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

V and VI semester B.ARCH

2026 -2027

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 2024-25)

V Semester

Sl. No.	Course and Course Code		Course Title	Teaching / Paper setting Dept.	Teaching hrs/week						Examination					Credits
					Lecture	Studio		Practical	Seminar	Self Study	Duration in hrs.	Mode of Exam	CIE Marks	SEE Marks	Total Marks	
						Core	Applied									
					L	S		P	SE	SS						
1.	PCC	5ATS01	Architectural Design-IV			8						Viva	50	50	100	**8**
2.	BSAE	5ATS02	Building Materials and Construction-V		1	3						Viva	50	50	100	**4**
3.	SEC	5ATS03	Building Information Modeling-II					3				Term Work	50	50	100	**3**
4.	BSAE	5ATS04	Structural Analysis – II (Design of Steel Structures)		1			2				Viva	50	50	100	**3**
5.	PCC	5ATT01	History of Architecture-V		3						3	Theory	50	50	100	**3**
6.	BSAE	5ATT02	Building Services-III (Air-Conditioning, Mechanical Transportation & Fire Protection)		3						3	Theory	50	50	100	**3**
7.	PCC	5ATT03	Sociology & Building Economics		3						3	Theory	50	50	100	**3**
8.	PEC	5ATPE	Professional Elective-III	Alternative Building Technologies (ATPE07)			2					Viva	50	50	100	**2**
				Product Design (ATPE08)												
				Environmental Responsive Architecture (ATPE09)												
9.	NCMC	SMC01-AT	National Service Scheme	PE				2			-	-	-	-	-	**0**
		SMC02-AT	Physical Education													
		SMC03-AT	Yoga & Pranayama													
			Total		11	11	2	7					**500**	**400**	**900**	**29**

Note: PCC: Professional Core Course, **BSAE**: Building Science and Applied Engineering Course, , **INT** –Internship,
HSMC: Humanity and Social Science & Management Courses, , **SEC** –Skill Enhancement Courses. **AEC**- Ability Enhancement Course **UHV**- Universal Human Value Courses

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

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B.ARCHITECTURE

SCHEME OF TEACHING AND EXAMINATION (270 Credits Scheme)

(Applicable to the students admitted during 2024-25)

VI Semester

Sl. No.	Course and Course Code		Course Title	Teaching / Paper setting Dept.	Teaching hrs/week						Examination					Credits
					Lecture	Studio		Practical	Seminar	Self Study	Duration in hrs.	Mode of Exam	CIE Marks	SEE Marks	Total Marks	
						Core	Applied									
					L	S		P	SE	SS						
1.	PCC	6ATS01	Architectural Design-V			8						Viva	50	50	100	**8**
2.	BSAE	6ATS02	Building Materials and Construction-VI		1	3						Viva	50	50	100	**4**
3.	PCC	6ATS03	Working Drawing-I			4						Viva	50	50	100	**4**
4.	BSAE	6ATS04	Structural Analysis – III (Design of Long Span Structures)		1			2				Viva	50	50	100	**3**
5.	PCC	6ATT1	Contemporary Architecture		3						3	Theory	50	50	100	**3**
6.	BSAE	6ATT2	Building Services-IV (Acoustics & Noise Control)		3						3	Theory	50	50	100	**3**
7.	PCC	6ATT3	Landscape Architecture		3						3	Theory	50	50	100	**3**
8.	PEC	6ATPE	Professional Elective-IV: AI in Architecture (ATPE10) / Bio-Mimicry (ATPE11) / Post Modern Art Practices (ATPE12)				2					Viva	50	50	100	**2**
9.	NCMC	6ATST	Study Tour		Study trip conducted after IV Semester Examination							Portfolio	100	-	100	**0**
10.	NCMC	SMC01-AT	National Service Scheme	PE				2					100	-	100	**0**
		SMC02-AT	Physical Education													
		SMC03-AT	Yoga & Pranayama													
			Total		11	15	2	4					**600**	**400**	**1000**	**30**

Note: PCC: Professional Core Course, **BSAE**: Building Science and Applied Engineering Course, , **INT** –Internship,
HSMC: Humanity and Social Science & Management Courses, , **SEC** –Skill Enhancement Courses. **AEC**- Ability Enhancement Course **UHV**- Universal Human Value Courses

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

ARCHITECTURAL DESIGN - IV

Contact Hours/ Week:	08	Credits:	8
Total Lecture Hours:	-	CIE Marks:	50
Total Studio Hours:	112	SEE Marks:	50
Course Code:	5ATS01	Exam Mode:	Viva

Course objectives:
This course will enable students to:

1.	Familiarize with the impact of technology, utilities, and regulations in shaping architecture.
2.	Understand the various complex parameters to be considered while designing in the public domain.
3.	Explore sustainable, contextual, and interdisciplinary approaches in the design of public buildings.

COURSE OUTLINE

- Background study to understand the (thematic) abstract, organic character of architecture (symbolism, aesthetics, identity) in the public domain; influence of environmental, socio-cultural, economic dimensions; user perception.
- The studio shall emphasize non-linear interdisciplinary design process encountered in Architectural design and the importance of other fields of knowledge in Architectural Design. The Design Studio will give prominence to bridging the gap between innovations in materials and techniques of construction.
- The Design studio will also give importance to include and encourage the use of passive design features, natural cooling systems, sustainable active cooling system using natural and low global warming potential refrigerants, vernacular, local, and low embodied energy/carbon materials and sustainable water, waste management systems.
- Projects shall be of urban scale with multiple functions; identity of public building (aesthetics, symbolic character, meaning, and environmental response) will be one of the architectural goals. Museums, art galleries, theme- based hotels, transport interchanges, terminals, shopping areas, informal markets can be chosen.
- Design emphasis shall be on the use of innovations in green materials and techniques of construction.
- AI-Assisted Design: AI-assisted concept generation, precedent and site analysis, design exploration, and evaluation. Critical evaluation, refinement, and validation of AI-generated design alternatives.

NOTE

a. Relevant case studies and literature studies may be assigned by the studio teachers, and students shall compile a report.
b. A minimum of two architectural projects shall be undertaken during the semester.
c. One design exercise may be carried out as group work, and a vertical studio involving other semesters may be encouraged for a full or partial project.
d. The portfolio covering the prescribed topics shall be presented through viva voce, using appropriate computer-aided tools.
e. Knowledge of alternative materials and construction techniques taught in building construction may be incorporated into design and detailing.
f. The projects listed in the syllabus indicate the expected scale and complexity; teachers may introduce projects of similar scope.

REFERENCE BOOKS		
1	Richard Patrick Parlour	Building Services: A Guide to Integrated Design : Engineering for Architects, Integral Publishing, 1997, ISBN: 9780646342603, 0646342606
2	Paul Tymkow, Savvas Tassou, MariaKolokotroni, Hussam Jouhara	Building Services Design for Energy Efficient Buildings, CRC Press, 2013, ISBN: 9781136893650, 1136893652
3	RussellFortmeyer, Charles D. Linn	Kinetic Architecture: Designs for Active Envelopes, Images Publishing Group, 2014, ISBN: 9781864704952, 1864704950
4	Michael Fox	Interactive Architecture : Adaptive World, Princeton Architectural Press, 2016, ISBN: 9781616895112, 161689511X

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Develop architectural concepts responding to thematic, environmental, socio-cultural, and economic contexts.
CO2	Explore interdisciplinary design approaches and the role of diverse fields of knowledge in architectural design.
CO3	Integrate innovative and green materials, sustainable construction techniques, passive design strategies, and sustainable building systems into architectural design.
CO4	Design multi-functional public buildings with emphasis on identity, symbolism, aesthetics, and user experience.
CO5	Explore AI-assisted tools for concept generation, precedent and site analysis, design exploration, and critical evaluation of design alternatives.

Course Articulation Matrix

		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	3			
	CO4		3	3		3							3	3			
	CO5							3					3	3			

BUILDING MATERIALS AND CONSTRUCTION – V

Contact Hours/ Week:	04	Credits:	4
Total Lecture Hours:	14	CIE Marks:	50
Total Studio Hours:	42	SEE Marks:	50
Course Code:	5ATS02	Exam mode:	Viva

Course objectives: This course will enable students to:	
1.	Understand the principles and construction of steel trusses, pre-engineered buildings, and large-span structures.
2.	Identify of contemporary structural systems and advanced construction techniques.
3.	Understand the applications of modern building materials and sustainable construction practices.

UNIT I
Steel Plane Trusses: Introduction to steel plane trusses, construction of steel trusses for various spans, ridge truss, saw-tooth truss with lattice girders, roof lighting, aluminium sheet and profiled MS sheet cladding, and roof fixing details. Detailing of Steel Trusses: Tubular and L-angle trusses for spans ranging from 8–16 m
12 Hours

UNIT II
Pre-Engineered Metal Buildings: Introduction to pre-engineered metal buildings, manufacturing and assembly processes, components, market study, materials used, energy intensiveness and environmental impact. Detailing of Pre-Engineered Buildings: Structural components, connections, roof fixing details with aluminium sheet and profiled MS sheet cladding.
10 Hours

UNIT III
Large Span Roof Systems: Introduction to large span structures including hyperbolic paraboloid shell roofs, folded plate roofs, cylindrical shell roofs, geodesic domes, space frames, tensile structures and pneumatic structures. Principles, methods of construction and detailing of hyperbolic paraboloid shell roofs, including formwork techniques and reinforcement details
12 Hours

UNIT IV
Construction and Detailing of Large Span Structures: Principles, methods of construction and detailing of folded plate roofs, cylindrical shell roofs, geodesic domes and space frame structures. Formwork techniques, reinforcement details where applicable, and explorations using physical models
12 Hours

UNIT V

Advanced Lightweight Structures and Building Materials: Principles, methods of construction and detailing of tensile and pneumatic structures with explorations using physical models. Plastics as a Building Material: Types, properties, applications, energy intensiveness, environmental impact assessment, recycling and upcycling of plastics including polycarbonates, acrylics, PVC polymer films and fibre-reinforced plastics, along with construction applications and detailing.
10 Hours

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. Energy intensiveness and recyclability of steel as a material can be studied. d. Site visits / case studies on related topics to be arranged by studio teachers and report to be compiled by students. e. Market survey of materials should be carried out by students. b. The entire portfolio on construction and materials shall be presented for viva.

REFERENCE BOOKS		
1	Roy Chudley & Roger Greeno	Building Construction Handbook, 12th edition, Routledge, 2020, ISBN - 0367135434, 978-0367135430
2	S. C. Rangwala	Engineering Materials [Material Science], Charotar Publishing House Pvt. Limited, 2024, ISBN : 978-9385039775
3	R. Barry	Barry's Introduction to Construction of Buildings, 4th edition, Wiley-Blackwell, 2004, ISBN : 1118977165, 978-1118977163
4	Glenn M. Hardie	Building Construction: Principles, Practices, and Materials, Pearson College Div, 1995, ISBN : 0133505707, 9780133505702
5	Arthur Lyons	Materials For Architects And Builders : 6th Edition, Routledge, 2019, ISBN : 0815363397, 978-0815363392

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Apply the construction principles and detailing of steel plane trusses for various roof systems.
CO2	Analyze the components, construction techniques, and applications of pre-engineered metal buildings.
CO3	Interpret the principles and applications of large-span roof systems in architectural design.
CO4	Apply the construction methods and detailing of large-span structures, including shell roofs, geodesic domes, and space frame systems.
CO5	Assess the applications of advanced lightweight structures and plastics as building materials with respect to performance and sustainability.

