DEPARTMENT OF ARCHITECTURE

ANNA UNIVERSITY, CHENNAI

VISION OF DEPARTMENT OF ARCHITECTURE

The Department of Architecture is committed to excellence in the field of architectural education and the discipline of architecture through its pedagogical, research, extension and outreach activities, directed towards the betterment of the world that we inhabit, in all realms shaped by architecture. It shall uphold universal moral and ethical values in all endeavours that it undertakes and be exemplary in creating positive transformations.

MISSION OF DEPARTMENT OF ARCHITECTURE

The Mission of the Department of Architecture is

- To tap and strengthen the innate potential of each student and deepen their knowledge/skills in order to enable them to self-actualizes well as become catalysts for positive change.
- To contribute to immediate context, larger society and the world through knowledge creation and dissemination.
- To engage and extend the expertise of the department in addressing and solving of issues/problems related to the built environment.
- To actively interact and collaborate with professionals, educational institutions and other related organizations at all scales in order to collectively further the cause of appropriate architecture.

ANNAUNIVERSITY: : CHENNAI - 600 025

UNIVERSITY DEPARTMENTS

REGULATIONS 2023

CHOICE BASED CREDIT SYSTEM

B.ARCH. FULL-TIME PROGRAMME

1. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

I. Become a practicing architect who can provide holistic and innovative solutions to needs and problems of society.
II. Find gainful employment in architectural firms/ building sector and contribute in design and decision making.
III. Be a part of organisations that influence policy and contribute to larger changes in society and environment.
IV. Contribute to the discipline of architecture through higher studies, research and development.
V. Become a thinker and entrepreneur who can direct creative vision, explorations, services and products towards a better future in an interconnected world.

2. PROGRAMME OUTCOMES (POs)

After going through the five years of study, our B.Arch. graduates will exhibit ability to:

PO#	Graduate Attribute	Programme Outcome
1	Analysis and Design Skill	Analyse and design architectural projects of all scales in a competent, innovative and appropriate manner as the situation
2	Understanding of Form and Architecture	Represent, understand and analyse forms and attributes of architecture in different ways (manual/ graphic/ diagrammatic/ digital means) so as to inform the architectural design process.
3	Ability for Cognition, Expression and Communication	Understand situations through experience and express ideas through various modes- reading, writing, speaking, art, cognitive mapping, etc., that are consistent with the self and the world.
4	Historical, Social and Cultural Awareness	Identify/ analyse/ understand with sensitivity the various cultural, social and historical aspects of architecture as well as make meaningful and contextual design decisions.
5	Critical and Creative Thinking	Critically understand/ theorise existing situations and make positive creative transformations towards the future.
6	Knowledge in Making of Building	Understand and contribute to constructional aspects of buildings involving material strength and choice, building component and structural design.
7	Support and Services to Buildings	Understand and work out basic and advanced services for a building in an optimal manner so as to enhance the quality of
8	Environment and Physical Context	Understand the relationships between environment and architecture and design livable buildings that are sensitive to as well as tap the potential of the environment at different
9	Skill in Building Analysis and	Calculate/analyse building costs and environmental performance and optimise design for varied criteria.
10	Profession and Ethics	Serve as a competent and ethical professional architect.
11	Life Long Learning, Research and Development	Understand and address specific aspects of the discipline of architecture in depth through rigorous exploratory and experimental studies and research.
12	Larger contribution to Society	Understand broader interdisciplinary connections with architecture and engage them to serve as a catalyst for positive

PEO / PO Mapping:

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
I	3	3	2	3	3	3	3	3	3	3	2	3
II	2					2	2	2	2	3		
III				2	3			3				3
IV		2	1	3	2						3	
V			1	1	3			2			2	3

‘1’ = Low; ‘2’ = Medium; ‘3’ = High;

Mapping of Course Outcome and Programme Outcome

Year	Sem	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
	1	Introduction to Language and English Skills			3		2							1
		Mathematics for Architects		3				2				2		
		Geometrical Understanding and Representation		3	2	2	-	-	-	-	-	-	-	-
		Art as Cognition and Expression			3									
		Foundational Design Studio	3	3	2	2	3							1
	2	World Architecture and Urbanism: Early Civilisations to Renaissance		2		3	2	1		1				
		Structural Mechanics	2					3						
		Environmental Science for Architecture								3				
		Building Components and their Representation		2				3		2				
		Thinking Through Diagrams and Models	2	3	3		2							
		Basic Space Design Studio	3	2	2	2	3	2		2				1
II	**3**	Architecture in India: Early Civilisations to Colonialism				3	2							
		Structural Systems and their Analysis		3				1						
		Climate and Built Environment						2		3				
		Building Construction with Basic Materials						3		2				
		Site Surveying and Planning	2					2	3	3				
		Advanced Space Design Studio	3	2	2	2	3	2	1	2				1
	4	Regional and Vernacular Built Environments in India				3	2			3				2
		Structural Design of Masonry and Timber						3						
		Water Supply and Sanitation in Buildings						2	3					
		Wood in Building Construction						3		2	1			
		Digital Drawing, Visualisation and Representation	2	2	3									
		Rural Habitat Design Studio	2	2	2	3	1	3	2	3			2	2
		Architecture and Urbanism of Colonialism and Modernity		2		3	2	2		2				1

III	**5**	Structural Design of Concrete						3						
		Electricity, Lighting and Acoustics in Buildings						2	3	3				
		Concrete in Building Construction						3						
		Urban Architecture Design Studio	3	2	2	2	3	1	1	1				1
		Professional Elective I												
	6	Specification, Estimation and Budgeting						3			2			
		Structural Design of Steel						3						
		Advanced Building Services						2	3	3				
		Steel, Glass and Plastic in Building Construction						3		2				
		Environmental Design Studio	3	2	2	1	2	2	2	3	2			2
		Professional Elective II												
IV	**7**	Contemporary Architecture: Theories and Practice				3	2							1
		Professional Practice of Architecture										3	2	3
		Contemporary Housing				2	2	1	1	2				
		Critical Design Studio	3	3	2	2	3	1	1	2	1	1	2	2
		Professional Elective III												
		Open Elective			1	1	1							3
IV	**8**	Practical Training	2	2	3	2	2	3	3	3	2	3	2	3
V	**9**	Urban Design	1	1	1	3	2			2				3
		Landscape and Ecology				2			1	3				
		Construction and Project Management			1		1	2	2	1		1	1	1
		Dissertation	1	2	3	3	2	1	1	1	1	1	3	3
		Urbanism and Architecture Design Studio	3	2	2	3	3			2		1	2	3
		Professional Elective IV												
V	**10**	Thesis	3	3	3	3	3	3	3	3	3	3	3	3
		Professional Elective V												

'1' = Low; '2' = Medium; '3' = High

ANNA UNIVERSITY: : CHENNAI
UNIVERSITY DEPARTMENTS
B. ARCH. FULL-TIME PROGRAMME
REGULATIONS 2023
CHOICE BASED CREDIT SYSTEM
CURRICULUM AND SYLLABI FOR SEMESTERS I TO X

SEMESTER I

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
THEORY								
1.	AR3101	Introduction to Architecture	PCC	3	0	0	3	3
2.	AR3102	Introduction to Language and English Skills	SEC	3	0	0	3	3
3.	AR3103	Mathematics for Architects	BSC & AEC	3	0	0	3	3
THEORY CUM STUDIO								
4.	AR3111	Geometrical Understanding and Representation	PCC	1	0	3	4	4
5.	AR3112	Art as Cognition and Expression	PCC	1	0	3	4	4
STUDIO								
6.	AR3121	Foundational Design Studio	PCC	0	0	9	9	9
			TOTAL	**11**	**0**	**15**	**26**	**26**

