SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMAKURU
School of Architecture

Vision

To establish as a pioneer institute in planning and design of built environment through excellence in teaching, research, consultancy and design innovation.

Mission

- To create conducive academic ambience that nurtures aesthetic attitude, technical confidence, and critical thinking among students.

- To develop research and design innovation skills in students to address various societal needs.

- To inculcate professional ethics based on values and entrepreneurial skills among students.

Program Educational Objectives (PEO's)

Graduates from school of Architecture will achieve the following Program Educational Objectives within few years of graduation

- Graduates will showcase capabilities for competent practice of Architecture and enhance career by pursuing higher education
- Graduates will exhibit strong design skills to solve complex real-time problems through high technical skills and strong communication along with the knowledge of various domains of architecture including landscape, architectural conservation, interior design, energy conscious architecture, urban design and planning, construction project management, alternative building techniques, building information modeling and digital architecture
- Graduates will demonstrate professionalism, ethical conduct, societal concerns, effective team work and adapt to dynamic global and local needs engaging in lifelong learning

Program Specific Outcomes (PSO's)

PSO1: Develop critical thinking to analyze, evaluate, synthesize and generate appropriate design solutions for varying scales and levels of complexity.

PSO2: Explore possibilities and application of various building materials, construction techniques, building systems and services.

PSO3: Draw inspiration from divergent architectural theories and history along with varied indigenous and vernacular settings.

PSO4: Demonstrate effective communication skills to present architectural works and comprehend professional practice.

Programme Outcomes (PO's)

1. **Architectural Knowledge:** Apply the knowledge of design principles, building systems & technologies, humanities and environmental aspects in design, planning and construction.
2. **Problem Analysis**: Identify, formulate, review research literature and analyse various scales of architectural projects to arrive at tangible conclusions.
3. **Design/ Development of solutions:** Design solutions to integrate interdisciplinary approach for contextual issues pertaining to built-environment.
4. **Conduct investigations of complex problems:** Use research-based knowledge and methodologies including context analysis, case studies, project requirements and synthesis of the information to provide context sensitive solutions.
5. **Modern tool usage:** Identify, select and apply the appropriate tools, techniques and resources to predict, design and simulate qualitative and quantitative outcomes with an understanding of its limitations.
6. **The Architect and Society:** Apply reasoning to address socio-cultural, legal and safety aspects relevant to the professional practice and social responsibility.
7. **Environment and Sustainability:** Understand the importance of the architectural design solutions in environmental and social contexts to demonstrate the need for sustainable built environment.
8. **Ethics:** Apply ethical principles and commit to professional ethics, responsibilities and norms of Architectural profession.
9. **Individual and teamwork:** Function effectively as an individual as well as a team member or a leader in diverse interdisciplinary settings.
10. **Communication:** Comprehend and effectively communicate issues related to architecture, community and society at large through documentation, graphical and verbal presentations.
11. **Project management and Finance:** Demonstrate knowledge and understanding of professional and management principles to apply to individual work, as a team member and as a leader, to manage projects in multidisciplinary environments.
12. **Life-Long learning:** Recognize the need for, have the preparation and ability to engage in independent and lifelong learning in the changing domain of societal and technological advancement and adopt it in individual's professional practice.

SYLLABUS

FOR

III and IV semester B.ARCH

2024 -2025

School of Architecture

Siddaganga Institute of Technology

(An Autonomous Institution affiliated to V.T.U., Belagavi, Approved by AICTE, New Delhi Accredited by NAAC with 'A++' Grade and ISO 9001:2015 Certified)

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SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMAKURU

(An Autonomous Institution affiliated to VTU, Belagavi, Approved by AICTE, New Delhi, Accredited by NAAC with 'A++' Grade & ISO 9001:2015 Certified)

B.ARCHITECTURE

SCHEME OF TEACHING AND EXAMINATION (270 Credits Scheme)

Applicable to the students admitted during the year 2023-24

III Semester

Sl. No.	Course and Course Code		Course Title	Teaching / Paper setting Dept.	Teaching hrs/week				Examination					Credits
					Lecture	Studio	Practical	Self Study Component	Duration in hrs.	Mode of Exam	CIE Marks	SEE Marks	Total Marks	
					L	S	P	SS						
1.	PCC	3ATS01	Architectural Design-II		3	5				Viva	50	50	100	**8**
2.	BSAE	3ATS02	Building Materials and Construction-III		1	3				Viva	50	50	100	**4**
3.	SEC	3ATS03	Computer Applications in Architecture		1		2			Term Work	50	50	100	**3**
4.	PCC	3ATT01	History of Architecture-III		3				3	Theory	50	50	100	**3**
5.	BSAE	3ATT02	Building Services-I (Water Supply and Sanitation)		3				3	Theory	50	50	100	**3**
6.	BSAE	3ATT03	Climatology		3				3	Theory	50	50	100	**3**
7.	BSAE	3ATT04	Building Structures-II	Civil	3				3	Theory	50	50	100	**3**
8.	PEC	3ATPE	Professional Elective-I: Art Appreciation (ATPE01) / Visual Communication (ATPE02) / Architectural Documentation (ATPE03)			2				Term Work	50	50	100	**2**
9.	HSMC	SHS01-AT	Social Connect and Responsibilities	Any Dept.			2		-	-	100	-	100	**1**
10.	NCMC	NMC02-AT	National Service Scheme / Yoga / Physical Education	PE			2		-	-	-	-	-	**0**
			Total		17	10	6				**500**	**400**	**900**	**30**

Note: PCC: Professional Core Course, **BSAE**: Building Science and Applied Engineering Course, **HSMC**: Humanity and Social Science & Management Course, **SEC** –Skill Enhancement Course, **AEC**- Ability Enhancement Course, **PEC**- Professional Elective Course, **NCMC**- Non-Credit Mandatory Course, **OEC**- Open Elective Course

L –Lecture, **S**- Studio, **P**-Practical, **SS** – Self-Study Component, **CIE**: Continuous Internal Evaluation, **SEE**: Semester End Examination

SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMAKURU

(An Autonomous Institution affiliated to VTU, Belagavi, Approved by AICTE, New Delhi, Accredited by NAAC with 'A++' Grade & ISO 9001:2015 Certified)

B.ARCHITECTURE

SCHEME OF TEACHING AND EXAMINATION (270 Credits Scheme)

Applicable to the students admitted during the year 2023-24

IV Semester

Sl. No.	Course and Course Code		Course Title	Teaching / Paper setting Dept.	Teaching hrs/week				Examination					Credits
					Lecture	Studio	Practical	Self Study Component	Duration in hrs.	Mode of Exam	CIE Marks	SEE Marks	Total Marks	
					L	S	P	SS						
1.	PCC	4ATS01	Architectural Design-III		3	5				Viva	50	50	100	**8**
2.	BSAE	4ATS02	Building Materials and Construction-IV		1	3				Viva	50	50	100	**4**
3.	SEC	4ATS03	Building Information Modeling-I		1		2			Term Work	50	50	100	**3**
4.	BSAE	4ATS04	Structural Analysis-I		1		2			Viva	50	50	100	**3**
5.	PCC	4ATT01	History of Architecture-IV		3				3	Theory	50	50	100	**3**
6.	BSAE	4ATT02	Building Services-II (Electrical and Illumination)		3				3	Theory	50	50	100	**3**
7.	PEC	4ATPE	Professional Elective-II: Inclusive Design (ATPE04) / Vernacular Architecture (ATPE05) / Bio-Mimicry (ATPE06)			2				Term Work	50	50	100	**2**
8.	HSMC	SHS02-AT	Universal Human Values	Any Dept.	1				1:30	Theory	50	50	100	**1**
9.	NCMC	NMC02-AT	National Service Scheme / Yoga / Physical Education	PE			2		-	-	-	-	-	**0**
			Total		13	10	6				**400**	**400**	**800**	**27**

Note: PCC: Professional Core Course, **BSAE**: Building Science and Applied Engineering Course, **HSMC**: Humanity and Social Science & Management Course, **SEC** –Skill Enhancement Course, **AEC**- Ability Enhancement Course, **PEC**- Professional Elective Course, **NCMC**- Non-Credit Mandatory Course, **OEC**- Open Elective Course

L –Lecture, **S**- Studio, **P**-Practical, **SS** – Self-Study Component, **CIE**: Continuous Internal Evaluation, **SEE**: Semester End Examination

SIDDAGANGA INSTITUTE OF TECHNOLOGY
Tumakuru-572103

(An Autonomous Constituent Institution of Visvesvaraya Technological University, Belagavi)

SCHOOL OF ARCHITECTURE

DETAILED SYLLABUS FOR
THIRD SEMESTER
B. ARCHITECTURE

ARCHITECTURAL DESIGN - II

Contact Hours/Week	:	08	Credits	:	8.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Studio Hours	:	75	SEE Marks	:	50
Course Code	:	3ATS01	Exam Mode	:	Viva

Course Objectives: This course will enable students to:

1. Explore the relationship between spatial configuration and activity
2. Understand the role and influence of context in the design of built environment
3. Identify appropriate design ideas and solutions to respond to Indian rural context.