Course Articulation Matrix

		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		3		3		
	CO4	3											3		3		
	CO5	3						3							3		

BUILDING INFORMATION MODELING-II

Contact Hours/ Week:	03	Credits:	3
Total Lecture Hours:	-	CIE Marks:	50
Total Practical Hours:	42	SEE Marks:	50
Course Code:	5ATS03	Exam Mode:	Term Work

Course objectives: This course will enable students to:	
1.	Familiarize with advanced BIM coordination and interoperability using ARCHICAD
2.	Develop skills in BIM-based analysis, scheduling, and design management for complex projects.
3.	Understand BIM workflows for multidisciplinary coordination and large-scale architectural projects.

UNIT I
Advanced BIM Coordination: Interdisciplinary coordination of architectural, structural, and building services models. Integration of structural and MEP information, model federation, coordination procedures, issue identification, and management of multidisciplinary BIM project.
9 Hours

UNIT II
BIM Interoperability and Model Exchange: Open BIM concepts and interoperability. Import and export of BIM models using IFC and other exchange formats. Linking external models, model federation, data exchange, and coordination across different BIM platforms. Introduction to clash detection and coordination workflows for complex projects.
8 Hours

UNIT III
BIM Analysis and Scheduling: BIM-based energy analysis using EcoDesigner. Preparation of Structural Analytical Models (SAF) and analytical models for energy analysis, followed by interpretation of performance data. Creation and management of quantity schedules, material schedules, area calculations, and project information for design and construction decision-making.
8 Hours

UNIT IV
BIM-Based Design Management: Development and management of design alternatives and options. Comparison and evaluation of design variations, project phasing, information management, and applications of BIM workflows for large-scale and complex architectural projects.
8 Hours

UNIT V
Visualization and Digital Presentation: Creation of 3D views, perspectives, materials, rendering, and walkthroughs. Preparation of presentation sheets and portfolios using Affinity tool in ArchiCAD, Adobe Photoshop, Adobe Illustrator, Adobe InDesign, or equivalent software. Development of a small architectural project demonstrating BIM visualization and digital presentation workflows.
9 Hours

REFERENCE BOOKS		
1	Chuck Eastman, Paul Teicholz, Rafael Sacks and Kathleen Liston	BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers, 3rd Edition, John Wiley & Sons, 2018. ISBN - 9781119287537
2	Brad Hardin and Dave McCool	BIM and Construction Management: Proven Tools, Methods, and Workflows, 2nd Edition, John Wiley & Sons, 2015. ISBN : 9781118942765
3	Eric Bobrow	Step by Step ARCHICAD 28: Residential Design, Bobrow Consulting Group, 2024. ISBN : 9781732607361
4	Scott Onstott	Enhancing Architectural Drawings and Models with Photoshop, Wiley, 2010. ISBN : 9780470616482

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Apply advanced BIM coordination workflows using ARCHICAD for multidisciplinary projects.
CO2	Demonstrate BIM interoperability and model exchange using IFC and related formats.
CO3	Analyze building performance data and BIM-based schedules for design and construction decisions.
CO4	Evaluate design alternatives and manage information for large-scale architectural projects.
CO5	Develop architectural visualizations and digital presentations using appropriate digital tools.

Course Articulation Matrix

		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		3		
	CO5					3							3		3		

STRUCTURAL ANALYSIS – II
(Design of Steel Structures)

Contact Hours/ Week:	03	Credits:	3
Total Lecture Hours:	15	CIE Marks:	50
Total Practical Hours:	30	SEE Marks:	50
Course Code:	5ATS04	Exam mode:	Viva

Course objectives: This course will enable students to:	
1.	To introduce the students to the advantages and limitations of steel structures
2.	Analysis and design of tension members and compression members as per relevant standards
3.	Design of beams and column bases as per relevant standards
4.	Design of different types of connections like bolted and welded connections for different structural elements.
5.	To introduce the students to the advantages and limitations of steel structures

UNIT I
Introduction and Design of Bolted Connections: Advantages and disadvantages of steel structures; loads and load combinations; design considerations; Limit State Method (LSM) of design; relevant codes, specifications, and section classification. Introduction to bolted connections, their advantages, modes of failure, and design of lap and butt joints. Eccentric connections with moments in and perpendicular to the plane of connection.
8 Hours

UNIT II
Design of Welded Connections - Advantages and disadvantages of welded connections; types of welded joints; design of fillet and butt welds; eccentric welded connections with moments in and perpendicular to the plane of connection.
8 Hours

UNIT III
Design of Tension Members: Introduction to tension members and sections used. Design of axially loaded tension members with bolted and welded connections, including the design of lug angles.
8 Hours

UNIT IV
Design of Compression Members: Design of compression members under concentric and eccentric loading. Design of compression members in roof trusses and built-up compression members, including the design of lacings.
8 Hours

UNIT V
Design of Beams and Column Bases: Introduction to beam sections; design of laterally supported beams and checks for strength, shear, and deflection. Design of slab bases and gusseted bases.
8 Hours

NOTES
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 to understand each of the structures.
d. A hands-on construction can be held for any of the modules

REFERENCE BOOKS		
1	S.K.Duggal	Limit state Design of steel structures, Tata McGraw-Hill, Edition 2nd, 2014. ISBN-978-0-07-070023-9
2	N.Subramanian	"Design of steel structures by Limit state method", Oxford University Press, First edition, 2014.
3	Ramachandra & Veerendra Gehlot	"Limit state Design of steel structures", Scientific Publishers (India). First Edition, 2013, ISBN: 8172336144
4	S. M. A. Kazimi, R. S. Jindal	"Design of steel structures", Prentice-Hall of India, 2nd edition, 1990,
5	S.S. Bhavikatti,	"Design of Steel Structures Limit State Method as per IS:800- 2007", WILEY, 5th edition

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Apply the principles of steel structural design, loads, load combinations, design codes, and the Limit State Method.
CO2	Design bolted and welded connections subjected to axial and eccentric loads.
CO3	Design steel tension and compression members, including built-up members and roof truss members.
CO4	Design laterally supported steel beams considering strength, shear, and deflection requirements.
CO5	Design appropriate steel column bases, including slab bases and gusseted bases.

Course Articulation Matrix

		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		3		
	CO3			3									3		3		
	CO4	3		3									3		3		
	CO5	3		3									3		3		

HISTORY OF ARCHITECTURE - V

Contact Hours/ Week:	03	Credits:	3
Total Lecture Hours:	42	CIE Marks:	50
Total Tutorial Hours:	--	SEE Marks:	50
Course Code:	5ATT01	Exam mode:	Theory

Course objectives:
This course will enable students to:

1.	Understand key architectural styles from the Renaissance to Modern architecture.
2.	Get introduced to the social, economic, and technological impacts of the Industrial Revolution on architectural forms and building technologies.
3.	Examine the contributions of major architects and movements in shaping modern architecture.
4.	Develop an appreciation of architectural innovations across different regions highlighting its cultural significance.
5.	Encourage critical thinking about the evolution of architectural design principles in response to changing societal needs and technological advancements.

UNIT I

Introduction to Renaissance Architecture: Background and influences on Renaissance Architecture. Characteristics of Renaissance Architecture in general. Renaissance Architecture Examples: St Andrea, Mantua and Palazzo Rucellai by Leon Alberti, Villa Rotunda (Capra) by Palladio, (New) St Peters' Rome by Michelangelo and others, St Paul's London by Sir Christopher Wren.
Baroque Architecture: General characteristics of Baroque. Eg: St Peters' Piazza by Bernini.
1750-1900 Transitional Period Architecture: A brief account of the situation before the changeover to Modern architecture in Europe. Palladian Revival in Britain, Greek revival and Gothic Revival. Transitional Period Examples: Chiswick House, London, St Pancras Church, London, West Minister Palace, London

9 Hours

UNIT II

Impact of Industrial Revolution in Europe: The Social, economic and political changes effected, new requirements, functions, new materials and technological developments. New proto types- Ex. Bridges, Expositions, Factories and Railway stations-Use of metal and glass.
Early Modern Architecture: Modern movement-Arts and crafts, Art-Nouveau, Italian futurism, Destijl movement; The Chicago School and rise of early sky scrapers; Louis Sullivan - Monadnock building, Chicago Auditorium, Wain Wright Building, Casa Mila, Sagrada Familia church, Schroder House

7 Hours

UNIT III

Modern Architecture I: Influence of concepts and ideas generated by FL Wright – Influence of Prairie style, Organic architecture; Robie House, Falling Waters, Guggenheim Museum. Influence of concepts and ideas generated by Le-Corbusier - Idea of Purism, Expressionism, Brutalism and Five points of architecture; Villa Savoy, Unite de Habitation, Ronchamp Church. Influence of concepts and ideas generated by Mies Van Der Rohe – Minimalism, Less is more; Glass and steel tower – Seagram building, Barcelona Pavilion, Farnsworth house.
Modern Architecture II: Influence of concepts and ideas generated by Walter Gropius - Functionalism, Bahaus building, Fagus shoe Factory, Alvar Aalto- Paimio Sanitorium.

9 Hours

UNIT IV
Modern Architecture III: International style, works of Eero Sarinen- TWA, Kennedy Airports. Richard Neutra- Lovell Health House. Phillip Johnson- Glass House, Museum Building. Oscar Niemeyer-Work in Brazilia- Legislature building and Church. Modern Architecture IV: New Ideas – Archigram Britain-Walking City, Plug-in city, Floating City etc. Kenzo Tange- Japan-Floating City and Shimbon Office Building. Moshe Safdie-Habitat 67. Sir BuckMinster Fuller-US Pavilion in Expo-67, Dymaxion Car, Bucki Dome.
8 Hours

UNIT V
Modern Architecture V: Brutalism- Works of Peter and Allison Smith, James Sterling-Use of Raw concrete, Library-Oxford University, development of Corporate Sky Scrapers- New York- Having multiple uses and tinted glass cladding, Rock Feller Centre-New York. Modern Architecture VI: Parallel movement-Soviet Union of 1920's- Constructivist movement, Modernism and works of Vladimir Tatlin- contributions of Engineers like Pierre Luigi Nervi- Rome Olympic Buildings, Pirelli Tower Italy, Gustave Eiffel-Eiffel Tower, bridges, Statue of Liberty base, Candela etc.
9 Hours

NOTE
a. Assignments to include the 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 & Hudson, 2007, ISBN: 9780500203958, 0500203954
2	Sir Banister Fletcher	Sir Banister Fletcher's Global History of Architecture Volume 1, 2020, Bloomsbury Visual Arts, ISBN: 9781472527882, 1472527887
3	Sigfried Giedion	Space, Time and Architecture: The Growth of a New Tradition, Fifth Revised and Enlarged Edition, 1967
4	Sarbjit Bahga, Surinder Bahga, Yashinder Bahga	Modern Architecture in India : Post-independence Perspective, Galgotia Publishing Company, 1993 ISBN: 8185989001, 9788185989006
5	Vikram Bhatt, Peter Scriver	After the Masters, Mapin Publishers, 1990 ISBN: 9780944142196, 0944142192
6	Kenneth Frampton	A Genealogy of Modern Architecture - Comparative Critical Analysis of Built Form; Lars Müller Publishers, 2015, ISBN: 9783037783696, 3037783699

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Identify the characteristics of Renaissance, Baroque, Transitional, and modern architectural styles.
CO2	Interpret the influence of industrialization on the evolution of architectural materials, construction techniques, and building typologies.
CO3	Analyse the philosophies and key works of influential architects and their impact on modern architecture.