SEMESTER II
(Prerequisite - Pass in Foundational Design Studio)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
THEORY								
1.	AR3201	World Architecture and Urbanism: Early Civilisations to Renaissance	PCC	3	0	0	3	3
2.	AR3202	Structural Mechanics	BSC & AEC	3	0	0	3	3
3.	AR3203	Environmental Science for Architecture	BSC & AEC	3	0	0	3	3
4.		NCC Credit Course Level 1*	-	2	0	0	2	2
THEORY CUM STUDIO								
5.	AR3211	Building Components and their Representation	PCC	1	0	3	4	4
6.	AR3212	Thinking through Diagrams and Models	PCC	1	0	3	4	4
STUDIO								
7.	AR3221	Basic Space Design Studio	PCC	0	0	9	9	9
			TOTAL	**11**	**0**	**15**	**26**	**26**

*NCC Credit Course level 1 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

SEMESTER III

(Prerequisite - Pass in Basic Space Design Studio)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
THEORY								
1.	AR3301	Architecture in India: Early Civilisations to Colonialism	PCC	3	0	0	3	3
2.	AR3302	Structural Systems and their Analysis	BSC & AEC	3	0	0	3	3
3.	AR3303	Climate and Built Environment	BSC & AEC	3	0	0	3	3
THEORY CUM STUDIO								
4.	AR3311	Building Construction with Basic Materials	BSC & AEC	1	0	3	4	4
5.	AR3312	Site Surveying and Planning	BSC & AEC	1	0	3	4	4
STUDIO								
6.	AR3321	Advanced Space Design Studio	PCC	0	0	9	9	9
			TOTAL	**11**	**0**	**15**	**26**	**26**

SEMESTER IV

(Prerequisite - Pass in Advanced Space Design Studio)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
THEORY								
1.	AR3401	Regional and Vernacular Built Environments in India	PCC	3	0	0	3	3
2.	AR3402	Structural Design of Masonry and Timber	BSC & AEC	3	0	0	3	3
3.	AR3403	Water Supply and Sanitation in Buildings	BSC & AEC	3	0	0	3	3
		NCC Credit Course Level 2*		3	0	0	3	3 #
THEORY CUM STUDIO								
4.	AR3411	Wood in Building Construction	BSC & AEC	1	0	3	4	4
5.	AR3412	Digital Drawing, Visualisation and Representation	SEC	1	0	3	4	4
STUDIO								
6.	AR3421	Rural Habitat Design Studio	PCC	0	0	9	9	9
			TOTAL	**11**	**0**	**15**	**26**	**26**

* NCC Credit Course level 2 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

SEMESTER V
(Prerequisite - Pass in Rural Habitat Design Studio)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
THEORY								
1.	AR3501	Architecture and Urbanism of Colonialism and Modernity	PCC	3	0	0	3	3
2.	AR3502	Structural Design of Concrete	BSC & AEC	3	0	0	3	3
3.	AR3503	Electricity, Lighting and Acoustics in Buildings	BSC & AEC	3	0	0	3	3
THEORY CUM STUDIO								
4.	AR3511	Concrete in Building Construction	BSC & AEC	1	0	3	4	4
STUDIO								
5.	AR3521	Urban Architecture Design Studio	PCC	0	0	10	10	10
			TOTAL	**10**	**0**	**13**	**23**	**23**
ELECTIVE								
6.		Professional Elective I	PEC	x	x	x	3	3
							26	**26**

SEMESTER VI
(Prerequisite - Pass in Urban Architecture Design Studio)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
THEORY								
1.	AR3601	Specification, Estimation and Budgeting	PCC	3	0	0	3	3
2.	AR3602	Structural Design of Steel	BSC & AEC	3	0	0	3	3
3.	AR3603	Advanced Building Services	BSC & AEC	3	0	0	3	3
4.		NCC Credit Course Level 3*		3	0	0	3	3 #
THEORY CUM STUDIO								
5.	AR3611	Steel, Glass and Plastic in Building Construction	BSC & AEC	1	0	3	4	4
STUDIO								
6.	AR3621	Environmental Design Studio	PCC	0	0	10	10	10
			TOTAL	**10**	**0**	**13**	**23**	**23**
ELECTIVE								
7.		Professional Elective II	PEC	X	X	X	3	3
							26	**26**

* NCC Credit Course level 3 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA

SEMESTER VII
(Prerequisite - Pass in Environmental Design Studio)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
THEORY								
1.	AR3701	Contemporary Architecture: Theories and Practice	PCC	3	0	0	3	3
2.	AR3702	Professional Practice of Architecture	PAECC	3	0	0	3	3
3.	AR3703	Contemporary Housing	PCC	3	0	0	3	3
STUDIO								
4.	AR3721	Critical Design Studio	PCC	0	0	11	11	11
			TOTAL	**9**	**0**	**11**	**20**	**20**
ELECTIVE								
5.		Professional Elective III	PEC	X	X	X	3	3
6.		Open Elective	OEC	X	X	X	3	3
							26	**26**

SEMESTER VIII
(Prerequisite - Pass in Critical Design Studio of VII Semester)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
STUDIO								
1.	AR3821	Practical Training	PAECC	X	X	X	X	26
			TOTAL	**X**	**X**	**X**	**X**	**26**

SEMESTER IX
(Prerequisite- Pass in Practical Training of VIII Semester)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
THEORY								
1.	AR3901	Urban Design	PCC	3	0	0	3	3
2.	AR3902	Landscape and Ecology	PCC	3	0	0	3	3
3.	AR3903	Construction and Project Management	PAECC	3	0	0	3	3
STUDIO								
4.	AR3921	Dissertation	PAECC	0	0	3	3	3
5.	AR3922	Urbanism and Architecture Design Studio	PCC	0	0	11	11	11
			TOTAL	**9**	**0**	**14**	**23**	**23**
PROFESSIONAL ELECTIVE								
6.		Professional Elective IV	PEC	X	X	X	3	3
							26	**26**

SEMESTER X
(Prerequisite - Pass in Urbanism and Architecture Design Studio of IX Semester)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
STUDIO								
1.	AR3081	Thesis	PCC	0	0	23	23	23
			TOTAL	**0**	**0**	**23**	**23**	**23**
PROFESSIONAL ELECTIVE								
2.		Professional Elective V	PEC	X	X	X	3	3
							26	**26**

Total No. of Credits: 260

PROFESSIONAL CORE COURSES (PCC)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
1.	AR3101	Introduction to Architecture	PCC	3	0	0	3	3
2.	AR3111	Geometrical Understanding and Representation	PCC	1	0	3	4	4
3.	AR3112	Art as Cognition and Expression	PCC	1	0	3	4	4
4.	AR3121	Foundational Design Studio	PCC	0	0	9	9	9
5.	AR3201	World Architecture and Urbanism: Early Civilisations to Renaissance	PCC	3	0	0	3	3
6.	AR3211	Building Components and their Representation	PCC	1	0	3	4	4
7.	AR3212	Thinking with Diagrams and Models	PCC	1	0	3	4	4
8.	AR3221	Basic Space Design Studio	PCC	0	0	9	9	9
9.	AR3301	Architecture in India: Early Civilisations to Colonialism	PCC	3	0	0	3	3
10.	AR3321	Advanced Space Design Studio	PCC	0	0	9	9	9
11.	AR3401	Regional and Vernacular Built Environments in India	PCC	3	0	0	3	3
12.	AR3421	Rural Habitat Design Studio	PCC	0	0	9	9	9
13.	AR3501	Architecture and Urbanism of Colonialism and Modernity	PCC	3	0	0	3	3
14.	AR3521	Urban Architecture Design Studio	PCC	0	0	10	10	10
15.	AR3601	Specification, Estimation and Budgeting	PCC	3	0	0	3	3
16.	AR3621	Environmental Design Studio	PCC	0	0	10	10	10
17.	AR3701	Contemporary Architecture: Theories and Practice	PCC	3	0	0	3	3
18.	AR3703	Contemporary Housing	PCC	3	0	0	3	3
19.	AR3721	Critical Design Studio	PCC	0	0	11	11	11
20.	AR3901	Urban Design	PCC	3	0	0	3	3
21.	AR3902	Landscape and Ecology	PCC	3	0	0	3	3
22.	AR3922	Urbanism and Architecture Design Studio	PCC	0	0	11	11	11
23.	AR3081	Thesis	PCC	0	0	23	23	23

BUILDING SCIENCES & APPLIED ENGINEERING COURSES (BSC & AEC)