COURSE OUTLINE:

- Relationship between spatial configuration and activity related functions – Understanding and interpretation of user requirements. Introduction to bubble diagrams, proximity charts etc.

- Introduction to Contextuality – Site Analysis. Impact of site and surrounding on design. Process and methods of carrying out Case studies – Spatial, Socio economic, Climatic, Functional aspects to be analysed to formulate design framework.

- Projects like Polyclinic, Skill development Centre, Community library, Day care centre, Primary school, etc to be tackled in rural context.

- Exploration of different ways of natural and Artificial Lighting for specific function to be detailed. Detailing of skylights, lighting in galleries, lighting for reading spaces, light explored for thematic design purposes can be tackled.

NOTE:

a. Relevant case studies and literature studies can be given by the studio teachers and report must be compiled by the students.
b. Minimum of two architectural projects must be tackled in the semester.
c. One of the design exercises can be carried out as group work to explore possibilities of students working as teams.
d. Projects to be presented with help of drawings, sketches, and models. Application of techniques learnt in architectural presentation must be incorporated.

REFERENCE BOOKS:

1.	Laurie Baker	"Rural Community Buildings"
2.	Charles Correa	"The new landscape: Urbanisation in the third world", Butterworth Architecture, 1989. ISBN 0-408-50071-9
3.	Charles Correa	"The Ritualistic Pathway: 5 Projects: A Portfolio of Architecture" Pregati Art Printers, 1993. ISBN 0863552277
4.	Geoffrey Broadbent	"Design in architecture", Spon Press; New ed of 2 Revised ed edition (1 May 1990). ISBN-10 : 0419168303

Course Outcomes: After the completion of this course, students will be able to,

1. **Identify** various spatial configurations with related functions.
2. **Explore** the influence of context in shaping architectural environments.
3. **Analyse** the various spatial, socio economic, climatic, functional factors affecting architectural design.
4. **Develop** the concept which enhances the user experience and living standards in rural context.
5. **Design** and detail appropriate building elements as per the project.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1		2											2			
	CO2		2											2			
	CO3		2		2									2			
	CO4			3		3		3						3			
	CO5										2			2			

BUILDING MATERIALS AND CONSTRUCTION - III

Contact Hours/Week	:	04	Credits	:	4.0
Total Lecture Hours	:	15	CIE Marks	:	50
Total Studio Hours	:	45	SEE Marks	:	50
Course Code	:	3ATS02	Exam Mode	:	Viva

Course Objectives: This course will enable students to:

1. Get introduced to the building materials related to RCC.
2. Impart the knowledge of construction practices related to various RCC components of a building.
3. Understand the techniques of waterproofing of concrete.

COURSE OUTLINE:

- **Introduction to Cement** - Types of cement, applications, manufacturing process, laboratory and field tests. Cements for special applications. Introduction to Concrete; Ingredients, grades, admixtures, properties, production, mix, proportioning. Concretes for special applications.
- **Introduction to RCC Footing** - Principles and methods of construction - Isolated square and rectangular column footings, combined footings, Eccentric Footing.
- **Introduction to RCC Beams** - Principles and methods of construction - Simply supported singly reinforced beam, doubly reinforced beam, Tee beams, L beams, fixed beam, Cantilevered, Inverted, Concealed beams.
- **Introduction to RCC staircase** - Principles and methods of construction - Waist slab, folded plate and stringer.
- **Introduction to RCC slabs** - Principles and methods of construction - One way, two-way, Cantilever, sloping roofs, Flat slab, ribbed, filler, waffle / coffered slab.
- **Introduction to Plastering** - Plastering methods for Internal - use of various finishes viz., lime, cement, plaster of Paris, puffing etc. For External - smooth, rough, textured, grit plaster.
- **Methods of Repair** - Special mortar and concrete, chemicals, special cements and high grade concrete, admixtures of latest origin. Techniques for repair; Surface repair, material selection, surface preparation and polymers coating. Repair of cracks in concrete and masonry: methods of repair, epoxy injection. Water proofing methods and materials for concrete roofs.

NOTE:

a. Minimum one plate on each construction topic and study of material in the form of portfolio.
b. Miniature models to scale should be done for the construction related topics.
c. Site visits to cement manufacturing plant, concreting construction site and RMC batching plant be arranged by studio teachers and report to be compiled by students.
d. Market survey of materials should be carried out by students.
e. The entire portfolio on construction and materials shall be presented for viva.

TEXT BOOKS:

1.	Roy Chudley	Construction Technology, Longman Scientific & Technical, 1987, ISBN 9780582014527, 0582014522
2.	Robin Barry	The Construction of Buildings (Foundations and oversite concrete, walls, floors, roofs), Blackwell Science, 1996, ISBN 9780632041077, 0632041072

3.	Sushil Kumar	Building construction, Standard Publishers Distributors Delhi, 2001, ISBN 9788186308868, 8186308865

REFERENCE BOOKS:

1.	Roy Chudley, Roger Greeno, Karl Kovac	Chudley and Greeno's Building Construction Handbook, CRC Press, 2020, ISBN: 9780429648779

Course Outcomes: After the completion of this course, students will be able to:

1. **Illustrate** the construction details of different RCC structural elements & staircases.
2. **Identify** the properties and applications of cement and concrete in construction.
3. **Elucidate** various methods of plasters used in buildings.
4. **Identify** various methods of waterproofing for RCC roofs.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3									3		3		3		
	CO2	3											3		3		
	CO3	3											3		3		
	CO4	3											3		3		

COMPUTER APPLICATIONS IN ARCHITECTURE

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	15	CIE Marks	:	50
Total Practical Hours	:	30	SEE Marks	:	50
Course Code	:	3ATS03	Exam Mode	:	Term Work

Course Objectives: This course will enable students to:

1. Get introduced to the mode of digital presentation.
2. Understand the basics of various digital tools available for Architectural drafting.
3. Familiarize with the required computer proficiency for enhancing presentation skills.

COURSE OUTLINE:

- **Introduction to AutoCAD** - Coordinate Systems -Absolute, Relative Rectangle & Relative Polar. Setting up the standards in AutoCAD by templates-line weight, line colour, etc.
- **Drawing tools** - Modification Tools, Creating Plans, Elevations & sections.
- **Advance Tools** - Patterns (Array), Polyline edit, using layers of advanced tools.
- **Express tools** - Quick measure, DST, Annotation, Table creation, and Leaders. Blocks, Xref, View Option, Raster Design, linking map with GEO, importing images & aligning with scaling.
- **Plotting and Scaling** - Group, Inquiry commands, DWG compare, and viewport setting. Selection of sheet size and plotting to various scales using the layout.
- **Introduction to rendering software** - Rendering of AutoCAD Plans, sections, and elevations in Adobe Photoshop or similar software.
- **Introduction to 3D modeling** - Introduction to SketchUp & creating 3D modelling, Importing AutoCAD file. Preparation of massing and detailed model.

