

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)

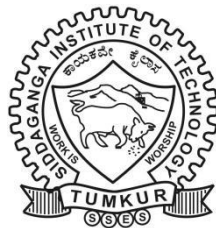
1. **Architectural Knowledge:** Apply the knowledge of design principles, building systems & technologies, humanities and environmental aspects in design, planning and construction.
2. **Problem Analysis:** Identify, formulate, review research literature and analyse various scales of architectural projects 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

2024 -2025



School of Architecture

Siddaganga Institute of Technology

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

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SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMAKURU

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B.ARCHITECTURE

SCHEME OF TEACHING AND EXAMINATION (270 Credits Scheme)

(Applicable to the students admitted during 2022-23)

V Semester

Sl. No.	Course and Course Code		Course Title	Teaching / Paper setting Dept.	Teaching hrs/week				Examination					Credits
					Lecture	Studio	Practical	Self Study Component	Duration in hrs.	Mode of Exam	CIE Marks	SEE Marks	Total Marks	
					L	S	P	SS						
1.	PCC	5ATS01	Architectural Design-IV		3	5				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		1		2			Term Work	50	50	100	3
4.	BSAE	5ATS04	Structural Analysis-II		1		2			Viva	50	50	100	3
5.	PCC	5ATT01	Contemporary Architecture-I		3				3	Theory	50	50	100	3
6.	BSAE	5ATT02	Building Services-III (HVAC, Mechanical Transportation & Fire safety)		3				3	Theory	50	50	100	3
7.	PEC	5ATPE	Professional Elective-III			2				Term Work	50	50	100	2
			Bio-Mimicry (ATPE06)											
			Product Design (ATPE08)											
8.	NCMC	NMC02-AT	National Service Scheme	PE			2			-	-	-	-	0
			Yoga											
			Physical Education											
			Total		12	10	6				450	350	800	26

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

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



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B.ARCHITECTURE

SCHEME OF TEACHING AND EXAMINATION (270 Credits Scheme)

(Applicable to the students admitted during 2022-23)

VI Semester

Sl. No.	Course and Course Code		Course Title		Teaching / Paper setting Dept.	Teaching hrs/week				Examination					Credits
						Lecture	Studio	Practical	Self Study Component	Duration in hrs.	Mode of Exam	CIE Marks	SEE Marks	Total Marks	
						L	S	P	SS						
1.	PCC	6ATS01	Architectural Design-V			3	5				Viva	50	50	100	8
2.	BSAE	6ATS02	Building Materials and Construction-VI			1	3				Viva	50	50	100	4
3.	BSAE	6ATS03	Working Drawing-I					4			Viva	50	50	100	4
4.	BSAE	6ATS04	Structural Analysis-III			1		2			Viva	50	50	100	3
5.	PCC	6ATT01	Contemporary Architecture-II			3				3	Theory	50	50	100	3
6.	BSAE	6ATT02	Building Services-IV (Acoustics & Noise Control)			3				3	Theory	50	50	100	3
7.	HSMC	6ATT03	Sociology & Building Economics			3				3	Theory	50	50	100	3
8.	PEC	6ATPE	Professional Elective-IV	Principles of Vastu (ATPE10)			2				Term Work	50	50	100	2
				Digital Architecture (ATPE11)											
				Design of High-Rise Buildings (ATPE12)											
9.	NCMC	6ATST	Study Tour		Study trip conducted after IV Semester Examination						Portfolio	100	-	100	0
10.	NCMC	NMC02-AT	National Service Scheme		PE			2		1:30	-	50	50	100	0
			Yoga												
			Physical Education												
			Total			14	10	8				450	450	900	30

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

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

ARCHITECTURAL DESIGN - IV

Contact Hours/Week	:	08	Credits	:	8.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Studio Hours	:	75	SEE Marks	:	50
Course Code	:	5ATS01	Exam Mode	:	Viva

Course Objectives: This course will enable students to:

1. Get introduced to sustainable site planning techniques.
2. Interpret the relationship of buildings with respect to context.
3. Incorporate the agenda of building bye laws, structures and services.
4. Get familiarized with the large span roof structures within the campus.

COURSE OUTLINE:

- Site planning techniques – Understanding ecological aspects of site, General Principles, Land Use and Facilities, sustainable site planning principles, study of relevant zoning regulations, role of landscape, open Space, circulation, and utility infrastructure in site planning.
- Formal, informal, and interactive processes of learning and role of the built environment.
- Projects such as Higher Educational Institutions, University Campuses, Hospitals, Exhibition Pavilions, IT Parks, etc. can be tackled.
- Detailing of large span roof structures for needed areas of the project. Elements like ramps, handrails to achieve inclusive design to be detailed.

NOTE:

- a. Relevant case studies and literature studies can be given by the studio teachers and a report must be compiled by the students.
- b. A minimum of two architectural projects must be tackled in the semester.
- c. One of the design exercises can be carried out as group work to explore possibilities of students working as teams.
- d. Vertical studio involving other semesters can be encouraged to carry out one full or part project.
- e. The portfolio covering the above topics shall be presented viva voce.
- f. Projects can be presented using appropriate computer aided tools.
- g. Knowledge of the alternative materials and techniques taught in building construction can be incorporated into design and detailing.
- h. The projects listed in the syllabus are only to state the scale and complexity. The projects of similar scope can be introduced by the teachers.

REFERENCE BOOKS:

1.	Richard P. Dober	Campus Planning, Educational Facilities Labs., Inc., Chicago, IL , 1996 ISBN-0-9601608-1-7
2.	Achyut Kanvinde and H James Miller	Campus Planning in India, U S Agency for international development, Manhattan USA, 1969
3.	Kevin Lynch	Site planning, The MIT Press, 1984 ISBN- 9780262121064
4.	Urban Strategies Inc.	Campus Design, Planning and physical resource management for universities and colleges, Urban Strategies Inc., 2014

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

1. **Recognize** the ecological and developmental aspects of site for sustainable solutions.
2. **Develop** suitable solutions for campus planning.
3. **Design** buildings considering bye-laws, services and structural requirements.
4. **Design** and detail innovative large span structures conducive to the given function.