CO4	Evaluate architectural innovations from diverse movements based on their cultural, technological, and architectural significance.
CO5	Analyse the evolution of architectural design concepts in response to societal, cultural, and technological changes.

Course Articulation Matrix

		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	
	CO4	3														3	
	CO5	3														3	

BUILDING SERVICES - III
(Air Conditioning, Mechanical Transportation and Fire Protection)

Contact Hours/ Week:	03	Credits:	3
Total Lecture Hours:	42	CIE Marks:	50
Course Code:	5ATT02	SEE Marks:	50

Course objectives: This course will enable students to:	
4.	Apply the principles of psychrometrics, climate analysis, and building load calculations to design integrated cooling systems
5.	Evaluate, size, and calculate the requirements for mechanical ventilation, evaporative cooling, radiant/structure cooling, and centralized HVAC systems
6.	Determine the spatial, architectural, safety, and traffic capacity requirements for elevators, escalators, and travelators
7.	Integrate life safety, passive fire protection strategies (such as compartmentation, egress routes, and refuge areas), and active fire suppression/detection systems into building design

UNIT I

Ventilation and Air-Conditioning Systems

Introduction to Mechanical Ventilation: Need and objectives of mechanical ventilation; natural and mechanical ventilation; supply, exhaust and balanced ventilation systems; types of ventilation equipment; ventilation requirements for different occupancies; air-change rate and fresh-air requirements; ventilation standards and guidelines as per NBC and ASHRAE; basic ventilation calculations; selection and location of fans and blowers.

Introduction to Air-Conditioning: Principles and objectives of air-conditioning; components of air-conditioning systems; classification of air-conditioning systems; window, split, cassette, ductable split, packaged, VRF/VRV and centralized air-conditioning systems; air-cooled and water-cooled systems; basic refrigeration cycle; refrigerants; cooling, heating, humidification and dehumidification.

Architectural Considerations: Space requirements for indoor and outdoor equipment; service shafts; equipment rooms and plant rooms; location of outdoor units, chillers, cooling towers and air-handling units; equipment access and maintenance; service zones; integration of HVAC systems with architectural planning and building design.

8 Hours

UNIT II

HVAC Load Calculation and Air Distribution

Air-Conditioning Load Calculations: Introduction to cooling and heating loads; factors affecting cooling load; heat gain through walls, roofs, floors and glazing; solar heat gain; internal heat gains from occupants, lighting and equipment; ventilation and infiltration loads; sensible and latent heat loads; diversity factors; basic cooling-load calculation for a small building; estimation of air-conditioning capacity.

Air Distribution Systems: Supply, return and fresh-air systems; ducted and non-ducted systems; types of ducts and duct materials; principles of duct sizing; air velocity and pressure loss; diffusers, grilles and registers; flexible ducts and connections; return-air and exhaust-air systems; basic principles of duct routing and layout.

Central Air-Conditioning Systems: Components and working of centralized air-conditioning systems; chillers; cooling towers; pumps; air-handling units; fan-coil units; chilled-water

systems; direct-expansion systems; primary and secondary air systems; constant air volume and variable air volume systems; introduction to VRF/VRV systems.

Architectural Integration of HVAC: Planning of AHU rooms, chiller plants and cooling towers; duct shafts and service shafts; ceiling coordination; vertical and horizontal service distribution; equipment clearances; access for operation and maintenance; acoustic and vibration considerations; preparation and interpretation of basic HVAC layouts.

8 Hours

UNIT III

Specialized HVAC, Controls and Energy Efficiency

Specialized HVAC Systems: HVAC requirements for hospitals, operation theatres, clean rooms, laboratories, server rooms, UPS rooms, auditoriums, theatres and commercial buildings; temperature and humidity control; filtration; fresh-air requirements; pressure relationships; zoning; specialized ventilation and exhaust systems.

HVAC Controls and Equipment: HVAC controls, thermostats, sensors, variable-speed drives and basic building management systems; selection and sizing of major equipment; plant-room planning; service access; refrigerant and chilled-water piping; condensate drainage; insulation; acoustic and vibration control.

Energy-Efficient and Environmentally Responsible HVAC: Factors affecting HVAC energy consumption; energy-efficient air-conditioning systems; energy-efficiency ratings; inverter and variable-speed technology; efficient chillers, cooling towers, fans and air-handling units; heat recovery and free cooling; efficient duct design; zoning and demand-controlled ventilation; energy-saving operation and maintenance.

Environmental Impact and Sustainable HVAC: Energy consumption and carbon emissions from air-conditioning; environmental impact of refrigerants, global warming potential and ozone depletion potential; low-impact and natural refrigerants; refrigerant management; passive cooling and mixed-mode operation; integration of renewable energy; selection of HVAC systems considering energy consumption, environmental impact, initial cost and life-cycle cost; basic HVAC schematic, duct and equipment layouts and coordination with architectural design.

9 Hours

UNIT IV

Vertical Transportation

Elevators: Introduction and importance of vertical transportation; types of elevators—passenger, service, goods, hospital, panoramic and high-speed elevators; traction and hydraulic systems; machine-room and machine-room-less elevators.

Elevator Planning and Design: Factors influencing elevator selection; building occupancy and traffic analysis; peak handling capacity, average waiting time, journey time, round-trip time and lift speed; basic traffic calculation; determination of number and capacity of lifts; grouping, zoning and arrangements of elevators.

Architectural Requirements: Requirements and planning of elevator shaft, pit, overhead space, machine room and control room; elevator lobby and landing areas; car dimensions and interiors; accessibility; ventilation, lighting and finishes; maintenance and service access; integration with building circulation and structural systems.

Safety and Regulations: Automatic Rescue Device (ARD); emergency alarm, lighting and communication; fireman’s operation; basic requirements of NBC, Elevator Acts and relevant standards; inspection and maintenance.

Escalators and Travelators: Types, applications and components; traffic capacity and basic calculations; width, speed and inclination factor; location and arrangement in different building types; landing and circulation requirements; safety provisions; architectural and structural requirements; integration with building circulation and other services.

8 Hours

UNIT V

Fire Safety in Buildings and Passive Fire Protection

Introduction to Fire Safety: Nature and classification of fire; causes and hazards of fire; fire load and fire risk; behaviour and spread of fire; classification of buildings as per NBC; combustible and non-combustible materials; fire resistance and grading of structural elements; basic principles of fire-resistant construction.

Passive Fire Protection: Principles of passive fire protection; fire-resistant construction; compartmentation, fire walls and fire doors; protected escape routes; travel distance; exit requirements; fire stairs and fire towers; fire refuge areas; fire assembly areas; fire-rated shafts and service ducts; smoke control and pressurization; fire driveways; emergency access; fire safety signage and wayfinding.

Active Fire Protection: Types and applications of portable fire extinguishers; basic fire-fighting systems; fire hydrants, wet and dry risers, hose reels and sprinkler systems; fire pumps and water storage; basic requirements of fixed fire-fighting installations; automatic fire detection and alarm systems; smoke and heat detectors; fire alarm panels and emergency communication.

NBC Requirements and Fire Safety Planning: National Building Code provisions for fire safety; classification and fire-safety requirements of different building occupancies; requirements for high-rise buildings; means of escape and evacuation; fire access and fire-fighting provisions; refuge areas; emergency power and fire-control rooms; basic coordination of fire-safety systems with architectural, structural and building services design.

9 Hours

REFERENCE BOOKS

1	Roy J Dossat.	'Principles of Refrigeration'5th Edition,2001
2	Manohar Prasad.	'Air Conditioning and Refrigeration Data Hand book'3rd Edition New Age International Publishers
3	DomKundwar	'Refrigeration and Air Conditioning',2016
4	V.Paul Lang	'Principles of refrigeration and AC'5th Edition,1995
5	Indian Standards Institution (ISI).	"National Building Code of India (NBC)", 2016, Bureau of Indian Standards
6		IS Codes - • 1391 (Part 1 & 2) : 1992 - Specification for room air conditioners • 8148 : 2003 - Specification for packaged air conditioners • 4591 : 1968 - Code of practice for installation and maintenance of escalators • 14671 : 1999 - Hydraulic lifts • 14665 : 2000 - Traction lift • 15259 : 2002 - Home Lifts

		• 15330 : 2003 - Lifts for handicapped persons; IS codes for Fire Services

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Identify the principles, components and applications of ventilation and air-conditioning systems and select appropriate systems for different building types.
CO2	Apply basic principles of HVAC load calculation, air distribution and duct design and integrate HVAC equipment, shafts and service spaces with architectural planning.
CO3	Analyse and select appropriate specialized, energy-efficient and environmentally responsible HVAC systems, considering controls, energy consumption, refrigerants and life-cycle performance.
CO4	Apply principles of vertical transportation to plan and design elevators, escalators and travelators based on building occupancy, traffic requirements and architectural integration.
CO5	Apply fire safety and passive fire protection principles in building design, including means of escape, compartmentation, fire-fighting systems, detection and alarm systems, and relevant NBC requirements.

Course Articulation Matrix

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

SOCIOLOGY & BUILDING ECONOMICS

Contact Hours/ Week:	03	Credits:	3
Total Lecture Hours:	42	CIE Marks:	50
Total Practical Hours:	--	SEE Marks:	50
Course Code:	5ATT03	Exam mode:	Theory

Course objectives: This course will enable students to:	
1.	Get introduced to the basic concepts of sociology and economics and their influence on architecture.
2.	Develop sociological imagination that will rethink to how social systems operate through individuals in relation with space and building typologies.
3.	Gain a comprehensive understanding of Urbanization and migration and social problems associated with these transformations in the urban settlements.
4.	Get introduced to the concepts of social research, data sources and analysis.
5.	Familiarize with the basics of economics, factors of production, consumer behavior with respect to architecture.