NOTE:
A. Portfolio of exercises and assignments containing reports, CAD drawings, and Presentation drawings done in the class to be submitted for progressive marks and SEE.

REFERENCE BOOKS:

1.	Autodesk Manual
2.	Adobe Photoshop Manual

Course Outcomes: After the completion of this course, students will be able to:

1. **Explore** the use of digital media as tools for presentation.
2. **Apply** skills in Architectural drafting and presentation using digital tools.
3. **Interpret** the Architectural ideas into presentation using appropriate software.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1					2											3
	CO2					3					3						3
	CO3					2					2						3

HISTORY OF ARCHITECTURE - III

Contact Hours/Week	:		03	Credits	:	3.0
Total Lecture Hours	:		45	CIE Marks	:	50
Total Tutorial Hours	:		--	SEE Marks	:	50
Course Code	:		3ATT01	Exam Mode	:	Theory

Course Objectives: This course will enable students to:

1. Get introduced to the evolution of Early Vedic and Buddhist phase.
2. Familiarize with the evolution of various styles in temple architecture.
3. Understand the architectural character and structural innovations in temple typology.
4. Understand the contextual influence and vernacular concepts in temple architecture.

UNIT I

Early Vedic phase - Architectural elements in the overall layout of the settlement,i.e. both public and individual structures. Evolution of the basic forms dictated by materials and needs.
Rise and development of Buddhist phase – the study of the early Hinayana and Mahayana phases. Types of structures and elements developed Eg: Stupas, Viharas, Chaityas, and Rock cut examples. Smaller elements like Stambas, railings, ornamental paintings etc. **07 Hrs**

UNIT II

Evolution of Hindu temple - Indo Aryan- Early temples of Gupta phase -Cave temple at Udayagiri, Kankali Devi Temple at Tigwa, Gupta temple at Sanchi & Dashavatara Temple at Deogarh.
Temples developed under Chalukyas- Lad Khan temple, Durga temple at Aihole, The Papanatha temple, The Virupaksha Temple at Pattadakal, Cave Temples and Mallikarjuna temple at Badami in Karnataka, Kailasanatha temple at Ellora. **07 Hrs**

UNIT III

Early Dravidian experiments by Pallavas - Rathas at Mahabalipuram, Shore temple, Kailasanatha temple & Vaikuntaperumal temple at Kanchipuram in terms of essential layout and elements of a temple.
Evolution of Cholas – the emergence of the large-scale layout of temple complexes - Brihadeshwara temple complex at Tanjore and temple Gangaikondacholapuram.
Nayaks - Contributions & developments through examples at Madurai - Meenakshi Sundaram Temple and Srirangam - Ranganatha Temple **07 Hrs**

UNIT IV

Hoysala style -Evolution and development of star shaped temples and other related special features like navaranga, multiple shrines etc..Eg: Temples of Belur, Halebid and Somnathpur.
Later Dravidian style of Vijayanagar style through examples at Hampi, Vijaya Vittala temple and Virupaksha temple.
Orissan style - Features and layout, form, shikara, internal & external treatment and their aesthetics. Mukteshwara and Lingaraja temple at Bhubaneshwar and Jagannath temple at Puri and the Sun Temple at Konark. **07 Hrs**

UNIT V

Gujarat style - Development of typical basic unit of temple & additional features like entrance arches and bathing tanks etc. Sun Temple, Modhera.

Khajuraho style - temple layout, grouping and ornamental features – Khandariyo Mahadeva, Lakshmana and Matangesvara temples.

Jain Architecture – Architectural features – Temples at Ranakpur, Dilwara temple at Mt. Abu, and Neminath temple at Mount Girnar **08 Hrs**

NOTE:

a. Assignments to include study of concepts relating to cultural and religious beliefs and structure.
b. Models, sketches and analytical studies can be carried out individually or in groups.

REFERENCE BOOKS:

1	Bannister Fletcher	A History of Architecture on the Comparative Method for Students, Craftsmen & Amateur;B.T. Batsford, Limited, 1901, ISBN: 9781343929623, 1343929628
2	Brown, Percy	"Indian Architecture, Buddhist and Hindu Period" 2nd edition Nov 2010, ISBN-13 - 978-1446510216
3	Grover Satish	"Architecture of India – Buddhist and Hindu" Published by Vikas Publishing House, Sahibabad, 1980, ISBN 10: 0706906853ISBN 13: 9780706906851

Course Outcomes: Students will be able to:

1. **Appraise** the architectural elements and structural material innovations during Buddhist architecture.
2. **Identify** the evolution of temple typology during Guptas and Chalukyas.
3. **Classify** the temple characteristics based on scale and structural innovations.
4. **Summarize** the vernacular concepts and design principles in temples of Hoysala and Orissan style.
5. **Identify** the building systems and technologies, planning and construction at Gujarath, Khajuraho and Jain architecture.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs											PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3														3	
	CO2	2														3	
	CO3	2														3	
	CO4	3														3	
	CO5	3														3	

BUILDING SERVICES - I
(Water Supply and Sanitation)

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Tutorial Hours	:	--	SEE Marks	:	50
Course Code	:	3ATT02	Exam Mode	:	Theory

Course Objectives: This course will enable students to:

1. Get introduced to the sources of water supply and its treatment processes.
2. Familiarize with the systems and methods of water distribution.
3. Identify various types of materials, and construction techniques used in sewerage system.
4. Get introduced to rainwater harvesting systems at various scales.
5. Familiarize with the concept of Solid waste management and special requirements of buildings.

UNIT I

Introduction to Environment and Health Aspects: History of Sanitation with respect to human civilization, Importance of Health, Hygiene Cleanliness, Waterborne, Water related, Water based, Epidemic diseases, Urban and Rural Sanitation.

Water Supply: Sources of Water supply – Municipal, bore well, river, etc. Quantity of water for different usages like Domestic, Hot water, Flushing, Gardening, Commercial, Industrial. Quality of supply for different uses as per national and international standards.

Water treatment: OBJECTIVESs of treatment, process- coagulation/flocculation, sedimentation, filtration (slow sand and rapid sand), disinfection, chlorination, softening. **09 Hrs**

UNIT II

Water distribution system - Requirement of a good distribution system.Methods of distribution systems- gravity system, pumping and combined system.Layouts of distribution system-dead end, grid-iron, ring and radial systems.Water distribution in building - Direct, over-head tank, underground and overhead tank, hydro-pneumatic and other systems. Distribution of water to fixture and fittings, schematic diagrams, Swimming pool, water bodies, efficient usage of water. **09 Hrs**

UNIT III

Plumbing: Water supply piping – hot, cold, flushing water, Piping in sunken areas, false ceiling areas, Drainage – floor traps, drains, P-trap, bottle traps, Single stack, two stack, cross venting, fixture venting, Material of construction like GI, PPR, PB, CPVC, Composite pipes, Copper, Flow control Valves – Gate valve, Globe valves, butterfly valves, Pressure Reducing valves &station, Pipe supports, hangers, fixing, plumbing of small residence.

Sanitary Fixtures, Fittings & Wellness: Soil appliances – Water closets, Bidet, urinals, Cisterns, Flush valve, Waste appliances – wash basin, sink, dishwasher, washing machine, Hot water system – Geysers, boilers, heat pump, Bath & water fixtures – Taps, mixers, single lever, quarter turn, bathtub, multi-jet bath, rain showers, health faucets, Wellness products : Sauna bath, steam bath, Jacuzzi. **09 Hrs**

UNIT IV

Sewerage system: Assessment of sewage generated, Collection of sewage / wastewater from all sources, Conveyance of sewage – gully trap, chamber, manhole, intercepting trap, grease traps, backflow preventer, schematic diagram. Materials of construction of sewerage network – PVC, UPVC, HDPE, corrugated PP pipes, objectives of Sewage treatment, types of treatment, aerobic, anaerobic and Space requirements.