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

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)																	
	POs												PSOs				
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1		3											3			
	CO2				3				3			3			3		
	CO3				3	3	3								3		
	CO4				3	3									3		

BUILDING MATERIALS AND CONSTRUCTION - V

Contact Hours/Week	:	04	Credits	:	4.0
Total Lecture Hours	:	15	SEE Marks	:	50
Total Studio Hours	:	45	CIE marks	:	50
Course Code	:	5ATS02	Exam mode:	:	Viva

Course Objectives: This course will enable students to:

1. Understand the applications of vaults and domes.
2. Identify large span roof structures.
3. Understand the applications of pre-engineered buildings.

COURSE OUTLINE:

- **Introduction to Vaults & Domes** - Qualitative influence of domes and vaults on building's interaction with solar heat and ventilation.
- **Vaults & domes I** - Principles and methods of construction including techniques and details of form-work. Construction of Masonry Vaults and Domes.
- **Vaults & domes II** - Concepts and construction of Reinforced concrete domes and vaults with formwork design.
- **Introduction to pre-engineering metal buildings** - its manufacturing and assembly process, details, market study and most importantly the materials energy intensiveness and its impact on the environment.
- **Detailing of a Pre-engineered building** - Including Roof fixing details with aluminium sheet and profiled MS sheet cladding.
- **Introduction to Advanced foundation** - Mat foundations, Pile foundations; different types of piles, precast piles, cast-in-situ piles in wood concrete and steel.
- **Pile foundation construction** - method of driving piles, Sheet piling, pile caps, etc.
- **Earth retaining structure** - Selection, Design, Construction of retaining structures including gravity, cantilever, sheet pile, and anchored earth and mechanically stabilized earth (reinforced earth) walls.
- **Introduction to large span roofs** - Principles and methods of construction of hyperbolic paraboloid shell roof, folded plate and cylindrical shell roof, geodesic domes, space frames, tensile and pneumatic structures.

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.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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

1. **Elucidate** the methods and details of constructing Vaults and Domes.
2. **Explore** the possibilities of pre-engineered buildings in construction industry.
3. **Interpret** the applications of large span roofs in designs.
4. **Identify** the uses of advanced foundation techniques in construction industry.

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

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)																	
	POs												PSOs				
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3									2		2		3		
	CO2	3											2		3		
	CO3	3									2		2		3		
	CO4	3											2		3		

BUILDING INFORMATION MODELING-II

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	15	CIE Marks	:	50
Total Practical Hours	:	30	SEE Marks	:	50
Course Code	:	5ATS03	Exam Mode	:	Term Work

Course Objectives: This course will enable students to:

1. Get introduced to the advanced applications of Revit.
2. Get familiarized with the analysis and scheduling of project.
3. Develop skills required for handling large scale projects.

COURSE OUTLINE:

- **Introduction to Revit MEP & Revit Structures** – Preparation of MEP drawings and structural drawings using advanced methods in Revit.
- **Introduction to Navisworks for clash detection** - Demonstration and exercises on its role and applicability in handling large scale projects.
- **Energy analysis & Scheduling** – creating energy model and reading charts for the analysis of building efficiency.
- **Design options & Manage** – creation and selection of variations in design.
- **Sheet Presentation & Advanced Realistic Interior and exterior rendering** using Enscape or similar software in Revit architecture to create walk through.

NOTE:

- a. Classroom exercise with detailing of MEP services and structures for the previous semester Architecture design project to be handled. Along with, energy analysis report to be generated for the same.
- b. A portfolio of Revit MEP and rendering exercises and assignments done in the class to be submitted for progressive marks and SEE.

REFERENCE BOOKS:

1.	Autodesk Manual for Revit
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Course Outcomes: After the completion of this course, students will be able to:

1. **Illustrate** skills of advanced MEP detailing in Revit.
2. **Explore** the methods of estimating and project handling using Revit.
3. **Apply** the rendering skills for building interiors and exteriors using appropriate plugins.

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

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)																	
	POs												PSOs				
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1					3									3		
	CO2					3					3				3		
	CO3										3				3		

STRUCTURAL ANALYSIS - II

Contact Hours/Week	:	03	Credits	:	3.0
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. Familiarize with steel structural systems and their selection criteria for integration in building design.
2. Study different materials and construction methods of rigid frame structures.
3. Get introduced to composite flooring, materials used and their structural design.

COURSE OUTLINE:

- **Structural Steel:** Different kinds of Steel, their Basic characteristics of Steel & Light Gauge Steel materials.
- **Concepts of design of Steel Structures:** Introduction to the concept of Working Stress Design and Load and Resistance Factor Design.
- **Steel Structural Systems:** Introduction to Rigid Portal Frames design of a one storey industrial building 18M X 48m with two-bay mezzanine office floor. Project work to include a framing plan for both the industrial building and the mezzanine, an approximate design of structural frame elements, columns and beams. Introduction to available sections in structural steel used in the design of frame elements (Indicative).
- **Introduction to National Building Code:** IS 800: Criteria & Design to satisfy ECBC and National Building Codes and Standards, Dead and Live load calculations as per IS875 (Part1&2). Determine the general loads to be considered in the design of the structure, based on the type of occupancy for each area specified.
- **Rigid Frames design-1:** Properties of Indian standard rolled steel section and general framing arrangement of beams and columns for the one story 18M X 48m industrial building.
- **Rigid Frames design-2:** Design of Rigid frame including selection of frames according to the span, spacing and frame configuration using steel manuals.
- **Composite Flooring Systems:** Discussion on steel-concrete composite construction using steel beams, metal decking and concrete, including the role of shear connector's attachment to the beam for composite action.
- **Composite flooring systems design for mezzanine:** Loading and Analysis (Moment diagram to be provided) and design of composite steel decking with concrete topping.
- **Rigid frame elements design-1:** Steel Structural Column design using IS special publication for the design of steel structures [SP-6 (1)].
- **Rigid frame elements design-2:** Steel Structural Beams and trusses design using IS special publication for the design of steel structures [SP-6 (1)].

