Faculty of Architecture and Planning

Department of Architecture

B.Arch.

Curriculum (I - X semesters)

Syllabus (I - IV semesters)

Regulations 2024

PERIYAR MANIAMMAI INSTITUTE OF SCIENCE & TECHNOLOGY
Vallam, Thanjavur – 613403

PERIYAR MANIAMMAI INSTITUTE OF SCIENCE & TECHNOLOGY

Periyar Nagar, Vallam, Thanjavur - 613403
Tamil Nadu, INDIA.

Periyar Maniammai Institute of Science & Technology is committed to imparting quality education, emphasizing the integration of proficiency and human values, along with the ongoing enhancement of educational quality.

Vision Statement:

To be a university of global dynamism with excellence in knowledge and innovation, ensuring social responsibility for creating an egalitarian society.

Mission:

- Offering well-balanced programs with scholarly faculty and state-of-the-art facilities to impart a high level of knowledge.
- Providing student-centered education and fostering their growth in critical thinking, creativity, entrepreneurship, problem-solving, and collaborative work.
- Engaging in progressive and meaningful research with a focus on sustainable development.
- Empowering students to acquire the skills necessary for global competencies.
- Instilling universal values, self-respect, gender equality, dignity, and ethics.

Quality Policy:

To be a leading institution of excellence in education and research, providing professional competence to meet academic, scholastic, and societal needs

Objectives:

- To provide value-based education with social responsibility and ethics to both urban and underserved rural students.
- To achieve excellence in education and empower students to attain global competence.
- To promote a culture of research and innovation in young minds, fostering academic excellence, and encouraging lifelong learning.
- To engage in specialized areas with a proven ability to make distinctive contributions to the objectives of the higher education system across diverse disciplines.
- To engage in extramural studies, extension programmes, and field outreach activities to contribute to the development of society.

The Motto:

THINK – INNOVATE – TRANSFORM

VISION MISSION OF THE DEPARTMENT

Vision Statement:

To be a unique department in creating eminent Architects with excellent creativity and sound technical knowledge, competent enough for adapting to the changing trends and culture of mankind and in turn applying them for the societal needs with environmental consciousness.

Mission:

- To produce Undergraduate, Postgraduate and Research scholars in Architecture on par with current Global demands and trends.
- To inspire and provide challenging ambience to evolve as leaders to advance in the field of Architecture.
- To provide a platform for innovation, critical thinking and research in the field of architecture and allied disciplines.
- To serve as a reliable, highly capable resource for the profession, academia, and society

B. ARCH (BACHELOR OF ARCHITECTURE)

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1 A successful professional to lead and coordinate the project team consisting of professionals from different disciplines in the design and execution of projects irrespective of the scale locally and globally.

PEO2 Able to understand the societal and individual's spatial needs and requirements with respect to the context, their culture and tradition and to come up with innovative unique and aesthetical design solutions.

PEO3 An environmentally and socially responsible person, able to design an optimum solution in terms of human, materials and energy resource utilization and take conscious efforts to transfer the essence of the past to the present and the future through his creations.

PEO4 Prepared for continued education in architecture or entry into the architectural field or the building industries.

PROGRAMME OUTCOMES

PO1 Ability to effectively use basic architectural theories and principles in the design process.

PO2 Ability to understand and frame the design requirements considering the diverse points of view to reach well-reasoned conclusions based on the relevant criteria and standards.

PO3 Ability to diagnostic survey record and analyze, interpret, apply, and develop a proposal at the individual building and urban level.

PO4 Ability to prepare technically clear drawings writes outline estimation and specifications and prepare models illustrating and clarifying the assembly of materials, systems, and components appropriate for a building design.

PO5 Ability to use traditional and digital media representational skills to analyze and convey essential design ideas at each stage of the design process.

PO6 Understanding of the architect's responsibility to work in the public interest, to respect historic resources, and to improve the quality of life for local and global neighbours.

PO7 Work collaboratively with teams of architects and various interdisciplinary design teams involved in the building industry, incorporating the financial implications, negotiating contracts, selecting service consultants.

PO8 Ability to design a sustainable built environment to provide healthful environments and reduce environmental impacts.

PO9 Sensitive enough to strictly adhere to the code of conduct prescribed by the competent authority to practice the profession in the country with respect to building codes and regulations, safety aspects and upheld the value of the profession at its highest.

PO10 Ability to upgrade required skills in the domain of construction technology, design process methods using software to meet the changing scenario.

PROGRAMME SPECIFIC OUTCOMES

PSO1 Understand the concept of energy in buildings and the impact of energy crisis in building industry and ability to design energy-efficient buildings.

PSO2 Understand the planning aspects from the macro to the micro-level and ability to develop a planning, urban design proposal.

PSO3 Able to design and develop built environments that are environmentally sustainable, socially inclusive, and climate-responsive, demonstrating a clear understanding and application of Sustainable Development Goals.

PERIYAR MANIAMMAI INSTITUTE OF SCIENCE & TECHNOLOGY

FACULTY OF ARCHITECTURE AND PLANNING

DEPARTMENT OF ARCHITECTURE

B. Arch - Architecture

CURRICULUM - REGULATIONS 2024

Category of courses and minimum credit requirement for B.Arch. degree programme as per the Guidelines of Council of Architecture (COA) are outlined below:

Sl. No.	Category of Courses	Credits	Weightage
1.	Professional Core Courses (PC)	130	50%
2.	Building Sciences and Applied Engineering (BS and AE)	52	20%
3.	Elective Courses		
	Professional Electives (PE)	20	7.7%
	Online courses	6	2.3%
	Open Electives (OE)	13	5%
4.	Professional Ability Enhancement Courses (PAEC)		
	Professional Ability Enhancement Compulsory Courses (PAECC)	26	10%
	Skill Enhancement Courses (SEC)	13	5%
	Total	260	100%

SEMESTER I

Sl.No.	Course Code	Course Name	Credits			
			L	T	P	C
Theory						
1	U24MA103	Applied Mathematics	2	1	0	3
2	U24AR101	World Architecture	3	0	0	3
3	U24AR102	Principles of Architecture	3	0	0	3
Theory Cum Studio						
4	U24AR103	Geometrical Visualization and Representation	2	0	2	3
5	U24AR104	Materials and Construction - I	2	0	2	3
Studio / Lab						
6	U24AR105	Visual Arts	0	0	4	2
7	U24EM108	Communication Skills	0	0	2	1
Design Studio						
8	U24AR106	Basic Design	0	0	8	12
Total			12	1	18	30

SEMESTER II

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Theory						
1	U24AR151	Indian Architecture	3	0	0	3
2	U24AR152	Form Space Context	3	0	0	3
3	U24AR153	Mechanics of Solids	2	1	0	3
Theory Cum Studio						
4	U24AR154	Advanced Geometrical Visualization and Representation	2	0	2	3
5	U24AR155	Materials and Construction - II	2	0	2	3
Workshop						
6	U24AR156	Carpentry and Model Making Workshop	0	0	6	3
Design Studio						
7	U24AR157	Architectural Design - I	0	0	8	12
Total			12	1	18	30

SEMESTER III

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Theory						
1	U24AR201	Climate and Architecture	3	0	0	3
2	U24AR202	Site Surveying and Planning	3	0	0	3
3	U24AR203	Analysis of Structures	2	1	0	3
Theory Cum Studio						
4	U24AR204	Water Supply and Drainage	2	0	2	3
5	U24AR205	Materials and Construction - III	2	0	2	3
Lab						
6	U24AR206	Computer Applications in Architecture	1	0	4	3
Design Studio						
7	U24AR207	Architectural Design - II	0	0	8	12
Audit Course						
8.	U24AU002	Universal Human Values	2	1	0	-
Total			15	2	16	30

SEMESTER IV

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Theory						
1	U24AR251	Contemporary Architecture	3	0	0	3
2	U24AR252	Design of Structures	2	1	0	3
3	U24XX7XX	Open Elective - I	3	0	0	3
4	U24AR8XX	Online Course - I	3	0	0	3
Theory cum Studio						
5	U24AR253	Mechanical and Electrical Services	1	0	2	2
6	U24AR254	Materials and Construction - IV	2	0	2	3
Lab						
7	U24AR255	Digital Graphics and Art	0	0	2	1
Design Studio						
8	U24AR256	Architectural Design - III	0	0	8	12
Audit Course						
9	U24AU004	Community Engagement and Social Responsibility	1	0	2	-
Total			14	1	14	30

SEMESTER V

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Theory						
1	U24AR301	Built Environment and Climate Change	2	0	0	2
2	U24AR302	Design of R.C.C structures	2	1	0	3
3	U24XX7XX	Open Elective - II	3	0	0	3
4.	U24AR9XX	Professional Elective - I	3	0	0	3
Theory Cum Studio						
5	U24AR303	Materials and Construction - V	2	0	2	3
6	U24AR9XX	Professional Elective - II	2	0	2	3
Lab						
7	U24AR304	REVIT Architecture	0	0	2	1
Design Studio						
8	U24AR305	Architectural Design - IV	0	0	8	12
Audit Course						
9	U24AU003	Cyber Security	2	0	0	-
Total			16	1	14	30

SEMESTER VI

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Theory						
1	U24AR351	Building Science and Performance Measurement	2	0	0	2
2	U24AR352	Estimation, Costing & Valuation	2	1	0	3
3	U24XX7XX	Open Elective - III	3	0	0	3
4	U24AR9XX	Professional Elective – III	3	0	0	3
Theory cum Studio						
5	U24AR353	Materials and Construction - VI	2	0	2	3
6	U24AR9XX	Professional Elective - IV	2	0	2	3
Studio						
7	U24AR354	Architectural Working Drawing and Specifications	0	0	2	1
Design Studio						
8	U24AR355	Architectural Design - V	0	0	8	12
Audit Course						
9	U24AU005	Disaster Mitigation Management	2	0	0	-
Total			16	1	14	30

SEMESTER VII

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Theory						
1	U24AR401	Human Settlement Planning	3	0	0	3
2	U24AR402	Professional Practice and Ethics	3	0	0	3
3	U24AR8XX	Online Course - II	3	0	0	3
Lab						
4	U24AR403	Environmental Performance Simulation and Analysis	2	0	2	3
5	U24AR404	Building Information Modelling	1	0	2	3
6	U24AR9XX	Professional Elective - V	2	0	2	3
Design Studio						
7	U24AR405	Architectural Design - VI	0	0	8	12
Audit Course						
8	U24AU006	Entrepreneurial Skill	2	0	0	-
Total			14	0	14	30

SEMESTER VIII

Sl.No.	Course Code	Course Name	Credits			
			L	T	P	C
Practical						
1	U24AR451	Practical Training	0	0	15	15
Total			0	0	15	15

SEMESTER IX

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Theory						
1	U24AR501	Urban Design	3	0	0	3
2	U24AR502	Project Management	3	0	0	3
3	U24AR503	Housing	3	0	0	3
4	U24AR504	Landscape Architecture	3	0	0	3
Theory Cum Studio						
5	U24AR9XX	Professional Elective - VI	2	0	2	3
Studio						
6	U24AR505	Dissertation	1	0	4	3
Design Studio						
7	U24AR506	Architectural Design - VII	0	0	8	12
Total			15	0	14	30

SEMESTER X

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Design Studio						
1	U24AR551	Thesis	0	0	15	15
Total			0	0	15	15

The number of credits in each semester is summarized as follows:

Course	I	II	III	IV	V	VI	VII	VIII	IX	X	Total
B. ARCH	30	30	30	30	30	30	30	15	30	15	270

Semester wise Credit Distribution (in all categories of courses)

Sl. No.	Category of Courses	Credits	I	II	III	IV	V	VI	VII	VIII	IX	X
1.	**Professional Core Courses (PC)**	141	18	18	12	15	12	15	15	0	21	15
2.	**Building Sciences and Applied Engineering (BS and AE)**	51	6	6	15	8	8	5	3	0	0	0
3.	**Elective courses**											
	Professional Electives (PE)	18	-	-	-	-	6	6	3	-	3	-
	Online Course	6	-	-	-	3	-	-	3	-	-	-
	Open Electives (OE)	9	-	-	-	3	3	3	-	-	-	-
4.	**Professional Ability Enhancement Courses (PAEC)**											
	Professional Ability Enhancement Compulsory Courses (PAECC)	30	3	3	0	0	0	0	3	15	6	0
	Skill Enhancement Courses (SEC)	15	3	3	3	1	1	1	3	0	0	0
5.	**Audit course**	-	-	-	-	-	-	-	-	-	-	-
Total Credits		270	30	30	30	30	30	30	30	15	30	15

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FACULTY OF ARCHITECTURE AND PLANNING

DEPARTMENT OF ARCHITECTURE

B. Arch - Architecture

CURRICULUM - REGULATIONS 2024

Category of courses and minimum credit requirement for B.Arch. degree programme as per the PMIST curriculum are outlined below:

Sl. No.	Category of Courses	Credits	Weightage
1.	Professional Core Courses (PC)	141	52.2%
2.	Building Sciences and Applied Engineering (BS and AE)	51	18.9%
3.	Elective Courses		
	Professional Electives (PE)	18	6.7%
	Online courses	6	2.2%
	Open Electives (OE)	9	3.3%
4.	Professional Ability Enhancement Courses (PAEC)		
	Professional Ability Enhancement Compulsory Courses (PAECC)	30	11.1%
	Skill Enhancement Courses (SEC)	15	5.6%
	Total	270	100

List of Courses under each Category

Professional Core Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24AR101	World Architecture	3	0	0	3
2	U24AR102	Principles of Architecture	3	0	0	3
3	U24AR103	Geometrical Visualization and Representation	2	0	2	3
4	U24AR105	Visual Arts	0	0	4	2
5	U24AR106	Basic Design	0	0	8	12
6	U24AR151	Indian Architecture	3	0	0	3
7	U24AR152	Form Space Context	3	0	0	3
8	U24AR154	Advanced Geometrical Visualization and Representation	2	0	2	3
9	U24AR156	Carpentry and Model Making Workshop	0	0	6	3
10	U24AR157	Architectural Design - I	0	0	8	12
11	U24AR202	Site Surveying and Planning	3	0	0	3
12	U24AR207	Architectural Design - II	0	0	8	12
13	U24AR251	Contemporary Architecture	3	0	0	3
14	U24AR256	Architectural Design - III	0	0	8	12
15	U24AR305	Architectural Design - IV	0	0	8	12
17	U24AR352	Estimation, Costing & Valuation	2	1	0	3
18	U24AR355	Architectural Design - V	0	0	8	12
19	U24AR401	Human Settlement Planning	3	0	0	3
20	U24AR405	Architectural Design - VI	0	0	8	12
21	U24AR501	Urban Design	3	0	0	3

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
22	U24AR503	Housing	3	0	0	3
23	U24AR504	Landscape Architecture	3	0	0	3
24	U24AR506	Architectural Design - VII	0	0	8	12
25	U24AR551	Thesis	0	0	15	15
Total			36	1	78	141

Building Science and Applied Engineering Courses

Sl.No.	Course Code	Course Name	Credits			
			L	T	P	C
1.	U24AR104	Materials and Construction - I	2	0	2	3
2	U24AR153	Mechanics of Solids	2	1	0	3
3	U24AR155	Materials and Construction - II	2	0	2	3
4	U24AR201	Climate and Architecture	3	0	0	3
5	U24AR203	Analysis of Structures	2	1	0	3
6	U24AR204	Water Supply and Drainage	2	0	2	3
7	U24AR205	Materials and Construction -III	2	0	2	3
8	U24AR252	Design of Structures	2	1	0	3
9	U24AR253	Mechanical and Electrical Services	1	0	2	2
10	U24AR254	Materials and Construction -IV	2	0	2	3
11	U24AR301	Built Environment and Climate Change	2	0	0	2
12	U24AR302	Design of R.C.C structures	2	1	0	3
13	U24AR303	Materials and Construction -V	2	0	2	3
14	U24AR351	Building Science and Performance Measurement	2	0	0	2
15	U24AR353	Materials and Construction -VI	2	0	2	3
16	U24AR403	Environmental Performance Simulation and Analysis	2	0	2	3
Total			32	4	18	51