UNIT I
Introduction to Sociology: Definition of Sociology; Nature, Scope and Utility of Sociology; Branches of Sociology; Relation of Sociology and its branches to architecture and the built environment. Elements of Society: Biosocial and Socio cultural associations; Definitions of sociological terms: society, community, family, culture; Difference between society and community; Different family structures and architectural responses to different family types in and outside India (examination of different housing typologies responding to different family types – traditional and contemporary); Relation between culture and built form.
9 Hours

UNIT II
Communities: Origin, growth and nature of settlements and communities. Their characteristics and spatial patterns. Urban and Rural Communities: Definitions of the terms “urban” and “rural”. The social, economic, ecological and spatial characteristics associated with urban and rural settlements Social, ecological and economic relations and interdependencies between urban and rural settlements. Urban sociology and rural sociology. Cities and Society: Urbanization – definition; causes and effects (exploring social, and economic factors influencing migration to urban areas). Effects of urbanization on rural areas. Impact of growing urbanization on urban life, viz. health, housing, transportation. Different types of migration. The impact of migration on urban form. The origin and characteristics of slums in European, American and Indian cities. Official definition of slums as per Census of India. Understanding cities as socio-ecological systems. Governmental and non-governmental approaches to engaging with issues regarding slums in Indian cities
9 Hours

UNIT III
Social Research: The need for research; the research process; ethics of social research; scope of social research. Difference between methodology and methods. Types of research methods: qualitative, quantitative, mixed research methods. Sources of research data: primary and secondary sources. Secondary data sources include literature review, official and unofficial documents. Primary data sources use methods such as field surveys, questionnaires, different types of interviews (open-ended / closed / structured / semi- structured), Participatory Rural

Appraisal (PRA) and Rapid Rural Appraisal techniques and case study approach. Economics: Definition of economics; Definitions of terms: Goods; Utility, Value, Price and Wealth. The relationship of economics with the built environment and land use.
8 Hours

UNIT IV
Economic organization of society: Different economic systems: capitalism; socialism, communism, mixed-economies. Primary, secondary and tertiary sectors of economy: agriculture, mining, manufacturing, banking, marketing, transport and service sectors. Factors of production: land, labour, capital and entrepreneurship. Relevance of factors of production to architecture and construction practice. Economics and the market: Production and Consumption, wants and needs and their characteristics. Concepts of economics: Opportunity cost; Laws of supply and demand; Laws of increasing, diminishing and constant returns; Standard of living. Analysis of the housing market in Indian cities to understand the dynamics of urban/affordable housing supply and demand in formal and informal settlements.
8 Hours

UNIT V
Urban land values: Various social, ecological, and economic factors affecting the value of urban land in formal and informal spaces. Difference between land use and land cover. Studying the characteristics of developed land in the city and real estate development vision prevailing in cities. The Bid Rent theory that defines the relationship between location and land value. Theoretical city models based on land use and land value. Building Costs: Cost and cost indices. Total cost of construction. Time value of money. Different sources of financing for buildings
8 Hours

REFERENCE BOOKS		
1	Neil J Smelser & Richard Swedberg	'The Handbook of Economic Sociology: Second Edition', ISBN 13: 978-0691121260, 2nd edition, Princeton university press, 2005
2	Paul A. Samuelson, William D. Nordhaus	Economics, McGraw-Hill Education, 2009, ISBN: 9780073511290, 0073511293
3	Robert K. Yin	Case Study Research and Applications: Design and Methods, SAGE Publications, 2017, ISBN: 9781506336176, 1506336175
4	Linda N. Groat, David Wang	Architectural Research Methods, Wiley, 2013, ISBN: 9781118418512, 1118418514
5	Paul Jones	The Sociology of Architecture : Constructing Identities, Liverpool University Press, 2011, ISBN: 9781846310775, 1846310776
6	Werner Z. Hirsch	'Urban Economic Analysis', ISBN 13: 978-0070290440, McGraw Hill US Inc., 1973

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Identify the elements of society and relationship with architecture.
CO2	Analyze the role of social institutions in shaping social structure.
CO3	Appraise the types and procedures of social research and basic terminologies of economics.

CO4	Differentiate between the different economic organizations of society and elucidate laws of economics.
CO5	Analyze land values, building costs, financing, and their influence on the built environment.

Course Articulation Matrix

		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			
	CO4	2												2			
	CO5	2												2			

PROFESSIONAL ELECTIVE – III

ALTERNATIVE BUILDING TECHNOLOGIES

Contact Hours/ Week:	02	Credits:	2
Total Lecture Hours:	-	CIE Marks:	50
Total Studio Hours:	28	SEE Marks:	50
Course Code:	ATPE07	Exam Mode**:**	Viva

Course objectives: This course will enable students to:	
1.	Understand the principles, materials, and construction systems of alternative and cost-effective building technologies.
2.	Familiarize with appropriate technologies and innovations developed in response to social, economic, climatic, and environmental contexts.
3.	Explore the application of alternative building technologies for sustainable, affordable, and context-responsive architecture.

UNIT I
Introduction to Alternative Building Technologies: Concepts of appropriate, alternative, and cost-effective building technologies. Need, principles, advantages, limitations, and role in sustainable development. Evolution of alternative building technologies in response to social, economic, climatic, and environmental contexts.
5 Hours

UNIT II
Alternative Building Materials: Study of alternative building materials including stabilized earth blocks, compressed earth blocks, bamboo, recycled materials, ferrocement, fibre-reinforced composites, and other locally available sustainable materials. Properties, applications, and construction techniques
6 Hours

UNIT III
Alternative Construction Systems: Cost-effective walling systems, roofing systems, flooring systems, prefabricated components, rat-trap bond masonry, funicular shell roofing, and other innovative construction techniques.
5 Hours

UNIT IV
Technological Innovations and Case Studies: Appropriate technologies developed by research organizations and institutions. Study of innovations by international and Indian architects, research laboratories, and organizations working in alternative building technologies. Case studies of successful projects.
6 Hours

UNIT V
Sustainable and Affordable Building Technologies: Application of alternative technologies for affordable housing, disaster-resilient construction, rural and urban development. Environmental impact, lifecycle considerations, resource efficiency, and future trends in alternative building technologies.
6 Hours

REFERENCE BOOKS		
1	Laurie Baker	The Laurie Baker Omnibus, Penguin Books India, 2007 ISBN : 9780143065470
2	S. K. Duggal	Building Materials, 5th Edition, New Age International Publishers, 2023. ISBN: 9789357880640
3	Gernot Minke	Building with Earth: Design and Technology of a Sustainable Architecture, Birkhäuser, 2021. ISBN: 9783035602272
4	Arthur Lyons	Materials for Architects and Builders, 6th Edition, Routledge, 2021. ISBN: 9780367555382
5	H. H. S. Visvesvaraya National Institute of Technology (VNIT) / BMTPC	Alternative Building Materials and Technologies, Building Materials and Technology Promotion Council (BMTPC), Latest Edition / Technical Publications.

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Interpret the concepts, principles, and significance of alternative building technologies in sustainable development.
CO2	Apply alternative building materials based on their properties, construction techniques, and suitability for different building applications.
CO3	Apply alternative construction systems and cost-effective building techniques in architectural design and construction.
CO4	Analyze technological innovations and case studies of alternative building technologies developed by research organizations and architects.
CO5	Assess the application of alternative building technologies for sustainable, affordable, and disaster-resilient development.

Course Articulation Matrix

		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			
	CO5	3						3					3	3			

PRODUCT DESIGN

Contact Hours/ Week:	02	Credits:	2
Total Lecture Hours:	-	CIE Marks:	50
Total Studio Hours:	28	SEE Marks:	50
Course Code:	ATPE08	Exam Mode**:**	Viva

Course objectives: This course will enable students to:	
1.	Get familiarize with the concept of form and space in product design.
2.	Recognize the relationship between form, materials, manufacturing processes, and product development.
3.	Develop creative approaches to product design through ideation, detailing, prototyping, and contemporary manufacturing techniques.

UNIT I
Introduction to Product Design: Fundamentals of product design, concepts of form, space, function, ergonomics, aesthetics, and user-centred design. Design thinking and the product design process.
5 Hours

UNIT II
Materials and Manufacturing Processes: Relationship between form, materials, manufacturing processes, and product performance. Selection of materials for product design and an overview of conventional and contemporary manufacturing methods.
5 Hours

UNIT III
Creativity and Concept Development: Creativity techniques, ideation methods, brainstorming, sketching, concept generation, evaluation of alternatives, and design refinement.
6 Hours

UNIT IV
Product Detailing and Prototyping: Product detailing, working drawings, mock-up models, prototype development, testing, evaluation, and refinement of product designs
6 Hours

UNIT V
Advanced Manufacturing and Contemporary Product Design: Introduction to advanced manufacturing processes including CNC machining, laser cutting, 3D printing, rapid prototyping, digital fabrication, sustainability, and emerging trends in product design.
6 Hours

REFERENCE BOOKS		
1	Mike Baxter	Product Design: A Practical Guide to Systematic Methods of New Product Development, CRC Press, 2018 ISBN : 978-0748741977
2	Karl T. Ulrich and Steven D. Eppinger	Product Design and Development, 7th Edition, McGraw-Hill Education, 2020. ISBN: 9781260566437
3	Don Norman	The Design of Everyday Things, Revised and Expanded Edition, Basic Books, 2013. ISBN: 9780465050659

4	Chris Lefteri	Materials for Design, Laurence King Publishing, 2014. ISBN: 9781780672908
5	Rob Thompson	Manufacturing Processes for Design Professionals, Thames & Hudson, 2007. ISBN: 9780500513750

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Analyze the relationship between form, function, ergonomics, and user requirements in product design.
CO2	Assess the suitability of materials and manufacturing processes for product development.
CO3	Apply creativity techniques to generate and refine innovative product design concepts.
CO4	Develop detailed product designs and prototypes using suitable modelling and fabrication techniques.
CO5	Evaluate product designs based on functionality, manufacturability, sustainability, and user requirements.

Course Articulation Matrix

		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			
	CO3	3		3										3			
	CO4	3		3										3			
	CO5	3						3					3	3			

ENVIRONMENTAL RESPONSIVE ARCHITECTURE

Contact Hours/ Week:	02	Credits:	2.0
Total Lecture Hours:	-	CIE Marks:	50
Total Studio Hours:	28	SEE Marks:	50
Course Code:	ATPE09	Exam Mode:	Viva

Course objectives: This course will enable students to:	
1.	Develop awareness and familiarity with green design.
2.	Integrate the principles of energy conservation in Architectural design.