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

TEXT BOOKS:

1.	Francis D.K. Ching.	'Building Structures Illustrated', John Wiley and sons, Inc. 2 nd Edition, 2013, ISBN: 978-1-118-45835-8.
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REFERENCE BOOKS:

1.	Martin Bechthold and Daniel L Schodek	STRUCTURES, Pearson Education, New Delhi. 7 th Edition, 2014, ISBN (13): 978-0-13-255913-3, ISBN (10):0-13-255913-3
2.	Roberts A Heller and Deborah J Oakley	Salvadori's Structure in Architecture - Pearson Education, New Delhi. 4 th Edition, 2017, ISBN (13): 978-0-13-280320-5, ISBN (10):0-13-280320-8
3.	Bureau of Indian Standards (BIS)	National Building Code of India (NBC 2016-SP-7).

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

1. **Comprehend** the steel structural systems and choose the appropriate system for a given architectural project.
2. **Explain** the principles, concepts and thumb rules involved in the design of composite flooring systems in buildings.
3. **Apply** knowledge of structural concepts and relevant building codes (IS) to design a rigid frame structures.

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

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)																	
	POs												PSOs				
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3	2												3		
	CO2	3													3		
	CO3	3		2											3		

CONTEMPORARY ARCHITECTURE - I

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	40	CIE Marks	:	50
Total Tutorial Hours	:	--	SEE Marks	:	50
Course Code	:	5ATT01	Exam mode	:	Theory

Course Objectives: This course will enable students to:

1. Extrapolate the contribution of eminent International architects
2. Study Ideas and philosophies of eminent Indian Architects.
3. Discuss 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 the students toward context and climate-responsive ideas in designing buildings.

UNIT I

Ideas and works of F L Wright - Robie House, Falling Waters, Guggenheim Museum, Johnson Wax Tower.

Ideas and works of Mies Van Der Rohe - Farnsworth house, Seagram Building, Crown Hall, Illinois Institute of Technology.

Ideas and works of Walter Gropius - Bauhaus building, Fagus Factory, Gropius House.

08 Hrs

UNIT II

Ideas and works of Le-Corbusier - Villa Savoy, Unite de Habitation, Ronchamp Church.

Works of Le-Corbusier in India – Capitol complex, Chandigarh: Legislative Assembly Building, High Court and Secretariat; Mill Owners' Building, Ahmedabad; Villa Shodhan, Ahmedabad.

Ideas & Works of Louis-I-Kahn – Indian Institute of Management, Ahmedabad.

Ideas and works of Balakrishna V Doshi - Sangath Office Building - Ahmedabad, Aranya housing, Indore, Indian Institute of Management- Bangalore.

08 Hrs

UNIT III

Ideas and works of Habib Rahman – Gandhi Ghat - Barrackpore, Rabindra Bhavan – New Delhi, New Secretariat- Kolkatta.

Ideas and works of Achyut Kanvinde – IIT Kanpur, Nehru Science Centre- Mumbai, Administrative building- Dudhsagar, Dairy Complex- Mehsana, Gujarat

Ideas and works of Ananth Raje – IIFM- Bhopal, Galbabbhai Farmers' Training Institute - Banaskantha, Gujarat, MAFCO wholesale market - Mumbai. **08 Hrs**

UNIT IV

Ideas & Works of Laurie Baker - Centre for Development Studies, Thiruvananthapuram, St. John Cathedral, Tiruvalla, The Hamlet, and Thiruvananthapuram.

Ideas and works of Joseph Allen Stein – India Habitat Centre- New Delhi, India International Centre – New Delhi, Triveni Kala Sangam – New Delhi.

Ideas & Works of Raj Rewal – Pragati maidan - New Delhi, Asian Games Village – New Delhi, Parliament Library – New Delhi, National Institute of Immunology, New Delhi. **08 Hrs**

UNIT V

Ideas and works of Uttam Jain - Campus Buildings- Jodhpur University, Habibganj Railway station- Bhopal, Aga Khan School, Mundra, Gujarat

Ideas & Works of Charles Correa – Ramakrishna House - Ahmedabad, Kanchenjunga Apartments – Mumbai, Cidade De Goa- Goa, Bharat Bhavan- Bhopal.

Ideas and works of Sanjay Mohe – CARE Institute-Trichy, Karunashraya – Bengaluru, Sai Temple - Bengaluru. **08 Hrs**

NOTE:

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

REFERENCE BOOKS:

1.	Ann Lee Morgan, Colin Naylor	Contemporary Architecture; St James Press, 1987 ISBN: 9780912289267, 0912289260
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.	Kenneth Frampton	A Genealogy of Modern Architecture - Comparative Critical Analysis of Built Form; Lars Müller Publishers, 2015, ISBN: 9783037783696, 3037783699
5.	David Dunster	Key Buildings of the Twentieth Century: Houses; Butterworth Architecture, 1985, ISBN: 9780408500296, 0408500298

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

- Elucidate** the works of International Master Architects.
- Analyse** the context and climate responsiveness of the projects.
- Explore** the approaches to form and function by various architects.
- Identify** Innovative design ideas and use of new materials and technology in projects.
- Interpret** the philosophies and innovative technologies of eminent Indian architects as inspiration in their design.

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

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

BUILDING SERVICES - III

(HVAC, Mechanical Transportation and Fire safety)

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Tutorial Hours	:	--	SEE Marks	:	50
Course Code	:	5ATT02	Exam mode	:	Theory

Course Objectives: This course will enable students to

1. Get introduced to the importance of mechanical services in buildings
2. Develop the knowledge about various mechanical services and their integration with architectural design.
3. Impart the knowledge of fire safety in buildings and the role of architect in providing fire safety measures.

UNIT I

Introduction to mechanical Ventilation: Mechanical/Artificial Ventilation - Definition, Need for mechanical ventilation in buildings. Rate of ventilation for different occupancies. Methods of mechanical ventilation in buildings. Guide lines/ventilation standards as per NBC/ASHRAE for different building types. Ventilation calculation.

Introduction to Air Conditioning: Definition, advantages and disadvantages. Industrial and comfort air conditioning. Basic air-conditioning system. Air-cycle in air conditioning and refrigeration cycle. Summer and winter air-conditioning.