Professional Elective Courses

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Semester- V - Professional Elective - I						
1	U24AR901	Vernacular Architecture	3	0	0	3
2	U24AR902	Contemporary process in Architecture	3	0	0	3
3	U24AR903	Art Appreciation	3	0	0	3
4	U24AR904	Architecture of South East Asia	3	0	0	3
Professional Elective - II						
5	U24AR905	Green Buildings and Rating Systems	2	0	2	3
6	U24AR906	Graphic and Product Design	2	0	2	3
7	U24AR907	Architectural Lighting and Acoustics	2	0	2	3
8	U24AR908	Architectural Design with Steel	2	0	2	3
Semester- VI - Professional Elective - III						
9	U24AR951	Culture and Architecture	3	0	0	3
10	U24AR952	Earthquake Resistant Architecture	3	0	0	3
11	U24AR953	Theory of Design	3	0	0	3
12	U24AR954	Sustainable Cities and Communities	3	0	0	3
Professional Elective - IV						
13	U24AR955	Building Automation and Management	2	0	2	3
14	U24AR956	Furniture Design	2	0	2	3
15	U24AR957	Appropriate Building Technologies	2	0	2	3
16	U24AR958	Architectural Design with Glass	2	0	2	3

Sl. No.	Course Code	Course Name	Credits			
			L	T	P	C
Semester- VII - Professional Elective -V						
17	U24AR909	Architectural Journalism	2	0	2	3
18	U24AR910	Energy Efficient Architecture	2	0	2	3
19	U24AR911	Advanced Vulnerability Assessment Methods	2	0	2	3
20	U24AR912	Digital Design Processes in Architecture	2	0	2	3
Semester- IX - Professional Elective - VI						
21	U24AR913	Architectural Conservation	2	0	2	3
22	U24AR914	Interior Design	2	0	2	3
23	U24AR915	Building Systems Integration	2	0	2	3
24	U24AR916	Advanced Building Performance Assessment Methods	2	0	2	3

Open Elective Courses

Sl.No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24XX7XX	Open Elective - I	3	0	0	3
2	U24XX7XX	Open Elective - II	3	0	0	3
3	U24XX7XX	Open Elective - III	3	0	0	3
Total			9	0	0	9

Professional Ability Enhancement Courses

Sl.No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24AR402	Professional Practice and Ethics	3	0	0	3
2	U24AR451	Practical Training	0	0	15	15
3	U24AR502	Project Management	3	0	0	3
4	U24AR505	Dissertation	1	0	4	3
Total						

Online courses

Sl.No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24AR851	Online Course - I	3	0	0	3
2	U24AR801	Online Course - II	3	0	0	3
Total			6	0	0	6

Skill Enhancement Courses

Sl.No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24MA103	Applied Mathematics	2	1	0	3
2	U24EM108	Communication Skills	0	0	2	1
3	U24AR206	Computer Applications in Architecture	1	0	4	3
4	U24AR255	Digital Graphics and Art	0	0	2	1
5	U24AR304	REVIT Architecture	0	0	2	1
6	U24EM356	Architectural Working Drawing and Specifications	1	0	2	2

Sl.No.	Course Code	Course Name	Credits			
			L	T	P	C
7	U24AR404	Building Information Modelling	1	0	2	3
8	U24EM402	Entrepreneur Skill	3	0	0	3
Total						

Audit Courses

Sl.No.	Course Code	Course Name	Credits			
			L	T	P	C
1	U24AU002	Universal Human Values	2	1	0	0
2	U24AU004	Community Engagement and Social Responsibility	1	0	2	0
3	U24AU003	Cyber Security	3	0	0	0
4	U24AU005	Disaster Mitigation Management	3	0	0	0
5	U24AU006	Entrepreneurial Skill	1	0	2	0

Syllabus
Regulations 2024

Course Code	Course Name	L	T	P	C
U24MA103	Applied Mathematics	2	1	0	3
Sustainable Development Goals					

Category: Building Sciences & Applied Engineering (BS&AE)

a. Preamble

This course aims to equip students with the mathematical skills necessary for solving engineering and architectural problems using both traditional and computational techniques.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the methods for calculating surface areas of complex geometrical shapes.	K2
CO2	Apply volume calculation techniques to complex geometrical structures and determine the volumes.	K3
CO3	Apply trigonometric ratios to solve real-time architectural design problems.	K3
CO4	Interpret various statistical diagrams and frequency distributions from the real data.	K2
CO5	Understand the methods for calculating surface areas of complex geometrical shapes.	K2
CO6	Solve mathematical problems related to areas, volumes, and statistical analysis with MS-Excel and MATLAB.	K3

c. Course Syllabus **Total: 45 Hours**

AREAS AND VOLUMES **10**

Surface Areas and Frustum of Complex Geometry Consisting of Primitives: Cuboid, Cylinder, Cone, Pyramid, and Cylinder - Practical Application of Calculating Areas of Building Element: Floors, Walls, Staircase - Volumes of Complex Geometry consisting of Primitives – Cuboid, Cylinder, Cone, Pyramid, and Cylinder- Practical application of Calculating Volumes of rooms, Staircases, Walls, Roofs - Mid Ordinate rule, Trapezoidal rule, Simpson's rule, Volume of Irregular solids, Prismoidal rule.

TRIGONOMETRY AND SETTING OUT **9**

Trigonometric Ratios for 30°, 45°, 60°- Angle of Elevation and Depression - Sine Rule and Cosine rule - Practical Application of Trigonometry on Staircases, Ramps and different kinds of Sloping Roofs - Setting out of Simple Building Sites - Bay Window and Curved Brick Works - Checking a Building for square corners - Circular Arches.

STATISTICS **9**

Tally Charts, Tables and Graphs- Types of Data: Discrete, continuous, raw and group - Averages: Mean, Mode and Median - Statistical diagrams: Pictorial, Bar Chart, Pie Chart and Line Graphs - Histograms - Frequency Distribution.

PROPORTIONS AND FIBONACCI NUMBERS **9**

Golden Mean Ratio - Algebraic Relations and its Application in Egyptian Pyramids - Fibonacci Series- Fibonacci Rabbit Experiment - Square Root Proportions - Modular Proportions

COMPUTER TECHNIQUES **8**

Introduction to Excel - Creating Formulas to Solve Problems based on Areas and Volumes – Trigonometry - Statistics - Proportions and Fibonacci Numbers - Introduction to MATLAB.

d. Activities

- Apply methods for calculating surface areas of complex geometrical shapes.
- Apply volume calculation techniques to practical architectural problems.
- Calculate angles of elevation and depression.
- Calculate averages (mean, mode, median) and create statistical diagrams (bar charts, pie charts, histograms).
- Explore the application of the golden mean ratio and Fibonacci series in architectural design.

e. Learning Resources

1. Surinder Singh Virdi and Roy T Baker, “Construction Mathematics”, Elsevier, Latest Edition: 2008.
2. Mario Livio, “The Golden Ratio”, Broadway Books, Latest Edition: 2002.
3. Corinna Rossi, “Architecture and Mathematics in Ancient Egypt”, Cambridge University Press, Latest Edition: 2017.
4. Annette Imhausen, "Mathematics in Ancient Egypt: A Contextual History", Princeton University Press, Edition: 2016.
5. James H. Clements, "Mathematics for Construction and Architecture", Routledge, Edition: 2020.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	1		1										
CO2	1		1										
CO3	1		1								2		
CO4	1		1										
CO5	1		1	2	2	2							
CO6	1		2	2									
Total	6		7	4	2	2					2		
Scaled value	1		2	1	1	1					1		

Course Code	Course Name	L	T	P	C
U24AR101	World Architecture	3	0	0	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This course facilitates the students to understand the evolution of human society and its impact on architecture and urbanism. It covers key architectural styles from different historical periods and explores the interplay of culture, ideology, and innovation shaping architecture and urbanism today.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the evolution of human society by describing key architectural developments in prehistory	K2
CO2	Understand the architectural characteristics of ancient Egypt and West Asia.	K2
CO3	Understand the contribution made to architecture by Greek and Roman	K2
CO4	Describe the influence of Christianity on early church architecture by examining prominent structures.	K2
CO5	Interpret the architectural styles of the Romanesque and Gothic periods by analyzing notable examples.	K3
CO6	Illustrate the impact of the Renaissance on architecture by studying the renowned works.	K3

c. Course Syllabus **Total : 45 Hours**

PREHISTORIC AND EGYPT **9**

Old Stone Age - Agricultural Revolution - New Stone Age - Development of Shelter - Nature of Art and Architecture - Factors Influencing Architecture - Outline of Architectural Character - Great Pyramid of Cheops, Gizeh - Great Temple of Ammon, Konark.

WEST ASIA, GREECE, AND ROMAN **9**

Early Persian Empire and its Cities - Greek: Orders in Architecture – Doric, Ionic and Corinthian - Parthenon - Roman: Colosseum – Pantheon, Rome.

EARLY CHRISTIAN AND BYZANTINE **7**

Evolution of Church Forms - St. Clement, Rome - St. Sophia, Constantinople - St. Marks, Venice

ROMANESQUE AND GOTHIC **10**

Romanesque: Architectural Characters of Italy and France during Romanesque Period - Pisa Complex, Italy - Abbay Aux Hommes, Caen, France - Gothic: Notre Dame, Paris - Milan Cathedral, Italy.

RENAISSANCE **10**

Rebirth and Revival and Sociological Influences in Art and Architecture - Different Phases of Renaissance Style in Italy and France - Typical Renaissance Structures - Palaces in Italy and Chateaux of France.

d. Activities

- Create a presentation discussing its historical context, unique features of Buildings of various regions.
- Compare and contrast architectural styles from different regions or time periods.
- Practice sketching architectural details or entire buildings of various regions.

e. Learning Resources

1. Sir Banister Fletcher, "A History of Architecture", CBS Publications (Indian Edition), 1999.
2. Spiro Kostov, "A History of Architecture – Setting and Rituals", 2nd Edition, Oxford University Press, 1995.
3. Pier Luigi Nervi, General Editor, "History of World Architecture" - Series, Harry N. Abrams, Inc. Pub., New York, 1972.
4. David Watkin, "A History of Western Architecture", Laurence King Publishing, 2015.
5. Leland M Roth, "Understanding Architecture: Its Elements, History and Meaning", Westview Press, 2013.

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1			3	1								1	
CO2			3	1								1	
CO3			3	1								1	
CO4			2	1								1	
CO5			2	1								1	
CO6			2	1								1	
Total			15	6								6	
Scaled value			3	1								1	

Course Code	Course Name	L	T	P	C
U24AR102	Principles of Architecture	3	0	0	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

The Course Principles of Architecture focuses on the objectives and scope of architecture. This course facilitates the learner to understand what architecture, the elements and theories of architecture is and gain knowledge to implement the same while designing spaces.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the basic definitions and objectives of architecture.	K2
CO2	Understand and apply architectural design process.	K2
CO3	Summarize the relationship between form, space and function in architecture.	K2
CO4	Interpret spatial relationships and organization types.	K2
CO5	Compare different proportions and scales and its applications in architectural design.	K4
CO6	Apply various visual principles of composition.	K3

c. Course Syllabus **Total : 45 Hours**

INTRODUCTION TO ARCHITECTURE **5**

Description of Architecture - Definitions to Architecture - Objective, scope and need for architecture - Applications - Work of an Architect Compared to an Artist, Technologist and a Designer / Craftsman.

ARCHITECTURAL DESIGN PROCESS **5**

Integration of Aesthetics and Function in Architectural Design process - Primary Elements of Architecture.

AESTHETIC COMPONENT **15**

Form and Space: Unity of opposites – Shapes - Visual and Emotional Effects of Geometric Forms: Sphere – Cube – Pyramid - Cylinder - Cone and their Derivatives - Subtractive and Additive Forms: Linear - Radial - Centralized - Clustered - Grid.

ARCHITECTURAL SPACE **10**

Space Defining Elements: Vertical - Horizontal and Curved Elements. Spatial Relationship: Space within a Space- Interlocking Spaces - Adjacent Spaces- Spaces linked by Common Spaces. Spatial Organization: Influencing Factors and their types- Centralized -Linear- Radial- Cluster- Grid.

PRINCIPLES OF DESIGN **10**

Proportion: Need for Proportion - Golden Proportion- Modular- Indian proportion and Japanese Proportions. Scale: The Need for Scale - Human Scale- Generic Scale. Ordering Principles: Balance- Rhythm- Symmetry- Datum- Hierarchy- Pattern - Axis Citing.

d. Activities

- Understanding objectives and scope of architecture.
- Acquire knowledge to choose appropriate forms while designing architectural spaces.
- Apply spatial relationship and organizations while designing spaces.
- Apply architectural principles.

e. Learning Resources

1. V.S.Pramar, "Design Fundamentals in Architecture", Samaiya Publications Private Ltd., New Delhi, 1997.
2. Paul Alan Johnson – "The Theory of Architecture - Concepts and themes", Van Nostrand Reinhold Co., New York, 1994.
3. Francis D.K.Ching, "Architecture-Form, Space and Order", Van Nostrand Reinhold Company, New York, 2007.
4. Helm Marie Evans and Caria David Dunneshil, "An Initiation to Design, Macmillan Publishing Co. Inc"., New York.

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	3	3						3			1		
CO2	3	3						3		2	3	3	
CO3	3	1						2			1		
CO4	3	1						1			1		
CO5	3	1						1			1		
CO6	3	1						1			1		
Total	18	10						11		2	8	3	
Scaled Value	3	2						2		1	2	1	

Course Code	Course Name	L	T	P	C
U24AR103	Geometrical Visualization and Representation	2	0	2	3
Sustainable Development Goals					

Category: Professional Ability Enhancement Course (PAEC)

a. Preamble

This course introduces learners to fundamental techniques of visual representation and facilitates their ability to visualize geometrical shapes and forms. Additionally, it sensitizes the learners with drawing conventions, symbols and enhances skills in preparing scaled technical drawings and projections.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand and demonstrate basic drawing terminologies and abbreviations used in architectural drawings.	K2
CO2	Describe the construction techniques for planar surfaces and basic geometrical shapes.	K2
CO3	Apply projection methods to visualize points, lines, and planes in different orientations.	K3
CO4	Illustrate the sectioning and development of surfaces of regular geometrical solids.	K3
CO5	Relate 3D objects to real life and construct orthographic projections in reduced scales.	K3
CO6	Demonstrate the procedure of measuring simple objects in real life and construct scaled technical drawings.	K3

c. Course Syllabus **Total : 60 Hours**

INTRODUCTION **12**

Introduction – Usage of Pencils - Drawing Instruments-Sheet Types - Drawing Table - Drawing Terminologies and Abbreviations - Sheet Layouts - Line - Shape-Lettering - Art Lettering- Dimensioning-Symbols - Scale.

GEOMETRICAL DRAWINGS AND PROJECTIONS **12**

Construction of Lines-Angles - Construction of Planar Surfaces: Square-Triangle, Rectangle-Regular Polygons - Circles- Curves - Conic Sections: Ellipse - Parabola, Hyperbola - Introduction to Projections: Points - Lines- Planes.

SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES **12**

Section of Regular Geometrical Solids: Cones- Cylinders - Prism- Pyramid-Hemisphere - Construction of Physical Models of Solids - Development of Surfaces of Solids - Intersection of Surfaces.

ORTHOGRAPHIC PROJECTION **9**

Introduction to Orthographic Projections - Construction of Physical Models of Complex Solids - Orthographic Projections of Basic and Complex Solids.