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
1.	AR3103	Mathematics for Architects	BSC & AEC	3	0	0	3	3
2.	AR3202	Structural Mechanics	BSC & AEC	3	0	0	3	3
3.	AR3203	Environmental Science for Architecture	BSC & AEC	3	0	0	3	3
4.	AR3302	Structural Systems and their Analysis	BSC & AEC	3	0	0	3	3
5.	AR3303	Climate and Built Environment	BSC & AEC	3	0	0	3	3
6.	AR3311	Building Construction with Basic Materials	BSC & AEC	1	0	3	3	4
7.	AR3312	Site Surveying and Planning	BSC & AEC	1	0	3	4	4
8.	AR3402	Structural Design of Masonry and Timber	BSC & AEC	3	0	0	3	3
9.	AR3403	Water Supply and Sanitation in Buildings	BSC & AEC	3	0	0	3	3
10.	AR3411	Wood in Building Construction	BSC & AEC	1	0	3	4	4
11.	AR3502	Structural Design of Concrete	BSC & AEC	3	0	0	3	3
12.	AR3503	Electricity, Lighting and Acoustics in Buildings	BSC & AEC	3	0	0	3	3
13.	AR3511	Concrete in Building Construction	BSC & AEC	1	0	3	4	4
14.	AR3602	Structural Design of Steel	BSC & AEC	3	0	0	3	3
15.	AR3603	Advanced Building Services	BSC & AEC	3	0	0	3	3
16.	AR3611	Steel, Glass and Plastic in Building Construction	BSC & AEC	1	0	3	4	4

PROFESSIONAL ABILITY ENHANCEMENT COMPULSORY COURES (PAECC)

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
1.	AR3702	Professional Practice of Architecture	PAECC	3	0	0	3	3
2.	AR3821	Practical Training	PAECC	x	x	x	x	26
3.	AR3903	Construction and Project Management	PAECC	3	0	0	3	3
4.	AR3921	Dissertation	PAECC	0	0	3	3	3

SKILL ENHANCEMENT COURSES (SEC)

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
1.	AR3102	Introduction to Language and English Skills	SEC	3	0	0	3	3
2.	AR3412	Digital Drawing, Visualisation and Representation	SEC	1	0	3	4	4

PROFESSIONAL ELECTIVE COURSES : VERTICALS

Sem & Elective	Design Process and Practice	Energy & Technology in Buildings	Architectural Tectonics	Digital Design Process	Urban Studies	Allied – Art, Design and Writing
5th Sem PEC I	Design Process and Thinking	Sustainable Design	Structure in Architecture	Contemporary Processes in Architectural Design	Human Behaviour and Built Environment	Techniques of Visual Art Interior Design
6th Sem PEC II	Design Detailing	Climatic Design Procedures	Earthquake Resistant Architecture	Parametric Modelling and Coding	Disaster Management	Art Appreciation Critical Writing
7th Sem PEC III	Soft Skills	Digital Tools for Building Modelling and Analysis	Contemporary Building Materials	Digital Fabrication and Architecture	Chennai-Evolution and Architecture History of Non-Western Architecture	Product Design
9th Sem PEC IV	Design Communication	Building Automation and Control Systems	Construction Technology	Data Visualisation and Analysis	Heritage Conservation	Techniques of Digital Art
10th Sem PEC V	Professional Service Firm: Management and Excellence	Green Building	Advanced Structures	Artificial Intelligence in Design Process	Smart Cities Human Settlements Planning	Architectural Journalism and Photography

PROFESSIONAL ELECTIVE COURSES (PEC)

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P/S		
ELECTIVE I								
1.	AR3001	Design Process and Thinking	PEC	2	0	1	3	3
2.	AR3002	Sustainable Design	PEC	3	0	0	3	3
3.	AR3003	Structure in Architecture	PEC	3	0	0	3	3
4.	AR3004	Contemporary Processes in Architectural Design	PEC	1	0	2	3	3
5.	AR3005	Human Behaviour and Built Environment	PEC	2	0	1	3	3
6.	AR3006	Techniques of Visual Art	PEC	1	0	2	3	3
7.	AR3007	Interior Design	PEC	2	0	1	3	3

ELECTIVE II								
1.	AR3008	Design Detailing	PEC	1	0	2	3	3
2.	AR3009	Climatic Design Procedures	PEC	1	0	2	3	3
3.	AR3010	Earthquake Resistant Architecture	PEC	3	0	0	3	3
4.	AR3011	Parametric Modelling and Coding	PEC	3	0	0	3	3
5.	AR3012	Disaster Management	PEC	3	0	0	3	3
6.	AR3013	Art Appreciation	PEC	2	0	1	3	3
7.	AR3014	Critical Writing	PEC	0	0	3	3	3
ELECTIVE III								
1.	AR3015	Soft Skills	PEC	3	0	0	3	3
2.	AR3016	Digital Tools for Building Modelling and Analysis	PEC	1	0	2	3	3
3.	AR3017	Contemporary Building Materials	PEC	3	0	0	3	3
4.	AR3018	Digital Fabrication and Architecture	PEC	3	0	0	3	3
5.	AR3019	Chennai- Evolution and Architecture	PEC	3	0	0	3	3
6	AR3020	History of Non-Western Architecture	PEC	3	0	0	3	3
7.	AR3021	Product Design	PEC	1	0	2	3	3
ELECTIVE IV								
1.	AR3022	Design Communication	PEC	1	0	2	3	3
2.	AR3023	Building Automation and Control Systems	PEC	3	0	0	3	3
3.	AR3024	Construction Technology	PEC	3	0	0	3	3
4.	AR3025	Data Visualisation and Analysis	PEC	2	0	1	3	3
5.	AR3026	Heritage Conservation	PEC	3	0	0	3	3
6.	AR3027	Techniques of Digital Art	PEC	1	0	2	3	3
ELECTIVE V								
1.	AR3028	Professional Service Firm: Management and Excellence	PEC	3	0	0	3	3
2.	AR3029	Green Building	PEC	3	0	0	3	3
3.	AR3030	Advanced Structures	PEC	3	0	0	3	3
4.	AR3031	Artificial Intelligence in Design Process	PEC	3	0	0	3	3
5.	AR3032	Smart Cities	PEC	3	0	0	3	3
6	AR3033	Human Settlements Planning	PEC	3	0	0	3	3
7.	AR3034	Architectural Journalism and Photography	PEC	2	0	1	3	3

SUMMARY

SL. NO	Subject Area	Credits per Semester										Credits Total
		I	II	III	IV	V	VI	VII	VIII	IX	X	
1	PCC	20	20	12	12	13	13	17		17	23	147
2	BSC & AEC	3	6	14	10	10	10					53
3	PEC & OEC					3	3	6		3	3	18
4	PAECC							3	26	6		35
5	SEC	3		-	4							7
	Total	26	26	26	26	26	26	26	26	26	26	260
6.	Non Credit/ Other courses	Induction Programme	NCC		NCC		NCC					0

AR3101 INTRODUCTION TO ARCHITECTURE L T P/S C
3 0 0 3

OBJECTIVES

- To give understanding of architecture as an outcome of the act of design by human society across history and region.
- To give an introduction to the discipline of architecture and its various facets.
- To introduce importance of form and its relation to design through study of nature and manmade environment.
- To introduce the vocabulary of form and space in terms of elements, principles, attributes and organisation as giving cognitive experience in the realm of architecture.

UNIT I INTRODUCTION TO ARCHITECTURE 9

Origin and definitions of architecture as need based, cultural, environmental, social, psychological response of human society. Architecture as phenomenological mediation of nature. Components of architecture: use, means, site, shelter, relation to nature, structure, skin, materials, services, circulation, typology, aesthetics, expression, character, symbolism, experience, etc., History and types of design in architecture- unself-conscious/ self-conscious design, design through craft/ design through drawing, pragmatic/ iconic/ canonic/ analogic design.