UNIT I
Introduction to Environmentally Responsive Architecture: Principles of sustainable and environmentally responsive architecture. Green buildings, sustainable site planning, site-specific design, development density, community connectivity, alternative transportation, site development, stormwater management, and heat island effect.
6 Hours

UNIT II
Energy-Efficient Building Design: Building energy performance, energy conservation strategies, on-site renewable energy systems, enhanced commissioning, green power, and application of solar passive design principles in buildings.
5 Hours

UNIT III
Sustainable Building Materials and Resources: Building reuse, conservation of existing walls, floors and roofs, construction waste management, material reuse, recycled materials, regional materials, certified wood, and resource-efficient construction practices
5 Hours

UNIT IV
Indoor Environmental Quality and Green Building Rating Systems: Indoor air quality management, daylighting, natural ventilation, occupant comfort, and views. Green building assessment systems including GRIHA, LEED, and region-specific sustainability considerations.
6 Hours

UNIT V
Passive Cooling Techniques and Climate-Responsive Design: Passive cooling strategies including evaporative cooling, earth air tunnels (earth tubing), wind scoops, roof ponds, shaded courtyards, thermal mass, and other climate-responsive techniques for energy-efficient buildings
6 Hours

REFERENCE BOOKS		
1	Arvind Krishan, Nick Baker, Simos Yannas and S. V. Szokolay,	Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings, Tata McGraw-Hill Education, 2001. ISBN : 9780074632185
2	Gernot Minke	Building with Earth: Design and Technology of a Sustainable Architecture, Birkhäuser, 2021. ISBN: 9783035602272

3	Laurie Baker,	The Laurie Baker Omnibus, Penguin Books India, 2007. ISBN: 9780143065470
4	Arthur Lyons	Materials for Architects and Builders, 6th Edition, Routledge, 2021. ISBN: 9780367555382
5	GRIHA Council	GRIHA Manual: Green Rating for Integrated Habitat Assessment, The Energy and Resources Institute (TERI)

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Interpret the principles of environmentally responsive architecture and sustainable site planning in the built environment.
CO2	Integrate energy-efficient design strategies, renewable energy systems, and solar passive principles to improve building performance.
CO3	Apply sustainable building materials and resource-efficient construction practices in architectural design.
CO4	Analyze indoor environmental quality parameters and green building rating systems for sustainable building assessment.
CO5	Assess passive cooling techniques and climate-responsive design strategies for energy-efficient buildings.

Course Articulation Matrix

		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			
	CO5	3						3					3	3			

NSS, PHYSICAL EDUCATION, YOGA AND PRANAYAMA

Contact Hours/ Week:	02	Credits:	Audit
Total Lecture Hours:	-	CIE Marks:	--
Total Studio Hours:	28	SEE Marks:	--
Course Code:	SMC01-AT SMC02-AT SMC03-AT	Exam Mode:	--

All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE) (Sports and Athletics), and Yoga (YOGA) with the concerned coordinator of the course during the first Week of V semesters. Activities shall be carried out in V semester and VI semester (for 2 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the Degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of Degree.

SIDDAGANGA INSTITUTE OF TECHNOLOGY
Tumakuru-572103

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

SCHOOL OF ARCHITECTURE

DETAILED SYLLABUS FOR
SIXTH SEMESTER
B. ARCHITECTURE

ARCHITECTURAL DESIGN - V

Contact Hours/ Week:	08	Credits:	8
Total Lecture Hours:	-	CIE Marks:	50
Total Studio Hours:	112	SEE Marks:	50
Course Code:	6ATS01	Exam Mode:	Viva

Course objectives: This course will enable students to:	
1.	Understand the role of built environment by intrinsic factors like size, volume, levels, functional spaces or zones, structural possibilities.
2.	Analyze the impact of external factors such as site, approach, traffic, climate change, ecology, services on architectural design.
3.	Create an 'Identity' to the Campus through integration of intrinsic and external factors.

COURSE OUTLINE

- The studio shall explore the idea of spatial structuring as a set of logical operations after an analytical understanding of the site, surroundings, program and intent expressing diversity of program and its resulting spatial variety and the relationship between the built and the unbuilt established through movement systems ,linkages and nodes etc.
- Institutional projects like facilities of higher learning, such as, Engineering college campus, medical college campus, management institute campus, hotel management institute, Law college campus, Dental college campus, Nursing college campus, Juvenile Correction Centre, etc.
- The project and design development should focus on integrating sustainable design in every aspect and process possible, with an emphasis on reducing thermal locals and integrating ventilation, insulation, thermal mass, shading, cool roofs, passive/natural cooling and low energy, low-carbon active cooling technologies; local materials as much as possible; sustainable systems such as storm water harvesting, water recycling and reusing, waste management systems and renewable energy systems and above all response to site context and existing informal systems.

NOTE

a. Relevant case studies and literature studies may be assigned by the studio teachers, and students shall compile a report.
b. A minimum of two architectural projects shall be undertaken during the semester.
c. One design exercise may be carried out as group work, and a vertical studio involving other semesters may be encouraged for a full or partial project.
d. The portfolio covering the prescribed topics shall be presented through viva voce, using appropriate computer-aided tools.
e. Knowledge of alternative materials and construction techniques taught in building construction may be incorporated into design and detailing.
f. The projects listed in the syllabus indicate the expected scale and complexity; teachers may introduce projects of similar scope.

REFERENCE BOOKS

1	Roger H. Clark, Michael Pause	Precedents in Architecture, Van Nostrand Reinhold, 2007, ISBN: 9780442020514, 0442020511
2	Geoffrey H. Baker	Le Corbusier: An Analysis of Form, Van Nostrand Reinhold, 1996, ISBN: 9780471288138, 0471288136

3	Herman Hertzberger	Lessons for Students in Architecture, 010 Publishers, 2001, ISBN: 9789064504648, 9064504644
4	Rem Koolhaas, Sanford Kwinter	Rem Koolhaas: Conversations with Students · Issue 30, Princeton Architectural Press, 1996, ISBN: 9781885232021, 1885232020

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Analyze the site, surroundings, programme, and contextual factors influencing architectural design.
CO2	Develop spatial organizations through logical relationships between built and unbuilt spaces, movement systems, linkages, and nodes.
CO3	Design architectural design proposals responding to functional requirements, user needs, context, and architectural identity.
CO4	Integrate structural systems, building services, and appropriate materials and construction techniques into architectural projects.
CO5	Integrate sustainable and climate-responsive strategies, local materials, and resource-efficient systems into architectural design proposals

Course Articulation Matrix

		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			3		3	3			
	CO4			3		3					3		3	3			
	CO5							3					3	3			

BUILDING MATERIALS AND CONSTRUCTION – VI

Contact Hours/ Week:	04	Credits:	4
Total Lecture Hours:	14	CIE Marks:	50
Total Studio Hours:	42	SEE Marks:	50
Course Code:	6ATS02	Exam mode:	Viva

Course objectives: This course will enable students to:	
1.	Familiarize with the construction systems fabrication techniques, and detailing of glass, façade systems, doors, windows, and partitions.
2.	Get introduced to the principles and applications of skylight systems, prefabricated construction, and industrialized building systems.
3.	Understand the applications of advanced construction technologies and high-performance materials for various building elements.

UNIT I
Glass as a Building Material: Glass as a Building Material: Manufacturing processes and types of glass including plate, tinted, decorative, reinforced, laminated, glass blocks, fibreglass, etched and coloured glass, and their applications in interior and exterior construction. Fabrication techniques, fibre-reinforced glass composites, environmental performance, life cycle impacts, carbon emissions, recyclability, and energy implications of glass in tropical climates. Frameless glass doors and windows – principles, fixing methods, fabrication and detailing
12 Hours

UNIT II
Contemporary Building Envelope Systems: Principles, materials, fixing and fabrication details of structural glazing, aluminium composite panel (ACP) cladding, Fundermax panels and thermally insulated façade systems. uPVC and FRP doors, windows and partitions – materials, construction, detailing and joinery.
14 Hours

UNIT III
Skylights in steel and glass – principles, methods of construction and detailing. Prefabrication and Industrialized Construction: Prefabrication in India – advantages, relevance in the Indian context, manufacturing processes, design considerations and applications. Industrialized building systems, modular construction techniques and their role in improving construction efficiency and sustainability.
12 Hours

UNIT IV
Advanced Construction Technologies: Introduction to advanced methods of building construction. CAD/CAM fabrication, CNC machining, robotic fabrication and 3D printing. Applications of advanced digital fabrication techniques and their impact on the construction industry in the Indian context.
10 Hours

UNIT V

High-Performance Building Materials: Introduction to high-performance materials and their significance in contemporary construction. Smart materials – properties, characteristics and applications in the building industry. Nanomaterials – introduction to nanotechnology, properties and applications in architecture and construction.
8 Hours

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 on related topics 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. The entire portfolio on construction and materials shall be presented for viva voce.

REFERENCE BOOKS		
1	Roy Chudley & Roger Greeno	Building Construction Handbook, 13th Edition, Routledge, 2020. ISBN : 9780367191191
2	S. C. Rangwala	Engineering Materials [Material Science], Charotar Publishing House Pvt. Limited, 2008 ISBN : 9788185594965, 8185594961
3	William Barr McKay	Building Construction, Fourth edition, Routledge, 2004 ISBN : 1873394721, 9781873394724
4	Roy Chudley, Roger Greeno	Advanced Construction Technology, 5th Edition, Routledge, 2016. ISBN : 9780435046835
5	G. D. Taylor	Materials in Construction: Principles, Practice and Performance, Longman, 2001 ISBN : 0582369347
6	Arthur Lyons	Materials for Architects and Builders, 6th Edition, Routledge, 2021 ISBN : 9780367555382

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Summarize the types, fabrication techniques, environmental performance, and applications of glass used in the construction industry.
CO2	Analyze the characteristics, components, and applications of contemporary façade systems.
CO3	Apply the construction details of skylight systems and the principles of prefabricated and industrialized construction in building design.
CO4	Analyze the applications and impact of advanced construction technologies and digital fabrication techniques in the construction industry.
CO5	Assess the applications of high-performance materials, including smart materials and nanomaterials, in the building industry.

Course Articulation Matrix

		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		3		
	CO3	3									3		3		3		
	CO4	3											3		3		
	CO5	3											3		3		

WORKING DRAWING - I

Contact Hours/ Week:	04	Credits:	4
Total Lecture Hours:	-	CIE Marks:	50
Total Practical Hours:	56	SEE Marks:	50
Course Code:	6ATS03	Exam Mode:	Viva

Course objectives: This course will enable students to:	
1.	Recognize the importance of creating working drawings for construction execution.
2.	Illustrate the essential components of working drawings, notations & drawing standards.
3.	Prepare detailed set of drawings for building elements.