MEASURED DRAWING – BASIC OBJECTS **15**

Fundamentals of Measured Drawing - Plan, Elevation and Section of Simple Objects - Furniture - Building Components in Suitable Enlarged / Reduced scales.

d. Activities

- Draft drawings using appropriate tools, instruments with standard drawing conventions
- Draft basic geometrical shapes and draw the projections of points, lines and planes
- Prepare physical models of geometrical shapes using cardboards, shapeable materials and draft the orthographic projections of the same.
- Develop surfaces from geometrical shapes and draw the projections
- Measure real life objects with tape and draft the plan, elevation and section of the same.

e. Learning Resources

1. Francis D.K Ching, “Architectural Graphics”, John Wiley & sons, 6th edition, 2015.
2. Francis D.K Ching, “A Visual Dictionary of Architecture”, John Wiley & sons, 2nd edition, 2011.
3. Martin, L. C. “Architectural Graphics”, Macmillan Pub Co. 2nd edition, 1970.
4. C. Leslie Martin, “Architectural Graphics”, The Macmillan Company, New York, 1964.
5. Lockard, W. K. “Drawing as a Means to Architecture”. Van Nostrand Reinhold Company, New York, 6th edition, 1992
6. Bhatt, N. D. “Engineering Drawing”, Anand: Charotar Publishing House, 2003
7. Timothy J. Sexton, “A Concise Introduction to Engineering Graphics”, SDC Publications, 6th edition, 2019.
8. Natarajan K.V, “A Textbook og Engineering graphics”, Dhanalakshmi publishers, Chennai, 2006.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1				1	1							1	
CO2				1	1								
CO3				1	1							1	
CO4				3	1							1	
CO5				3	1								
CO6				1	1							1	
Total				10	6							4	
				2	1							1	

Course Code	Course Name	L	T	P	C
U24AR104	Materials and Construction - I	2	0	2	3
Sustainable Development Goals					

Category: Building Science & Applied Engineering (BS & AE)

a. Preamble

This course introduces to the students various building components and their functions. Basic materials such as stone, lime, mud, bamboo, thatch, and straw to give knowledge about the construction using basic materials in simple situations.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Describe the various elements of building construction by identifying their functions and applications.	K2
CO2	Knowledge on different types of stone masonries and their construction details.	K1
CO3	Understand the properties, process of manufacturing, and application of lime in building construction.	K2
CO4	Understand the properties, uses and treatment and techniques of mud construction.	K2
CO5	Explain the properties and uses of bamboo, straw, and thatch in construction.	K2
CO6	Design buildings using a combination of basic materials.	K6

c. Course Syllabus **Total : 60 Hours**

BUILDING ELEMENTS AND TERMINOLOGY **15**

Introduction to Building elements – Substructure: Foundation, Plinth, and Damp-Proof Course - Super Structure: Floor, Wall, Column, Beam, Sill, Lintel, Arch, Fenestrations, Plastering, Shading Devices, Stairs, Balcony, Roof, Parapet, Coping, and Weathering Course – Load Transmission in Load-Bearing and Framed Structures - Role of Soil in Building Construction: Formation, Grain Size Distribution, Soil Classification Systems, and Soil Stabilization.

STONE **15**

Stone in Building Construction: Sources, Characteristics, Selection, Seasoning, Dressing, Testing, Deterioration, Preservation, and Durability - Basic Principles of Stone Masonry: Joints, Mortar, Plastering, Pointing, and Finishes - Different Types of Stone Masonry Walls - Structural Use of Stone Masonry: Foundation, Walls, Piers, Columns, Arches, and Lintels - Masonry Integrated Elements: Openings, Cornices, and Copings.

LIME **6**

Lime as a basic binding material: Classification of Lime – Properties and Uses; Manufacturing Process; Mortar – Functions, Requirements, Mix Proportions, and Handling Precautions.

MUD CONSTRUCTION **9**

Mud as a Basic Construction Material: Plaster and Mortar - Products: Stabilized Blocks - Wall Construction: Cob, Rammed Earth, Wattle and Daub, Adobe, Compressed Stabilized Earthen Blocks - Foundation and Plinth for Mud Structures - Damp and Weather Proofing - Mud flooring - Mud domes.

BAMBOO, STRAW, THATCH FOR STRUCTURAL USE & FINISHES 15

Bamboo: Anatomy, Properties, Strength, Processing, Harvesting, Treatment, Preservation, Uses, Joints, Framed construction for Walls, Floors, and Roof Techniques - Straw and Thatch: Physical Aspect, Properties Related to Fire, Moisture, Insects, Pests - Straw Bale Construction – Thatch Roof Techniques.

d. Activities

Drafting:

- Draw a detailed cross-section of a typical wall showing the various building elements: foundation, plinth, damp-proof course, floor, wall, column, beam, sill, lintel, arch.
- Draw structural elements of stone masonry: foundations, walls, piers, columns, arches, and lintels.
- Draw detailed sections of mud wall construction techniques: cob, rammed earth, wattle and daub, adobe, and compressed stabilized earth blocks.
- Draw sections illustrating the foundation and plinth details of mud structures.
- Draw the construction details for bamboo components: doors, windows, framed walls, floors, and roofs.
- Draw roofing details for thatch and straw bale construction.

Gain insight into construction principles and methods through site visits, and lectures or seminars from industry professionals and related organizations.

e. Learning Resources

1. S.C.Rangwala – “Engineering Materials” Charotar Publishing House – Anand 2019.
2. S. C. Rangwala, Building Construction, 34th ed. Charotar Pub. House, Anand, 2022.

3. W.B.Mckay – “Building Construction” Vol. 1,2,3- Longmans U.K 2012.
4. Don A. Watson, “Construction Materials and Processes”, McGraw Hill, 1986.
5. Klans Dukeeberg, Bambus, “Bamboo”, Karl Kramer Verlag Stuttgart Germany, 2000.
6. “National Building Code of India 2016”- Part 6 Structural Design- Section 3 timber and Bamboo.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1										2			
CO2										2			
CO3								3		2	2		
CO4								3		2	2		
CO5								3		2	2		
CO6				3						2			
Total				3				9		12	6		
Scaled value				1				2		2	1		

Course Code	Course Name	L	T	P	C
U24AR105	Visual Arts	0	0	4	2
Sustainable Development Goals					

Category: Skill Enhancement Courses (SEC)

a. Preamble

The course Visual Arts facilitate students for a dynamic exploration of creativity and expression. This course will develop into a diverse range of artistic mediums and techniques, from traditional to contemporary forms. Through hands-on projects and in-depth study, students will develop fundamental skills in drawing, painting, sculpture, and digital art.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Create artworks using various drawing tools and techniques, demonstrating mastery in lines, shades, and shadows across different mediums.	K6
CO2	Produce freehand perspective drawings of human figures, architectural elements, and natural scenery.	K6
CO3	Apply principles of color theory to craft two-dimensional and three-dimensional paintings.	K3
CO4	Render architectural drawings using diverse techniques, and color themes.	K3
CO5	Integrate Indian aesthetic principles into sculptural works.	K6
CO6	Execute sculptural projects using subtractive and additive techniques, and materials	K6

c. Course Syllabus **Total : 60 Hours**

INTRODUCTION TO THE ART AND OBJECT **12**

History of the Arts, - Artists and Art Movements - Drawing Tools - Quality of Lines - Expressions with Pen, Pencil, Charcoal, and Marker- Objects with Varied Shapes in Different Mediums - Charcoal, Pencils, and Pastels on Paper / Form / Boards. Shades and Shadows.

FREE HAND PERSPECTIVE DRAWING **10**

Freehand Drawing: Human Figures – Vehicles- Trees - Shrubs – Plants - Plans - Views – Building Perspectives– Single Space Interior. - Freehand Sketches - Outdoor Sketching: Historic - New Built Structures – Natural Scenery.

PAINTING **10**

Classification of Colors - Hues – Values- Shades- Color Wheel- Color Composition, Properties- Elements of Color - Two-Dimensional and Three-Dimensional Aspects of Painting.

RENDERING TECHNIQUES FOR ARCHITECTURAL DRAWING **10**

Architectural Representation: Trees - Hedges - Foliage - Human Figures - Cars, Symbols- Monochromatic and different Themes of Rendering- Architectural Rendering Techniques: Pen and Ink- Color- Values- Tones.

SCULPTURE **18**

Indian Aesthetics - Sculpture Techniques: Form- Texture-Mass-Volume-Sculpture in Relief- Shallow Relief-Sculpture in Round - Free-Standing Sculpture in Relation to Architectural Space - Carving Techniques: Stone and Wood - Subtractive and Additive processes. Moulding and Casting: Plaster of Paris, Cement, Fiber glass.

d. Activities

- Understanding the color wheel
- Creative composition and college painting
- Perspective- interior and exterior drawing
- Outdoor sketch
- Develop and Create sculpture model

e. Learning Resources

1. Maittand Graves, “The Art of Colour and Design” McGraw-Hill Book company Inc. 1951
2. Ching Francis, “Drawing a Creative Process”, Van Nostrand Reinhold, New York, 1990
3. Webb, Frank, “The Artist guide to Composition”, David & Charles, U.K., 1994.
4. Norling, E. “Perspective made easy”, Dover publications, New york,1999
5. Robert, W. G. “Perspective: From Basic to Creative”. 1st edition, London: Thames and Hudson, 2006.

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1					1								1
CO2					3								
CO3					3								
CO4					3								1
CO5					1								
CO6					3								1
Total					14								3
Scaled Value					3								1

Course Code	Course Name	L	T	P	C
U24EM108	Communication Skills	0	0	2	1
Sustainable Development Goals					

Category: Skill Enhancement Courses (SEC)

a. Preamble

This course is to enhance the essential skills and strategies to communicate confidently, clearly, and persuasively in a variety of professional contexts. To enhance their communication skills in English by developing their listening, speaking, reading and writing skills.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand of the techniques and strategies of communication.	K2
CO2	Enhance their reading skills specifically journals, books.	K3
CO3	Develop the speaking skills specifically conversing with peers, presenting their works.	K4
CO4	Understand skill related to listening and writing skills.	K2
CO5	Apply different strategies in writing a paper or proposal.	K3
CO6	Apply communication skills for professional presentations.	K3

c. Course Syllabus **Total : 30 Hours**

INTRODUCTION **5**

i. Listening - Short Talks, Interviews and Discussions from various media.

ii. Speaking - Negotiating meaning, convincing people- describing places.

iii. Reading - Texts on architecture.

iv. Writing process descriptions.

v. Vocabulary Development - Abbreviations and Acronyms.

vi. Grammar - Suitable Tenses to Write Descriptions and Describe.

SPEAKING, READING AND WRITING **5**

i. Listening - Listen to Talks for Specific Information.

ii. Speaking - Preparing a Presentation using the Computer, Participating in Small Group Discussion.

iii. Reading - Lengthy Articles Related to Architecture and Construction.

iv. Writing - Writing Formal emails, Vocabulary Appropriate Words to Describe Topics in Architecture.

v. Grammar- Suitable Grammar for Writing a Report.

DESCRIPTIVE PRESENTATION **6**

i. Listening - Descriptions of Place, Conversations and Answering Questions,

ii. Speaking - Making a PowerPoint Presentation on a given Topic,

iii. Reading - Architecture Manuals.

iv. Writing - Writing a Report, Writing Essays-Descriptive essays.

v. Vocabulary - Adjectives of Comparison.

vi. Grammar - Collocations.

ANALYTICAL PRESENTATION **7**

i. Listening - TED talks.
ii. Speaking - Participating in Group Discussions.
iii. Reading - Reading and Interpreting Visual Information.
iv. Writing - Writing Analytical Essays and Argumentative.
v. Vocabulary - Suitable Words to be used in Analytical and Argumentative Essays.
vi. Grammar - Subject-Verb Agreement.

PROJECT PROPOSAL PRESENTATION **7**

i. Listening - Ink Talks and Longer Talks.
ii. Speaking - Talking about One's Project Proposal.
iii. Reading - Reading Essays on Construction Buildings, Different Schools of Architecture.
iv. Writing - Writing Proposals.
v. Vocabulary - Related Vocabulary.
vi. Grammar - Cohesive Devices.

d. Learning Resources

1. V.R. Narayanaswamy, "Strengthen Your Writing" (Orient Longman)
2. Jaya Sasikumar, Champa Tickoo, "Writing with A Purpose", Published by Oxford University Press | Paper Back | Language – English
3. Freeman,Sarah "Study Strategies", New Delhi, Oxford University Press, 1979.
4. Paul Gunashekar M.L. Tickoo, "Reading for Meaning", Published by S. Chand & Company Ltd. Sultan Chand &Company
5. Robert S. Oliver, "The Complete Sketch", Van Nostrand Reinhold, New York, 1989.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1							2						
CO2	3		2				2						
CO3							2						
CO4			2	3			2						
CO5			3				2					3	
CO6			3				2					3	
Total	3		10	3			12					6	
Scaled Value	1		2	1			2					1	

Course Code	Course Name	L	T	P	C
U24AR106	Basic Design	0	0	8	12
Sustainable Development Goals					

Category: Professional Core Courses (PCC)

a. Preamble

The basic design course teaches students about the design thinking process and how to conceive concepts and create 2D and 3D models utilizing various materials, components, and design principles. Students investigate the principles, color, texture, and spatial relationships in two and three dimensions as a result of this.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Create innovative designs from point to 3D form.	K6
CO2	Produce visual compositions by organizing shapes and employing principles	K6
CO3	Apply color theory, visual textures, and optical illusions into visually compelling compositions	K3
CO4	Construct geometric and sculptural forms, exploring solids and voids through various materials and techniques.	K6
CO5	Integrate ergonomics and anthropometrics to design functional products and spatial elements that align with human interaction.	K6
CO6	Evaluate and apply design concepts to enhance spaces and products at various scales	K6

c. Course Syllabus **Total : 120 Hours**

INTRODUCTION TO DESIGN **30**

Definition of Design - Design Thinking - Design Process - Design Problems and Solutions - Study of Architectural Elements.

Exercises: Point to line, line to plane, and plane to 3D form, with innovative designs at each stage.

PRINCIPLES OF VISUAL COMPOSITIONS **30**

Principles of Design and its Role in Expression (Architectural Expression). Introduction to Principles of Organization / Composition - Repetition - Variety- Radiation – Rhythm - Gradation - Emphasis - Subordination - Proportion, Harmony- Balance - Focal point - Symmetry - Asymmetry - Background, Foreground, Sense of Direction.

Exercises: To Explore the Principles - Symmetrical and Asymmetrical compositions and Patterns by the Organization of Shape- Expressing Themes using Geometrical / Organic Shapes.

VISUAL PROPERTIES **25**

Study of Classification of Colors - Study of Visual Properties - Visual Textures, Optical Illusion and apply them in Visual Composition.
Exercise: Collage / Painting / Nature scene.

FORMS – GEOMETRIC / SCULPTURAL **35**

Exploring the Forms: Linear and Planar, fluid and plastic forms using Material like Match stick, Mount Board, Metal foil, Wire string, Thermocol, Clay, Plaster of Paris Study of Solids and Voids : Sculptural Forms and Spaces - Additive Models using Similar Forms / Dissimilar Forms- Subtractive Models from a given Geometric

Form - using various Materials and Mediums like Casting – Moulding- Study of Ergonomics of Human Figure- Dimensions of Furniture and Relationship with Human Anthropometrics of Cottage.

Exercise: Product Design, Space frames / Pavilions, Wardrobe Design - Spatial Understanding (Interior), Compound Wall - Spatial Understanding (Exterior).

d. Activities

- By utilizing the sticks and threads on the board, students can create a 3D form and investigate how 3D form evolved.
- Students use the same sheet to create an architectural concept by choosing any two colors.
- Use tint and shade to create the color cards and construct the house.
- Product design – pen stand
- Space frames / Pavilions
- Wardrobe Design – Spatial Understanding (Interior)
- Compound Wall - Spatial Understanding (Exterior)

e. Learning Resources

1. Kumar Vyas, “Design and Environment- A Primer”, National Institute of Design, 2009.
2. Pierre von Meiss, “Elements of Architecture: From Form to Place”, Routledge, 2014.
3. James F. Eckler, “Language of Space and Form: Generative Terms for Architecture”, Wiley, 2012.
4. Owen Cappleman and Michael Jack Jordon, “Foundations in Architecture: An Annotated Anthology of Beginning Design Project”, Van Nostrand Reinhold New York, 1993.
5. Charles Wohlschlaeger and Cynthia Busic-Snyder, “Basic Visual Concepts and Principles for Artists, Architects and Designers”, McGraw Hill, New York 1992.