Storm water Management: Assessment, Drainage system – piped drains, open drains, Recharging of storm water, Drainage of basements, podium, paved areas, Collection, Reuse of water within the project, reduction of the load on municipal system, landscape drainages and Rainwater harvesting. **09 Hrs**

UNIT V

Solid Waste Management: Assessment of waste, Waste to wealth concept, Municipal waste, garden waste, organic & inorganic, Commercial waste, Medical waste & Industrial waste, Collection, segregation, treatment, disposal, Organic waste – Bio-methanation, Vermi- composting, Organic waste converter.

Special requirements: Solar Hot Water Generation, Central LPG Supply System, Medical Gases Supply, Central Vacuum and Waste Collection. **09 Hrs**

REFERENCE BOOKS:

1.	RS Deshpande	A Text Book of Sanitary Engineering, Vol:1, United Books, Pune, 1959.
2.	Birdie, G. S. and Birdie J. S	"Water Supply and Sanitary Engineering", Dhanpat Rai Publications, 2010

Course Outcomes: After the completion of this course, students will be able to:

1. **Elucidate** the sources of water supply, their requirements with quality and quantity as per standards.
2. **Identify** different water distribution systems and layouts at building and urban scale.
3. **Develop** plumbing layout for a small project.
4. **Summarize** the sewage and storm water management systems.
5. **Explore** types and collection methods of solid waste and its treatment methods.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3						2							3		
	CO2	3													3		
	CO3	3		3											3		
	CO4		3												3		
	CO5	3	3												3		

CLIMATOLOGY

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Tutorial Hours	:	--	SEE Marks	:	50
Course Code	:	3ATT03	Exam Mode	:	Theory

Course Objectives: This course will enable students to:

1. Acquaint with the knowledge required for understanding the influence of Climate on architecture

2. Familiarize with the environmental processes which affect buildings.
3. Gain insight into the passive design strategies and techniques applied in buildings in different climates.

UNIT I

Introduction to Climate: Elements of climate, measurement and representations of climatic data. Classifications and Characteristics of tropical climates. Major climatic zones of India.

Interrelation between the human built environment and the natural environment: Historical trajectory of environmental degradation and climate change as a function of humankind's architectural and industrial interventions.

Introduction to the current Climate crisis and targets- Documentation of changes in climate, environmental conditions over time and their ramifications on the built environment and the roles and responsibilities of the profession of architecture. Develop a climate change timeline. **09 Hrs**

UNIT II

Thermal comfort: Thermal balance of the human body, basic understanding of psychrometric chart and related parameters (dry-bulb temperature, wet-bulb temperature, absolute humidity, relative humidity, enthalpy, specific volume), psychrometric basis of human thermal comfort, thermal comfort factors (including mean radiant temperature and air speed),

Thermal Comfort Indices (Effective temperature, corrected effective temperature, bioclimatic chart, tropical summer index by CBRI Roorkee), Indian Model of Adaptive Comfort (IMAC) and comparison with global thermal comfort models, measuring indoor air movement: Kata-thermometer, and measuring indoor radiation: Globe thermometer. Uses of psychrometric chart for climate analysis, Calculation of Overheated and under heated period (based on air temperature only) for locations in Climatic zones and their optimization in terms of solar heating and Passive cooling desired. **09 Hrs**

UNIT III

Thermal performance of building elements: Effect of thermo-physical properties of building materials and elements on indoor thermal environment. Convection, Radiation, concept of Sol-air temperature and Solar Gain factor. Thermal properties and performance of different materials used in construction such as Mud, Wood, Bamboo, RCC, Steel, Glass, GI, Tin, etc and relating it to Thermal Stress. Assessment of passive cooling possibilities and natural night-sky radiation of roofing materials and retrofitted radiant-barrier materials. **09 Hrs**

UNIT IV

Thermal Heat gain or loss: Steady state and periodic heat flow concepts (conduction, convection and radiation), conductivity, resistivity, diffusivity, emissivity, thermal capacity, time lag and 'U' value. Calculation of U value for multi-layered walls and Roof, Temperature Gradient, Inference of time lags from Graphs for walls and Roof. Construction techniques for improving thermal performance of walls and roofs. (Effect of density, Insulation, and Cavity)

Sun-path diagram: Solar geometry & design for orientation and use of solar charts in climatic design.

Shading devices: Optimizing design of shading devices effectively for overheated periods while allowing solar radiation for under-heated periods for different wall orientations. **09 Hrs**

UNIT V

Natural ventilation: Functions of natural ventilation, Stack effect due to thermal force and wind velocity. Air movements around buildings, Design considerations and effects of openings and external features on internal air flow and Wind shadows.

Natural/passive cooling: Introduction to passive techniques of cooling such as evaporative cooling (including basic assessment of its cooling potential using the psychrometric chart for various climatic zones), earth tubing, wind scoops, roof ponds, shaded courtyards etc.

Day Lighting: Nature of natural light, its transmission, reflection, diffusion, glare. Advantages and limitations in different climatic zones, North light, Daylight factor, components of Daylight devices. **09 Hrs**

Note:

The following Assignments/Exercises/activities related to each unit are to be carried out by the subject teacher:

1. Assignment 01: Collection of climatic data like Dry bulb temperature, relative humidity, wind speed, rainfall, etc for different cities in 5 different climatic zones and plotting the data in the form of graphs.
2. Assignment 02: Plotting of above temperature and relative humidity climatic data on psychrometric chart.
3. Assignment 03: Measuring temperature and relative humidity of a room using *temperature and humidity data logger* and importing the data into a computer for analysis.
4. Assignment 04: Calculation of comfort temperature for any location using IMAC thermal comfort model. (Numerical based calculation)
5. Assignment 05: Calculation of U value for multi-layered wall and roof elements.
6. Assignment 06: Design of a optimised shading device for a window for a given wall orientation using sun path diagram.
7. Assignment 07: Design considerations for buildings in tropical climates with special requirements to hot & dry, warm – humid and composite climates. Case studies/ Literature study of relevant traditional and contemporary building examples.
8. Assignment 08 (ABL) - Evaporative Cooling Effect from a Wet Cloth Details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Sustainable Cooling Technology Module: http://fairconditioning.org/knowledge-resources/#210-sust-cooling-technologies-1553498467
9. Assignment 09 (ABL) - Details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Sustainable Cooling Technology Module: http://fairconditioning.org/knowledgeresources/#210-sust-cooling-technologies-1553498467
10. Assignment 10 (ABL) - Details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Passive Design Module: http://fairconditioning.org/knowledge-resources/#230-passivedesign-1552544785

REFERENCE BOOKS:

1.	Koenigsberger	Manual of Tropical Housing & Buildings (Part-II), Orient Longman, Bombay, 1996.
2.	ArvindKrishan, Baker &Szokolay	Climate Responsive Architecture, Tata McGraw Hill, 2002.
3.	Martin Evans	Housing, Climate, and Comfort; Architectural Press (1 March 1980)
4.	Donald Watson and Kenneth Labs	Climatic Building Design - Energy-Efficient Building Principles and Practice; McGraw-Hill Book Company, 1983.
5.	Mili Majumdar (Editor);	Energy Efficient Buildings in India; The Energy and Resources Institute, TERI (28 February 2009)
6.	Baruch Givoni	Passive and Low Energy Cooling of Buildings; John Wiley & Sons (1 July 1994).
7.	Bureau of Energy Efficiency, Ministry of Power, Government of India.	Energy Conservation Building Code (ECBC) 2007;

Course Outcomes: After the completion of this course, students will be able to:

1. **Appraise** the interrelation between the human built environment and the natural environment.
2. **Expound** the factors affecting human thermal comfort in climate-responsive building design.
3. **Explore** the thermal performance of different materials in various building elements.
4. **Apply** concepts of thermal heat gain, U value, shading devices and sunpath diagram in building envelope design.
5. **Derive** appropriate strategies to build in different climatic context.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	2		3											2		
	CO2	3		2											3		
	CO3		2		3										3		
	CO4					3		2					2		3		
	CO5			3				3					3		3		

BUILDING STRUCTURES - II

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Practical Hours	:	--	SEE Marks	:	50
Course Code	:	3ATT04	Exam mode	:	Theory

Course Objectives: This course will enable students to:

1. Get introduced to basic principles of building mechanics.
2. Identify tension, compression, simple stresses and strain in various building elements.
3. Analyze various forces and their effects on structural elements of buildings.