UNIT II FORM IN NATURE AND MANMADE ENVIRONMENT 9

Understanding form in all its attributes as the basis of creating architecture. Characteristics of form and its relationship with use/function/evolution as manifested in first hand examples from nature and everyday manmade environment including artefacts, objects buildings, cityscapes. Human body and sensory environment. Cognitive experience of form- ideas of Gestalt, visual perception, proxemics. Tactile, auditory, olfactory senses and human environment.

UNIT III FORM AS GEOMETRIC ELEMENTS AND THEIR EFFECTS 9

Form as embodied in and/or constituted by geometric elements such as point, line, plane, volumes. Attributes, generation and interrelationships among elements. Perceptual effects and use of specific manifestations of the elements- planes as shapes and volumes as geometric forms/space such as sphere, cube, pyramid, cylinder, cone and their sections/ derivatives. Architectural use of elements. Exercises and architectural case studies.

UNIT IV ATTRIBUTES AND PRINCIPLES OF FORM 9

Form as manifesting attributes such as pattern, light, colour, surface, texture. Effects of these attributes. Form in its basic state, in combinations, composite organisations and configurations as manifesting characteristics such as proportion, scale, balance, symmetry, asymmetry, rhythm, axis, hierarchy, datum, unity, harmony, dominance, climax, focus. Characteristics acting as principles to generate architectural design. Exercises and architectural case studies.

UNIT V ORGANISATION OF FORM AND SPACE 9

Cognitive experience of form and space in architecture –enclosure, internal and external spaces, continuous spaces, hierarchy of spaces, spatial organisation (centralised, linear, radial, clustered, grid), built form- open space relationships. Relationship of movement/ circulation/ path with reference to architectural form and space. Haptic experience. Exercises and architectural case studies.

TOTAL:45 PERIODS

COURSE OUTCOMES:

CO1: Ability to recognise different facets of architecture.
CO2: Basic understanding of form and design in all aspects and scales.
CO3: Ability to discern the relationship between manifestations of form and its effects on humans.

REQUIRED READING

- Geoffrey Broadbent, 'Design in Architecture - Architecture and the Human Sciences', D.Fulton, 1988.
- Francis D.K. Ching, 'Architecture-Form, Space and Order', Van Nostrand Reinhold Company, New York, 2007.
- Simon Unwin, 'Analysing Architecture', Routledge, London, 2003.
- V.S. Pramar, 'Design Fundamentals in Architecture', Somaiya Publications Private Ltd., NewDelhi, 1973.
- Yatin Pandya, 'Elements of Space Making', Mapin, 2008.
- Francis D.K. Ching, James F. Eckler, 'Introduction to Architecture', Wiley, 2012.
- Robert McCarter, JuhaniPallasmaa, 'Understanding Architecture', Phaidon 2012.
- Anthony C. Antoniades, 'Poetics of Architecture: Theory of Design', John Wiley and Sons,1992.

REFERENCES

1. Pierre von Meiss, 'Elements of Architecture: From Form to Place', Routledge, 1990.
2. Rudolf Arnheim, 'The Dynamics of Architectural Form', University of California Press 2009.
3. NeilsPrak, 'The Language of Architecture', De Gruyter Mouton, 2017.
4. Leland M.Roth, 'Understanding Architecture, its Experience, History and Meaning', Routledge, 2018.
5. Hazel Conway, 'Understanding Architecture: An Introduction to Architecture and Architectural History', Routledge, 2005.
6. Paul Alan Johnson, 'The Theory of Architecture – Concepts and Themes', Van Nostrand Reinhold Co., New York, 1994.
7. Kumar Vyas, 'Design and Environment- A Primer', National Institute of Design, 2009.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	3	2	2	-	-	-	-	-	-	-	-
2	1	3	2	2	-	-	-	-	-	-	-	-
3	1	3	2	2	-	-	-	-	-	-	-	-
4	1	3	2	2	-	-	-	-	-	-	-	-
Avg.	**1**	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3102 INTRODUCTION TO LANGUAGE AND ENGLISH SKILLS L T P/S C
3 0 0 3

OBJECTIVES

- To give an introduction to the concepts and evolution of language in human society including its various expressions and functions
- To give basic skills of English language in everyday situations involving speaking, listening, reading, writing, presenting.
- To enable the use of language to think, express experience and communicate larger meaning.

UNIT I INTRODUCTION TO LANGUAGE AND LINGUISTICS 9

Communication in humans and animals. Language in humans– definition, function and hypotheses of evolution. Some concepts of language- Phonetics, Phonology, Morphology, Syntax, Semantics, Pragmatics.

UNIT II ENGLISH- SPEAKING AND LISTENING 9

Everyday communication and human interaction through language. Speaking and listening. Simple class exercises.

UNIT III ENGLISH- READING, WRITING, PRESENTING 9

Reading and writing. Language comprehension skills through reading and writing. Presenting information and ideas. Simple exercises.

UNIT IV LANGUAGE AS EXPRESSION AND COGNITION 9

Language as expression – poetry, prose, literature, etc., Cognitive function of language. Cognitive role of language in constructing reality, abstracting, projecting the future. Simple exercises.

UNIT V LANGUAGE AS DISCOURSE 9

Thinking, talking and writing about ideas and situations within a social context and conveying broader meaning and abstraction. Discourse, dialectic. Simple class exercises.

TOTAL: 45 PERIODS

COURSE OUTCOMES

CO1: An understanding of basic role of language in humans.
CO2: Skill and confidence in everyday requirements of the English language.
CO3: Ability to express experience, explore meaning and construct reality through language.

REQUIRED READING

- Sharon Hendenreich, 'English for Architects and Civil Engineers', Springer, 2014
- www.cambridgescholars.com
- www.robertdwatkins.com/Englishworkbook.pdf
- N. Chomsky, 'Reflections on Language', Fontana, 1975.
- Steve Pinker, 'The Language Instinct', Penguin, 2015.
- R.L. Trask, 'Language and Linguistics: The Key Concepts', Routledge, 2007.
- R.L. Trask, 'Language: The Basics', Routledge 1999

REFERENCES

1. Chris Mounsey, 'Essays and Dissertation', Oxford University Press, 2005.
2. Sidney Greenbaum, 'The Oxford English Grammar', Oxford University Press, 2005.
3. Krishna Mohan and Meera Banerji, 'Developing Communication Skills', 2nd edition, Laxmi Publications, 2009.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	3	-	2	-	-	-	-	-	-	-
2	-	-	2	-	3	-	-	-	-	-	-	2
3	-	-	3	-	3	-	-	-	-	-	-	2
Avg.	**-**	**-**	**3**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3103 **MATHEMATICS FOR ARCHITECTS** **L T P/S C**
3 0 0 3

OBJECTIVES

- To help derive solutions involving trigonometric and exponential functions in practical problems.
- To inform about three dimensional analytical geometry.
- To enable understanding of functions of more than one variable.
- To give information to solve differential equation of certain type.
- To enable data analysis and interpretation of results using statistical tools.

UNIT I TRIGONOMETRY AND MENSURATION 9

Trigonometric (sine, cosine and tan functions) and exponential functions. De- Moiver's theorem. Area of plane figures. Computation of volume of solid figures.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 9

Direction cosines and ratios. Angle between two lines. Equations of a plane. Equations of a straight line. Coplanar lines. Shortest distance between skew lines. Sphere, Tangent plane, Plane section of a sphere.

UNIT III INTEGRATION AND FUNCTIONS OF TWO VARIABLES 9

Integration of rational, trigonometric and irrational functions. Properties of definite integrals. Reductions formulae for trigonometric functions. Taylor's Theorem - Maxima and Minima (Simple Problems).

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS 9

Linear equations of second order with constant coefficients. Simultaneous first order linear equations with constant coefficients. Homogeneous equation of Euler type. Equations reducible to homogeneous form.

UNIT V BASIC STATISTICS AND PROBABILITY 9

The arithmetic mean, median, mode, standard deviation and variance. Regression and correlation. Elementary probability. Laws of addition and multiplication of probabilities. Conditional probability. Independent events.

TOTAL: 45 PERIODS

COURSE OUTCOME

CO1: Ability to understand the mathematical properties of geometric figures and objects.
CO2: Skill in solving mathematical problems that would be useful for the field of architecture.
CO3: Ability to analyse and interpret data.