UNIT I
Introduction to working drawing - its purpose and importance in building construction. Methods of representing various contents & specific information in working drawings. Study of building bye-laws and preparation of sanction drawings.
10 Hours

UNIT II
Preparation of center-line drawing, excavation drawings, foundation/footing drawings and working plans, elevations and sections.
14 Hours

UNIT III
Detailing of various building elements like Staircases, railings and skylights, etc. Preparation of schedules of openings and detailed drawings of doors and windows.
12 Hours

UNIT IV
Preparation of structural and building services drawings. Flooring, tiling, and dadoing details. Interior detailing of toilets, kitchens, and other relevant spaces.
14 Hours

UNIT V
Preparation of site plans incorporating landscape elements and relevant site development details.
6 Hours

REFERENCE BOOKS		
1	Mario Carpo	The Working Drawing: The Architect's tool, Park Books, 2016, ISBN-10: 3906027317, ISBN-13: 978-3906027319
2	Keith Styles	Working Drawings Handbook, Taylor & Francis, 2012
3	Ernst & Peter Neufert	Nuferts Standards, Wiley & Sons, 4th edition, 2012, ISBN-10: 9781405192538, ISBN-13: 978-1405192538

Course Outcomes:
Upon completion of this course the student will be able to:

CO1	Develop drawings as per building bye-laws, sanction drawings, and working drawings.
CO2	Prepare and interpret detailed drawings required for construction, including plans, elevations, and sections, in accordance with standard engineering drawing practices.
CO3	Apply architectural drafting principles to produce detailed drawings of building components and comprehensive door-window schedules for building projects.
CO4	Prepare and develop MEP (Mechanical, Electrical, and Plumbing) drawings using advanced tools and workflows in Revit.
CO5	Interpret site plans and identify essential landscape elements and their functions

Course Articulation Matrix

		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**
	CO3					**3**											**3**
	CO4					**3**					**3**						**3**
	CO5										**3**						**3**

STRUCTURAL ANALYSIS – III
(Design of Long Span Structures)

Contact Hours/ Week:	03	Credits:	3
Total Lecture Hours:	14	CIE Marks:	50
Total Practical Hours:	28	SEE Marks:	50
Course Code:	6ATS04	Exam mode:	Viva

Course objectives:
This course will enable students to:

1.	Get familiarize with the structural behaviour and applications of high-rise, long-span, and special structural systems.
2.	Develop an understanding of various loading conditions and relevant Indian Standard provisions for the analysis and design of high-rise and long-span structures.
3.	Get introduce to the principles of analysis and preliminary design of portal frames, arches, vaults, domes, and space truss systems.
4.	Develop an understanding of cable-supported and suspension structures, including their structural behaviour, load transfer, and applications.
5.	Conceptualize and select appropriate structural systems by integrating structural efficiency, architectural requirements, constructability, and code provisions.

UNIT I

Introduction to Long-Span Structures and Structural Design: Introduction to horizontal or long-span structures. Introduction to the structural design project for an Airport Terminal Building of dimensions 75 m × 300 m. Selection of appropriate horizontal structural systems and estimation of loads based on applicable building codes and standards.

8 Hours

UNIT II

Structural Analysis and Loading: Determination of loads based on the type of occupancy and structural requirements. Gravity loading including dead and live load calculations based on IS 875 (Part 1 and Part 2); seismic load calculations based on IS 1893 using the static analysis procedure; and wind load calculations based on IS 875 (Part 3).

9 Hours

UNIT III

Rigid Frame, Arch and Vault Structures: Design of portal frame systems with rigid beam-column connections. General framing arrangement, load path, and total structural weight calculation for a 75 m × 300 m building. Design of arch and vault structural systems using masonry, concrete, or steel, including structural arrangement, load path, and total structural weight calculation.

9 Hours

UNIT IV

Dome and Long-Span Planar Truss Structures: Design of dome structures using curved structural systems in masonry, concrete, or steel, including structural arrangement, load path, and total structural weight calculation. Design of long-span planar truss systems based on triangular structural configurations for large-span roofs, including general framing arrangement and load path.

8 Hours

UNIT V

Cable and Suspension Structures: Introduction to cable and suspension structural systems for long-span buildings. Design of cable-supported or suspension roof systems for a 75 m × 300 m building, including structural arrangement, basic load path, and total structural weight calculation.
8 Hours

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 made by students to analyse each of the structural systems.

REFERENCE BOOKS		
1	Francis D.K. Ching.	'Building Structures Illustrated', John Wiley and sons, Inc. 2nd Edition, 2013, ISBN: 978-1-118-45835-8.
2	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
3	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
4	Bureau of Indian Standards (BIS)	National Building Code of India (NBC 2016-SP-7).

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	**Identify the characteristics and applications of horizontal and long-span structural systems.**
CO2	Apply relevant Indian Standard provisions to determine dead, live, wind, and seismic loads for long-span structures.
CO3	Analyze portal frame, arch, and vault structural systems based on their configuration, load path, and structural behaviour.
CO4	Analyze dome and long-span planar truss systems considering structural arrangement, load transfer, and structural weight.
CO5	Develop an appropriate preliminary structural scheme for large-span buildings by integrating cable and suspension systems, loading, structural analysis, design principles, and code requirements.

Course Articulation Matrix

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

CONTEMPORARY ARCHITECTURE

Contact Hours/ Week:	03	Credits:	3
Total Lecture Hours:	42	CIE Marks:	50
Total Tutorial Hours:	--	SEE Marks:	50
Course Code:	6ATT1	Exam mode:	Theory

Course objectives: This course will enable students to:	
1.	Extrapolate the contribution of eminent architects post-independence.
2.	Study Ideas and philosophies of renowned International Architects.
3.	Identify the contribution of various architects in shaping the built environment through their noted works.
4.	Draw inspiration from Innovative design ideas and use of new materials and technology by eminent architects.
5.	Sensitize towards the context and climate-responsive ideas in designing buildings.

UNIT I
Introduction to **Architecture in India (Pre independence):** The Architecture of the Princely States of Jaipur, Bikaner and Mysore: Their city examples – clock towers, railway stations, public offices, assembly halls, water systems, public hospitals, etc. Developing an environmental and vernacular expression connection in Pre independence architecture. Architecture in India (Post-Independence): Works of public nature in Chandigarh and Ahmadabad (Legislative Assembly Complex including High Court, Legislative assembly and Secretariat, Chandigarh and Mill Owners Building, Ahmedabad), IIM, Ahmadabad and its significance. Modern Architecture in India I: Ideas and works of BV Doshi (Institute of Indology, Ahmedabad, IIM-Bangalore and Hussain-Doshi Gufa, Ahmedabad) and Charles Correa: (Vidhan Bhavan, Bhopal, Jawahar Kala Kendra, Jaipur, Kanchenjunga Apartments, Mumbai and Kala Academy Panaji, Goa).
9 Hours

UNIT II
Modern Architecture in India II: Ideas and works of Raj Rewal (Pragati Maidan, New Delhi and Asian Games Village, New Delhi), Achyut Kanvinde (IIT, Kanpur and Nehru Science Centre, Mumbai), Uttam Jain(Lecture Theatres, Jodhpur and Engineering College, Kota). Modern Architecture in India II: Enrichment of Indian experience- Cost effectiveness and local influences. Lauire Baker (Centre for Development Studies, Thiruvananthapuram and St. John Cathedral at Tiruvalla) and. Bimal Patel (Sabarmati River front development at Ahmedabad and Kashi Vishwanath Corridor, Varanasi). Sanjay Mohe (Karunashraya, Bangalore, NIFT, Chennai, Anji Reddi Memorial, Hyderabad). Parallel trends in Indian architecture: a) Revivalist- monumental, Religious. b) Experimental- Pondicherry, Belgium embassy, IITB, Sriram Centre, New Delhi. c) Vernacular influence- Cost effective concepts.
9 Hours

UNIT III
Last phase of Modern Architecture: Ideas and works of Richard Meier (Smith House, Connecticut and Getty Centre, Brent Wood, Los Angeles) and Charles Moore (Architect's Own House at Orinda and Piazza d'Italia, New Orleans), Bernard Tschumi (Kyoto Railway Station Project and Parc de la Villete, Paris). High-tech architecture or Structural Expressionism I: An architectural style that emerged in the

1970s: The High-tech architecture practitioners include British architects Sir Norman Foster(Hong Kong Shanghai Bank and Renault Distribution Centre, Swindon, England), Sir Richard Rogers
8 Hours

UNIT IV
High-tech architecture or Structural Expressionism II: The High-tech architecture practitioners include Italian architect Renzo Piano (Pompidou Centre, Paris and Menil Museum, Houston) and Spanish architect Santiago Calatrava (Lyon-Satolas Railway Station and Olympic Stadium at Athens). Postmodern Architecture: Development of Postmodernism with its origins in the alleged failure of Modern architecture from 1950s, and spreading in the 1970s and its continuous influence on present-day architecture. Ideas and works of Robert Venturi
8 Hours

UNIT V
Hyper theories of Architecture I: Development of postmodern architecture in 1980s is the ideas of Deconstructivism including, Frank Gehry (AeroSpace Museum, Santa Monica and Guggenheim Museum, Bilbao). Daniel Leibskind (Jewish Museum, Berlin and World Trade Centre, New York), Rem Koolhas(Dance Theatre, The Hague and Netherlands Sports Museum). Hyper theories of Architecture II: Ideas of Deconstructivism including, ZahaHadid (Phaeno Science Center (2005) - Wolfsburg, Germany and Vitra Fire Station - Weil am Rhein, Germany), and Bernard Tschumi in Deconstruction.
8 Hours

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

REFERENCE BOOKS		
1	Richard Meier	Richard Meier, Architect, Vol. 4, Rizzoli publisher, 2004 ISBN - 10: 0847826333, ISBN-13: 978-0847826339
2	Sarbjit Bahga, Surinder Bahga, Yashinder Bahga	Modern Architecture in India : Post-independence Perspective, Galgotia Publishing Company, 1993 ISBN: 8185989001, 9788185989006
3	Vikram Bhatt, Peter Scriver	After the Masters, Mapin Publishers, 1990 ISBN: 9780944142196, 0944142192
4	Martin Pawley	Norman Foster: A Global Architecture (Architecture/Design Series), Universe publisher, 1999 ISBN - 10: 0789302632, ISBN-13: 978-0789302632
5	Renzo Piano & Kenneth Frampton	Renzo Piano: The complete Log book, Thames and Hudson Publisher, 2017 ISBN - 10: 9780500343104, ISBN-13: 978-0500343104
6	Bernard Tschumi	Architecture & Disjunction, The MIT Press Publisher, 1996 ISBN - 10: 0262700603, ISBN-13: 978-0262700603
7	Paul Goldberger	Building Art: The life & work of Frank Gehry, Knopf publisher, 2015 ISBN - 10: 0307701530, ISBN-13: 978-0307701534
8	Aaron Betsky	Complete Zaha Hadid: Expanded and Updated, Thames

		and Hudson Publisher, 2018ISBN - 10: 0500343357, ISBN-13: 978-0500343357
9	Santiago Calatrava & Cristina Carrillo de Albornoz	Santiago Calatrava: Drawing, Building, Reflecting, Thames and Hudson Publisher, 2018, ISBN - 10: 0500343411, ISBN-13: 978-0500343418
10	Rem Koolhaas	Rem Koolhaas: Elements of Architecture, Taschen America Llc Publisher, 2018 ISBN - 10: 9783836556149, ISBN-13: 978-3836556149
11	Carter Wiseman	I M Pei: A profile in American Architecture, Harry N. Abrams publisher, 1990 ISBN - 10: 0810937093 ISBN-13: 978-0810937093