6. Victor Papanek, “Design for the Real world, Human Ecology and Social Change”, Chicago Review Press, 2005.
7. Taiji Miyasaka, “Seeing and Making in Architecture: Design Exercises”, Routledge, 2013.
8. V.S. Pramar, “Design Fundamentals in Architecture”, Somaiya Publications, New Delhi, 1997.
9. Francis D. K. Ching, “Architecture: Form Space and Order”, Van Nostrand Reinhold Co., (Canada), 1979.

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	3	3										1	
CO2	3	3											
CO3	3	3								1		1	
CO4		3								1		1	
CO5		3		3						1		1	
CO6		3		3						1		1	
Total	9	18		6						4		5	
Scaled Value	2	3		1						1		1	

Course Code	Course Name	L	T	P	C
U24AR151	Indian Architecture	3	0	0	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

The students would learn about and gain knowledge on the development of architectural form with reference to Technology, Style and Character in the Indus valley Civilization, Vedic period and manifestation of Buddhist, Hindu and Islamic architecture in various parts of the country.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the origin of various civilization and Architecture in India at different points of time	K2
CO2	Understand of the cultural, social, and technological developments that shaped the transformative period in architectural history	K2
CO3	Understand the architectural responses with respect to materials, technology, style and character in the Buddhist, Hindu and Dravidian Architecture.	K2
CO4	Understand the emergence of Islamic Architecture, form & function of different structures, the underlying geometry, concepts of decoration and colors.	K2
CO5	Gain Knowledge on the history related to design thinking, cultural aspiration, social needs, and the evolution of the built environment.	K2
CO6	Appreciate universal qualities of architecture & their effects	K5

c. Course Syllabus **Total : 45 Hours**

ANCIENT INDIA AND BUDDIST ARCHITECTURE **8**

Indus Valley Civilization - Culture and Pattern of Settlement. Aryan Culture -Vedic Village and the Rudimentary Forms of Bamboo and Wooden Construction under the Mauryan Rule. Buddhist Architecture: Hinayana and Mahayana Buddhism - Architectural Production During Ashoka's Rule - Ashokan Pillar. Salient Features of a Chaitya Hall and Vihara- Karli, Rani Gumpha.

HINDU ARCHITECTURE **8**

Hindu Architecture - Evolution of Hindu temple - Early Shrines of the Gupta and Chalukyan Periods – Tigawa Temple, Ladh Khan Temple, Aihole, Papanatha and Virupaksa Temples, Pattadakal

DRAVIDIAN ARCHITECTURE AND INDO ARYAN STYLE **9**

Dravidian Architecture -Rock Cut Productions under Pallavas - Shore Temple, Mahabalipuram -Dravidian Order - Brihadeeswara Temple, Tanjore - Meenakshi Temple, Madurai. Indo Aryan - Salient Features of an Indo-Aryan Temple - Lingaraja Temple- Bhuvaneswar- Sun Temple, Konark. Kunds - Vavs - Adalaj - Surya Kund, Modhera.

INTRODUCTION TO INDO ISLAMIC ARCHITECTURE **8**

Indo Islamic Architecture- Advent of Islam into the Indian subcontinent and its Impact - Factors Influencing Islamic Architecture - Evolution of Building Types in Terms of Forms and Functions - the Mosque, the Tomb, and Minaret, the Madrasa, the Caravanserai. Elements and Character of Islamic Architecture in Terms of Structure, Materials and Methods of Construction. Elements of Decoration, Color, Geometry, Light.

STYLES OF ISLAMIC ARCHITECTURE **12**

Imperial style - Development of Imperial style - Qutb Minar, Alai Darwaza, Square and Octagonal Tombs of Sayyid and Lodi dynasty- Provincial styles - Development of the Provincial Styles - Atala masjid, Jaunpur - Adina masjid, Bengal - Tin Darwaza, Ahmedabad- Gol Gumbaz, Bijapur- Mughal style - Development of the Mughal Style, Humayun Tomb - Agra Fort - Fatehpur Sikri-Delhi Fort - Jami Masjid Delhi- Taj Mahal

d. Activities

- Create a presentation discussing its historical context, unique features of Buildings of various regions.
- Compare and contrast architectural styles from different regions or time periods.
- Practice sketching architectural details or entire buildings of various regions.

e. Learning Resources

1. Percy Brown, “Indian Architecture (Buddhist and Hindu Period)”, Taraporevala and Sons, Bombay, 1983.
2. Satish Grover, “The Architecture of India (Buddhist and Hindu Period)”, Vikas Publishing Housing Pvt. Ltd., New Delhi, 2003.
3. Christoper Tadgell, “The History of Architecture in India from the Dawn of civilization to the End of the Raj”, Longmon Group U.K.Ltd., London, 1990.
4. George Michell, “The Hindu Temple”, BI Publications., Bombay, 1977.
5. Stella Kramrisch, “The Hindu Temple”, Motilal Banarsidass, 1976
6. Parameswaran Pillai V.R., “Temple culture of south India”, Inter India Publications.
7. George Michell Ed, “Temple Towns of Tamil Nadu”, Marg Publications, 1995.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1						3		1				1	
CO2						3		1				1	
CO3						3		1				1	
CO4						3		1				1	
CO5						3		1				1	
CO6						3		1				1	
Total						18		6				6	
Scaled value						3		1				1	

Course Code	Course Name	L	T	P	C
U24AR152	Form Space Context	3	0	0	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This course imparts knowledge about architecture, design and various components involved in it. This course educates them about the fundamental principles and elements of architecture and applies them while designing architectural spaces. Students will be equipped to design spaces and products applying various principles of design for courses such as Architectural Design and Interior Design.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the relationship between form and function to describe aesthetic and functional aspects in architectural design.	K2
CO2	Organize knowledge about anthropometrics to apply standards in architectural projects.	K3
CO3	Understand the influence of climatology on architectural design.	K2
CO4	Apply the principles of space-defining elements to organize spatial relationships and arrangements in architectural design.	K3
CO5	Describe the socio-psychological aspects of architecture and the cultural and social impacts on the design of spaces.	K2
CO6	Apply knowledge of building materials and structural systems to demonstrate viable architectural spaces.	K3

c. Course Syllabus **Total : 45 Hours**

FUNCTIONAL AND AESTHETIC ASPECTS **9**

The Relationship of Form and Function Found in Natural objects and Man-made Objects their Aesthetics - Human Activities - The need for Appropriate Space and Environment for Performing the Activities Efficiently - The Impact of the Built Environment on the Activity - The Architect's Role in the Creation of Built Environment, Tackling Functional Aspect and Aesthetic Aspects - Handling Architectural Projects: Planning, Designing and Execution.

ANTHROPOMETRICS AND ITS APPLICATION **9**

Determining Size and Shape of Various Activity Spaces- Anthropometrics and the Information Available in Standards and their Application in Architecture - Circulation: Pattern and Space Taken by Circulation Routes- Five Different Types of Circulation Pattern-Path Space Relationship- Access to Buildings -Types of Entrances.

CLIMATE AND SITE **9**

Impact of Climatology on the Design of Spaces- Impact of Site Conditions on the Design of Spaces

BUILDING MATERIALS AND STRUCTURAL SYSTEM **9**

The relationship between building materials and structural systems - Resultant forms - Examples from the past and present.

SOCIO PSYCHOLOGICAL ASPECTS **9**

Culture - Relationship between Believes-Values - Aspiration of the User and its Impact on Architecture.

d. Activities

- Design spaces based on anthropometry and human activities.
- Understands the relationship between form and function and acquires knowledge to choose appropriate forms while designing architectural spaces.
- Apply site context and climatological aspects while designing spaces.
- Apply appropriate building materials and structures for various spaces.
- Understands the influence of culture in built environment.

e. Learning Resources

5. V.S.Pramar, "Design Fundamentals in Architecture", Samaiya Publications Private Ltd., New Delhi, 1997.
6. Francis D.K.Ching, "Architecture-Form, Space and Order", Van Nostrand Reinhold Company, New York, 2007.
7. Paul Alan Johnson – "The Theory of Architecture - Concepts and themes", Van Nostrand Reinhold Co., New York, 1994.
8. Helm Marie Evans and Caria David Dunneshil, "An initiation to design", Macmillan Publishing Co. Inc., New York

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	3											1	
CO2	3											1	
CO3	3											1	
CO4	3											1	
CO5	3											1	
CO6	3											1	
Total	18											6	
Scaled value	3											1	

Course Code	Course Name	L	T	P	C
U24AR153	Mechanics of Solids	2	1	0	3
Sustainable Development Goals					

Category: Building Sciences & Applied Engineering (BS&AE)

a. Preamble

This course is the foundation for the entire knowledge in this program, covering basic mechanics of solid bodies and their responses. It facilitates student to solve the problems related to different force parameters, inertia and energy and as well introduce the student about the shape and geometry of the body and concept of moment of inertia and its applications.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the basic concepts of forces and structural systems, and describe their applications in solving mechanical problems.	K3
CO2	Organize knowledge of equilibrium principles, and apply these principles to determine the stability of rigid bodies.	K3
CO3	Interpret the methods of analyzing plane trusses, and solve problems involving simply supported and cantilevered trusses	K2
CO4	Understand the properties of sections, and compare various geometric proportions used in structural design	K2
CO5	Describe the elastic properties of solids, and apply this knowledge to analyze stress-strain relationships in materials.	K2
CO6	Apply the principles of solid mechanics, and illustrate their relevance in professional architectural design	K3

c. Course Syllabus **Total: 45 Hours**

FORCES AND STRUCTURAL SYSTEMS **8**

Units of Measurement- Introduction to Scalar and Vector- Types of Force Systems - Resultant of Parallel Forces - Law of Mechanics – Coplanar and Non - Coplanar Forces - Resolution - Composition of Forces.

EQUILIBRIUM OF RIGID BODIES **7**

Principle of Moments - Principle of Equilibrium – Free Body Diagram- Simple Problems- Types of Supports and their Reactions- Requirements of Stable Equilibrium.

ANALYSIS OF PLANE TRUSSES **10**

Introduction to Determinate Plane Trusses - Analysis of Simply Supported and Cantilevered Trusses by Method of Joints - Method of Sections.

PROPERTIES OF SECTION **10**

Golden Mean Ratio - Algebraic Relations and its Application in Egyptian Pyramids - Fibonacci Series- Fibonacci Rabbit Experiment - Square Root Proportions - Modular Proportions

ELASTIC PROPERTIES OF SOLIDS **10**

Stress Strain Diagram for Mild Steel- High Tensile Steel and Concrete - Concept of Axial - Volumetric Stresses and Strains - Elastic Constants - Relation between Elastic Constants - Application to Problems.

d. Activities

- Calculate the centroid of any shape given.

- Conduct tension test on steel, aluminum, copper and brass.
- Conduct compression tests on spring, wood and concrete.
- Calculate flexural and torsion values to determine elastic constants.
- Determine hardness of metals.

e. Learning Resources

1. R.K.Bansal – "A textbook on Engineering Mechanics". Lakshmi Publications. Delhi 2008
2. R.K.Bansal – "A textbook on Strength of Materials" Lakshmi Publications. Delhi 2010
3. P.C.Punmia, "Strength of Materials and Theory of Structures"; Vol. I, Laxmi publications, Delhi 2018
4. S.Ramamrrutham, "Strength of materials" - Dhanpatrai & Sons, Delhi, 2014.
5. W.A.Nash, "Strength of Materials" - Schaums Series – McGraw-Hill Book Company, 2008
6. R.K. Rajput – "Strength of Materials", S. Chand & Company Ltd., New Delhi 2015
7. Dr.N.Koottiswaran – "Engineering Mechanics" Sri Balaji Publications 2014. NPTEL Videos

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1							1			1			
CO2							1			1		1	
CO3							1			1			
CO4							1			1		1	
CO5							1			1			
CO6							1			1		1	
Total							6			6		3	
Scaled value							1			1		1	

Course Code	Course Name	L	T	P	C
U24AR154	Advanced Geometrical Visualization and Representation	2	0	2	3
Sustainable Development Goals					

Category: Skill Enhancement Courses (SEC)

a. Preamble

This prerequisite for this course is to have completed Geometrical visualization and representation. This course introduces learners to fundamental techniques of three-dimensional visualization and representation and facilitates their ability to visualize complex geometrical shaped and buildings. Additionally, it enhances skills in measured documentation and preparing of technical drawings.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the principles of three-dimensional views, projections and perspective views.	K2
CO2	Apply the components of perspectives to construct one-point perspectives of basic geometrical shapes and interiors.	K3
CO3	Apply the methods of perspective drawing to create two-point perspectives of geometrical shapes and building exteriors	K3
CO4	Illustrate the principles of sciography to accurately depict shadows in architectural drawings	K3
CO5	Apply the steps for measured drawing to prepare detailed plans, sections, and elevations of small building	K3
CO6	Demonstrate the ability to integrate sciography with perspectives and in architectural plans and elevation	K3

c. Course Syllabus **Total : 60 Hours**

INTRODUCTION TO VIEWS **12**

Introduction to Three Dimensional Views - Types of Axonometric Projections – Isometric- Dimetric - Trimetric projections - Construction of Isometric View of Objects and Furniture - Differences between Axonometric and Perspective Views.

FUNDAMENTALS OF PERSPECTIVES **9**

Introduction to Perspectives - Types of Perspectives: One Point, Two Point & Three Point - Anatomy of Perspectives – Objects- Study of Picture Plane- Station Point, Vanishing Point- Cone of Vision - Eye level - Ground Level - Variation - Effects - Construction of One-Point Perspective of Basic Geometrical Shapes and Interiors.

CONSTRUCTION OF ONE POINT AND TWO POINT PERSPECTIVES **15**

Construction of One-Point Perspective of Basic Geometrical Shapes and Interiors - Two-Point Perspective of Basic Geometrical Shapes and Building Exteriors.

SCIOGRAPHY **12**

Introduction to Sciography - Principles of Shade and Shadow - Shadows of Lines- Planes -Simple Solids - Shadows of Architectural Elements - Construction of Sciography of Basic Geometrical Shapes - Buildings - Application of Sciography in Pictorial Representation of Plans- Elevation - Views.

MEASURED DRAWING - BUILDINGS **12**

Thickness and Hollows, Plan, Section & Elevation - Measuring and Drawing the plan, Section of a Single Space to Scale - Drawing the Plan, Section & Elevation of a Small Building to Scale.

d. Activities

- Learn the procedure to construct isometric views
- Understand the basics of perspective projections.
- Draft basic geometrical shapes and draw the projections of points, lines and planes
- Learn the technique to construct one point and two-point perspective
- Understand Sciography by placing objects in direct sun at different times of a day and draw the Sciography
- Measure a small building with tape and draft the plan, elevation and section of the same to appropriate scale.

e. Learning Resources

1. Francis D.K Ching, "Architectural Graphics", John Wiley & sons, 6th edition, 2015.
2. Francis D.K Ching, "A Visual Dictionary of Architecture", John Wiley & sons, 2nd edition, 2011.
3. Martin, L. C. "Architectural Graphics", Macmillan Pub Co. 2nd edition, 1970.
4. C. Leslie Martin, "Architectural Graphics", The Macmillan Company, New York, 1964.
5. Lockard, W. K. "Drawing as a Means to Architecture". Van Nostrand Reinhold Company, New York, 6th edition, 1992
6. Robert S. Oliver, "The Complete Sketch", Van Nostrand Reinhold, New York, 1989.
7. Norling, E." Perspective made easy", Dover publications, New york,1999
8. Norling, E. "Perspective drawing". California', Walter Fostor Art Books, 1969
9. Robert, W. G. "Perspective: From Basic to Creative". 1st edition, London: Thames and Hudson, 2000

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1			1	3								1	
CO2			1	3									
CO3			1	3								1	
CO4			1	3									
CO5			1	3								1	
CO6			1	3								1	
Total			6	18								4	
			1	3								1	

Course Code	Course Name	L	T	P	C
U24AR155	Materials and Construction - II	2	0	2	3
Sustainable Development Goals					

Category: Building Science & Applied Engineering (BS & AE)

a. Preamble

This course introduces students to properties and characteristics of timber, its conversion, preservation and uses, various market forms of timber, their production, properties and application in the building industry. To understand both in general and in detail the methods of construction by using basic materials such as brick; clay products, natural and man-made timber for both structural and nonstructural components.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the properties and types of brick and timber to describe their applications in building construction.	K2
CO2	Identify the structural uses of brick masonry to organize construction methods for foundations, walls, and roofs	K2
CO3	Apply knowledge of timber preservation techniques to demonstrate methods for enhancing timber durability	K3
CO4	Interpret the usage of timber in building components to prepare design solutions for doors, windows, and flooring	K2
CO5	Analyze the properties of allied clay products to distinguish their use in roofing, flooring, and paving	K4
CO6	Illustrate the process of treating timber with paints and varnishes to apply finishing techniques effectively	K3

c. Course Syllabus **Total : 60 Hours**

BRICK MASONRY **15**

Manufacturing of Brick - Properties and Uses- Types - Various Sizes of Brick. Selection of Good Brick and Application in various Building Components- Types of Brick Bonds- Junctions - Structural use of Brick Masonry in Foundation-Walls-Piers - Vaults-Columns-Arches and Lintels- Structural use of Brick for Roofing - Madras Terrace - Flat - Sloping Roofs - Masonry Integrated Elements – Openings-Cornices -Copings.