REQUIRED READING

- Grewal B.S., 'Higher Engineering Mathematics', Khanna Publishers, New Delhi, 44th Edition, 2011.

REFERENCES

1. Bali N., Goyal M. and Watkins C., 'Advanced Engineering Mathematics', Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
2. Ramana B.V., 'Higher Engineering Mathematics', Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.
3. Greenberg M.D., 'Advanced Engineering Mathematics', Pearson Education, New Delhi, 2nd Edition, 5th Reprint, 2009.
4. Gupta S.C and Kapoor V.K., 'Fundamentals of Mathematical Statistics', Sultan Chand and Sons, New Delhi, 9th Edition,1996.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	3	-	-	-	2	-	-	-	2	-	-
2	-	3	-	-	-	2	-	-	-	2	-	-
3	-	3	-	-	-	3	-	-	-	3	-	-
Avg.	**-**	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3111 GEOMETRICAL UNDERSTANDING AND REPRESENTATIO L T P/S C
1 0 3 4

OBJECTIVES

- To introduce geometrical understanding as one of the bases of architecture.
- To give an understanding of basic and derived geometry of form in terms of their generation and attributes.
- To give skills of representation of forms in terms of technical drawing and projections.

UNIT I **10**

Relation between geometry and form. Introduction to point, line, plane, solid. Definition of geometrical drawing. Drawing lines and angles. Drawing shapes/ planar surfaces - triangle, square, rhombus, rectangle, polygon, hexagon, etc). Drawing of circles, tangents, curves, conic sections (hyperbola, parabola, ellipse).

Construction of physical planar models of all the above. Viewing the physical planar models from different angles and sketching them with light and shade, shadow as a prelude to understanding the concepts of different types of projections and sciography. Introduction and explanation of terminologies - orthographic, isometric, axonometric, perspective projections and sciography.

UNIT II **20**

Drawing problems on orthographic, isometric and axonometric projections of lines and planes of different types in different positions. Sciography for the same.

Types of perspective projections- one point, two point, three point. Terminologies- picture plane, stationary point, vanishing point, cone of vision, eye level, etc., Methods of constructing perspectives.

Drawing perspective projections of simple planar surfaces/ shapes. Sciography for the same.

UNIT III **20**

Introduction to geometric solids- cube, prism, pyramids, cones, cylinders. Generation of geometric solids through construction of physical models from lines and planar surfaces (including concept of development). Construction of block models of solids. Viewing the models from different angles and sketching them with light and shade, shadow in order to understand them in different types of projections.

Drawing problems on orthographic, isometric and axonometric projection of solids of different types in different positions. Sciography for the same.

Perspective projection of simple solids. Sciography for the same.

UNIT IV **10**

Understanding sections of solid and true shape of sections through cutting of block models, viewing them from different angles and sketching them. Understanding simple intersection of solids and composite forms through making block models and viewing them from different angles and sketching them.

Simple drawing problems on orthographic, isometric and axonometric projection of the above.

TOTAL: 60 PERIODS

COURSE OUTCOME

CO1: Ability to understand the relationship between geometry and architectural form.
CO2: Understanding of various attributes of geometric forms and skill in their creation and dissection.
CO3: Ability to represent geometric forms through technical drawings.

REQUIRED READING

- Morris I.H., 'Geometrical Drawing for Art Students', Orient Longman, Madras, 2004.
- Francis D. K. Ching, 'Architectural Graphics', John Wiley and Sons, 2012.
- Natarajan K.V, 'A Textbook of Engineering Graphics', Dhanalakshmi Publishers, Chennai, 2006

REFERENCES

1. Leslie Martin C, 'Architectural Graphics', The Macmillan Company, New York, 1978.
2. Fraser Reekie, 'Reekie's Architectural Drawing", Viva Books Private Limited, 1999.
3. Roger Burrows, '3D Thinking in Design and Architecture', Thames and Hudson, 2018.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	3	1	-	-	1	-	-	-	2	-	-
2	-	3	2	-	-	2	-	-	-	2	-	-
3	-	3	3	-	-	3	-	-	-	3	-	-
Avg.	**-**	**3**	**2**	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3112 ART AS COGNITION AND EXPRESSION L T P/S C
1 0 3 4

OBJECTIVES

- To give understanding of the role and importance of art as a means of understanding the world.
- To give skills in techniques and media of art.
- To enable expression of ideas, thoughts and experience through various visual modes both in terms of realism and abstraction.

UNIT I INTRODUCTION TO ART 10

Origin and evolution of art as human cognition, representation, expression. Role of art. Understanding representation in art - naturalistic, realistic, symbolic, stylistic, abstract, non- objective art, etc., through study of important works across history from different cultures of the world. Simple studio exercises in basic modes of representation through observation or thought.

UNIT II ART AS OBSERVATION AND RECORDINGOF HUMAN EXPERIENCE 20

Properties and uniqueness of different media for art. Studio exercises to observe and record the nature of simple indoor and outdoor subjects through techniques of line, colour, light and shade, texture, etc., using different media- drawing, sketching, painting, sculpture, watercolour, tempera, oil, acrylic, pencils, pastels, crayons, paper, canvas, brush, airbrush, pen and ink, mixed media, clay, Plaster of Paris, wire, papiermache.

UNIT III ART AS HEIGHTENED REPRESENTATION OF REALITY 15

Understanding role of art in heightening reality through accentuation of line, colour, light and shade, texture, emphasis, contrast, balance, etc., by the study of examples from world of art. Studio exercises to understand and bring out the essential characteristics of landscapes, people, places, built environment, situations and objects by heightened reality through appropriate ideas/ tools/techniques.

UNIT IV ART AS ABSTRACTION OF REALITY 15

The power and role of abstraction as a way of expressing experience and reality through understanding exemplary artists' works and art movements. Studio exercises in abstract expression of real environment, thoughts and emotions through any appropriate media and technique.

TOTAL: 60 PERIODS

COURSE OUTCOME

CO1: Sensitivity and knowledge of art as basic human endeavour.
CO2: Ability and skill to record experience through art.
CO3: Ability to abstract thought, observation and experience through art.

REQUIRED READING

- E.H. Gombrich, 'Art and Illusion', Phaidon, 2002.
- E.H. Gombrich, 'The Story of Art', Phaidon, 2002.
- ParthaMitter, 'Indian Art', Oxford University Press, 2001.
- Nathan Cabot Hale, 'Abstraction in Art and Nature', Dover, 2003.
- Robert L. Solso, 'Cognition and the Visual Arts', MIT Press, 1994.
- Webb, Frank, 'The Artist Guide to Composition', David and Charles, U.K., 1997.
- Francis Ching, 'Drawing a Creative Process', Van Nostrand Reinhold, New York,1990.
- Lucy Watson, 'Complete Painting and Drawing Handbook', DK Adult, 2009.
- JuhaniPallasma, 'The Thinking Hand', John Wiley, 2009.

REFERENCES

1. Bernard S. Myers, 'Understanding the Arts', Holt Rinehart and Winston Inc, 1964.
2. Fred, S. Kleiner, 'Gardener's Art through Ages', Wadsworth Publishing, 2012.
3. John Dewey, 'Art as Experience', Penguin, 2005.
4. Wassily Kandinsky, Point and Line to Plane, Dover, 2013.
5. Alan Swann, Graphic Design School, Harper Collins, 1997.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	3	-	-	-	-	-	-	-	-	-
2	-	-	3	-	-	-	-	-	-	-	-	-
3	-	-	3	-	-	-	-	-	-	-	-	-
Avg.	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3121 FOUNDATIONAL DESIGN STUDIO L T P/S C
0 0 9 9

OBJECTIVES

- To give an understanding of design as creating form towards a purpose at various scales.
- To enable exploration of the universal visual, experiential and cognitive aspects of design through engaging elements and principles of form.
- To give an insight into the ways in which form/ morphology and use/effect can come together.