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Identify key developments in Indian architecture from pre-independence to post-independence modernism.
CO2	Analyze major trends in modern Indian architecture, including regional, experimental, revivalist, and vernacular approaches.
CO3	Explore the ideas and works of architects associated with late Modern and High-Tech architecture.
CO4	Identify the characteristics and design approaches of High-Tech and Postmodern architecture.
CO5	Interpret the philosophies and design approaches of architects associated with Deconstructivist and contemporary architecture

Course Articulation Matrix

		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	
	CO4	3														3	
	CO5	3														3	

BUILDING SERVICES - IV
(Acoustics & Noise Control)

Contact Hours/ Week:	03	Credits:	3
Total Lecture Hours:	42	CIE Marks:	50
Total Tutorial Hours:	--	SEE Marks:	50
Course Code:	6ATT2	Exam mode:	Theory

Course objectives: This course will enable students to:	
1.	Get introduced to the fundamentals of acoustics, sound properties, and the behaviour of sound in enclosed spaces.
2.	Get familiarize with acoustical measurements, materials, and their applications in architectural design.
3.	Understand the principles of acoustical design for auditoriums and other specialized spaces.
4.	Understand the principles of noise transmission, sound insulation, and noise control in buildings.
5.	Identify industrial and urban noise management strategies for creating acoustically sustainable built environments

UNIT I
Introduction to Acoustics: Scope of acoustics, acoustical problems in contemporary architectural design, sound source, path and receiver. Nature and properties of sound – frequency, pitch, tone, sound pressure, sound intensity, decibel scale, loudness, threshold of audibility and pain, masking, and inverse square law. Behaviour of sound in enclosed spaces – reflection from plane, concave and convex surfaces, diffraction, absorption, sound absorption coefficient, reverberation and reverberation time calculation.
8 Hours

UNIT II
Acoustical Measurement and Materials: Sound Level Meter (SLM), Articulation Index (AI), Speech Transmission Index (STI), speech intelligibility, sound attenuation, Noise Reduction Coefficient (NRC) and Noise Criteria (NC) curves. Acoustical materials : porous absorbers, panel absorbers, membrane absorbers, acoustical plasters, diffusers and Helmholtz resonators. Vernacular methods of sound insulation, adjustable acoustics, functional absorbers and acoustical retrofitting of existing buildings
9 Hours

UNIT III
Acoustical Design of Auditoriums - Multipurpose Halls Evolution of auditoriums from Greek and Roman theatres. Use of IS code 2526 - 1963 for design and detailing of Auditoriums - Cinema Halls - Multi- purpose Halls - Halls for speech and music. Acoustical Design and Detailing of Other Spaces – Open air theatres, Halls for Indoor Sports, home theatres, recording studios, open plan offices, etc. Sound reinforcement systems, sound masking systems and speech privacy.
9 Hours

UNIT IV
Introduction to Environmental Noise Control: Sources and classification of noise – outdoor and indoor, airborne, structure-borne, impact, mechanical, community and industrial noise.

Noise transmission, Mass Law, transmission loss, acceptable noise levels and design principles for noise reduction.
Constructional Measures: Enclosures, barriers, sound insulation and vibration isolation for mechanical services. Construction detailing of composite walls, double walls, floating floors, wood-joist floors, plenum barriers and sound locks. Sound Transmission Class (STC) ratings.

9 Hours

UNIT V

Industrial Noise: Sources of industrial noise including impact, friction, reciprocation, air turbulence and machinery. Methods of noise reduction using enclosures and barriers.
Urban Soundscape: Sources of urban noise including road, rail, air traffic and industrial activities. Traffic planning, site planning, town planning and regional planning considerations for noise control. Role of architects and urban planners in shaping healthy soundscapes and sustainable acoustic design.

7 Hours

NOTE

a. Design exercises based on the above topics, with a minimum of two exercises
b. Application of indoor and outdoor acoustical design criteria.
c. Study of the relationship between the form and shape of spaces and their acoustical performance.

REFERENCE BOOKS

1	M. David Egan	Architectural Acoustics, J. Ross Pub., 2007, ISBN: 9781932159783, 1932159789
2	Leslie L. Doelle	Environmental acoustics, McGraw-Hill, 2007, ISBN: 9780070173422, 0070173427
3	Vern Oliver Knudsen, M.C Harris	Acoustical Designing in Architecture, Acoustical Society of Amer (1 June 1980) ISBN: 978-0883182673
4	David Egan	Concepts in Architectural Acoustics, McGraw-Hill Inc 1972 ISBN: 978-0070190535
5	Michael Ermann	Architectural Acoustics Illustrated, 3rd Edition, Wiley, 2021 ISBN: 9781119775287
6	National Building Code of India	National Building Code of India (NBC) 2016; Part 8 Section 4 173rd EC dated 31.07.2023
7		IS 2526:1963 – Code of Practice for Acoustical Design of Auditoriums and Conference Halls. IS 1950:1962 – Code of Practice for Sound Insulation of Non-Industrial Buildings. IS 3483:1965 – Code of Practice for Noise Reduction in Industrial Buildings. IS 4954:1968 – Recommendations for Noise Abatement in Town Planning. IS 11050 (Part 1):1984 – Rating of Sound Insulation in Buildings and of Building Elements – Airborne Sound Insulation. IS 11050 (Part 2):1984 – Rating of Sound Insulation in Buildings and of Building Elements – Impact Sound Insulation.

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Interpret the basic principles of sound and architectural acoustics and their application in built spaces.
CO2	Apply acoustical measurement tools and material properties to assess and improve sound performance in buildings.
CO3	Design acoustically appropriate auditoriums and other functional spaces in compliance with relevant standards and codes.
CO4	Analyze noise sources and transmission mechanisms and apply suitable sound insulation and noise control measures in buildings.
CO5	Assess urban and industrial noise environments and propose sustainable soundscape and noise mitigation strategies.

Course Articulation Matrix

		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		
	CO3		3	3											3		
	CO4			3				3							3		
	CO5	3						3					3		3		

LANDSCAPE ARCHITECTURE

Contact Hours/ Week:	03	Credits:	3
Total Lecture Hours:	42	CIE Marks:	50
Total Practical Hours:	--	SEE Marks:	50
Course Code:	6ATT3	Exam mode:	Theory

Course objectives: This course will enable students to:	
1.	The discipline of landscape architecture, its historical evolution, and contemporary relevance in ecological and sustainable design.
2.	Develop an understanding of the relationship between architecture and landscape through site analysis, planning, and design integration.
3.	Familiarize with the primary and secondary elements of landscape design and their application in creating functional and aesthetic outdoor spaces.
4.	Study and critically analyze historical and cultural landscape philosophies and their influence on modern and contemporary landscape design.
5.	Explore the works of notable international and Indian landscape architects to understand varying design approaches and contextual responses.

UNIT I
Introduction to the discipline of landscape architecture: Landscape as a broad terminology, Natural and Man modified landscapes. Brief history and the growth of landscape architecture as a design and planning profession from gardens to regional landscapes. Scope and nature of professional work in contemporary landscape architecture, Changing priorities of disciplinary approach: ecology, biodiversity and sustainability.
8 Hours

UNIT II
Relating Architecture and Landscape, Site analysis and Site planning: Study of architectural response to landscapes and understanding the relation between architecture and landscape through case examples. The idea of site as part of whole/larger landscape, Site inventory and analysis: physical, biological, social contextual studies and layers of site analysis, site suitability analysis, inferences and response for architectural interventions. Design considerations and approaches to site planning, site program, siting of buildings and open spaces, introduction to grading and land modifications, working with sloping sites.
9 Hours

UNIT III
Elements of landscape architecture and their application in landscape design: Primary landscape elements; Landform, water and vegetation, Design considerations and their role in articulating outdoor spatial design. Secondary landscape elements: Street furniture, landscape walls, paving, inert ground covers, trellis, outdoor shading structures, embellishments, etc. Design considerations and their role in spatial design. Hard and soft landscapes
9 Hours

UNIT IV
Works of noted landscape architects and landscape projects: Eastern landscape philosophies: Chinese and Japanese gardens, Asian landscapes: Mughal and Persian gardens. Western landscape designs: Italian and French gardens, English romantic gardens and American parks
8 Hours

UNIT V
Examples of contemporary landscape projects: works of Garret Eckbo, Martha Schwartz, Peter Walker & Partners, Hargreaves Associates, Andropogon Associates, Field Operations, Turenscape etc. Landscape projects in India: works of Ravindra Bhan and Mohammed Shaheer.
8 Hours

NOTES
a. Small scale landscape design project to be given as an assignment and/or activity.
b. Detailing such as roof garden, terrace garden, vertical garden has to be done as part of assignment

REFERENCE BOOKS		
1	John O Simonds	Landscape Architecture: A Manual of Site Planning and Design, McGraw Hill Education, 3rd Edition, 1997, ISBN-10: 0070577099, ISBN-13: 978-0070577091
2	John L. Motloch	Introduction to Landscape Design, Wiley, 2000, ISBN: 9780471352914, 0471352918
3	Tom Turner	Garden History: Philosophy and Design 2000 BC – 2000 AD, Routledge, 1st Edition, 2004, ISBN-10: 0415317487, ISBN-13: 978-0415317481
4	John R Etherington	Environment and Plant Ecology, Wiley-Blackwell, 2nd Edition, 1982, ISBN-10: 047110146X, ISBN-13: 978-0471101468
5	Brian Clouston	Landscape design with plants, Newnes, 2nd Edition, 2013, ISBN-13: 978-0434902347
6	Ian McHarg	Design with Nature, John wiley & sons Inc, 1995, ISBN-10: 047111460X, ISBN-13: 978-0471114604
7	Elke Mertens, Karsten Jørgensen, Nilgül Karadeniz, Richard Stiles	The Routledge Handbook of Teaching Landscape, Taylor & Francis, 2019, ISBN: 9781351212939, 1351212931
8	Heather L. Venhaus	Designing the Sustainable Site: Integrated Design Strategies for Small Scale Sites and Residential Landscapes, Wiley, 2012, ISBN: 9781118183434, 1118183436
9	Adit Pal, Geeta Wahi Dua, Mohammad Shaheer	Landscape Architecture in India: A Reader, Landscape, 2013, ISBN: 9788192625409, 8192625400
10	Diedrich Bruns, Stefanie Hennecke	The Routledge Handbook of Landscape Architecture Education, Taylor & Francis, 2022, ISBN: 9781000782196, 1000782190

Course Outcomes:
Upon completion of this course the student will be able to:

CO1	Summarize the scope of landscape architecture, its interdisciplinary nature, and its role in addressing ecological and sustainability challenges.
CO2	Conduct comprehensive site analysis and develop site-responsive planning strategies for architectural interventions.
CO3	Apply appropriate landscape elements - including landform, vegetation, and built features—in the design of outdoor environments.
CO4	Analyze traditional and modern landscape philosophies from both Eastern and Western cultures and apply these insights in design thinking.

