel in RCC structures
		LO4	**Interpret** the typical structural details for beams in special conditions such as earthquake resistant buildings, plinth beam, ring beam, coffer slab etc
		LO5	**Asses** the working of structural details through site visit
CO4	To interpret the structural design of columns in RCC structure and the design details using column interaction diagram	LO1	**Learn** the principles of structural design method for column in RCC structure
		LO2	**Outline** the features of IS code provisions regarding limit state method for designing columns in RCC structures
		LO3	**Evaluate** the load considerations, transfer of load and their structural behaviour for design of columns in RCC structure
		LO4	**Interpret** the typical structural details for column and the difference between various columns using column interaction diagram
		LO5	**Asses** the working of structural details through site visit
CO5	To interpret the design of flat slab and their structural details	LO1	**Learn** the principles of structural design method for Flat slab
		LO2	**Outline** the features of IS code provisions regarding limit state method for designing beams and lintel in RCC structures
		LO3	**Evaluate** the need of flat slab in structures and their component and design consideration
		LO4	**Interpret** the typical structural details for flat slab
		LO5	**Asses** the working of structural details through site visit

REFERENCES:

1. Victor E. Sauoma, Structural Engineering- analysis & design, University of Colorado,2011.
2. Simha .N.C and Roy .S.K, Fundamentals of Reinforced Concrete, S. Chand& Co. Ltd, Delhi,2001

7. Summer Internship Project –I (Institute Level Evaluation) (Code – 210319)

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.	**210319**	ummer Internship roject –I	SEC- 4	-	-	-	-	50	-		50	2	-	-	2	**1**	SO	Offline

8. Biology for Architects (Code – 210310)

Objective – The course aims to obtain understanding of the basic principles of biomimicry, and use of biomimicry in architecture, relation of biomimicry to building, skin and introduce students to principles of sustainability.

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.	**210310**	iology for Architec	MAC-1	50	10	20	20	-	-	-	100	2	2	-	-	Grade	PP	Blended* (2/1)

UNIT 1 INTRODUCTION TO BIOMIMICRY

History of biomimicry, Biomimetic, Bionics, various types of Biomimicry. Concept of Biomimicry Approaches to Biomimicry. Principles and levels of Biomimicry.

UNIT 2 NATURAL PATTERNS & BIOMIMICRY

Various patterns in nature, Understanding Biomimicry: theory and case studies, building elements as cells in biology, Patterns of Biophilia.

UNIT 3 SKIN: 3D PATTERNS & BIOMIMICRY

3D Patterns, use of 3D patterns in biomimicry, the impact of use of biomimicry on reducing the buildings energy consumption, buildings interaction with the environment.

UNIT 4 SUSTAINABILITY IN ARCHITECTURE

History, theory and types. Impact of the built environment on nature. Process of making construction process and maintenance of a building sustainable.

UNIT 5 INTEGRATING BIOLOGY IN DESIGN

Application of Biology in the design process along with design exercise to realize the process of discovering biological inspiration and its application.

COs & LOs for Biology for Architects Overall Course Outcome: Students will be able to understand the biological behaviour and inspiration for designing buildings and their methods of designing.			
CO1	Students will be able to **Define** basic elements and principles of biomimicry approaches	LO1	**Understand** elements of nature for the purpose of problem solving
		LO2	**Memorize** the historical concepts of biomimicry
		LO3	**Relate** concepts of biomimetic with built environment
		LO4	**Learn** principles of biomimicry
		LO5	**Express** in the form of presentations, concepts and approaches to biomimicry
CO2	Students will be able to **Analyse** natural environment and surrounding to achieve biomimicry in architecture	LO1	**Relate** cell as in science to the built form
		LO2	**Appraise** movements, stillness & patterns in nature
		LO3	**Summarize** established theories and concept like biophilia, prospect and refuge and more
		LO4	**Observe** natural elements as an inspiration for designs and composition
		LO5	**Compose** of basic natural element in digital or manual formats
CO3	Students will be able to **Experiment** three dimensional patterns to achieve low energy consumption in buildings	LO1	**Link** the three dimensional spaces, patterns with biomimetic architecture
		LO2	**Integrate** use of biomimicry for energy efficiency of buildings
		LO3	**Validate** with study of case examples for relationship between building and environment
		LO4	**Stimulate** textures, patterns inspired from nature, on and around built forms
CO4	Students will be able to **Apply** theories and concepts of sustainability to built form and surroundings	LO1	**Define** sustainability in each field incorporating architecture studies
		LO2	**Understand** the design philosophy behind the history of sustainable architecture
		LO3	**Infer** from various environmental impact assessment reports
		LO4	**Programme** building that are sustainable and have ease of construction
CO5	Students will be able to **Design** in and around the built structures, without harming our ecosystem	LO1	**Learn** of designing comfortable spaces
		LO2	**Apply** different strategies to achieve sustainable goals
		LO3	**Play** with locally available material according to site and design development
		LO4	**Build** a methodology to integrate biology in design

References:

1. Kohler, Matthias & Silke Langenberg, ed. Fabricate (2014 print, 2017 online) NA2543.T43 F33 2014 2014 gta Verlag digital fabrication, material‐based design
2. Aksamija, Ajla Sustainable Facades: Design Methods for High‐ Performance Building Envelopes online ebook 2013 Wiley building envelopes
3. Aranda, Benjamin; Lasch, Chris Tooling NA2728 .A58 2006 2006 Princeton Architectural parametric design
4. Ball, Philip Nature's patterns: a tapestry in three parts. Shape online ebook (2nd edition of Self‐made Tapestry) 2011 Oxford University Press biomimicry, pattern.