09 Hrs

UNIT II

Air Conditioning Systems: Window units, package units, split units and Cassette AC. Central Air-conditioning systems; direct expansion and chilled water systems. Location of air-conditioning equipment in buildings. Architectural/spatial requirement of various equipment. Air-conditioning load: definition, factors contributing to AC load. Implications of architectural decisions on AC load of a building. Zoning: purpose and advantages. Air-distribution systems: Ducts and duct systems. Air-outlets, air-handling units.

Specialized Air Conditioning Systems: Clean Rooms, Server & Hub Rooms, UPS Rooms, Operation Theatres etc.

09 Hrs

UNIT III

Vertical Transportation in Buildings- Elevators; brief history. Elevating of building: environmental considerations i.e., location in building, serving floors, grouping, size, shape of passenger car, door arrangement etc. Lift Acts and National Building Code. Service requirements: Quality of service, quantity of service, time, passenger handling capacity, space and physical requirements, machine room space and its typical layout.

Types of Elevators - Definitions of passenger, hospital, freight, service elevators. Important components of electric traction and hydraulic elevators. Double-decker, sky lobby, lift lobby, lift interiors etc. Space requirements for different types of elevators.

Escalators - Definition and important components. Design considerations; location and arrangement in buildings. Space requirement, Escalators Vs. elevators.

09 Hrs

UNIT IV

Fire safety in buildings & passive fire protection: Causes of fire, combustible and non-combustible building materials, classification of fire, growth of fire, fire load, fire hazards. Classification of buildings and fire grading of structural elements as per NBC. Fire rating for different materials. Concept of passive fire protection and control; integration of fire safety norms at design and construction stage, design of escape routes, fire escape staircase, fire lifts, water storage requirements etc., Evacuation time, crowd management, Emergency exits for differently abled persons.

09 Hrs

UNIT V

Active fire protection and fire safety in high rise buildings- Active fire control using portable extinguishers. Basic concepts in fixed fire-fighting installations. Automatic fire detection and alarm systems.

National Building Code Requirements for Fire Safety: Rules for Fire Protection and Fire Fighting Requirements for High Rise Buildings in India.

09 Hrs

NOTE:

- The subject teacher could arrange for visits to relevant facilities to provide an understanding of the various provisions and integration of air conditioning, vertical transportation and fire safety in buildings. Case study reports could be submitted as group assignments.
- Conceptual design of air-conditioning systems, mechanical ventilation, mechanical transportation, active & passive fire fighting systems for a high rise building.

REFERENCE BOOKS:

1.	Roy J Dossat.	'Principles of Refrigeration' 5 th Edition, 2001
2.	Manohar Prasad.	'Air Conditioning and Refrigeration Data Hand book' 3 rd Edition New Age International Publishers
3.	DomKundwar	'Refrigeration and Air Conditioning', 2016
4.	V. Paul Lang	'Principles of refrigeration and AC' 5 th 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: After the completion of this course, students will be able to:

- Explain** the importance of ventilation and its impact on design and human comfort.
- Illustrate** the fundamental principles and applications of Air-conditioning and Refrigeration systems in MEP design.
- Apply** standards to design a reliable, safe and efficient vertical transportation system.
- Classify** buildings and describe major techniques used in fire safety.
- Identify** fire protection measures involved in fire safety design.

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

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)																	
	POs												PSOs				
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3	3												3		
	CO2	3	3												3		
	CO3	3													3		
	CO4	3													3		
	CO5	3						3							3		

PROFESSIONAL ELECTIVE - III

Contact Hours/Week	:	02	Credits	:	2.0
Total Lecture Hours	:	-	CIE Marks	:	50
Total Studio Hours	:	30	SEE Marks	:	50
Course Code	:	5ATPE	Exam Mode	:	Term Work

ATPE06: Bio-Mimicry

Course Objectives: This course will enable students to:

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

COURSE OUTLINE:

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

ATPE08: Product Design

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 and material and the process of manufacture.
3. Demonstrate a prototype product design.

COURSE OUTLINE:

Concept of form and space in product design; Relating Form to Materials and Processes of Manufacture. Creativity techniques; product detailing and manufacture; exploratory mock-up models for concept development, refinement and detailing; product design prototyping and advanced manufacturing processes.

ATPE09: Theories in Architecture

Course Objectives: This course will enable students to:

1. Understand the historical, cultural, and social contexts of architecture and to influence their design decisions.

COURSE OUTLINE:

This course will enable students with a deeper understanding of the principles, philosophies, and concepts that underpin the practice of architecture. By studying architectural theories, students can gain insight into the historical, cultural, and social contexts that have shaped architectural movements and styles. This knowledge not only enhances their appreciation for the built environment but also informs their design decisions, allowing them to create more thoughtful and meaningful spaces. Additionally, understanding architectural theories enables students to critically evaluate existing buildings and designs, fostering a more informed and reflective approach to their own work and brings comprehensive understanding of architecture as a discipline and as a form of cultural expression.

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

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

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

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)																	
	POs												PSOs				
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3														3	
	CO2	3														3	
	CO3	3														3	

Physical Education
(Sport & Athletics/Yoga & NSS)

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

SIDDAGANGA INSTITUTE OF TECHNOLOGY
Tumakuru-572103

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

SCHOOL OF ARCHITECTURE

DETAILED SYLLABUS FOR
SIXTH SEMESTER
B. ARCHITECTURE

ARCHITECTURAL DESIGN - V

Contact Hours/Week	:	08	Credits	:	8.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Studio Hours	:	75	SEE Marks	:	50
Course Code	:	6ATS01	Exam Mode	:	Viva

Course Objectives: This course will enable students to:

1. Understand the socio-cultural, climatic aspects which nurture the formation and development of a community.
2. Get introduced to various spatial aspects of community design.
3. Incorporate appropriate site planning strategies for housing projects based on the category and context.
4. Understand various building services and other infrastructure facilities in the given project.