Unit I

Simple Stresses & Strains: Basic concept of simple stress and compound stress, deformation Definition and discussion on Simple stress, deformation, strain,elasticity, ductility, brittleness , Hooke's law ,fatigue and factor of safety. Numerical problems on calculation of simple stress and deformation in bars of uniform and varying c/s subjected to tensile and compressive loads. **09 Hrs**

Unit II

Modulus of Elasticity (E), Modulus of Rigidity (C), and Bulk modulus (K), Poisson's ratio, relationship between elastic constants , Temperature effects on Structures Numerical problems on calculation of elastic constants,deformation of composite bars subjected to compressive and tensile loads. **09 Hrs**

Unit III

Elastic Stability of Columns: Column- Strut -length of column-Effective length of column-slenderness ratio short column and long column-failure of short column - failure of long column-Critical load or Crippling load on long column- Euler's theory of Long columns with assumptions and formula for Critical load concept of safe load. Numerical problems on calculation of critical load and safe load using Euler's Formula for long columns of solid and hollow circular and rectangular c/s. **09 Hrs**

Unit IV

Shear Force diagram SFD and Bending moment diagram BMD. Concept of shear force and bending moment in a beam subjected to external loads- sign convention-pure bending-point of contra flexure point of zero shear. Numerical problems on drawing SFD and BMD for Cantilever , Simply supported and overhanging beams subjected to concentrated load and uniformly distributed load (udl), location of point of contra flexure. **09 Hrs**

Unit V

Stresses in Beams: Concept of bending stress and Shear stress developed in beams subjected to bending - Simple bending equation with assumptions -Neutral Axis-Section modulus, Equation for calculation of shear stress. Numerical problems on Calculation and sketching of variation of bending stress and shear stress across the c/s of beam. (Rectangular, T , I sections) **09 Hrs**

TEXT BOOKS:

1.	Bureau of Indian Standards (BIS)	IS 456-2000 Plain and Reinforced Concrete - Code of Practice, 4th Revision, 10th reprint, 2007.
2.	Bureau of Indian Standards (BIS)	IS SP-16 (1980): Design Aids for Reinforced Concrete to IS 456:1978 [CED 2: Cement and Concrete], 11th Reprint, March 1999.

REFERENCE BOOKS:

1.	Martin Bechthold and Daniel L Schodek	STRUCTURES, Pearson Education, New Delhi. 7th Edition, 2014, ISBN (13): 978-0-13-255913-3, ISBN (10):0-13-255913-3
2.	Robers A Heller and Deborah J Oakley	Salvadori's Structure in Architecture - Pearson Education, New Delhi. 4th Edition, 2017, ISBN (13): 978-0-13-280320-5, ISBN (10):0-13-280320-8

Course Outcomes: After the completion of this course, students will be able to:

1. **Identify** the tension and compression members of a structure.
2. **Elucidate** shear stresses and bending stresses in various sections.
3. **Analyze** the bending moment and shear force acting on simple structures.
4. **Apply** the concept of shear and bending stress and building reactions to it.
5. **Apply** the knowledge to determine effective length, critical load, slenderness ratio for columns and beams of building failure.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3													3		
	CO2	3			3										3		
	CO3	3													3		
	CO4	3													3		
	CO5	3													3		

PROFESSIONAL ELECTIVE - I

Contact Hours/Week	:	02	Credits	:	2.0
Total Lecture Hours	:	-	CIE Marks	:	50
Total Studio Hours	:	30	SEE Marks	:	50
Course Code	:	3ATPE	Exam Mode	:	Term Work

ATPE01: Art Appreciation

Course Objectives: This course will enable students to:

1. Provide understanding of various types of arts and appreciate their aesthetic qualities.

COURSE OUTLINE:

Definition of Art and its various meanings. Types of Arts – Fine Arts, Performing arts, Commercial arts, Industrial arts, Folk Arts, abstract art, temporal arts, spatial arts, pop art, Photography, Film making and Literature.
Relationship between various art forms and Architecture. Exercises on understanding the nature and characteristics of art forms and deriving parallels to principles of Architectural design.
Various factors of Art influencing evolution of Architectural principles and style. Exercises analyzing historic and contemporary examples in which various art forms have influenced the style and character of Architecture.
Expression of Architecture through Artistic presentation. Exploring alternative methods of presenting design ideas like painting, sculpture, role play, music, Drama, Short movie, Advertisement, story, etc.

ATPE02: Visual Communication

Course Objectives: This course will enable students to:

1. Impart the techniques of Visual Communication.

COURSE OUTLINE:

Visual communication used in day to day life, print, electronic media, advertisement and in art / architecture context - differences and similarities. Understanding meaning generation process in visual language. Devices of visual language - space, context, scale, associate, transform, crop, frame, distort, abstract, fragment, exaggerate, and subvert, irony. Pictograms and ideograms. Understanding the differences between logo and symbol. Process of logo creation. Hierarchy in visual content being presented. Relationship between text and images and their interrelationships.Cultural context of meaning generation and aesthetic principles involved.

ATPE03: Architectural Documentation

Course Objectives: This course will enable students to:

1. To understand the character of a settlement, street, building, spaces, materials through a process of measured drawings and photographic documentation.

COURSE OUTLINE:

This course will introduce them to the need for Documentation. Tools for Documentation available, Methodology, Importance of Archival research, Old Photographs, Maps etc.
Secondary information on the /street/heritage, Reconnaissance survey of the /street/heritage building; Mapping of the street, Identification of selected typology of structures for detailed measured drawing, Recording of measurements- horizontal, vertical, measuring angles, marking center lines, datum, notations, building orientation. Legend of materials used; Structural details and joineriesDetails of various elements - openings, ornamental details.

Mapping activities in various locations, Supporting sketches, Information on people, surroundings, climate, Access to site, Preparation of Drawings, Developing drawings from the field data - Plans at various levels, Building floor plans, Reflected ceiling plans, roof plans, all elevations, relevant sections. Drawings of details such as openings, ornamental details, joineries. Analysis as tools for understanding and interpreting the measured drawings

Course Outcomes: After completion of course, Students would be able to:

1. **Apply** desired knowledge and skill in a particular domain of Architecture.
2. **Analyze** the processes required for the particular subject.
3. **Develop** an expertise in the chosen field for career enhancement.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3														2	
	CO2	3														2	
	CO3	3														3	

SOCIAL CONNECT & RESPONSIBILITIES

Contact Hours/Week	:	02	Credits	:	1.0
Total Lecture Hours	:	-	CIE Marks	:	100
Total Practical Hours	:	30	SEE Marks	:	-
Course Code	:	SHS01-AT	Exam Mode	:	-

Course Objectives: This course will enable students to:

1. Enable the student to do a deep drive into societal challenges being addressed by NGO(s), social enterprises & the government and build solutions to alleviate these complex social problems through immersion, design & technology.
2. Provide a formal platform for students to communicate and connect to their surroundings.
3. Enable to create of a responsible connection with society.

UNIT I

Plantation and adoption of a tree: Plantation of a tree that will be adopted for four years by a group of B.Tech/ B Arch. students. They will also make an excerpt either as a documentary or a photo blog describing the plant's origin, its usage in daily life, and its appearance in folklore and literature. **03 Hrs**

UNIT II

Heritage walk and crafts corner: Heritage tour, knowing the history and culture of the city, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms. **03 Hrs**

Unit III

Organic farming and waste management: usefulness of organic farming, wet waste management in neighbouring villages, and implementation in the campus. **03 Hrs**

Unit IV

Water Conservation: knowing the present practices in the surrounding villages and implementation in the campus, documentary or photo blog presenting the current practices. **03 Hrs**

Unit V

Food Walk City's culinary practices, food lore, and indigenous materials of the region used in cooking.