CONTENT

Architecture as a discipline starts with morphology as the answer to questions and needs of human society. While the needs are multifarious, including shelter and comfort, social and psychological wellbeing, culture and meaning, expression of time and context, etc., the means are negotiated through the fundamentals of form in its various attributes. In the foundational studio, the exploration would be on understanding these fundamentals as universals as well as in terms of particular manifestations in specific cultural and temporal contexts. The word form here means all physical manifested aspects.

The explorations in the foundational studio would be of two types. One would be to understand and break down form to its component elements and principles in order to get insight into the most important aspects that give a totality of cognitive effect(perceptive, behavioural, cultural etc.,) or use (anthropometrics, activities, scale, etc.,).Design exploration would continue after this to create a form for use/effect. Another would be to explore component elements like point, line, planes, volume, shape, colour, texture light, pattern, etc., using principles such as balance, unity, dominance, transparency, proportion, scale, solid, void, fluidity, movement, fractal, order, chaos, gestalt, etc., This exploration could be an end in itself or could lead to the creation of a higher level of or composite form/design through using elements and principles in conjunction towards human need/ use (perceptive, behavioural, cultural, anthropometrics, activities, scale, etc.,).

The whole studio would be conducted through a series of related design exercises with multiple stages as well as standalone independent exercises. Observational/ analytical study and design exploration could go hand in hand or one could precede the other, based on the specific project. The exercises would be mediated through situations and contexts, historic and contemporary references, local or global character, aesthetics, basics of human response and behaviour, etc., Different media would be explored in 2D and 3D. The final exercise(s) would be focussed towards small product/ furniture/ architectural design/ component design in urban context, etc.,

TOTAL: 135 PERIODS

COURSE OUTCOME

CO1: Awareness of the totality and components of form in the creation of design.
CO2: Ability to explore the visual/ cognitive language and grammar of the universal elements and principles of design.
CO3: Ability to understand needs as encompassing functional, behavioural, cultural, experiential, etc.,
CO4: Ability to engage awareness towards creating a morphology that fulfils stated intents and needs.

REQUIRED READING

- Kumar Vyas, 'Design and Environment- A Primer', National Institute of Design, 2009.
- Pierre von Meiss, 'Elements of Architecture: From Form to Place', Routledge, 2014.
- James F. Eckler,' Language of Space and Form: Generative Terms for Architecture', Wiley, 2012.
- Owen Cappleman and Michael Jack Jordon, 'Foundations in Architecture: An Annotated Anthology of Beginning Design Project', Van Nostrand Reinhold New York, 1993.
- Charles Wallschlacgerm and Cynthia Busic-Snyder, 'Basic Visual Concepts and Principles for Artists, Architects and Designers', McGraw Hill, New York 1992.
- Victor Papanek, 'Design for the Real world, Human Ecology and Social Change', Chicago Review Press, 2005.

REFERENCES

1. Taiji Miyasaka, 'Seeing and Making in Architecture: Design Exercises', Routledge, 2013.
2. V.S. Pramar, 'Design Fundamentals in Architecture', Somaiya Publications, New Delhi, 1997.
3. Francis D. K. Ching, 'Architecture: Form Space and Order', Van Nostrand Reinhold Co., (Canada), 1979.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	2	2	3	-	-	-	-	-	-	1
2	3	3	2	2	3	-	-	-	-	-	-	1
3	3	3	2	2	3	-	-	-	-	-	-	1
Avg.	**3**	**3**	**2**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3201 WORLD ARCHITECTURE AND URBANISM: EARLY CIVILISATIONS TO RENAISSANCE

L	T	P/S	C
3	0	0	3

OBJECTIVES

- To introduce the timeline and geography of evolution of human society in order to set the context for the study of architecture and urbanism across the ages.
- To give knowledge about early civilisations and their productions.
- To enable an understanding of the contributions of Classical Greece and Rome.
- To enable understanding of the intersecting forces in Europe such as religion, trade, technology, etc from the decline of Roman empire to the Medieval period and the resultant architecture and urbanism.
- To create awareness of the emergence of Renaissance and humanism in Europe and the resultant architecture and urbanism.

UNIT I PREHISTORY TO RIVER VALLEY CIVILISATIONS 6

Different ages of human history. Time line and geography of human civilisations. Elements and determinants of human settlements. Prehistoric habitats and art. River Valley civilisations of Nile, Indus, Tigris/Euphrates and Yellow river; their geographical context; their political, social, religious, cultural and economic systems; settlement patterns, dwellings and other buildings.

UNIT II PERSIA, GREECE AND ROME 10

Early Persian empire, its cities and architecture.

Origin of Greek civilisation. Nature of settlements and dwellings. Political, social, religious, cultural and economic systems. Greek philosophy. Greek polis and democracy. Evolution of the Greek temple and the building of the Acropolis. Public architecture - Theatre and Agora. Other building types. Optical illusions in architecture

Origin of Roman civilisation. Nature of settlements and dwellings. Political, social, religious, cultural and economic systems. Republic and Empire. Urban planning. Domestic architecture. Architecture as imperial propaganda. Forums and basilicas. Other building types. Structural forms: materials and techniques of construction spanning large spaces.

Political empires of Persia, Greece and Rome and their larger effects.

UNIT III JUDAISM, CHRISTIANITY AND ISLAM 9

Judaism and Christianity- Birth and geographic spread. Transformation of the Roman Empire. Early Christian worship and burial. Church planning-Basilican concept. Byzantine empire. Centralised plan concept in churches. Birth and spread of Islam in the first millennium. Outline of building types of Islam. Commonality in forms and ideas across Southern/ Eastern Europe and Western/ Central Asia.

UNIT IV MEDIEVAL EUROPE 10

Outline history of medieval Europe- Population explosion, feudalism and rural manorial life, development of trade/ commerce and medieval cities, rise of nation states and technology of warfare, religious aspects- papacy, monasticism and crusades. Art and architecture in Medieval Europe. Craft and merchant guilds. Domestic Architecture. Romanesque and Gothic architecture including development of vaulting. Late medieval Europe and its problems.

UNIT V RENAISSANCE IN EUROPE 10

Renaissance and Humanism in Europe, its causes and its various facets in society. Trade and exploration. Protestant Reformation. Cities and their transformation. Character and building types of Early Renaissance, High Renaissance, Mannerism, Baroque and Rococo. Renaissance in different nations. Works of Brunelleschi, Michelangelo, Christopher Wren, Andrea Palladio, Inigo Jones.

TOTAL: 45 PERIODS

COURSE OUTCOME

CO1: An overall understanding of the timelines and early history of civilisations and their contributions across the world.

CO2: Knowledge about the contributions of Greece and Rome to architecture and urbanism.

CO3: Familiarity with the intersecting forces in Europe from decline of Roman empire to Medieval times and their manifestation in cities and architecture.

CO4: An understanding of Renaissance and humanism and the resultant architecture and urbanism.

REQUIRED READING

- Ching, F. D. K., Jarzombek, M. and Prakash, V, 'A Global History of Architecture', 2nd Ed. John Wiley and Sons, 2010.
- Sir Banister Fletcher, 'A History of Architecture', CBS Publications (Indian Edition),1999.
- Spiro Kostof, 'A History of Architecture – Setting and Rituals', 2nd Ed, Oxford University Press, 1995.
- Leland M Roth, 'Understanding Architecture: Its Elements, History and Meaning', Westview Press, 2013.

REFERENCES

1. David Watkin, 'A History of Western Architecture', Laurence King Publishing, 2015.
2. Pier Luigi Nervi, General Editor, 'History of World Architecture Series', Harry N. Abrams, New York, 1972.
3. S. Lloyd and H.W. Muller, 'History of World Architecture – Series', Faber and Faber, London,1986.
4. Gosta, E. Samdstrom, 'Man the Builder', McGraw Hill Book Company, New York, 1975.
5. Vincent Scully, 'Architecture – The Natural and the Man Made', Harper Collins, 1991.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	3	2	-	-	-	-	-	-	-
2	-	2	-	3	2	1	-	1	-	-	-	-
3	-	2	-	3	2	1	-	1	-	-	-	-
4	-	2	-	3	2	1	-	1	-	-	-	-
Avg.	**-**	**1.5**	**-**	**3**	**2**	**1**	**-**	**1**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3202 STRUCTURAL MECHANICS L T P/S C
3 0 0 3

OBJECTIVES

- To give familiarity about structural resolutions and its important in realisation of architectural design concepts
- To give exposure to forces, moments and resolution of forces.
- To give understanding of geometrical properties of sections of different shapes.
- To give understanding of basic elastic properties of solids.
- To introduce to behaviour of solids under complex stresses

UNIT I FORCE SYSTEM 9

Principles of statics. Forces and their effects. Types of force systems. Resultant of concurrent and parallel forces. Lami's theorem. Principle of moments. Varignon's theorem. Principle of equilibrium.