COURSE OUTLINE:

- Study of traditional and vernacular settlements studied in history with respect to climate responsiveness, sense of community, socio cultural factors influencing design, principles, elements, context and materials. Study on use of theories of proportion into design.
- Introduction to aspects of community – public and private realms, edge conditions, connectivity, convenience, comfort, security, health, socio cultural aspects, sense of belonging and territoriality, modularity, Housing density etc.
- Projects such as housing for Low-cost housing, apartments, community housing etc. to be tackled. Housing projects of LRHD, HRHD, LRLD and HRLD could be addressed. Temporary housing like housing for deprived, disaster relief shelter etc. can be handled.
- Develop grid set out plan for individual units or cluster and to provide structural details like columns, beams, roofs etc. Providing basic service details like water supply, sanitation, rain water harvesting, etc.

NOTE:

- a. Relevant case studies and literature studies can be given by the studio teachers and reports must be compiled by the students.
- b. A minimum of two architectural projects must be tackled in the semester.
- c. One of the design exercises can be carried out as group work to explore possibilities of students working as teams.
- d. Vertical studio involving other semesters can be encouraged to carry out one full or part project.
- e. The portfolio covering the above topics shall be presented viva voce.
- f. Projects to be presented with the help of drawings, sketches, and models. Application of techniques learnt in architectural presentation must be incorporated.
- g. Knowledge of the alternative materials and techniques taught in building construction can be incorporated into design and detailing.
- h. The projects listed in the syllabus are only to state the scale and complexity. The projects of similar scope can be introduced by the teachers.

REFERENCE BOOKS:

1.	Charles correa	Housing and urbanization, Urban Design Research Institute, 1999
2.	Sam Davis	The architecture of affordable housing, University of California Press, 1995
3.	David Levitt and Jo McCafferty	The housing design handbook-A guide to good practice, Routledge, 04-Oct-2018

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

1. **Analyze** the influence of climate, context, socio-cultural factors and material technology on the evolution and functioning of community.
2. **Differentiate** housing typologies based on density, function, scale, user group and so on.
3. **Design** housing projects with various demands, scale, and sense of community.
4. **Design** and detail various structural, services required for a housing project.

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

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)																	
	POs												PSOs				
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1		3			3								3			
	CO2		3											3			
	CO3			3		3		3			3			3			
	CO4			3		3								3			

BUILDING MATERIALS AND CONSTRUCTION - VI

Contact Hours/Week	:	04	Credits	:	4.0
Total Lecture Hours	:	15	SEE Marks	:	50
Total Studio Hours	:	45	CIE marks	:	50
Course Code	:	6ATS02	Exam mode:	:	Viva

Course Objectives: This course will enable students to:

1. Familiarize with the construction systems and detailing of special doors, windows, partitions, structural glazing and cladding.
2. Get introduced to various skylights using steel and glass with their fixing details.
3. Understand the applications of advanced methods and smart materials for various building elements.

COURSE OUTLINE:

- **Glass as a building material** - Glass manufacturing in various types like plate, tinted, decorative, reinforced, laminated glass block, fibreglass, glass murals, partially coloured glass, etching of glass and its applications in building industry for both exteriors and interiors. Glass fabrication techniques, fibre reinforced composite materials and products. Qualitative and quantitative study of the material's contributions to increased building solar heat gain in the tropics, increased air conditioning load and hence artificial cooling energy needs, and inability to promote natural unassisted night-time cooling through spontaneous release of accumulated heat. Study the life cycle environmental impacts, carbon emissions and recyclability of Glass as a material used in building construction.
- **Frame-less glass doors and windows** - Fixing and Fabrication details.
- **Contemporary façade systems** - Fixing and fabrication details of Structural glazing, AC sheet cladding, composite panel cladding – aluminum and fundermax panels, thermal insulation façade.
- **UPVC and FRP doors, windows, partitions** - Detailing and study of joinery.
- **Skylight in steel and glass** - Principles and methods of construction and detailing.
- **Prefabrication in India** - Advantages and relevance in the Indian context. Design, analysis and manufacture processes.
- **Introduction to advanced methods of Building construction** - CAD /CAM fabrication and 3D printing. Analyze the larger impact of the advanced methods on the construction industry in Indian context.
- **High Performance Materials** - Smart Materials: Properties of Smart Materials, Applications in Building Industry. Nano Materials: Introduction to Nanotechnology in building materials, Applications in Building Industry.

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.

TEXT BOOKS:

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

REFERENCE BOOKS:

1.	William Barr McKay	Building Construction, Fourth edition, Routledge, 2004 ISBN : 1873394721, 9781873394724
2.	Roy Chudley, Roger Greeno	Advanced Construction Technology, Pearson Prentice Hall, 2006 ISBN : 9780132019859
3.	G. D. Taylor	Materials in Construction, CRC Press, 2013 ISBN : 9781317879022, 1317879023
4.	Arthur Lyons	Materials for Architects and Builders, Routledge, 2014 ISBN : 0415704979, 9780415704977

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

1. **Apply** the construction details of upvc doors and windows.
2. **Explore** the possibilities of contemporary façade systems.
3. **Apply** the details of skylight systems.
4. **Explore** the types and application of glass in construction industry.
5. **Elucidate** the knowledge of smart materials in building industry.

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

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

WORKING DRAWING - I

Contact Hours/Week	:	04	Credits	:	4.0
Total Lecture Hours	:	--	CIE Marks	:	50
Total Practical Hours	:	60	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.

COURSE OUTLINE:

- **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.
- **Preparation** of center-line drawing, excavation drawings, foundation/footing drawings and working plans, elevations and sections.
- **Detailing** of various building elements like Staircases, railings and skylights, etc. Schedule of openings and door-window details.
- **Services** – Electrical layout, Water supply and sanitary drawing. Flooring, tiling and dadoing details. Interior Details of Toilet and Kitchen layout etc.,
- **Site detailing** - Site plan showing water supply, sewage layout and site drainage.

NOTE:

- a. One design project handled in the earlier semester can be chosen to execute complete set of working drawings.
- b. Studio teachers can arrange for construction site visits for field supervision.

REFERENCE BOOKS:

1.	Mario Carpo	The Working Drawing: The Architect's tool, Park Books, 2016, ISBN-10: 3906027317, ISBN-13: 978-3906027319
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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: After the completion of this course, students will be able to:

1. **Develop** architectural drawings, sanction drawings, and working drawings.
2. **Design and develop** detailed drawings of various building and site elements.