03 Hrs

NOTE:

The pedagogy will include interactive lectures, inspiring guest talks, field visits, social immersion, and a course project. Applying and synthesizing information from these sources to define the social problem to address and take up the solution as the course project, with your group. Social immersion with NGOs/social sections will be a key part of the course. Will all lead to the course project that will address the needs of the social sector?

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs											PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1							2								1	
	CO2							1								1	
	CO3							2								1	
	CO4							2								1	
	CO5							1								1	

Physical Education
(Sport &Athletics/Yoga & NSS)

Contact Hours/Week	:	02	Credits	:	0.0
Total Lecture Hours	:	-	CIE Marks	:	--
Total Seminar Hours	:	30	SEE Marks	:	--
Course Code	:	NMC02-AT	Exam Mode	:	--

SIDDAGANGA INSTITUTE OF TECHNOLOGY
Tumakuru-572103

(An Autonomous Constituent Institution of Visvesvaraya Technological University, Belagavi)

SCHOOL OF ARCHITECTURE

DETAILED SYLLABUS FOR
FOURTH SEMESTER
B. ARCHITECTURE

ARCHITECTURAL DESIGN - III

Contact Hours/Week	:	08	Credits	:	8.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Studio Hours	:	75	SEE Marks	:	50
Course Code	:	4ATS01	Exam Mode	:	Viva

Course Objectives: This course will enable students to:

1. Interpret principles of climate responsiveness in architectural projects.
2. Explore suitable strategies and proposals with respect to climate and context.
3. Familiarize with alternative building material and techniques to suit the project.

COURSE OUTLINE:

- Application of Climatic responsive architectural principles on given project. The project tackled would explore the possibilities of passive design for the given climatic condition with respect to site planning, landscape, building design and detailing.
- Introduction to sense of place. Study of design ideas and strategies adopted in historical precincts learnt earlier with respect to philosophy, principles, elements, context, and materials.
- Projects like Nature cure centres, Theme resort and restaurants etc to be tackled.
- Exploration of alternative building material and technology and incorporation of it into design. Detailing of any part of the building to represent the basic understanding.

NOTE:

a. Relevant case studies and literature studies can be given by the studio teachers and report must be compiled by the students.
b. Minimum of two architectural projects must be tackled in semester.
c. One of the design exercises can be carried out as group work to explore possibilities of students working as teams.
d. The portfolio covering the above topics shall be presented for viva.
e. Projects to be presented with help of drawings, sketches, and models. Application of techniques learnt in architectural presentation must be incorporated.
f. Knowledge of the alternative materials and techniques taught in building construction can be incorporated into design and detailing.

REFERENCE BOOKS:

1.	Van Nortrand	"Passive and Low Energy Cooling of building"
2.	Bureau of Indian Standards IS 3792 (1987), Handbook on Functional requirements of buildings other than industrial buildings	
3.	O.H. Koenigsberger and others	"Manual of Tropical Housing and Building – Part I"
4.	William J.R. Curtis	"BalkrishnaDoshi: An Architecture for India"
5.	Christopher Alexander	"A Pattern Language: Towns, Buildings, Construction"

Course Outcomes: After the completion of this course, students will be able to:

1. **Develop** architectural concepts for various climatic conditions.
2. **Identify** appropriate passive strategies to enhance human comfort in extreme climatic conditions.
3. **Interpret** the idea of sense of place and place making in architecture.
4. **Design** and detail appropriate building elements using alternative building materials.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1			2		2		2						2			
	CO2			2		2		2						2			
	CO3		2		2									2			
	CO4							1			2			1			

BUILDING MATERIALS AND CONSTRUCTION - IV

Contact Hours/Week	:	04	Credits	:	4.0
Total Lecture Hours	:	15	CIE Marks	:	50
Total Studio Hours	:	45	SEE Marks	:	50
Course Code	:	4ATS02	Exam Mode	:	Viva

Course Objectives: This course will enable students to:

1. Get introduced to various architectural applications of steel.
2. Explore application of types of metals in building interiors and exteriors.
3. Understand the paints and roofing materials.

COURSE OUTLINE:

- **Introduction to Metals** - Properties and architectural uses of mild steel and stainless steel. Introduction to non-ferrous materials. Properties, types and applications in Architecture like Aluminum, Copper, zinc and alloys like Brass and Bronze. Introduction to various types of metal finishes.
- **Introduction to Structural steel design** - Study of market forms of steel and its applications, MS sheet cladding. Design and construction of Steel sliding and folding doors.
- **Introduction to steel staircases** - Design and construction of steel staircase, fire escape stairs and composite steel staircases.
- **Introduction to Steel roofing** - Design and construction of steel trusses for various spans, north light truss, roof lighting and roof fixing details. Design and construction of Decking slab.
- **Introduction to Aluminium** - Study of Aluminium profiles and its application in buildings. Design and construction of Aluminium doors, windows and partitions.
- **Introduction to Roofing materials** - Properties and applications of Polycarbonate sheets, Fiberglass, Asphalt shingles, Roof fabrics, AC sheets and metal roofs.
- **Introduction to Paints** - Types of paints and process of painting different surfaces. Varnishes, distemper, emulsions and enamel paints and their applications. Constituents of oil paints and its characteristics. Types of finishes for various material surfaces.

NOTE:

a. Minimum one plate on each construction topic and study of material in the form of portfolio.
b. Miniature models to scale should be done for the construction related topics.
c. Site visits / case studies to explore various roof structures to be arranged by studio teachers and report to be compiled by students.
d. Market survey of materials should be carried out by students.
e. Building construction guidelines to be referred from National building code (NBC).
f. The entire portfolio on construction and materials shall be presented for viva.

TEXT BOOKS:

1.	Mr Roy Chudley & Roger Greeno	Construction Technology, Edition 4, Prentice Hall, 2009 ISBN : 0131286420, 978-0131286429
2.	S. C. Rangwala	Engineering Materials [Material Science], Charotar Publishing House Pvt. Limited, 2008, ISBN : 9788185594965, 8185594961

REFERENCE BOOKS:

1.	R. Barry	The Construction of Buildings Volume 1, Seventh edition, Blackwell Science Ltd, 1999, ISBN : 8176710016, 978-8176710015
2.	Glenn M. Hardie	Building Construction: Principles, Practices, and Materials, Prentice Hall, 1995, ISBN : 0133505707, 9780133505702
3.	G. D. Taylor	Materials in Construction, CRC Press, 2013, ISBN : 9781317879022, 1317879023

Course Outcomes: After the completion of the course, students will be able to:

1. **Interpret** the methods and details of constructing building elements using steel**.**
2. **Explore** the possibilities of aluminium in construction industry.

3. **Explore** the types and finishes of paints.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	2									2		2		3		
	CO2	3									3		3		3		
	CO3	3											3		3		

BUILDING INFORMATION MODELING - I

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	15	CIE Marks	:	50
Total Practical Hours	:	30	SEE Marks	:	50
Course Code	:	4ATS03	Exam Mode	:	Term Work

Course Objectives: This course will enable students to:

1. Get familiarize with 3D modelling software.
2. Enhance presentation skills combining various digital platforms.

COURSE OUTLINE:

- **Advanced 3D Modeling** - Application of materials for SketchUp model and introduction to rendering plugins - Rendering the project with Enscape or similar software. Installation of plugin software to SketchUp - Presentation and printing.
- **Introduction to BIM** - Brief comparison between 3D modelling software and their applicability. Introduction to Revit, creating template in Revit.
- **3D model creation** (Direct method or with the Support) - creating walls, terrain and building pad, floor, roof, doors & windows, curtain walls, stairs, Railings. Section views. Handling line weights, using graphics.
- **Revit Library** - creating components, model in place, Massing & Site, dimensions & annotation (rooms, legends etc), creating 3D, creating sheets, plotting, Design Option, Family Creations and project coordination.
- **Installation of plugin software to Revit** and creation of 3D rendered views, Presentation and printing. Rendering the project with Enscape or similar software.