ALLIED PRODUCTS USING CLAY **10**

Properties - Use of Clay Products in buildings - Roofing, Flooring, -Paving- Roof tiles – Pan - Pot - Mangalore - Clay – Ceramic- Vitrified tiles - Introduction to Innovative and Composite Construction using Brick and Clay Products.

TIMBER AND ALLIED PRODUCTS **15**

Timber as a Building Material- its Physical Properties – Uses- Defects - Conversion - Seasoning - Decay – Preservation- Fire Retardant Treatment, Anti-termite Treatment - Industrial Timbers: Plywood-Hard Board-Block Board, Particle Board - Carpentry and Joinery: Mitering- Ploughing-Grooving- Rebating- Veneering-Various forms of joints in wood work.

USAGE OF TIMBER AND ALLIED PRODUCTS **15**

Timber in Doors and Windows - Fully Paneled Shutter Doors - Fully Glazed Window - Ventilators Details of Joints- Fixed Glass and Louvered Windows - Timber in Floors-Use of Templates for Support -Timber Staircases - Timber Truss.

PAINTS AND VARNISHES **05**

Paints and Varnishes - Composition- Properties - Uses of Ordinary Paints. Varnishes - Wood Preservatives- Method of Painting of Timber.

d. Activities

- Practicing in construction yard by making examples of Arches and brick masonry.
- Drawings of brick closers, bats and various types of brick bonds.
- Drawings of brick footing, semi-circular, segmental arch,
- Drawings of timber joinery for Windows, doors, ventilators. Timber partitions and trusses
- Site visits to gain knowledge about construction details.
- Gain insight into construction principles and methods through site visits, and lectures or seminars from industry professionals and related organizations.

e. Learning Resources

1. S.C.Rangwala, "Engineering materials", Charotar Publishing, 2011.
2. W.B.Mckay – "Building Construction" Vol. 1,2,3- Longmans U.K 2012.
3. B.C. Punmia, "Building Construction", 2005
4. Francis D.K Ching-Building "Construction illustrated" – John Willey and Sons-2000
5. Don A. Watson, "Construction Materials and Processes", McGraw Hill, 1986.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1			1					1			1		
CO2			1	3				1					
CO3			1	3				1		1			
CO4			1	3				1		1			
CO5			1					1			1		
CO6			1	3				1					
Total			6	12				6		2	2		
Scaled value			1	2				1		1	1		

Course Code	Course Name	L	T	P	C
U24AR156	Carpentry and Model Making workshop	0	0	6	3
Sustainable Development Goals					

Category: Professional Core Courses (PC)

a. Preamble

The course facilitates students to understand various model-making materials, exploring the design process, and visualization of the dimensions of spaces through making 2D and 3D models using the same materials, inducing the thinking skills of the students and explore the massing of the buildings and be able to apply the elements and principles of dot, line, plane, form, scale, proportion, rhythm, harmony, repetition, etc.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the basic concepts of model making and joinery by exploring various materials and techniques	K2
CO2	Organize and prepare base block models by applying different methods and materials suitable for architectural modeling	K3
CO3	Apply the process of detailed modeling by representing building elements using appropriate materials	K3
CO4	Apply techniques to create structural system models that accurately reflect various architectural framework	K3
CO5	Analyze and compare different innovative materials and techniques for model making in architectural contexts	K4
CO6	Create innovative models by combining traditional and new materials, demonstrating creativity in professional applications	K6

c. Course Syllabus **Total : 90 Hours**

INTRODUCTION TO MODEL MAKING AND JOINERY **18**

Architectural Models- Role of Scaled Models - Types of Models: Block- Detailed, Construction - Interior Models - Concepts of Model Making - Materials Cutting - Finishing and Joinery - Carpentry Tools - Joints Exercise: Model for Joinery - Geometrical Shapes and Product Design.

BASE AND BLOCK MODELLING **20**

Preparation of Base for Models using Wood /Boards - Block Models of objects (3D Compositions) and Buildings Involving the Usage of Various Materials. Contour Representation- Roads/Pavements - Trees/Shrubs - Lawn- Water bodies - Street Furniture- Fencing - Exercise: Conceptual, Interior and Exterior Model with Landscape Elements and Contour.

DETAIL MODELLING **18**

Detailed models - Representation of Various building elements - Materials like Mount board, Snow-white Board, Acrylic Sheets - Surface Finishes like brick/stone representation, Stucco finish - Various Site Elements - Exercise: Model for Detailed building components.

STRUCTURAL SYSTEMS MODEL **20**

Structural Systems - Space Frames - Different forms of Shell roofs using POP, Clay, Soap; Tensile Structures using Fabric - Exercise: Model for structural systems.

INNOVATIVE IDEAS, MATERIAL AND TECHNIQUES **14**

Innovative Ideas - New Materials and Techniques. - Exercise: Model using Innovative materials.

d. Activities

- Students make the real model for joinery, geometrical shapes, and product design in the workshop.
- Students choose the spatial plan, elevations, sections, and views from any renowned architect's works and make the conceptual, interior, and exterior models with landscape elements for the same building.
- Students Select the contour site, analyses the characteristics of the contour, and make the model for it.
- Students select the building components with different finishes, and make the model for the same Develop and Create sculpture model.
- Students make the model for the structural system.
- Students explore the innovative materials and make the models for it.

e. Learning Resources

1. Hoboken “Models”.3rd Ed.: John Wiley & Sons.
2. Kieran, S. and Timberlake, J. (2008). LobollyHouse : “Elements of a New Architecture”. New York: Princeton Architectural Press.
3. Morgan, C. L. and Nouvel, J. (2002). “The Elements of Architecture”. London : Thames &Hudson.
4. Werner, M. (2011). “Model Making”. New York: Princeton Architectural Press
5. Hajra Choudhury, Hazra Choudhary and Nirjhar Roy “Elements of Workshop Technology, Vol. I”, , Media promoters and Publishers Pvt. Ltd., 2007.
6. W. A. J. Chapman “Workshop Technology”, ,1st South Asian Edition, Viva Book Pvt Ltd., 1998.
7. P.N. Rao “Manufacturing Technology”, Vol.1”, 3rd Ed.”, , Tata McGraw Hill Publishing Company, 2009
8. Mills, Criss B., “Designing with Models”, John Wiley & Sons, New Jersey,

9. Knoll, Wolfgang & Hechinger, Martin, “Architectural Models”, J.Ross Publishing, 2006.
10. Watson, Don A., “Construction Materials and Processes”, McGraw Hill Co., University of Michigan, 1972.
11. Mckay, W.B., “Building Construction”, Vol.1, 2, 3 Longmans, U.K.1981.
12. Alanwerth, “Materials”, The Mitchell Pub.Co.Ltd., London, 1986.
13. Chudley, R., “Building Construction Handbook”, British Library Cataloguing in Publication Data, London, 1990.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1				1	1							1	
CO2				1	1								
CO3				1	1							1	
CO4				1	1								
CO5				1	1							1	
CO6				1	1							1	
Total				6	6							4	
Scaled value				1	1							1	

Course Code	Course Name	L	T	P	C
U24AR157	Architectural Design - I	0	0	8	12
Sustainable Development Goals					

Category: Professional Core Courses (PCC)

a. Preamble

This course aims to initiate a learning process in architectural design through principles of spatial organization, primary response to climate, material and structure alongside developing an understanding of a small-scale structure and single space design.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the principles of spatial organization by analyzing architectural design fundamentals	K2
CO2	Analyze the relationship between human activities and architectural space to identify design factors	K4
CO3	Apply scalar and proportional studies in design to create human-centric architectural spaces	K3
CO4	Organize data and case studies to inform the selection of materials and construction methods	K3
CO5	Apply spatial needs and configurations by understanding anthropometry and climate considerations.	K3
CO6	Create design a single space by integrating scale, function, and material choices	K6

c. Course Syllabus **Total : 120 Hours**

FUNDAMENTALS TO ARCHITECTURAL SPACE MAKING 10

Parameters of Architectural Design - Factors Influencing Architectural design - Relationship between the Human Activity - Interrelationship of Architectural Space to Form, Structure, and Materials - Design Process.

VOLUMETRIC UNDERSTADING OF SPACES 20

Planes - Articulation of Planes to Define Spaces- Volumes- Interpreting Through Case Examples – Scale and Proportion- Human Anthropometry-Activity and Behavioral Aspects.

STUDIO UNIT - DESIGN OF A SHELTER 30

Design Project: Pavilion (Permanent/ Temporary), Snack Bar, Information Kiosk, Built Play Area, Bus Stop Shelter, Covered Seating Structure, Conservatory, Entrance Gateway.

Areas of concern/ focus:

- Scale and Proportion
- Activity Analysis
- Appropriate Materials and Construction

Methodology: Data collection, case studies, analysis and presentation of studies – Data collection with respect to design and detailing for the users

Presentation: Concepts and presentation of design with scaled models and rendered drawings.

SPATIAL UNDERSTANDING IN DESIGN 30

Anthropometry and Interpreting the Respective Spatial Needs and Configuration in Architectural Design through Consecutive Design Process - Framing of Requirements – Functionality-Climate-User - Material.

STUDIO UNIT – DESIGN OF A SINGLE SPACE **30**

Design Project: Residential spaces: Toilet cum Powder Room, Kitchen, Bedroom, Hostel Room, Studio Unit

Professional Workspace: Workspace for Architects, Designers, Artist, Writer, etc.,

Areas of concern/ focus:

- Scale and proportion
- Activity analysis
- Appropriate materials and construction

Methodology: Data collection, case studies, analysis and presentation of studies – Data collection with respect to design and detailing for the users

Presentation: Concepts and presentation of design with scaled models and rendered drawings.

d. Activities

- Exploring architectural case study and analyzing the same through sketches
- Preparation of defined volumes through models using different materials.
- Team / individual discussion and brainstorming sessions.
- Live Site study and case study explorations.
- Preparation of sheets for various stages of design process
- Preparation and composing presentation drawings for given Architectural design project.
- Preparation of Physical Model for the final approved Architectural design

e. Learning Resources

1. De Chiara and Callender, “Time Saver Standard for Building Types”, McGraw-Hill Co., 2nd Edition, 1980.
2. Edward D.Mills, Planning “The Architects Handbook” 10th Edition, British Library Cataloguing in Publication Data, 1985.
3. Andrew Alpern, “Handbook of Speciality Elements in Architecture”, McGraw-Hill Book Co., 1982.

4. Rudolf Herg “Neufert Architect's Data”, , Crosby Lockwood and Sons Ltd., 1970.
5. Edward D.Mills – “Planning the Architects Hand Book” - Bitterworth, London, 1985.
6. Francis D.K.Ching – “Architecture - Form Space and Order” Van Nostrand Reinhold Co., (Canaa), 1979.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	3	3								1	1		
CO2	3	3								1			
CO3	3	3								1	1		
CO4	3	3								1		1	
CO5	3	3								1			
CO6	3	3								1	1	1	
Total	18	18								6	3	2	
Scaled Value	3	3								1	1	1	

Course Code	Course Name	L	T	P	C
U24AR201	Climate and Architecture	3	0	0	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This course explores the relationship between climate and design, focusing on how factors like temperature, humidity, and sunlight impact architecture. Students will learn sustainable design principles to create energy-efficient, resilient buildings that respond to local climates. Through case studies, they will gain skills to design structures that minimize environmental impact.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Remember the factors influencing climate and its impact on architectural design	K1
CO2	Design shelters adapted to different tropical climate zones, considering local climatic conditions	K6
CO3	Understand air movement patterns and their role in enhancing natural ventilation within buildings	K2
CO4	Evaluate the heat transfer properties of building materials and their impact on thermal performance	K5
CO5	Apply solar geometry principles to design effective solar control strategies for buildings.	K3
CO6	Analyze the factors influencing climate and its impact on architectural design	K4

c. Course Syllabus **Total: 45 Hours**

CLIMATE AND THERMAL SENSATION **10**

Factors that determine climate - Components of climate - Characteristics of climate types, Building design Approaches - Body heat balance - Effective temperature – Bioclimatic chart - Comfort zone.

SOLAR CONTROL **07**

Solar geometry - Solar chart - Sun angles and shadow angles. Design of solar shading devices – Exploratory exercises - Shading device study models.

HEAT FLOW THROUGH BUILDING MATERIALS **08**

Basic principles of Heat Transfer - Performance and properties of different materials - calculation of 'U' value - Time lag and decrement of building elements - Study projects.

AIR MOVEMENT **10**

Wind rose - Wind shadows - The effects of topography on wind patterns - Air movement around and through buildings - The use of fans - Stack effect - Venturi effect - Thermally induced Air currents – Use of court yard - Wind Scoop.

SHELTER DESIGN IN TROPICS **10**

Design considerations for various climatic zones including warm-humid, hot-dry, composite, upland, and heavy rainfall regions - Landscape and climatic design - Mini projects in relation with Architectural Design - Solar Passive Architecture.

d. Activities

- Prepare a comparative report with climatic components for different climates.
- Assignment with 3D model incorporating climate and architecture concepts
- Understand the climate relationship while designing architectural spaces.
- Apply site context and climatological aspects while designing spaces.

e. Learning Resources

1. O.H. Koenigsberger and Others, "Manual of Tropical Housing and Building" – Part I -Climate design, Orient Longman, Madras, India, 2010.
2. Bureau of Indian Standards IS 3792, "Hand book on Functional requirements of buildings other than industrial buildings", 1987.
3. Galloe, Salam and Sayigh A.M.M., "Architecture, Comfort and Energy", Elsevier Science Ltd., Oxford, U.K., 1998.
4. M.Evans - Housing, Climate and Comfort - Architectural Press, London, 1980.
5. B.Givoni, Man, Climate and Architecture, Applied Science, Banking, Essex,1988.
6. Donald Watson and Kenneth Labs., Climatic Design - McGraw Hill Book Company , New York - 1983.
7. B. Givoni, "Passive and Low Energy Cooling of building", Van Nortrand Reinhold New York, USA, 1994.
8. http://www.envinst.conu.edu/~envinst/research/built.html
9. http://www.teriin.org/
10. http://www.pge.com/pec/archives/w98 passi.html
11. http://solstice.crest.org/efficiency/index.html

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	2		3					2			1		3
CO2	1		3					2			1		3
CO3	1		3					2			1		3
CO4	1		3					2			1		3
CO5	1		3					2			1		3
CO6	3		3					3			1		3
Total	9		18					13			6		18
Scaled value	2		3					3			1		3

Course Code	Course Name	L	T	P	C
U24AR202	Site Surveying and Planning	3	0	0	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

The Course Site Surveying and Planning focuses on the objectives and scope of architecture. This course facilitates the learner to understand process involved in site analysis and its importance in architectural designing.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the basic concepts of surveying	K2
CO2	Understand the factors involved in site analysis process.	K2
CO3	Interpret the natural factors of that influence the site.	K2
CO4	Apply various techniques in site gradation.	K3
CO5	Understand the organization of circulation in site planning.	K2
CO6	Analyze and prepare site analysis and site plan.	K4

c. Course Syllabus **Total: 45 Hours**

INTRODUCTION **7**

Survey - Definition of plot, site, land and region, Units of Measurements, Reconnaissance - Need for surveying - Methods of surveying - Various equipment - Modern Surveying Instruments used in field surveys – GIS – Remote sensing.