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

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

STRUCTURAL ANALYSIS - III

Contact Hours/Week	:	03		Credits	:	3.0
Total Lecture Hours	:	15		CIE Marks	:	50
Total Practical Hours	:	30		SEE Marks	:	50
Course Code	:	6ATS04		Exam mode	:	Viva

Course Objectives: This course will enable students to:

1. Familiarize with concepts of high-rise structures.
2. Get introduced to various structural systems adaptable for resisting lateral loads.
3. Study structural properties and application of long span truss systems.

COURSE OUTLINE:

- **Introduction:** Horizontal or Long Span Structures.
- **Introduction to the Structural design Project:** Design for an Airport terminal building of dimension 75M X 300M using horizontal system. Selection of Horizontal structural systems including load calculation based on Building Codes and Standards (indicative).
- **Structural Analysis and Design to satisfy Building Codes and Standards:** Determine the general loads to be considered in the design of the structure, based on the type of occupancy specified for each area. a) Gravity loading: Dead and Live load calculation based on IS 875 (Part 1&2) b) Seismic loading: Seismic loading calculation based on IS 1893 Code Static Analysis Procedure c) Wind loading: Wind loading calculation based on Indian Standard I.S. 875 (Part3).
- **Design of Portal frame Structure System:** Design of two-dimensional rigid frames that have a rigid joint between column and beam. General framing arrangement of Portal frame for 75M X 300M building, basic load path and total structural weight calculation.
- **Design of Arch and Vault Structures:** Design of curved structural member spanning two points, of masonry, concrete or steel and used as the roofing systems of large span buildings. Design of Arch and Vault arrangement for spanning 75M X 300M building, and basic load path and total structural weight calculation.
- **Design of Dome Structures:** Domes as polar arrays of curved structural systems in masonry, concrete, steel with glass cladding, their structural strength and properties as roofing systems of large column-free spans. Design of dome(s) for spanning 75M X 300M building, basic load path and total structural weight calculation.
- **Long Span Planar Truss Design:** Triangular structural system; assembly of simple triangular planar trusses. Planar trusses in roofs and bridges. General framing arrangement of Long Span Truss for 75M X 300M building, and basic load path and total structural weight calculation.
- **Vierendeel truss design:** Truss design with rectangular or square assembly of members with rigid joints capable of resisting bending moments. General framing arrangement of Vierendeel truss for 75M X 300M building, and basic load path and total structural weight calculation.
- **Cable and Suspension Structures:** Design for long-span systems using Cable and suspension systems. Design cable suspended roof to span 75M X 300M building, and basic load path and total structural weight calculation.

- **Space Truss:** Design of three dimensional trusses, their structural properties and strength due to three dimensional triangulation. Design of Space Truss roof for spanning 75M X 300M building, and basic load path and total structural weight calculation.
- **Concrete Shell structure design:** Design of double curved surfaces formed from warped surface (e.g. hyperbolic parabolic); their properties and strength as lightweight construction for column free large spans. Design of Concrete shell roof to spanning 75M X 300M building, and basic load path and total structural weight calculation.
- **Fabric Structure:** Design of membrane structures of thin flexible fabric covers that provide light weight free-form roofing system. Design of Fabric roof to span 75M X 300M building, and basic load path and total structural weight calculation.

NOTE:

- Relevant case studies and literature studies can be given by the studio teachers and report has to be compiled by the students.
- Site visits to be arranged by studio teacher.
- Miniature models should be made by students to analyse each of the structural systems.

TEXT BOOKS:

1.	Francis D.K. Ching.	'Building Structures Illustrated', John Wiley and sons, Inc. 2 nd Edition, 2013, ISBN: 978-1-118-45835-8.
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REFERENCE BOOKS:

1.	Martin Bechthold and Daniel L Schodek	STRUCTURES, Pearson Education, New Delhi. 7 th Edition, 2014, ISBN (13): 978-0-13-255913-3, ISBN (10):0-13-255913-3
2.	Robers A Heller and Deborah J Oakley	Salvadori's Structure in Architecture - Pearson Education, New Delhi. 4 th Edition, 2017, ISBN (13): 978-0-13-280320-5, ISBN (10):0-13-280320-8
3.	Bureau of Indian Standards (BIS)	National Building Code of India (NBC 2016-SP-7).

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

1. **Comprehend** various types of lateral structural systems based on their application.
2. **Explain** the principles, concepts and thumb rules involved in the design of high-rise structural systems.
3. **Apply** the principles, concepts and thumb rules involved in the design of long span truss and vierendeel truss.

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

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)																	
	POs												PSOs				
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3													3		
	CO2	3	2	2		1									3		
	CO3	3	2	2		1									3		

CONTEMPORARY ARCHITECTURE-II

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Tutorial Hours	:	--	SEE Marks	:	50
Course Code	:	6ATT01	Exam Mode	:	Theory

Course Objectives: This course will enable students to:

1. Extrapolate the contribution of eminent contemporary architects.
2. Study Ideas and philosophies of renowned International Architects.
3. Discuss 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 the students toward context and climate-responsive ideas in designing buildings.

UNIT I

Ideas & Works of Richard Meier – Smith House - Connecticut, Getty Centre - Brentwood, Los Angeles & Jubilee Church Rome

Ideas and works of Norman Foster - Hong Kong Shanghai Bank, Renault Distribution Centre - England & Zayed National Museum – Abu Dhabi.