NOTE:

a. Initial exercise to convert Architectural design project drawings (of semester 3 / 4) into digital format using Auto CAD.
b. 3D modelling to be done using SketchUp for 4th semester Architecture design project.
c. Preparation of detailed 3D model to be done using Revit for the 3rd semester Architecture design project.
d. Students are expected to present the final outcomes in the form of drawing panels, booklets, posters using Adobe Photoshop or similar software.
e. The portfolio containing 4th semester SketchUp model and 3rd semester Revit modelling exercises and assignments to be submitted for progressive marks and SEE.

REFERENCE BOOKS:

1.	Autodesk Manual for Revit
2.	Trimble SketchUp Manual

Course Outcomes: After the completion of this course, students will be able to:

1. **Illustrate** the Architectural design project in digital mode using appropriate software.
2. **Develop** skills of 3D modelling and rendering techniques using digital tools.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1					3					3						3
	CO2										3						3

STRUCTURAL ANALYSIS - I

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	15	CIE Marks	:	50
Total Practical Hours	:	30	SEE Marks	:	50
Course Code	:	4ATS04	Exam mode	:	Viva

Course Objectives: This course will enable students to:

1. Familiarize with the characteristics and properties of Reinforced Concrete as a building material.
2. Understand fundamental principles of structural behavior of Reinforced Concrete buildings.
3. Identify the relevant IS codes to design RCC building elements.

COURSE OUTLINE:

- **Reinforced concrete cement** - Basic characteristics of Concrete & Reinforced concrete including specifications and testing. Basics of mix design, water-cement ratio, strength, durability, workability requirements and formwork. Structural behavior under different loads and the need for reinforcement.

- **Designing of RCC beams** - Introduction to National building code and IS456:2000- Mechanics of Reinforced cement concrete, Loads on the structure as per IS 875, concrete structural system design.

- **Designing of singly reinforced RCC beams** (simply supported, fixed and cantilevered supports) using SP16 (Design Aids for Reinforced Concrete to IS 456:2000).

- **Designing of RCC slabs** - Designing of one way & two-way RCC slabs using SP16 (Design Aids for Reinforced Concrete to IS 456:2000).

- **Designing of RCC columns** - Designing of short & long RCC columns using SP16 (Design Aids for Reinforced Concrete to IS 456:2000).

- **Designing of RCC footings** - Designing of isolated RCC footing using SP16 (Design Aids for Reinforced Concrete to IS 456:2000).

NOTE:

a. Relevant case studies and literature studies can be given by the studio teachers and report has to be compiled by the students.
b. Site visits to be arranged by studio teacher.
c. Miniature models should be done to understand each of the structures.
d. Design considerations to be referred from IS 456:2000

TEXT BOOKS:

1.	Bureau of Indian Standards (BIS)	IS 456-2000 Plain and Reinforced Concrete - Code of Practice, 4th Revision, 10th reprint, 2007.
2.	Bureau of Indian Standards (BIS)	IS SP-16 (1980): Design Aids for Reinforced Concrete to IS 456:1978 [CED 2: Cement and Concrete], 11th Reprint, March 1999.

REFERENCE BOOKS:

1.	Martin Bechthold and Daniel L Schodek	STRUCTURES, Pearson Education, New Delhi. 7th Edition, 2014, ISBN (13): 978-0-13-255913-3, ISBN (10):0-13-255913-3
2.	Robers A Heller and Deborah J Oakley	Salvadori's Structure in Architecture - Pearson Education, New Delhi. 4th Edition, 2017, ISBN (13): 978-0-13-280320-5, ISBN (10):0-13-280320-8

Course Outcomes: After the completion of this course, students will be able to:

1. **Elucidate** the characteristic properties, strengths and drawbacks of Reinforced concrete.
2. **Apply** relevant IS codes & standards to design various RCC structural elements.
3. **Design** various RCC structural elements.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3													3		
	CO2	3		3											3		
	CO3	3													3		

HISTORY OF ARCHITECTURE - IV

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Tutorial Hours	:	--	SEE Marks	:	50
Course Code	:	4ATT01	Exam mode	:	Theory

Course Objectives: This course will enable students to:

1. Recognise the architectural characteristics in Islamic and Colonial periods in India.
2. Familiarize with the evolution of various phases of Islamic Architecture in India.
3. Analyse the influence of vernacular elements, technology, and planning in Islamic Building Typologies.
4. Familiarize with the influence of Colonial period in India.

UNIT I

Coming of Islam to India in 11th century A.D. Distinctive features of each of the dynasties. Development of basic mosque and tomb prototypes.
Imperial style - Delhi: Slave and Khilji phase: Quwwat-ul-Islam, Qtub complex, Tomb of Iltumish, Alai Darwaza, Tughlaq and Sayyid& Lodi dynasties. Eg: Tomb of Ghiyasuddin Tughlaq, Khirki masjid, Octoganal and square tombs- Muhammad shah sayyid tomb, Bada Gumbad and Sikandar Lodi tomb. **09 Hrs**

UNIT II

Development of Provincial styles and their distinctive features.Jaunpur - Eg: Atala Masjid and Jami Masjid. Bengal style - Eg: Adina masjid, Eklakhi tomb, Chota sona and Bada sona Masjid
Ahmedabad - Integration of Hindu and Muslim style in building features - exclusive features. Eg: Jami masjid at Ahmedabad and Wavs of Gujarat, Recreational complex at Sarkhej. **09 Hrs**

UNIT III

Bijapur, Gulbarga and Bidar - variations in design approach between Bijapur, Gulbarga and Bidar in planning and features - forms and finishes. Bijapur: Eg: GolGumbaz, Ibrahim Rauza and Jami masjid. Gulbarga: Jami Masjid Bidar: Madrasa of Md. Gawan at Bidar.
Mughal Phase: Fort and complexes of Mughal architecture during Akbar, Jehangir and Shahjehan:
Eg: Agra Fort, Fathepur Sikri fort and Red fort, Shahajanabad **09 Hrs**

UNIT IV

Mughal phase - Development under Humayun, Akbar, Jehangir and Shahjehan as well as Aurangazeb. Exclusive features and typology of Mughal tombs and complex structural systems and their use. Eg: Humayun's tomb, Tomb of Salim Chisti, Akbar's tomb, Tomb of Mariam-uz-Zamani,
Taj mahal, Tomb of Itmad ud Daulah sat Agra and Bibi-ka-Maqbarah at Aurangabad. **09 Hrs**

UNIT V

Colonial Phase –Arrival of British - Initial phase. Forts of Bombay, Madras and Kolkata.
Later phase: Eg: Campuses, railway stations, public buildings etc. - St. Paul's Cathedral, Bombay Town hall,

Victoria terminus, Club at Madras etc.
Final/last phase: Design and layout of New Delhi and its buildings. Eg: Rashtrapathi Bhavan, Parliament. **09 Hrs**

NOTE:

a. Assignments to include study of concepts relating to cultural and religious beliefs and structure.
b. Models, sketches and analytical studies can be carried out individually or in groups.

REFERENCE BOOKS:

1.	Kenneth Frampton	" Modern Architecture- A Critical History" Thames and Hudson Aug 2007, ISBN-13 : 978-0500203958
2.	Tadgel, Christopher	"History of Architecture in India" Phaidon Press, July 1994, ISBN : 9780714829609, 0714829609
3.	Brown, Percy	"Indian Architecture - Islamic period" ISBN: 9781446513118, 1446513114
4.	Grover Satish	The architecture of India: Islamic (727-1707 A.D.) Vikas Publishing House, 1981, 070691130X, 9780706911305

Course Outcomes: Students will be able to:

1. **Identify** the design elements of mosques and tombs in the early Islamic period in India.
2. **Analyse** the influence of vernacular architecture and construction techniques in Islamic architecture.
3. **Explore** the material invention, planning, buildings systems and technologies during Mughal Phase.
4. **Comprehend** the public building typologies during British Colonial Phases.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	2														2	
	CO2	2														2	
	CO3	3														3	
	CO4	3														3	

BUILDING SERVICES - II
(Electrical and Illumination)

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Tutorial Hours	:	--	SEE Marks	:	50
Course Code	:	4ATT02	Exam mode	:	Theory

Course Objectives: This course will enable students to:

1. Get introduced to electrical services and its importance in Architecture
2. Familiarize with the fundamentals of illumination.
3. Develop skills to design lighting schemes for various Architectural spaces.