FACTORS OF SITE ANALYSIS **10**

Site planning - Importance of site analysis – Site factors - On-site and off-site factors - Analysis of natural, cultural, and aesthetic factors: topography, hydrology, soil, vegetation, climate, surface drainage, accessibility, size and shape, and infrastructure available - Sources of water supply and means of the disposal system - Visual aspects.

SITE SELECTION AND ANALYSIS **8**

Study of microclimate and the role of vegetation, wind, landforms and water as modifier of microclimate - Site selection process - Site selection criteria for housing development, commercial and institutional projects - Importance of site analysis - Systemic process of site analysis.

SITE ANALYSIS TECHNIQUES **10**

Study of landform: Contours - slope analysis - grading process - conservation methods - Preparation of site analysis diagram.

SITE PLANNING AND LAYOUT PRINCIPLES **10**

Context of the site - Preparation of site plan drawing - Incorporation of site analysis factors - Organization of vehicular and pedestrian circulation - Types and hierarchy of roads - Intersection of streets - Parking regulations.

d. Activities

- Understanding objectives and scope of surveying.
- Understanding the concepts of natural, manmade and environmental factors in different site conditions.
- Analyzing the factors while designing architectural spaces.

e. Learning Resources

1. B.C.Punmia - "Surveying" Vol.I - Standard Book House, New Delhi - 2016.
2. Kevin Lynch – "Site planning" - MIT Press, Cambridge, MA - 1984.
3. Edward. T. Q., "Site Analysis", Architectural Media, 2014.
4. Joseph De.Chiarra and Lee Coppleman – "Planning Design Criteria" - Van Nostrand Reinhold Co.,New York - 1982.
5. Beer R, "Environmental Planning for Site development" 1990
6. Turner, "Landscape Planning and environmental impact design" 1998.
7. W.M. Marsh – "Landscape Planning", John Wiley & Sons, USA 1983.

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	1		3	3								2	
CO2	1		3	3								2	
CO3	1		3					3				2	
CO4	1		3	3								2	2
CO5	1		3			2						3	3
CO6	1		3	2	3							2	
Total	6		18	11	3	2		3				13	5
Scaled value	1		3	2	1	1		1				2	1

Course Code	Course Name	L	T	P	C
U24AR203	Analysis of Structures	3	0	0	3
Sustainable Development Goals					

Category: Basic knowledge of core engineering (Core Courses)

a. Preamble

The course aims to provide students with a fundamental understanding of structural analysis. It covers essential concepts such as shear force, bending moment, stresses, deflection of beams, and behavior of indeterminate structures. Through practical applications and problem-solving, students will develop analytical skills necessary for structural engineering. This course lays the foundation for advanced topics in structural design and analysis, equipping students with skills required for real-world engineering challenges.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the basic concepts of shear force and bending moment in beams.	K2
CO2	Apply bending theory to calculate bending and shear stresses in beams.	K3
CO3	Evaluate the slope and deflection of beams under various loading conditions.	K5
CO4	Analyze short and long columns for stability under axial loads.	K4
CO5	Apply methods of analysis to continuous and fixed beams.	K3
CO6	Understand the behavior of indeterminate structures and perform basic analysis.	K2

c. Course Syllabus **Total: 45 Hours**

SHEAR FORCE AND BENDING MOMENT **9**

Concepts of shearing force and bending moment - Shear force and bending moment diagrams for cantilever and simply supported beams subjected to point load, uniformly distributed loads, and their combinations.

STRESSES IN BEAMS **9**

Principle of moments and equilibrium, Free body diagram (FBD) and its significance, Types of supports Theory of simple bending - Bending stresses in beams and shear stresses in beams - Examples on simple sections and stress distribution diagrams.

DEFLECTION OF BEAMS **9**

Slope and deflection at a section - Double Integration and Macaulay's method for simply supported and cantilever beams subjected to concentrated loads and uniformly distributed loads.

THEORY OF COLUMNS **9**

Short and long columns - Euler's method and its limitations - Derivations of Euler's formula (for different end conditions) - Rankine’s formula for columns (no derivations) - Application to practical problems.

INTRODUCTION TO INDETERMINATE STRUCTURES **9**

Concepts of indeterminate structures - Analysis of continuous beams, fixed beams, and partial frames - Application to simple problems.

d. Activities

- Measure the deflection and observe shear force and bending moment variations
- Perform stress and deflection analysis under various loading conditions.
- Demonstrate how end conditions influence the buckling load.
- Analyze the structural system using indeterminate analysis methods (continuous beams, fixed beams, or frames) and also identify structural weaknesses, and suggest preventive measures.

e. Learning Resources

1. M.M. Ratwani & V.N. Vazirani, Analysis of Structure, Vol.1, Khanna Publishers, Delhi, 2017.
2. R.K. Bansal, A Textbook on Strength of Materials, 6th Edition, Laxmi Publications, New Delhi, 2018.
3. Paul W. McMullin, Jonathan S. Price, Introduction to Structures, Routledge, 2016.
4. B.C. Punmia et al., SMTS-I, Strength of Materials, 10th Edition, Laxmi Publications, 2018.

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1			3										
CO2			3									1	
CO3			3										
CO4			3										
CO5			3									1	
CO6			3										
Total			18									2	
Scaled value			3									1	

Course Code	Course Name	L	T	P	C
U24AR204	Water Supply and Drainage	2	0	2	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This course provides a comprehensive knowledge on technologies and components of the various plumbing services - water supply, sewerage, drainage, waste management, plumbing systems and fire safety. This course also enables the conceptual design of plumbing services for small buildings.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the water supply management at urban level and building level.	K2
CO2	Understand the sewerage management at urban level and building level.	K2
CO3	Understand the Storm water drainage systems at urban level and building level.	K2
CO4	Analyze the concepts of solid waste management.	K4
CO5	Design plumbing systems for a small building	K6
CO6	Apply the appropriate fire safety systems in buildings	K5

c. Course Syllabus **Total: 60 Hours**

WATER SUPPLY **10**

Sources of Water supply, demand assessment, Treatment - Screening, Aeration, Sedimentation, Filtration, Disinfection, Softening and Conditioning - RO, UV solar water heaters. Storage: reservoirs, overhead tanks, underground sumps, firefighting storage - Distribution systems: mechanical equipment, pumping, types of distribution, water meter, and automation.

SEWERAGE **12**

Sewerage systems - Sewage and Sullage - Sewerage system in Buildings - Single stack system, one pipe / two pipe plumbing, septic tank, leach pits. Sewerage system at campus / city level - sewage treatment plants, pumping stations. Shapes of sewer pipes: circular, egg shaped, horse shoe shaped, parabolic, semi elliptical, rectangular, U - shaped, semicircular, and basket handle shaped. Components of sewer: Sewer line, gradients, manholes, and inspection chambers.

DRAINAGE AND SOLID WASTE MANAGEMENT **12**

Storm water drainage systems at city level - Systems at building level: Roof drainage, Storm water gutter, storage sumps. Rain water harvesting - runoff coefficient, surface area and annual rainfall - Sustainable practices and systems.

Principles of solid waste management - Waste management concepts: minimizing waste generation, maximizing reuse, recycling and renewing - Concepts of circular economy – Solid waste management Process - Characterization of solid waste, Segregation, Collection, Transportation, Treatment and Disposal methods; incineration, sanitary land filling, bioleaching, biomining, pyrolysis, vermicomposting, bio gas system, and modern renewable energy technologies.

PLUMBING SYSTEMS IN BUILDINGS **10**

Basic principles of plumbing; Plumbing and sanitary fittings with their functional requirements - wash basins, water closets, urinals, bidets, bath tubs, and sinks - Types of valves - gate, float, flap, ball, and flush valves. Types of taps - faucets, stop cocks, and bib cocks. Types of traps - 'P', 'Q', 'S', floor traps and bottle traps - Types of pipes and their applications - galvanized steel, PVC, CPVC, uPVC, copper, stainless steel, PEX, ABS, HDPE, cast iron, and black iron.

FIRE SAFETY **16**

Triangle of combustion - Causes of fire in buildings - Classification of fire - Stages of fire and its spread. Fire alarm systems - Detection systems – Heat, fire, and smoke detectors, modules, communications and alert systems, control panels and automation. Firefighting systems - manual and automatic suppression systems - extinguishers, hydrants, wet and dry risers, sprinklers, clean agents; mechanical systems including motors, pumps, and water reserves. Fire safety standards and guidelines - NPFA, NBC. Planning and Design considerations - compartmentalization, egress design. Smoke management - Smoke barriers, pressurization, and ventilation. Evacuation management - zonal evacuation, fire drill, refuge spaces.

d. Activities

- Calculate the residential water supply and plan a storage system.
- Design water supply and drainage layout for a residential building.
- Understanding of types of plumbing products through catalogue.
- Prepare a case study report on fire safety design.

e. Learning Resources

1. Benjamin Stein, et al., 'Mechanical and electrical equipment for buildings',10th edition, John Wiley & Sons, Inc, 2006.
2. S.C.Rangwala, 'Water Supply and Sanitary Engineering', Charotar Publishing House, 2016.
3. Punmia B.C, 'Waste Water Engineering', Laxmi Publications, 2009.
4. 'National Building Code', Bureau of Indian Standards.
5. 'Indian Standard Code of Practice for Water Supply in Buildings, IS :2065 – 1983'
6. G.M. Fair, J.C. Geyer and D.Okin, 'Water and Waste Water Engineering Volume II', John Wiley and Sons, Inc. New York, 2010.
7. Maurice Jones Jr., Jones, "Fire Protection Systems", 2nd edition, Jones & Bartlett Publishers, 2013
8. Das Akhil Kumar, "Principles of fire safety engineering", 2nd edition, 2020.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1				2			1				2		2
CO2				3			1		2		2		2
CO3				3			1		2				2
CO4				3			1		2				2
CO5				3			1		2				2
CO6				3			1				2		2
Total				17			6				6		12
Scaled value				3			1				1		2

Course Code	Course Name	L	T	P	C
U24AR205	Materials and Construction - III	2	0	2	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This course examines the use of ferrous and non-ferrous metals and glass in modern construction, focusing on their properties, manufacturing methods, structural roles, and innovative applications. It highlights emerging trends such as high-performance alloys, lightweight systems, energy-efficient glazing, and advanced fabrication techniques like 3D metal printing. Combining theory with practical exercises, the course equips students with the technical knowledge and skills to design and detail metal and glass elements in sustainable, high-performance buildings.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Explain the historical development and applications of iron and steel in architecture.	K2
CO2	Apply principles of steel construction, including beams, columns, trusses, and frames.	K3
CO3	Analyze advanced steel structures like geodesic domes, space frames, and diagrids.	K4
CO4	Describe the properties, manufacturing, and uses of aluminum, copper, and titanium in buildings.	K2
CO5	Evaluate different types of glass and their applications in architecture.	K5
CO6	Create technical drawings and models while documenting construction details through site visits.	K6

c. Course Syllabus **Total : 60 Hours**

FERROUS METALS AND THEIR APPLICATIONS **12**

Historical evolution of iron in architecture - examples, such as the Eiffel Tower and early industrial buildings – Types of iron, its uses in building industry - Outline the manufacturing process of steel and its alloys - Properties, types, and applications of mild steel, high-strength steel, and weathering steel - Protective coatings - corrosion in ferrous metals and preventive measures - Fire protection of steel.

STEEL CONSTRUCTION TECHNIQUES AND INNOVATIONS **12**

Construction principles and detailing of steel structural components - Steel frame structures: beams, columns, portal frames, and flat roof systems - Specific applications: steel staircases, lattice trusses, and tubular steel roof trusses - Joining and fixing techniques - INSDAG guidelines - Technical drawings, and model-making exercises - Site visits to document structural details through sketches, photographs, and reports.

ADVANCED STEEL STRUCTURES **12**

Steel in complex structural systems: geodesic domes, space frames, diagrid structures - - outline of prefabrication principles - Preco beams, cellular beams, and composite slim floor beams - Facade solutions: Steel curtain wall glazing – Recent trends in roofing materials: Corrugated GI sheets, Corrugated hypar shell structures, pre-coated metal sheets - Cable structures.

NON-FERROUS METALS IN CONSTRUCTION **12**

Aluminum, Copper, and Titanium: properties, various finishes, corrosion resistance and protective coatings - Connections for extruded sections, flat products – Applications: Aluminum doors and windows, ironmongery, glass framing systems, curtain walls, structural glazing, and exterior wall claddings - Installation techniques and material compatibility for skylights, interior drywall partitions, and false

ceilings - Use of gaskets, caulking, and sealants - Technical drawings: shopfront curtain walls, structural glazing systems, and aluminum composite panel cladding.

GLASS IN ARCHITECTURE **12**

Glass as a building material: composition, forming processes, and manufacturing techniques, extruded sections and cast glass blocks - Types of glass: structural, fire-resistant, insulated, solar control glass, and energy-efficient glass - acoustic properties – Applications: glass wall systems, glass staircases, balustrades, and partition systems.

d. Activities

- **Plate 1**: Detailing of steel structural connections (eg., beam-to-column, base plates, gusset plates, bolted / welded joints).
- **Plate 2**: Drawing of shopfront curtain wall or structural glazing system using Aluminium sections.
- **Plate 3**: Glass applications in architecture – staircases, balustrades, or partition details.
- **Visit** a **building** with exposed steel or glass structures (eg., an airport terminal, mall, tech park, or metro station). Document structural systems, detailing, and material behaviour through sketches, photographs, and a short report.
- Group assignment to analyze a significant architectural project (e.g., Eiffel Tower, steel stadium, or glass pavilion). Cover aspects like material use, structural design, innovation, and construction techniques.

e. Learning Resources

1. Jackson, N. & Dhir, R. K. – *Civil Engineering Materials* (Macmillan Press, 1996)

2. William D. Callister & David G. Rethwisch – *Materials Science and*

Engineering: An Introduction (Wiley, 2020)

3. Arthur Lyons – *Materials for Architects and Builders* (Routledge, 2019)
4. J. E. Gordon – *The New Science of Strong Materials: Or Why You Don't Fall Through the Floor* (Penguin Books, 2006)
5. Francis D.K. Ching – *Building Construction Illustrated* (Wiley, 2020)
6. M. Ashby & H. Shercliff – *Materials: Engineering, Science, Processing and Design* (Elsevier, 2023)
7. INSDAG (Institute for Steel Development & Growth) – *Steel in Construction: Guidelines and Case Studies* (INSDAG, 2018)
8. Lambert Engineering – *Structural Steel: Design, Fabrication, and Construction* (Lambert Publishing, 2016)
9. B. C. Punmia & A. K. Jain – *Design of Steel Structures* (Laxmi Publications, 2017)
10. Subramanian N. – *Steel Structures: Design and Practice* (Oxford University Press, 2018)
11. Salvadori, M. – *Why Buildings Stand Up: The Strength of Architecture* (W.W. Norton & Company, 2002)
12. J. R. Davis – *Aluminum and Aluminum Alloys* (ASM International, 1993)
13. D. E. Macdonald – *Passivity of Metals* (Springer, 2011)
14. George E. Totten & Hong Liang – *Surface Modification and Mechanisms of Metallic Biomaterials* (CRC Press, 2013)
15. Pilkington Glass Handbook – *Glass in Architecture & Construction* (Pilkington, 2008)
16. Michel Fremond & Franco Maceri – *Mechanics of Masonry Structures* (Springer, 2005)
17. Peter Rice & Hugh Dutton – *Structural Glass* (Spon Press, 1995)
18. N. Christian Wittwer – *Glass Construction Manual* (Birkhäuser, 2007)
19. Robert McCarter & Frank Barkow – *Building with Glass* (Princeton Architectural Press, 2018)

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1				3				1					
CO2				3				1					
CO3				3				1					
CO4				3				1					
CO5				3				1		3			2
CO6				3				1					
Total				18				6		3			2
Scaled value				3				1		1			1

Course Code	Course Name	L	T	P	C
U24AR206	Computer Applications in Architecture	1	0	4	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

The Course Computer Applications in Architecture introduces students to industry-standard computer-aided design, 3D modeling, and visualization tools, enabling them to create precise 2D drawings, develop detailed 3D architectural models, and generate realistic renderings and walkthroughs.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the digital tools essential for design, visualization and documentation	K2
CO2	Create 2D Architectural design and detail drawings	K6
CO3	Create 3D Architectural models integrating spatial understanding	K6
CO4	Apply materials, textures and lighting for generating realistic visualization	K4
CO5	Create real-time and photorealistic images	K6
CO6	Create immersive virtual walkthroughs and to present digital	K6

c. Course Syllabus **Total: 60 Hours**

INTRODUCTION **8**

Fundamentals of Computer-Aided Design (CAD) in Architecture - Introduction to the CAD interface, tools, and workflows used for architectural drafting and documentation.