Ideas & Works of Renzo Piano – Pompidou Centre – Paris, Zentrum Paul Klee- Bern & Jean - Marie Tjibaou Cultural Centre – Tinu Peninsula **09 Hrs**

UNIT II

Ideas and works of Bernard Tschumi - Park de la Villette – Paris & New Acropolis Museum –Athens, Paul & Henri Carnal Hall, Institut Le Rosey, Rolle, Switzerland

Ideas and works of Frank Gehry – Vitra Design Museum – Germany, Guggenheim Museum – Bilbao & Museum of Pop Culture - Seattle

Ideas and works of Zaha Hadid – Heydar Aliyev Cultural Center – Baku, London Aquatics Center- London & Maxxi National Museum - Rome **09 Hrs**

UNIT III

Ideas and works of Daniel Libeskind - Jewish Museum – Berlin, Ground Zero - New York & Denver Art Museum - Colorado

Ideas and works of Santiago Calatrava - Lyon-Satolas Railway Station, Olympic Stadium- Athens & Turning Torso - Sweden

Ideas and works of Rem Koolhaas - The CCTV building - Beijing, The Maison à Bordeaux – France & Seattle Central Library – Seattle **09 Hrs**

UNIT IV

Ideas and works of I M Pei - Pyramide Du Louvre - Paris, Museum of Islamic Art –Doha & Luce Memorial Chapel – Taiwan

Ideas & works of Jean Nouvel – Louvre Abu Dhabi, 100 Eleventh Avenue- Manhattan & DR Koncerthuset - Copenhagen

Ideas & Works of SOM Architects – The Willis Tower, 1973, Chicago Burj Khalifa – Dubai, Sheikh Khalifa Medical City – Abu Dhabi **09 Hrs**

UNIT V

Ideas and works of Geoffrey Bawa - Kandarama Hotel - Dambulla, Bawa House – Colombo & Sri Lankan Parliament Building

Ideas and Works of Hassan Fathy - New Gurna Village - Luxor, Hamid Said house – Cairo & Ceramics Factory in Qina - Egypt

Ideas and works of Tadao Ando - Church of light - Osaka, Naoshima contemporary Art museum – Japan & Water Temple – Japan **09 Hrs**

REFERENCE BOOKS:

1	Richard Meier	Richard Meier, Architect, Vol. 4, Rizzoli publisher, 2004 ISBN - 10: 0847826333, ISBN-13: 978-0847826339
2	Martin Pawley	Norman Foster: A Global Architecture (Architecture/Design Series), Universe publisher, 1999 ISBN - 10: 0789302632, ISBN-13: 978-0789302632
3	Renzo Piano & Kenneth Frampton	Renzo Piano: The complete Log book, Thames and Hudson Publisher, 2017 ISBN - 10: 9780500343104, ISBN-13: 978-0500343104
4	Bernard Tschumi	Architecture & Disjunction, The MIT Press Publisher, 1996 ISBN - 10: 0262700603, ISBN-13: 978-0262700603
5	Paul Goldberger	Building Art: The life & work of Frank Gehry, Knopf publisher, 2015 ISBN - 10: 0307701530, ISBN-13: 978-0307701534
6	Aaron Betsky	Complete Zaha Hadid: Expanded and Updated, Thames and Hudson Publisher, 2018 ISBN - 10: 0500343357, ISBN-13: 978-0500343357
7	Santiago Calatrava & Cristina Carrillo de Albornoz	Santiago Calatrava: Drawing, Building, Reflecting, Thames and Hudson Publisher, 2018 ISBN - 10: 0500343411, ISBN-13: 978-0500343418
8	Rem Koolhaas	Rem Koolhaas: Elements of Architecture, Taschen America Llc Publisher, 2018

		ISBN - 10: 9783836556149, ISBN-13: 978-3836556149
9	Carter Wiseman	I M Pei: A profile in American Architecture, Harry N. Abrams publisher, 1990 ISBN - 10: 0810937093 ISBN-13: 978-0810937093

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

1. **Elucidate** the works of world-renowned Architects.
2. **Analyse** the context and climate responsiveness of the projects.
3. **Explore** the approaches to form and function by various architects.
4. **Identify** Innovative design ideas and use of new materials and technology in projects.
5. **Interpret** the philosophies and innovative technologies of eminent architects as inspiration in their design.

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

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

BUILDING SERVICES - IV (Acoustics & Noise Control)

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Tutorial Hours	:	--	SEE Marks	:	50
Course Code	:	6ATT02	Exam mode	:	Theory

Course Objectives: This course will enable students to:

1. Get introduced to basic terminologies associated with the sound and its properties.
2. Explain the behavior of sound in indoor and outdoor spaces.
3. List out the materials used in acoustical design.
4. Calculate the various acoustical parameters of enclosed spaces.
5. Identify the indoor and outdoor noise mitigation strategies.

UNIT I

Scope of Acoustics, Acoustical problem in contemporary Architectural Design, Sound

Source, Path and Receiver. Properties of Sound Introduction to the study of acoustics - nature of sound, basic terminology - frequency, pitch, tone, sound pressure, sound intensity, decibel scale, loudness, threshold of audibility and pain, masking, sound and distance - inverse square law.

09 Hrs

UNIT II

Behaviour of sound in enclosed spaces - reflection of sound, nature of reflection from plane, convex and concave surfaces, sound diffraction, Absorption of sound, sound absorption coefficient, reverberation, reverberation time calculation.

09 Hrs

UNIT III

Sound absorbents, porous materials, panel or membrane absorbers and cavity or Helmholtz resonators, role of functional absorbers. Absorption coefficients of indigenous acoustical materials.

09 Hrs

UNIT IV

Acoustical design requirement for halls used for speech, drama and music - general purpose halls used for speech and music, cinema theatres, home theatres, recording studios and open air theatres. Study of auditoria designed and acoustically treated. IS code 2526- 1963.

09 Hrs

UNIT V

Introduction to environmental noise control, noise and its classification, outdoor and indoor noise, airborne noise and structure borne. Transmission of noise and transmission loss. STC Rating. Idea of Sick building syndrome. Means of noise control and sound insulations. Constructional measures of noise control and sound insulation.

Industrial and Urban noise - methods of reduction by enclosures and barriers. Traffic planning and design against outdoor noise for air traffic, road traffic and rail traffic. **09 Hrs**

NOTE:

- Design exercises involving the above topics. (Minimum 2 exercises)
- Outdoor and indoor design criteria.
- Relationship of forms & shapes of plans with respect to sound.