UNIT I

Importance of electrical services in buildings. Brief introduction to various sources of electricity and different types of power plants. Achieving Net Zero Building design. Transmission of electricity from source to consumers. Functions and types of sub-stations, Functions of transformers, service connections -UG and OH Panel board. **09hrs**

UNIT II

Wiring systems - PVC casing & capping wiring, conduit wiring, various types of cables and conduit. Necessity of earthing -Types of earthing - Pipe and Plate earthing. Functions and types of protective devices: Fuses, MCB's, functions of ELCB. Electrical and lighting load calculations for buildings. Basic rules as per NBC and other relevant codes. Problems on load calculation **09 Hrs**

UNIT III

Fundamentals of illumination*:* Important definitions: Light, solid angle, Luminous flux, luminance and brightness. Laws of illumination and applications, Problems on Laws of Illumination and application. **08 Hrs**

UNIT IV

Importance of illumination*:* Importance of lighting, Natural lighting and artificial lighting. Fatigue and reduction of fatigue by providing good illumination scheme. Various types of electrical lamps. Principle and construction, Advantages, Disadvantages an applications-Incandescent, fluorescent/CFL, and HID lamps i.e. sodium vapour, mercury vapour, and metal halide lamps. **09 Hrs**

UNIT V

Design of lighting schemes*:* Factors to be considered for good lighting schemes: Quality and quantity of lighting. Systems of luminaire: Direct, semi-direct, diffused, semi- indirect &indirect, various factors to be considered - Utilization factor, Depreciation factor/maintenance factors. Lighting calculations: Point to point method and light flux method (lumen method) Problems on preparation of a lighting electrical scheme. **10 Hrs**

NOTE:

a. Assignments/Exercises related to each unit to be carried out.
b. Site visits to be arranged by faculty.
c. National building code to be referred.

REFERENCE BOOKS:

1.	H Cotton	" Electrical Technology", 7th Edition 2005.
2.	L Uppal	“Electrical Wiring, Estimating and Costing” Khanna Publishers 1987
3.	M L Anwani	“Basic Electrical Engg”, Dhanpath Rai & Co ,2022
4.	National electric Code, Indian Electricity Rules 1956, Energy Conservation and Building Code.	

Course Outcomes: After the completion of this course, students will be able to:

1. **Elucidate** the importance & sources of electricity.
2. **Differentiate** the types of wiring systems and protective devices**.**
3. **Calculate** the Illumination for the given space.
4. **Identify** appropriate lighting fixtures for different architectural spaces.
5. **Design** lighting schemes for the given spaces.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3													3		
	CO2	3													3		
	CO3	3	3												3		
	CO4	3													3		
	CO5		3	3				3							3		

PROFESSIONAL ELECTIVE - II

Contact Hours/Week	:	02	Credits	:	2.0
Total Lecture Hours	:	-	CIE Marks	:	50
Total Studio Hours	:	30	SEE Marks	:	50
Course Code	:	4ATPE	Exam mode	:	Term Work

ATPE04: Inclusive Design

Course Objectives: This course will enable students to:

1. Get introduced to the concept of ‘Inclusive Design’, a design paradigm that extends far beyond the bias on the able-bodied in architecture.

2. Widen the scope of the conceptual architectural thinking and strengthen the design skills to achieve social sustainability through design by addressing needs and abilities of all sections of the society.

COURSE OUTLINE:

This course will introduce students to Inclusive Design and its concepts. It focuses on the basic issues that create the biggest impact on usability of the physical environment — the interaction between human ability (and disability) and the design of places, products, and systems. The focus of the course is on the usability of spaces, buildings, objects, and interfaces based on human ability. The student will develop an understanding of human ability and its importance in defining both disability and usability. 'Harmonised Guidelines & standards for Universal accessibility in India' will be introduced, to help in architectural design and detailing.

ATPE05: Vernacular Architecture

Course Objectives: This course will enable students to:

1. Inculcate an appreciation of vernacular architecture; as an expression of local identity and indigenous traditions of the culture.
2. Study vernacular methods through the lens of environmental responsiveness.

COURSE OUTLINE:

Introduction to the approaches and concepts to the study of vernacular architecture, history and organization of vernacular buildings of different regions in the Indian context; with an understanding of forms, spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction techniques. Study of factors that shape the architectural character and render the regional variations of vernacular architecture - geographic, climatic, social, economic, political and religious aspects, local materials and skills available in the region etc.

Methods of observation, recording, documenting and representing vernacular architecture with examples.

Study and documentation of vernacular architecture of selected building typologies. Rigorous documentation, accuracy in measuring, collating the recorded information and drawing them up in specified formats and scales are part of this module.

A critical review of the relevance and application of vernacular ideas in contemporary times. An appraisal of architects who have creatively innovated and negotiated the boundaries of 'tradition' while dynamically responding to the changing aspirations and lifestyles of the world around.

Case Study of how vernacular materials can help ease climatic challenges. Mapping old vernacular materials and how they have evolved (different contexts) and thus how it can be applied for informal settlements today.

ATPE06: Bio-Mimicry

Course Objectives: This course will enable students to:

1. To understand 'Bio-mimicry' in architecture
2. Reconnect with nature: learning to observe nature by function
3. To understand and explore how biology can be integrated with nature inspired design
4. To examine how the 'bio-mimicry approach' can influence sustainable designs and innovations

COURSE OUTLINE:

This elective is to introduce students to understand Bio-mimicry and explore the biological component that can influence the design approach. Application of nature-inspired approaches from historical to contemporary architecture and in sustainable practices.

Course Outcomes: After completion of course, Students would be able to:

1. **Apply** desired knowledge and skill in a particular domain of Architecture.
2. **Analyze** the processes required for the particular subject.
3. **Develop** an expertise in the chosen field for career enhancement.

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3														2	
	CO2	3														2	
	CO3	3														2	

UNIVERSAL HUMAN VALUES

Contact Hours/Week	:	01	Credits	:	1.0
Total Lecture Hours	:	15	CIE Marks	:	50
Total Studio Hours	:	-	SEE Marks	:	50
Course Code	:	SHS02-AT	Exam Mode	:	Theory

Course Objectives: This course will enable students to:

1. Appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. Facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. Highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

UNIT I

Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Happiness and Prosperity – Current Scenario, Method to Fulfil the Basic Human Aspirations

UNIT II

Harmony in the Human Being

Understanding Human being as the Co-existence of the Self and the Body, Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health

UNIT III

Harmony in the Family and Society

Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Other Feelings, Justice in Human-to-Human Relationship, Understanding Harmony in the Society, Vision for the Universal Human Order

UNIT IV

Harmony in the Nature/Existence

Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence

UNIT V

Implications of the Holistic Understanding – a Look at Professional Ethics

Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Holistic Technologies, Production Systems and Management Models-Typical Case Studies, Strategies for Transition towards Value-based Life and Profession

REFERENCE BOOKS:

1	JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3	The Story of Stuff (Book).
4	The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5	Small is Beautiful - E. F Schumacher.
6	Slow is Beautiful - Cecile Andrews
7	Economy of Permanence - J C Kumarappa
8	Bharat Mein Angreji Raj – PanditSunderlal
9	Rediscovering India - by Dharampal

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)

		POs												PSOs			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1								2				2			2	
	CO2								2				2			2	
	CO3								2				2			2	
	CO4								2				2			2	
	CO5								2				2			2	

Physical Education
(Sport &Athletics/Yoga & NSS)

Contact Hours/Week	:	02	Credits	:	0.0
Total Lecture Hours	:	-	CIE Marks	:	--
Total Seminar Hours	:	30	SEE Marks	:	--
Course Code	:	NMC02-AT	Exam Mode	:	--