Developing 2D drawings with understanding of: (i) Layers, line types and object properties, (ii) Lines, polylines, shapes and modifying objects, (iii) Snapping, dimensioning, text and hatching, (iv) Layers, line weights and title blocks

ARCHITECTURAL DRAFTING AND DOCUMENTATION **14**

Developing architectural floor plans and sections – Layouts and plotting – Blocks and dynamic components – Xrefs & Collaboration

3D MODELLING AND VISUALIZATION **18**

Introduction to 3D Modeling Tools. Understanding the interface and functionalities of intuitive modeling and layout software used for architectural visualization and presentation.

Developing 3D models with understanding of: (i) Components and Groups, (ii) Creating and editing geometry, (iii) Applying materials and textures, (iv) Layers, styles, scenes, sections, tags, texts, dimensions, sheet sets

RENDERING AND VIRTUAL WALKTHROUGH **12**

Understanding Enscape interface. Rendering settings and real-time-visualization. Daylight, Artificial lighting, Texture and reflections of materials, creating perspectives, 360 degree and panoramic views. Generating scenes and transitions, generating walkthroughs and presenting techniques.

ADVANCED 3D MODELING **8**

Working with complex geometries and terrain modelling. Exploring the supportive plugins for modeling and analysis.

d. Activities

- Developing Architectural Floor plans with Sections and Elevations using AutoCAD.
- Developing 3D model for the floor plan with Isometric view, Elevation and Section using SketchUp.
- Applying materials and textures to the interior and exterior of the building. Creating exterior design and interior design of a bedroom.
- Applying lighting and creating rendered views of a building.
- Creating a virtual walkthrough of the building and working with presentation.

e. Learning Resources

1. "Mastering AutoCAD 2023 and AutoCAD LT 2023" – Brian C. Benton & George Omura
2. "SketchUp for Site Design: A Guide to Modeling Site Plans, Terrain, and Architecture" – Daniel Tal
3. "Real-Time Rendering for Architects: A Guide to Enscape and VR Workflows" – Holger Meyer
4. "Architectural Graphics" – Francis D.K.Ching
5. "Architectural Design with SketchUp: 3D Modeling, Extensions, BIM, Rendering, Making, and Scripting" – Alexander C. Schreyer

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1					3					2			
CO2					3					2			
CO3					3					2			
CO4					3					2			
CO5					3					2			
CO6					3					2			
Total					18					12			
Scaled value					3					2			

Course Code	Course Name	L	T	P	C
U24AR207	Architectural Design - II	0	0	8	12
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This course develops fundamental architectural design skills with a focus on spatial planning, climate responsiveness, and site integration. Students will explore user-centric design, material selection, and sustainable building strategies providing a comprehensive approach to architectural problem-solving.

b. Course Outcomes

After successful completion of the course, the students will be able

COs	Course Outcome	Knowledge Level
CO1	Understand spatial planning and site integration for climate-responsive design.	K2
CO2	Interpret through case study to develop knowledge on definition of volumes & spaces in architectural design.	K4
CO3	Apply design techniques to create functional, user-centric spaces.	K3
CO4	Analyze zoning, circulation, and spatial relationships for efficient design.	K4
CO5	Design of spaces with the understanding of functional, aesthetical structural, and material considerations.	K6
CO6	Develop a neat architectural presentation drawings, scale models using various medium.	K6

c. Course Syllabus **Total: 150 Hours**

ARCHITECTURAL DESIGN PROCESS **10**

Project scope - user needs, and site context. Area Statement - Concept development through ideation, sketches, and precedent studies. Spatial planning – Zoning - circulation - Relationship between form and function. The integration of structural systems - MEP services, sustainability - accessibility. Effective communication through drawings, models, and presentations.

CLIMATIC UNDERSTANDING OF SPACES **30**

Spatial Planning with respect Climate factors in design - Study methodologies including solar orientation to optimize spatial planning, natural ventilation, shading devices, thermal mass and material selection to regulate indoor conditions. Orientation of buildings - Zoning of spaces - Facade treatments.

STUDIO UNIT –I **40**

Design Project: Weekend Cottage, Residential buildings, Gate complexes including security Kiosk and entry / exit gates, Crèche, Cafeteria, Motel etc.,

Areas of concern/ focus:

- Climate understanding of space
- Form space relationship
- Activity analysis
- Appropriate materials and construction

Methodology:

Data collection, case studies, analysis and presentation of studies – Data collection with respect to design and detailing for the users

Presentation:

Concepts and presentation of design with scaled models and rendered drawings.

SITE LEVEL UNDERSTANDING IN DESIGN **30**

Analyzing Site - topography, climate, vegetation, access, and surrounding context - Site orientation, zoning, circulation, drainage, and integration with natural elements. Site Factors like wind patterns, sun path, and views influence spatial planning and building placement – Site Planning in Design

STUDIO UNIT – II **40**

Design Project: Nursery or primary schools, schools for children with specific disabilities, primary health center, neighbourhood market, community library,

Areas of concern/ focus:

- Site planning aspects
- Behavioral aspects
- Activity analysis
- Appropriate materials and construction

Methodology:

Data collection, case studies, analysis and presentation of studies – Data collection with respect to design and detailing for the users

Presentation:

Concepts and presentation of design with scaled models and rendered drawings

d. Activities

- Exploring architectural case study and analyzing the same through sketches
- Team / individual discussion and brainstorming sessions.
- Live Site study and case study explorations.
- Preparation of sheets for various stages of design process
- Preparation and composing presentation drawings for given Architectural design project.
- Preparation of Physical Model for the final approved Architectural design

e. Learning Resources

1. Joseph De Chiara, Michael J Crosbie, “Time-Saver Standards for Building Types”, McGraw Hill Professional, 2001.
2. Julius Panero, Martin Zelnik, “Human Dimension and Interior Space”, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, “Time-Saver Standards for Interior Design and Space Planning”, McGraw Hill, 2001.
4. Ernst Neuferts, “Architects Data,” Blackwell, 2002.
5. Ramsey et al, “Architectural Graphic Standards”, Wiley, 2000
6. Richard P. Dober, “Campus Planning” - Society for College and University Planning, 1996.
7. AchyutKanvinde, “Campus design in India”, American year Book, 1969, (e - book 2018
8. Kevin Lynch, “Site planning”, MIT Press, Cambridge, 30 June 2012.
9. Sam F. Miller, “Design Process: A Primer for Architectural and Interior Design”, Van Nostrand Reinhold, 1995.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	3	2	2		3			3				3	2
CO2	3	3	3										
CO3	3												
CO4	3												
CO5	3		3	3									
CO6	3			3	3								
Total	18	18	8	6	3			3				3	2
Scaled value	3	3	2	1	1			1				1	1

Course Code	Course Name	L	T	P	C
U24AR251	Contemporary Architecture	3	0	0	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This course equips students to trace architectural evolution from the Industrial Revolution to Contemporary trends, highlighting key movements, technological advancements, and influential architects and thereby gain a critical perspective on architectural evolution and its future directions.

b. Course Outcomes

After successful completion of the course, the students will be able

COs	Course Outcome	Knowledge Level
CO1	Understand architectural evolution from pre-industrial to contemporary times..	K2
CO2	Interpret the spatial configuration and design ideologies and three-dimensional articulation from master architects works	K4
CO3	Analyze the contextual design solution, Spatial organization of architects works	K4
CO4	Apply the knowledge towards logical design development.	K3
CO5	Understand the characteristics of international styles and alternatives.	K2
CO6	Understand context-responsive designs by synthesizing historical and technological aspects and digitally integrated solutions	K2

c. Course Syllabus **Total: 45 Hours**

ARCHITECTURE PRE AND POST INDUSTRIALIZATION 5

Neo Classicism – Study of the Industrial revolution and its impact on architecture, including the emergence of new building typologies, materials and construction technologies. Exploration of the Arts & Crafts movement in Europe and America; Art nouveau; the Chicago School; and Art Deco architecture in both Europe and America.

Key Architects: Victor Horta, Hector Guimard, Antonio Gaudi, and Charles Rennie Mackintosh.

EVOLUTION OF MODERNISM 10

Early modernism in Europe and America – Exploration of the Critique of ornamentation and the concept of Raumplan by Adolf Loos. Study of Peter Behrens, the Werkbund and the influence of modern art movements (isms) on architecture. Art Deco, the Bauhaus, CIAM and the emergence of the International Style. Discussions on Adolph Loos and the debates surrounding ornamentation in modern architecture.

Key Architects: Walter Gropius, Le Corbusier, Alvar Aalto, Frank Lloyd Wright, Mies van der Rohe, Philip Johnson, Richard Neutra.

EVOLUTION OF POST MODERNISM 10

Critiquing Modernism - works and writings of Venturi, Jane Jacob and Christopher Alexander. – Exploration of High-Tech Architecture, Critical Regionalism, Deconstructive Architecture, and the Memphis Milano dedsign movement.

Key Architects: Richard Rogers, Renzo Piano, Richard Meier, Jørn Utzon, Tadao Ando, Zaha Hadid, Bernard Tschumi, Daniel Libeskind, Frank O. Gehry, Rem Koolhaas, and Santiago Calatrava

CONTEMPORARY ARCHITECTURE IN INDIA **10**

Study of prominent modern and contemporary architects who have shaped post-independence Indian architecture. Exploration of architectural philosophies, contextual responses, material expression, and contributions to Indian urbanism.

Pioneering Architects: B.V Doshi, Charles Correa, Louis Khan, Raj Rewal, Achyut Kanvinde, Uttam Jain, Lauire Baker, Anant Raje.

Current Practices: Sanjay Mohe, Christopher Benninger, Hafeez Contractor, Chitra Viswanath, Sanjay Puri.

CONTEMPORARY ARCHITECTURE GLOBALLY **10**

Nature of contemporary society - Architectural movements and their responses to modern societal needs - parametric design, digital processes, sustainability, globalization, phenomenology, and complexity in architecture.

Key Architects: Norman Foster, I.M Pei, Zaha Hadid (ZHA), Bjarke Ingels Group (BIG), OMA and Rem Koolhaas, Steven Holl, William Mcdonough, Yeong, Peter Zumthor, Juhani Pallasmaa, Glenn Murcutt.

d. Activities

- Exploring contemporary buildings and architects work, analyzing form, materials, technology, and sustainability thorough sketches
- Debate and Discuss contemporary design trends.
- Engage with practicing architects working on contemporary design.
- Create sketches of visual infographics on key contemporary architectural movements
- Reviewing book written by master architects

e. Learning Resources

1. Willam J.Curtis, Modern Architecture Since 27 June 1996.
2. Bill Risebero, Modern Architecture and Design 1 January 1983.

3. Kenneth Frampton, Modern Architecture: A Critical History, Thames and Hudson, London, 28 August 2007.
4. Diane Ghirardo , 'Architecture after Modernism', Thames & Hudson, London, 1990.
5. Elie G. Haddad, David Rifkind, 'A Critical History of Contemporary Architecture: 1960-2010', Routledge, 2016.
6. Bhatt and Scriver, 'Contemporary Indian Architecture- After the Masters', University of Washington Press, 1991
7. Bahga et al, 'Modern Architecture in India - Post Independence Perspective', Galgotia, 1993
8. Jane Jacobs, 'Deaths and Life of Great American Cities', Modern Library, 2011.
9. Christopher Alexander, ' A Pattern Language', Oxford University Press, Oxford, 2015.
10. Robert Venturi, 'Complexity and Contradiction in Architecture', 1977.
11. Kate Nesbitt, Ed, 'Theorising a New Agenda for Architecture', Princeton University Press, 1996.

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	1		3										
CO2			3										
CO3			3										
CO4			3										
CO5			3									2	
CO6			3							3		2	
Total	1		18							3		4	
Scaled value	1		3							1		1	

Course Code	Course Name	L	T	P	C
U24AR252	Design of Structures	3	0	0	3
Sustainable Development Goals					

Category: Basic knowledge of core engineering (Core Courses)

a. Preamble

This course provides in-depth knowledge of the principles and techniques involved in the design and analysis of steel structures. It covers the behavior of steel members, connections, and various structural elements under axial, bending, and combined loading. The syllabus integrates modern practices, industry standards, and the latest IS codes to prepare students for real-world structural engineering challenges.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the properties, behavior, and classification of steel sections and connections.	K2
CO2	Analyze and design steel connections (riveted, bolted, and welded) using IS 800:2007.	K3
CO3	Design tension members using appropriate codal provisions.	K3
CO4	Design compression members, including built-up sections, considering buckling effects.	K3
CO5	Apply structural analysis principles to beams, trusses, and frames.	K3
CO6	Utilize design software for steel structure analysis and detailing.	K4

c. Course Syllabus **Total: 45 Hours**

INTRODUCTION TO STRUCTURAL STEEL DESIGN AND ANALYSIS **9**

Overview of structural systems and their components - Mechanical properties of steel: strength, ductility, toughness, and weldability - IS 800:2007 – General Construction in Steel – Code of Practice - Limit State Design (LSD) and Working Stress Method (WSM) - Load combinations and safety factors in structural steel design - Introduction to structural analysis software.

STEEL SECTIONS AND CONNECTIONS **9**

Properties of rolled steel sections: I-sections, channels, angles, and hollow sections - Bolted connections: Types, design principles, and codal provisions (IS 800:2007) - Welded connections: Types of welds, permissible stresses, and design of fillet welds - Riveted connections: Behavior and analysis (excluding eccentric connections) - Design examples using manual calculations and software.

TENSION MEMBERS **9**

Introduction to tension members and their applications - Net sectional area and permissible stresses - Design of axially loaded tension members - Incorporating lug angles and splicing techniques - Code provisions: IS 800:2007 -Practical design examples using hand calculations.

COMPRESSION MEMBERS **9**

Introduction to compression members and failure modes - Buckling effects: local and global buckling - Design of columns with various sections - Application of IS 800:2007 for compression member design – Problems.

BASIC INDUSTRIAL TRUSSES **9**

Definition and types of trusses used in industrial structures - Applications of trusses in warehouses, factories, and industrial sheds - Components of Industrial

Trusses - Analysis of Statically Determinate Trusses - Design of Basic Industrial Trusses - Selection of truss configuration (Pratt, Warren, and Howe trusses) – case study.

d. Activities

- Study structural steel failures and propose redesign solutions. Identify causes of failure and suggest preventive measures.
- Submit detailed drawings and calculations.
- Design a steel truss bridge or a portal frame using IS codes.
- Visit an industrial construction site to observe steel connections and member installations. Document and present findings.
- Industry experts to discuss the latest trends in steel structure design, analysis, and software applications.

e. Learning Resources

1. Ramachandra S., Design of Steel Structures, Standard Book House, Delhi, 1984.
2. Duggal S.K., Limit State Design of Steel Structures, Tata McGraw-Hill, 2017.
3. Bhavikatti S.S., Design of Steel Structures, I.K. International Pvt Ltd, 2009.
4. IS 800:2007 – General Construction in Steel – Code of Practice.
5. IS 875 (Part 1-5) – Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures.
6. IS 801:1975 – Code of Practice for Use of Cold-Formed Light Gauge Steel Structural Members.
7. National Building Code of India, Part VI – Structural Design.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1			3										
CO2			3										
CO3			3										
CO4			3										
CO5			3										
CO6			3							2			
Total			18							2			
Scaled value			3							1			

Course Code	Course Name	L	T	P	C
U24AR253	Mechanical and Electrical Services	1	0	2	2
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preambles

This course exposes the students to the science behind air-conditioning systems, the different types, components and applications in controlling a building's indoor environment. This course familiarizes the students about the different requirements of electrical services in a building and enriches about sources, principles, products and design of lighting from artificial sources.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand the different air conditioning systems and their basic principles	K2
CO2	Understand the design criteria and components of Air-conditioning systems in buildings	K2
CO3	Understand the fundamentals of electricity and load	K2
CO4	Understand the components and distribution of electricity in buildings	K2
CO5	Assess the types of lighting contextual to an interior space.	K5
CO6	Analyze the lighting level for a small interior space	K4

c. Course Syllabus **Total: 60 Hours**

PRINCIPLES AND SYSTEMS OF AIR CONDITIONING 14

Laws of Thermodynamics - Transfer of heat - Refrigeration cycle components - Vapor compression cycle - Refrigerant, Compressor, condenser, evaporator, refrigerant control devices, electric motors, air handling units, cooling towers. Types of Air conditioning systems for buildings: window unit, split system, package unit, and centralized systems: chilled water, air cooled and district cooling systems. Cooling load calculations - Mechanical Ventilation systems.