UNIT II SUPPORTS AND REACTIONS 6

Types of supports and reactions-Bending moment and Shear forces-Determination of reactions for simply supported beams. Relation between bending moment and shear force.

UNIT III SECTIONAL PROPERTIES 10

Properties of section – Centre of gravity, Moment of Inertia, Section modulus, Radius of gyration for various structural shapes. Theorem of perpendicular axis. Theorem of parallel axis.

UNIT IV ELASTIC PROPERTIES AND CONSTANTS 12

Elastic properties of solids. Concept of stress and strain. Deformation of axially loaded simple bars. Types of stresses. Concept of axial and volumetric stresses and strains. Elastic constants. Elastic Modulus. Shear Modulus. Bulk Modulus. Poisson's ratio. Relation between elastic constants.

UNIT V COMPLEX STRESSES 8

Principal stresses and strain. Numerical and Graphical method. Mohr's diagram.

TOTAL: 45 PERIODS

COURSE OUTCOME

CO1: Ability to apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
CO2: Understanding the concept of bending moment and shear force of beam.
CO3: Understanding of the basic geometrical properties of sections.
CO4: Knowledge about elastic properties of solids.
CO5: Ability to solve problems of principal stresses and strains using numerical and graphical method.

REQUIRED READING

- R.K. Bansal, 'A Text book on Engineering Mechanics', Lakshmi Publications, Delhi,2008.
- R.K. Bansal, 'A textbook on Strength of Materials', Lakshmi Publications, Delhi 2010.
- Paul W. McMullin, 'Jonathan S. Price, 'Introduction to Structures', Routledge, 2016.

REFERENCES

1. P.C. Punmia, 'Strength of Materials and Theory of Structures; Vol. I', Lakshmi Publications, Delhi 2018.
2. S. Ramamrutham, 'Strength of Materials', Dhanpatrai and Sons, Delhi, 2014.
3. W.A. Nash, 'Strength of Materials', Schaums Series, McGraw Hill Book Company,1989.
4. R.K. Rajput, 'Strength of Materials', S.K. Kataria and Sons, New Delhi , 2017.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	-	-	-	-	2	-	-	-	-	-	-
2	1	-	-	-	-	3	-	1	-	-	-	-
3	2	-	-	-	-	3	-	1	-	-	-	-
4	2	-	-	-	-	3	-	1	-	-	-	-
5	1	-	-	-	-	3	-	-	-	-	-	-
Avg.	**2**	**-**	**-**	**-**	**-**	**3**	**-**	**1**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3203 ENVIRONMENTAL SCIENCE FOR ARCHITECTURE L T P/S C
3 0 0 3

OBJECTIVES

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasise on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- To facilitate the understanding of global and Indian scenario of renewable and non-renewable resources, causes of their degradation and measures to preserve them.
- To familiarise about influence of societal use of resources on the environment and introduce the legal provisions, National and International laws and conventions for environmental protection.
- To inculcate the effect of population dynamics on human and environmental health and inform about human right, value education and role of technology in monitoring human and environmental issues.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – bio geographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds Field study of simple ecosystems – pond, river, hill slopes, etc.

Introduction to the design of built environment with consideration of environment, ecosystems and biodiversity.

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

Built environment and its relation to environmental pollution, both as a cause and as a response.

UNIT III NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land 47 degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

The use of natural resources in architecture and the built environment through principles and case studies.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment protection act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

Socially and environmentally sensitive design of built environment through case studies.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

Architectural design and density.

TOTAL: 45 PERIODS

COURSE OUTCOME

CO1: Understanding of the functions of environment, ecosystems and biodiversity and their conservation.

CO2: Ability to identify the causes, effects and environmental pollution and natural disasters and contribute to the preventive measures in the immediate society.

CO3: Understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.

CO4: Familiarity with different forms of energy and apply them for suitable applications in for technological advancement and societal development.

CO5: Knowledge of societal activity on the long and short term environmental issues and abide by the legal provisions, National and International laws and conventions in professional and personal activities and to identify and analyse effect of population dynamics on human value education, consumerism and role of technology in environmental issues.

CO6: An understanding of the design of built environment with due consideration of environmental implications.

REQUIRED READING

- Anubha Kaushik and C. P. Kaushik, 'Perspectives in Environmental Studies', 6th Edition, New Age International Publishers (2018).
- Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, (2016).
- Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).

REFERENCES

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice Hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press (2005).
5. ErachBharucha,'Textbook of Environmental Studies for Undergraduate Courses', Orient Blackswan Pvt. Ltd, 2013.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	-	-	3	-	-	-	-
2	-	-	-	-	-	-	-	3	-	-	-	-
3	-	-	-	-	-	-	-	3	-	-	-	-
4	-	-	-	-	-	-	-	3	-	-	-	-
5	-	-	-	-	-	-	-	3	-	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High;

NCC Credit Course Level 1*

NX3251	**(ARMY WING) NCC Credit Course Level - I**	**L**	**T**	**P**	**C**
		2	**0**	**0**	**2**

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1
	TOTAL: 30 PERIODS	

NCC Credit Course Level 1*

NX3252	(NAVAL WING) NCC Credit Course Level - I	L	T	P	C
		2	0	0	2
NCC GENERAL					**6**
NCC 1	Aims, Objectives & Organization of NCC				1
NCC 2	Incentives				2
NCC 3	Duties of NCC Cadet				1
NCC 4	NCC Camps: Types & Conduct				2
NATIONAL INTEGRATION AND AWARENESS					**4**
NI 1	National Integration: Importance & Necessity				1
NI 2	Factors Affecting National Integration				1
NI 3	Unity in Diversity & Role of NCC in Nation Building				1
NI 4	Threats to National Security				1
PERSONALITY DEVELOPMENT					**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving				2
PD 2	Communication Skills				3
PD 3	Group Discussion: Stress & Emotions				2
LEADERSHIP					**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code				3
L 2	Case Studies: Shivaji, Jhasi Ki Rani				2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT					**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth				3
SS 4	Protection of Children and Women Safety				1
SS 5	Road / Rail Travel Safety				1
SS 6	New Initiatives				2
SS 7	Cyber and Mobile Security Awareness				1
				TOTAL : 30 PERIODS	

NCC Credit Course Level 1*

NX3253	(AIR FORCE WING) NCC Credit Course Level - I	L	T	P	C
		2	0	0	2
NCC GENERAL					**6**
NCC 1	Aims, Objectives & Organization of NCC				1
NCC 2	Incentives				2
NCC 3	Duties of NCC Cadet				1
NCC 4	NCC Camps: Types & Conduct				2
NATIONAL INTEGRATION AND AWARENESS					**4**
NI 1	National Integration: Importance & Necessity				1
NI 2	Factors Affecting National Integration				1
NI 3	Unity in Diversity & Role of NCC in Nation Building				1
NI 4	Threats to National Security				1
PERSONALITY DEVELOPMENT					**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving				2
PD 2	Communication Skills				3
PD 3	Group Discussion: Stress & Emotions				2

LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL : 30 PERIODS

AR3211 BUILDING COMPONENTS AND THEIR REPRESENTATION L T P/S C
1 0 3 4

OBJECTIVES

- To introduce the components of a typical building and their nomenclature.
- To introduce the concept of scale and enable understanding of a building through measured drawing.
- To give skills of representing physical characteristics of materials.
- To give skills in isometric and perspective projections of the measured building.