CO5	Appraise the key contemporary landscape practices by evaluating design philosophies and projects of renowned landscape architects globally.

Course Articulation Matrix

		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	
	CO3			3												3	
	CO4		3													3	
	CO5				3											3	

PROFESSIONAL ELECTIVE – IV

AI IN ARCHITECTURE

Contact Hours/ Week:	02	Credits:	2
Total Lecture Hours:	-	CIE Marks:	50
Total Studio Hours:	28	SEE Marks:	50
Course Code:	ATPE10	Exam Mode**:**	Viva

Course objectives: This course will enable students to:	
1.	Get introduce to the fundamental applications of Artificial Intelligence in architecture and the built environment.
2.	Develop computational thinking and digital skills for parametric workflows, generative design, and design automation.
3.	Get familiarize with emerging AI technologies and their applications in contemporary architectural practice.

UNIT I
Introduction to Artificial Intelligence in Architecture: Fundamentals of Artificial Intelligence (AI), Machine Learning (ML), Deep Learning, and Generative AI. Evolution of AI in architecture, applications, opportunities, limitations, and ethical considerations.
6 Hours

UNIT II
AI-Assisted Design Exploration: Prompt engineering for architects, AI-assisted concept generation, precedent studies, mood boards, image generation, space planning, and visualization techniques. Introduction to AI-assisted design platforms such as Midjourney, ComfyUI, Adobe Firefly, Krea, Unreal Engine, and other equivalent or emerging AI-assisted design platforms.
6 Hours

UNIT III
AI-Enabled Design Workflows: AI-assisted design development, automation of repetitive design tasks, architectural documentation, workflow optimization, and integration of AI into the design process.
6 Hours

UNIT IV
AI for Building Analysis and Decision Support: AI applications in environmental analysis, daylight studies, energy performance, BIM-assisted workflows, quantity estimation, and data-driven design decision-making.
5 Hours

UNIT V
Emerging AI Technologies and Professional Practice: AI applications in digital twins, smart buildings, AI ethics, copyright, verification of AI-generated outputs, and the future of AI in architectural practice.
5 Hours

REFERENCE BOOKS		
1	Neil Leach	Architecture in the Age of Artificial Intelligence: An Introduction to AI for Architects, Bloomsbury Visual Arts, 2022. ISBN : 9781350165526
2	Phil Bernstein	Machine Learning: Architecture in the Age of Artificial Intelligence, RIBA Publishing, 2022. ISBN: 9781915722218
3	Mario Carpo	The Second Digital Turn: Design Beyond Intelligence, MIT Press, 2017. ISBN: 9780262035798
4	Stuart Russell and Peter Norvig	Artificial Intelligence: A Modern Approach, 4th Edition, Pearson, 2021.. ISBN: 9789356063570
5	Branko Kolarevic	Architecture in the Digital Age: Design and Manufacturing, Taylor & Francis, 2003. ISBN: 9780415278201

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Interpret the fundamentals of Artificial Intelligence and its applications, opportunities, limitations, and ethical considerations in architecture.
CO2	Apply AI-assisted design tools and prompt engineering techniques for concept generation, visualization, and space planning.
CO3	Apply AI-enabled workflows to automate design development, architectural documentation, and workflow optimization.
CO4	Analyze AI-assisted building performance evaluation and data-driven decision-making for sustainable architectural design.
CO5	Assess emerging AI technologies and their implications for professional architectural practice, including ethics, copyright, and verification of AI-generated outputs

Course Articulation Matrix

		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								3			
	CO3	3				3								3			
	CO4	3				3		2						3			
	CO5					3								3			

BIOMIMICRY

Contact Hours/ Week:	02	Credits:	2
Total Lecture Hours:	-	CIE Marks:	50
Total Studio Hours:	28	SEE Marks:	50
Course Code:	ATPE11	Exam Mode:	Viva

Course objectives: This course will enable students to:	
1.	Get introduce to the principles and concepts of bio-mimicry in architecture.
2.	Get familiarize with nature-inspired design approaches and the integration of biological principles into architectural design
3.	Understand the role of bio-mimicry in developing sustainable, innovative, and environmentally responsive architectural solutions

UNIT I
Introduction to Bio-mimicry: Concepts, principles, and evolution of bio mimicry. Nature as model, measure, and mentor. Levels of bio-mimicry—organism, behaviour, and ecosystem. Introduction to biological systems and natural adaptations relevant to architecture
5 Hours

UNIT II
Nature-Inspired Design Strategies: Observation and analysis of natural forms, structures, materials, and processes. Functional adaptations in plants, animals, and ecosystems. Translation of biological principles into architectural concepts.
6 Hours

UNIT III
Bio-mimicry in Architecture: Historical and contemporary applications of bio-mimicry in architecture. Study of nature-inspired buildings, façades, structures, envelopes, ventilation systems, and material innovations through national and international case studies.
5 Hours

UNIT IV
Bio-mimicry and Sustainable Design: Biomimetic approaches for energy efficiency, thermal comfort, daylighting, natural ventilation, water conservation, resource optimization, and climate-responsive architecture. Bio-mimicry in sustainable building technologies
6 Hours

UNIT V
Emerging Trends and Design Applications: Bio-mimicry in computational design, material innovation, adaptive building systems, regenerative design, and future architectural applications. Design exploration using biomimetic principles and evaluation of contemporary innovations.
6 Hours

REFERENCE BOOKS		
1	Janine M. Benyus,	Biomimicry: Innovation Inspired by Nature, Harper Perennial, 2002. ISBN : 9780060533229
2	Michael Pawlyn	Biomimicry in Architecture, RIBA Publishing, 2016. ISBN: 9781859466285

3	Stephen R. Kellert, Judith Heerwagen and Martin Mador	Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life, Wiley, 2008. ISBN: 9780470163344
4	Maibritt Pedersen Zari	Regenerative Urban Design and Ecosystem Biomimicry, Routledge, 2018. ISBN: 9781138297784
5	Göran Pohl and Werner Nachtigall	Biomimetics for Architecture & Design: Nature – Analogies – Technology, Springer International Publishing, 2015 ISBN: 9783319191195

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Analyze biological principles and natural systems relevant to architectural design.
CO2	Interpret nature-inspired strategies for solving architectural and environmental challenges
CO3	Analyse biomimetic applications in contemporary architecture and sustainable design
CO4	Apply biomimetic principles in developing innovative architectural concepts.
CO5	Integrate bio-mimicry approaches into environmentally responsive and sustainable architectural solutions

Course Articulation Matrix

		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					3						3			
	CO3	3	3					3						3			
	CO4	3						3						3			
	CO5	3				2		3						3			

POST MODERN ART PRACTICES

Contact Hours/ Week:	02	Credits:	2
Total Lecture Hours:	-	CIE Marks:	50
Total Studio Hours:	28	SEE Marks:	50
Course Code:	ATPE12	Exam Mode**:**	Viva

Course objectives: This course will enable students to:	
1.	Understand the relationship between artistic movements and architectural development in the postmodern era.
2.	Get familiarize with postmodern theories, art movements, and their influence on architecture and allied disciplines
3.	Explore artistic practices and exhibition design through conceptual and spatial representation.

UNIT I
Foundations of Modernism and Postmodernism: Evolution of Modernism, Avant-Garde movements, emergence of Postmodernism, philosophical foundations, and theoretical perspectives. Relationship between art, architecture, culture, and society
6 Hours

UNIT II
Postmodern Art Movements: Neo-Dada, Pop Art, Institutional Critique, and Public Art. Influence of these movements on architecture, urban spaces, and contemporary design practices.
5 Hours

UNIT III
Contemporary Artistic Practices: Installation Art including Arte Povera, Earth Art, and site-specific practices. Conceptual Art, Fluxus, idea-based practices, Minimalism, and geometric abstraction. Video Art and digital media in artistic expression.
5 Hours

UNIT IV
Performance and Experimental Art: Performance Art, Body Art, Feminist Art, participatory art, interactive installations, and interdisciplinary artistic practices. Analysis of selected artists and contemporary case studies.
6 Hours

UNIT V
Art, Space and Exhibition Design: Contemporary art practices, practitioner studies, interpretation of historical and cultural narratives through mind mapping. Exhibition planning, sketching, model making, spatial organization, prototyping, presentation, and public exhibition
6 Hours

REFERENCE BOOKS		
1	Charles Jencks	The Language of Post-Modern Architecture, 7th Edition, Academy Editions, 1991. ISBN : 9780847813643
2	Hal Foster	The Anti-Aesthetic: Essays on Postmodern Culture, The New Press, 1998. ISBN: 9781565847425

3	Tony Godfrey	Conceptual Art, 2nd Edition, Phaidon Press, 2023. ISBN: 9781838665616
4	Terry Farrell and Adam Nathaniel Furman	Postmodernism: Architecture That Changed Our World, 2nd Edition, RIBA Publishing, 2024. ISBN: 9781915722447
5	Claire Bishop	Installation Art: A Critical History, Tate Publishing, 2005 ISBN: 9781854375186

Course Outcomes: Upon completion of this course the student will be able to:	
CO1	Interpret the evolution, philosophical foundations, and theoretical perspectives of Modernism and Postmodernism in art and architecture.
CO2	Interpret the philosophical and cultural foundations of postmodern artistic practices
CO3	Evaluate contemporary artistic expressions and their influence on architectural thinking.
CO4	Assess performance and experimental art practices through the study of artists, interdisciplinary approaches, and contemporary case studies.
CO5	Integrate postmodern artistic approaches into architectural and spatial design explorations

Course Articulation Matrix

		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			
	CO4		3											3			
	CO5	3												3			

STUDY TOUR

Contact Hours/ Week:	--	Credits:	0
Total Lecture Hours:	--	CIE Marks:	100
Total Studio Hours:	--	SEE Marks:	--
Course Code:	6ATST	Exam Mode:	Portfolio

Course objectives: This course will enable students to:	
1.	Understand the relationship between artistic movements and architectural development in the postmodern era.
2.	Get familiarize with postmodern theories, art movements, and their influence on architecture and allied disciplines
3.	Explore artistic practices and exhibition design through conceptual and spatial representation.

COURSE OULTINE
A minimum of two Study tours has to be undertaken before the semester end examination of 6th semester B. Architecture. The study tour may include places of architectural interest in India or Abroad. The choice of places and buildings to be visited is left to the concerned department. The students have to submit a study tour report as group work at the end of the semester. The reports are to be assessed by the department for progressive marks. The department may use its discretion about the choice of places for study tour and suitable time schedule

NSS, PHYSICAL EDUCATION, YOGA AND PRANAYAMA

Contact Hours/ Week:	02	Credits:	0
Total Lecture Hours:	-	CIE Marks:	100
Total Studio Hours:	28	SEE Marks:	--
Course Code:	SMC01-AT SMC02-AT SMC03-AT	Exam Mode:	--

All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first Week of V semesters. Activities shall be carried out in V semester and VI semester (for 2 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the Degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of Degree.