REFERENCE BOOKS:

1.	Leslie L. Doelle	'Environmental acoustics' ISBN 978-0701734275, McGraw Hill Higher Education (1 January 1972)
2.	David Egan	'Architectural Acoustics' ISBN 978-1932159783, J Ross Publishing; Illustrated edition (28 February 2007)
3.	Knudsen Ver	'Acoustical design in buildings' ISBN 978-0883182673, Acoustical Society of Amer (1 June 1980)
4.	Patrich Peter	'Acoustics – Noise and Buildings' ISBN 978-1135712778, John Wiley & Sons Inc (1 December 1950)

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

- Expound** various terminologies related to sound and its properties.
- Elucidate** behavior of sound in indoor and outdoor environment and its effects on building design.
- Recognize** the indigenous acoustical materials and their applications.
- Apply** principles of acoustical design in detailing various performance and speech-oriented spaces.
- Develop** sensitivity in design towards external and internal noise mitigation.

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

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

SOCIOLOGY & BUILDING ECONOMICS

Contact Hours/Week	:	03	Credits	:	3.0
Total Lecture Hours	:	45	CIE Marks	:	50
Total Tutorial Hours	:	--	SEE Marks	:	50
Course Code	:	6ATT03	Exam mode	:	Theory

Course Objectives: This course will enable students to:

- Familiarize students with the basic concepts of sociology and economics and their influence on architecture.
- Develop sociological imagination that will rethink to how social systems operate through individuals in relation with space and building typologies.
- Gain a comprehensive understanding of Urbanization and migration and social problems associated with these transformations in the urban settlements.
- Introduce the concepts of social research, data sources and analysis.
- Familiarize the students with the basics of economics, factors of production, consumer behavior with respect to architecture.
- Learn cost analysis of buildings and sources of funding for building activity.

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 (exploration of architectural examples). **09 Hrs**

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) (Theory 1). 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 (Theory 2). Governmental and non-governmental approaches to engaging with issues regarding slums in Indian cities.

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. **09 Hrs**

UNIT III

Economics: Definition of economics; Definitions of terms: Goods; Utility, Value, Price and Wealth. The relationship of economics with the built environment and land use.

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. **09 Hrs**

UNIT IV

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 housing supply and demand in formal and informal settlements. Analysis of affordable housing. **09 Hrs**

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 (Activity 2) .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. **09 Hrs**

REFERENCE BOOKS:

1.	Neil J Smelser & Richard Swedberg	‘The Handbook of Economic Sociology: Second Edition’, ISBN 13: 978-0691121260, 2 nd edition, Princeton university press, 2005
2.	Werner Z. Hirsch	‘Urban Economic Analysis’, ISBN 13: 978-0070290440, McGraw Hill US Inc., 1973

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

1. **Identify** the elements of society and their impact on architectural design. (PO1)
2. **Discuss** and critique the nature of social institutions that shapes the social structure. (PO1)
3. **Criticize** the impact of urbanization on settlements in turn on social life and physical infrastructure. (PO1)
4. **Relation** between the different sectors of occupation and factors of production. Learn the impact of economics on architectural projects. (PO1)

5. **Analyze** the impact of standard of living on the spatial quality of built spaces. Learn the concepts of life cycle costing of buildings. (PO1)

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

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

PROFESSIONAL ELECTIVE - IV

Contact Hours/Week	:	02	Credits	:	2.0
Total Lecture Hours	:	-	CIE Marks	:	50
Total Studio Hours	:	45	SEE Marks	:	50
Course Code	:	6ATPE	Exam mode	:	Term Work

ATPE10: Principles of Vastu

Course Objectives: This course will enable students to:

1. To familiarize with the concept of Vastu.
2. To recognize the relationship between Vastu principles with built form in architecture.

COURSE OUTLINE:

Vastu or Vastu Shastra is an ancient Indian system of architecture and design that emphasizes the balance and harmony between a built structure and its inhabitants. Aligning the structure with natural elements and energy forces surrounding it can help achieve balance.

ATPE11: Digital Architecture

Course Objectives: This course will enable students to:

1. Get introduced to the application of Digital Architecture.

COURSE OUTLINE:

This course will enable students to allow a diverse range of complex forms to be created with great ease using computer algorithms. The new genre of "scripted, iterative, and indexical architecture" produces a proliferation of formal outcomes, leaving the designer the role of selection and increasing the possibilities in architectural design. This has "re-initiated a debate regarding curvilinearity, expressionism and role of technology in society" leading to new forms of non-standard architecture by architects such as Zaha Hadid, Kas Oosterhuis and UN Studio.

ATPE12: Design of High-Rise Buildings

Course Objectives: This course will enable students to:

1. Get introduced to concept of skyscrapers.
2. Realize the importance of services in High-Rise buildings.
3. The various complexities involved in designing skyscrapers.

COURSE OUTLINE:

The design and construction of skyscrapers involves creating safe, habitable spaces in very tall buildings. The buildings must support their weight, resist wind and earthquakes, and protect occupants from fire. Yet they must also be conveniently accessible, even on the upper floors, and provide utilities and a comfortable climate for the

occupants. The problems posed in skyscraper design are considered among the most complex encountered given the balances required between economics, engineering, and construction management. The students may be given a snapshot of this very important typology that gives them an insight into complex world of various services that form the backbone of any skyscrapers. The students will also critically analyse the impact of tall buildings on environment and climate.

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

1. **Apply** desired knowledge and skill in a particular domain of Architecture. (PO1)
2. **Analyze** the processes required for the particular subject. (PO1)
3. **Develop** an expertise in the chosen field for career enhancement. (PO1)

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

Mapping of Course Outcomes (COs) to Program Specific Outcomes (PSOs)																	
	POs												PSOs				
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
COs	CO1	3														3	
	CO2	3														3	
	CO3	3														3	

STUDY TOUR

Contact Hours/Week	:	--	Credits	:	0.0
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. To expose students to historical, vernacular and contemporary architecture.
2. To document the learning from study tour.

OUTLINE:

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.

Physical Education (Sport & Athletics/Yoga & NSS)

Contact Hours/Week	:	02	Credits	:	0.0
Total Lecture Hours	:	-	CIE Marks	:	50
Total Seminar Hours	:	30	SEE Marks	:	50
Course Code	:	NMC02-AT	Exam Mode	:	--