COMPONENTS AND DESIGN ASPECTS OF AIR CONDITIONING SYSTEMS 10

Design criteria for selection of air conditioning systems - Production components: configuring / sizing of Chillers, Air Handling Units, Fan Coil Units, mechanical equipment, and spatial requirements. Distribution components: ducts, pipes, grills. Energy efficient systems: Variable Refrigerant Volume (VRV), Variable Refrigerant Flow (VRF) and the latest innovations.

GENERATION AND DISTRIBUTION OF ELECTRICITY 12

Generation of electricity: Fundamentals of electricity - voltage, current, resistance, power, Ohms and Kirchoffs laws. Units - watt, volt, amps. Distribution from grid to facilities – two-phase and three-phase systems. Components - substations, transformers, generators, inverters, distribution boards, meters, switchboards, switches, fuses, circuit breakers, integrated circuits, wires and conduits, earthing, lightning conductors. Electrical load estimation and electrical wiring design for a small building. Site visits with documentation in the form of sketches / drawings / photos. Understanding of products, product catalogues for a small building.

ELECTRICAL LIGHTING **12**

Laws and terminologies related to light and lighting. Sources of artificial lighting - Incandescent lamp, Compact Fluorescent Lamp (CFL), Fluorescent tube, Discharge lamps, and LEDs. Classification of lamps and luminaires based on light output: direct lighting, semi-direct lighting, general diffuse lighting, semi- indirect lighting, and dindirect lighting. Classification of lighting based on function: ambient, task, accent, informational lighting / guidance / emergency lighting, and ddecorative lighting. Classification based on installation type: recessed, surface-mounted, pendant lights, sconces, track lighting, under-cabinet lighting, high-bay and low-bay lighting, strip lighting, and soffit lighting.

LIGHTING DESIGN FOR BUILDINGS **12**

Lighting calculations; principles and methods. Application and selection of appropriate luminaires. Recommended lighting levels for various indoor and outdoor environments based on function and use. Overview of lighting simulation and performance analysis using lighting design software. Design exercise to develop lighting solution for projects of simple scale, incorporating luminaire selection, lighting calculations, layout planning, and technical drawings.

d. Activities

- Prepare a case study report on air conditioning services of an existing building.
- Calculate the lighting level and design a lighting layout with selection of appropriate luminaries.
- Collect a catalogue of luminaries and design the lighting for the required tasks

e. Learning Resources

1. Benjamin Stein, et al., “Mechanical and electrical equipment for buildings”,10th edition, John Wiley & Sons, Inc, 2006.

2. A.K.Mittal, 'Electrical and Mechanical Services in High Rise Building: Design and Estimation Manual', CBS, 2015.
3. National Building Code - Bureau of Indian Standards.
4. 'ISHRAE Handbook for Refrigeration', 2015.
5. ISHRAE, 'All about AHUs- Air Handling Units'.
6. Descottes, Herve and Cecilia E. Ramos, 'Architectural Lighting: Designing with Light and Space, Princeton Architectural Press, Princeton, 2013.
7. Derek Phillips and John Howard, 'Lighting in Architectural Design', McGraw Hill. New York, 1964.
8. David Egan, Victor Olgyay 'Architectural Lighting', McGraw-Hill, 2001.
9. Gary Gordon, 'Interior Lighting for Designers', 5th Edition, John Wiley and Sons Inc., New York, 2015.

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1				2			1				2		
CO2				3			1		2		2		
CO3				3			1		2				
CO4				3			1		2				
CO5				3			1		2				
CO6				3			1				2		
Total				17			6		8		6		
Scaled value				3			1		2		1		

Course Code	Course Name	L	T	P	C
U24AR254	Materials and Construction - IV	2	0	2	3
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This course provides a comprehensive understanding of cement and concrete, their properties, and their applications in construction. It covers concrete mix design, structural elements, advanced construction techniques, and specialized applications such as pre-stressed concrete and staircase design. The course also includes formwork, scaffolding, and quality control measures to enhance construction efficiency and safety.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Explain the composition, properties, and types of cement and concrete.	K2
CO2	Apply principles of mix design, batching, placing, and curing in concrete construction.	K3
CO3	Analyze the behavior of different concrete structural elements like foundations, slabs, and beams.	K4
CO4	Evaluate advanced concrete techniques such as pre-cast, pre-stressed, and post-tensioned concrete.	K5
CO5	Design and detail different types of staircases with appropriate support conditions.	K6
CO6	Demonstrate knowledge of formwork, scaffolding, and safety measures in concrete construction.	K3

c. Course Syllabus **Total : 60 Hours**

CEMENT AND CONCRETE **12**

Types of cement: composition, properties, and applications - Tests for cement and mortar - Aggregates: grading, suitability, and influence on concrete properties - Water-cement ratio and reinforcement in concrete - Admixtures and their role in modifying concrete behavior - Concreting process: mix proportioning, batching, mixing, transporting, placing, compaction, curing, and formwork - Quality control and testing methods for concrete - Types of concrete: Ferrocement, Fiber-Reinforced Concrete (FRC), Fiber-Reinforced Polymer (FRP), and their applications.

STRUCTURAL CONCRETE **18**

Introduction to framed structures - Concrete in foundations: isolated, combined, continuous, and strap footings - Concrete in floors (PCC), walls, and partitions – Technical drawings of Concrete elements: lintels, sunshades, beams, columns, and slabs (one-way and two-way) - Site visits to document structural details through sketches, photographs, and reports.

ADVANCED CONCRETE CONSTRUCTION TECHNIQUES **15**

Pre-cast and cast-in-situ concrete walls - Pre-cast building elements and their applications - Pre-stressed concrete: principles, advantages, and applications - Post-tensioned and pre-tensioned concrete techniques**.**

STAIRCASE DESIGN AND DETAILING **15**

Factors influencing staircase design - Types of staircases: straight flight, doglegged, quarter-turn, bifurcated, spiral, helical, etc. - Structural support conditions: inclined slab, cranked slab, continuous, cantilever - Foundations and finishing materials for staircases - Detailing of handrails and balusters - Staircase design considerations for accessibility and physically challenged individuals – Produce technical drawings.

TEMPORARY STRUCTURES – FORMWORK AND SCAFFOLDING 10

Fundamentals of formwork and scaffolding - Types of formwork: timber, steel, aluminum, modular, slip form, and climbing formwork - Types of scaffolding and their applications - Case studies and real-world examples.

d. Activities

- Prepare detailed technical drawings (plan, section, and elevation) for: Lintels, sunshades, One-way and two-way slabs, Beams, columns, and footings (isolated and combined).
- Lab session on: Tests for cement (e.g., consistency, setting time), Sieve analysis for aggregates, Concrete cube compressive strength testing.
- Site visit to an under-construction building or concrete yard to study: Formwork and scaffolding, Pre-cast components (like staircases or façade panels), Framed structural system in-situ. As an outcome the following are to be submitted: Sketches, photographs, and brief technical report.
- Prepare a design and detailing plate for at least one type of staircase: Plan, section, and elevation including reinforcement and finishes.
- Case study on a project that uses: Precast panels or prestressed elements, Documentation of construction method, benefits, and detailing.

e. Learning Resources

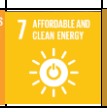
1. Neville, A. M. (2011). Properties of Concrete (5th ed.). Pearson.
2. Shetty, M. S. (2019). Concrete Technology: Theory and Practice (8th ed.). S. Chand Publishing.
3. Gambhir, M. L. (2013). Concrete Technology (4th ed.). McGraw Hill.
4. Krishna Raju, N. (2018). Pre-stressed Concrete (6th ed.). McGraw Hill.
5. Mehta, P. K., & Monteiro, P. J. M. (2014). Concrete: Microstructure, Properties, and Materials (4th ed.). McGraw Hill.
6. Kumar, A. R. (2015). Scaffolding and Formwork (1st ed.). Laxmi Publications.

f. Online Resources

1. IS 456:2000 – Code of Practice for Plain and Reinforced Concrete
2. IS 1343:2012 – Code of Practice for Pre-Stressed Concrete
3. National Programme on Technology Enhanced Learning (NPTEL) – Concrete Technology by IIT Madras
4. Bureau of Indian Standards (BIS) – Guidelines on Concrete Mix Design
5. INSDAG (Institute for Steel Development & Growth) – Case studies on formwork and scaffolding

COs - POs / PSOs Articulation Matrix

	POs										**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1				3									
CO2				3									
CO3				3									
CO4			3	3									
CO5				3									
CO6				3									
Total			3	18									
Scaled value			1	3									

Course Code	Course Name	L	T	P	C
U24AR255	Digital Graphics and Art	0	0	2	1
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This course introduces students to digital tools and techniques that enhance architectural representation, conceptualization, and digital art exploration. Ability to bridge traditional hand-drawing methods with digital techniques**,** develop dynamic architectural compositions**,** and create visually compelling presentations**.**

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Understand digital graphics and tools	K2
CO2	Create digital sketches and conceptual compositions	K6
CO3	Create vector graphics for Architectural creations	K6
CO4	Apply experimental and generative digital art in generating forms	K3
CO5	Create Architectural presentations and digital portfolios	K6
CO6	Apply digital art in Architectural communication	K3

c. Course Syllabus **Total: 60 Hours**

INTRODUCTION **6**

Understanding digital graphics in architectural representation - Raster vs. vector graphics: differences and applications - Overview of digital tools used in architectural visual communication.

Tools: Digital sketching (using tools such as Krita / Sketchbook); Vector-based design (Inkscape / Illustrator); Image editing (GIMP / Photoshop); 3D visualization (FreeCAD or Blender); and presentation graphics (Canva).

DIGITAL SKETCHING AND CONCEPT REPRESENTATION **12**

Hand-drawn to digital workflow using digital sketching and image editing tools - Architectural freehand sketching and diagramming – Application of digital brushes for textures, shading, and depth – Creation of concept boards, montages, and abstract visual compositions.

VECTOR GRAPHICS AND ARCHITECTURAL INFOGRAPHICS **18**

Architectural diagrams and presentation drawings - Creating graphic layouts, mood boards, and portfolios – Producing digital collages and conceptual renderings – Creating Infographics and data visualizations relevant to architecture.

DIGITAL ART AND GENERATIVE TECHNIQUES IN ARCHITECTURE **10**

Exploring 3D as a Medium for digital art - Generative and parametric art in architectural representation - AI-Assisted and code-based art generation – Digital abstractions and motion graphics for architectural storytelling.

ARCHITECTURAL PRESENTATION AND DIGITAL PORTFOLIO **14**

Structuring an architectural portfolio using digital media - Designing presentation sheets, posters, and digital layouts - Post-production techniques for enhancing visualizations and refining presentation quality.

d. Activities

- Understanding digital graphics and exploring the tools and techniques in the presentation software's
- Developing Architectural design diagrams and presentation drawings
- Analyzing the methods to develop digital arts in Architectural communication.
- Integrating digital skills to generate architectural portfolio
- Digital sketching and image editing tools - Krita & GIMP / Photoshop

e. Learning Resources

1. **"**Sketching for Architecture and Interior design" – Stephanie Travis
2. "Architectural Drawing" – David Dernie
3. "Graphic Design for Architects: A Manual for Visual Communication" – Karen Lewis
4. "The Art of Digital Design: Theory and Practice" – Stephen T.Karris
5. "The New Media Reader" – Noah Wardrip-Fruin & Nick Montfort
6. "The Algorithmic Beauty of Plants" – Przemyslaw Prusinkiewicz & Aristid Lindenmayer
7. "Designing Programmes" – Karl Gerstner
8. "Portfolio Design" – Harold Linton
9. "Representing Architecture" – Neil Spiller
10. "Drawing for Architects: Construction and Design Manual" – Natascha Meuser

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1					3								1
CO2					3								1
CO3					3								1
CO4					3								1
CO5					3								1
CO6					3								1
Total					18								6
Scaled value					3								1

Course Code	Course Name	L	T	P	C
U24AR256	Architectural Design - III	0	0	8	12
Sustainable Development Goals					

Category: Professional Core Course (PCC)

a. Preamble

This studio explores the intersection of architecture and rural communities, focusing on vernacular architecture, social structures, cultural influences, environmental sustainability, and contextual design. Students will engage in on-site analysis, community interaction, and the design of rural interventions that respect traditional wisdom while addressing contemporary challenges.

b. Course Outcomes

After successful completion of the course, the students will be able to

COs	Course Outcome	Knowledge Level
CO1	Analyze rural settlements to understand spatial organization, socio-cultural influences, and built-form characteristics.	K4
CO2	Document and interpret vernacular architecture, including materials, construction techniques, and environmental responses.	K2
CO3	Examine the relationship between human activities, movement patterns, and spatial planning in rural environments.	K4
CO4	Evaluate the role of natural resources, infrastructure, and local livelihoods in shaping rural architecture.	K5
CO5	Develop context-sensitive architectural interventions that integrate traditional wisdom with contemporary sustainability principles.	K6
CO6	Synthesize research, documentation, and community engagement to design a rural public building that responds to functional, social, and environmental needs	K6

c. Course Syllabus **Total: 180 Hours**

UNDERSTANDING RURAL SETTLEMENTS **36**

Introduction to rural architecture, settlement patterns, and spatial organization – study of socio-cultural influences, livelihoods, and community interactions - Field visit to a rural settlement - Document and analyze - Mapping built-form, open spaces, infrastructure, and natural resources.

VERNACULAR MATERIALS & CONSTRUCTION TECHNIQUES **24**

Exploration of local materials - Study of traditional construction techniques and their sustainability - Hands-on model-making.

RURAL TRANSFORMATION & CHALLENGES **24**

Analysis of changes in rural built environments due to urbanization, policies, and development programs - Study of rural sustainability challenges: water supply, sanitation, energy, infrastructure, and climate change resilience - Interactive community engagement sessions to understand rural aspirations and needs.

SITE ANALYSIS & PROBLEM IDENTIFICATION **24**

Selection of project site based on field study - Detailed site analysis: physical, social, environmental, and infrastructural mapping - Identification of design problems and opportunities based on community needs - Development of design briefs and objectives.

DESIGN DEVELOPMENT **72**

Participatory design and stakeholder collaboration - Conceptualization of sensitive, responsive, and sustainable architectural solutions - Exploration of form, space, materiality, and construction systems - Integration of passive design strategies.

d. Learning Resources

1. Oliver, Paul. Encyclopedia of Vernacular Architecture of the World.
2. Rudofsky, Bernard. Architecture Without Architects.
3. Hassan Fathy. Architecture for the Poor.
4. Rapoport, Amos. House Form and Culture.

COs - POs / PSOs Articulation Matrix

	POs										PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**
CO1	3	2										3	3
CO2		2										3	3
CO3		3										3	3
CO4				3								3	3
CO5					3			3				3	3
CO6						3	3	3				3	3
Total	3	7		3	3	3	3	6				18	18
Scaled value	1	2		1	1	1	1	1				3	3