UNIT I INTRODUCTION TO BUILDING COMPONENTS AND THEIR NOMENCLATURE 12

Building as act of construction for human use layered over the earth - foundation, structural systems, enclosures, weather protection. Understanding building components and their nomenclature using historic and contemporary examples from literature study, site visits, sketches. The nomenclature to include 1) basic types of construction such as load bearing/framed/space structure 2) basic components in a building such as foundation, plinth, walls, floors, roofs(flat, sloped, vaulted),roof covering, ceilings, staircases (principles and different geometric types), doors, windows and ventilators, lintel, sunshade, coping, cornice, stringcourse, parapet, waterproofing, finishing, mortar, decoration, paving3) basic materials for the components.

UNIT II MEASURED DRAWING AND PROJECTIONS OF BASIC COMPONENTS 16

Introduction to concept of scale and measured drawing through basic components such as handrails, furniture, arches, etc., Orthographic (plan, elevation, section) and isometric projection of the simple components. Representation of different materials through rendering, Perspective projection of simple components.

UNIT III MEASURED DRAWING OF HISTORICAL BUILDING 18

Understanding a historic building in totality or in part through measuring drawing.

UNIT IV MEASURED DRAWING OF CONTEMPORARY BUILDING 14

Understanding a contemporary building in totality or in part through measuring drawing.

TOTAL: 60 PERIODS

COURSE OUTCOME

CO1: Ability to recognise and name components of a building.
CO2: Ability to measure and draw components of a building.
CO3: Ability to make isometric and perspective projections of components of a building.
CO4: Understanding a building in total or in part through the process of measured drawing.

REQUIRED READING

- Francis D. K. Ching, 'Architectural Graphics' John Wiley and Sons, 2009.
- Rendow Yee, 'Architecture Drawing: A Visual Compendium of Types and Methods', John Wiley and Sons, 2012.
- Francis D. K. Ching, Steven P. Juroszek, 'Design Drawing', John Wiley and Sons, 2010.

REFERENCES

1. John M. Holmes, 'Applied Perspective', 2nd edition, Sir Isaac, Pitman and Sons Ltd., London 1967.
2. Robert W. Gill, 'Basic Perspective', Thames and Hudson, London, 2006.
3. Leslie Martin C., 'Architectural Graphics', 2nd edition, The Macmillan Company, New York,1970.
4. Natascha Meuser, 'Drawing for Architects: Construction and Design Manual', Dom Pub, 2015.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	2	-	-	-	3	-	2	-	-	-	-
2	-	2	-	-	-	3	-	2	-	-	-	-
3	-	2	-	-	-	3	-	2	-	-	-	-
Avg.	-	**2**	-	-	-	**3**	-	**2**	-	-	-	-

'1' = Low; '2' = Medium; '3' = High

AR3212 THINKING THROUGH DIAGRAMS AND MODELS L T P/S C
1 0 3 4

OBJECTIVES

- To introduce diagrams and models as representation of reality and thought.
- To enable understanding of the important attributes of built environment through diagrams and models.
- To introduce how design thinking can be enhanced through diagrams and models.

UNIT I INTRODUCTION TO DIAGRAMS IN ARCHITECTURE 12

Introduction to idea of diagrams and models as basic representation of reality and thought. Historical evolution of diagrams and models in architecture with key examples from the past to the present, illustrating how attributes are identified and diagrammed for study and for design.

UNIT II UNDERSTANDING BUILT ENVIRONMENT THROUGH DIAGRAMS 18

Introduction to conventional functional diagramming such as activity, zoning, matrix, proximity chart, etc., Overview of diagrammable aspects of a building. Understanding key attributes of a real building through diagrammatic aspects. Exploring various methods to diagram the same building. Exploring different real buildings with the same methods to discern key differences in them.

UNIT III UNDERSTANDING BUILT ENVIRONMENT THROUGH MODELS 18

Model making as a tool to understand buildings through analogical thinking. Understanding different degrees of representations in models from the most realistic to the most abstract, based on purpose for which model is done. Techniques and materiality in model making.

UNIT IV DIAGRAMS AND MODELS AS AID TO DESIGN THINKING 12

Creating simple diagrams and models as proposition towards the future for an existing simple real life situation or for a future projection. The scale could range from macro to micro.

TOTAL: 60 PERIODS

COURSE OUTCOME

CO1: An understanding of diagrams and models as a mode of thought and analysis.
CO2: An ability to discern the important attributes of a building through diagrams and models.
CO3: Ability to project thoughts towards the future through diagrams and models.

REQUIRED READING

- Mark Garcia, 'The Diagrams of Architecture', Wiley 2010.
- Iain Fraser and Rod Henmi, 'Envisioning Architecture – An Analysis of Drawing, 1991',John Wiley and Sons, 1993.
- Alan F. Blackwell, 'Thinking with Diagrams', Springer, 2001.
- Nikolaus Gansterer, 'Drawing A Hypothesis: Figures of Thought', Springer, 2011.
- Neil Spiller, 'Visionary Architecture: Blueprints of the Modern Imagination', Thames and Hudson, 2008.
- Mo Zell, 'The Architectural Drawing Course', Thames and Hudson, 2017.
- Marc Treib, 'Drawing/Thinking Confronting an Electronic Age', Routledge, 2008.
- Mo Zell – The Architectural Design course, Understand the Principles and Master the Practices, Thames, and Hudson, 2008.

REFERENCES

1. Peter Cook, 'Drawing: The Motive Force of Architecture', Wiley, 2014.
2. JuhaniPallasma, 'The Thinking Hand', John Wiley, 2009.
3. Anthony Vidler, 'Diagrams of Diagrams: Architectural Abstraction and Modern Representation', Representations, No. 72. (Autumn, 2000), pp. 1-20.
4. Shin, Sun-Joo, Lemon, Oliver and Mumma, John, 'Diagrams', The Stanford Encyclopaedia of Philosophy, Winter 2018 Edition, Edward N. Zalta (ed.). https://plato.stanford.edu/archives/win2018/entries/diagrams/
5. Matt Bua, 'Architectural Inventions: Visionary Drawing of Buildings', Laurence King Publishing, 2012.
6. Lorraine Farrelly, Representational Techniques, AVA, 2011.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	3	-	2	-	-	-	-	-	-	-
2	2	3	3	-	1	-	-	-	-	-	-	-
3	1	3	3	-	3	-	-	-	-	-	-	-
Avg.	**2**	**3**	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3221 BASIC SPACE DESIGN STUDIO L T P/S C
0 0 9 9

OBJECTIVES

- To enable the understanding of the qualitative and quantitative aspects of basic space design for human use.
- To facilitate exploration of ways to address timeless aspects involved in the design of human built habitat in a micro scale.
- To enable a sensitivity towards the cultural, particular and temporal aspects of architecture.

CONTENT

Humans create and shape spaces/ forms for use. Use includes all aspects of human life- starting from containing the human as a unit (anthropometrics), the needs for carrying out of basic activities, spatial requirements for them, relationship between spaces, requirements of shelter, privacy, social and cultural factors, environmental response, psychological well being, light and air,

meaning and symbolism, structure and economy, and so on. Architecture as a discipline brings all these needs together into a coherent totality through the act of conscious design. Conscious design involves the study/analysis of the existing and extrapolating towards the future through speculation.

In the Basic Space Design Studio, the focus would be on simple architectural design projects that would enable the learning of the fundamentals of space with respect to all the above. The projects would be based on small, everyday situations involving simple circulation, materials and use. It could a typology of private or public nature. Some suggestive projects are bedroom, bathroom, kitchen, shop, pavilion, creche, snack bar, residence, petrol bunk, fire station, bus stop. There would be a maximum of three projects.

The techniques used for study and presentation can align themselves towards the above, such as cognitive maps, sketches, manual drawings, physical models with simple materials.

TOTAL: 135 PERIODS

COURSE OUTCOME

CO1: Ability to design simple spaces for human use addressing spatial, social, cultural and temporal human needs.

CO2: Ability to consider the particular context in the process of designing.

REQUIRED READING

- Kent C. Bloomer, Charles W. Moore, 'Body, Memory and Architecture', Yale, 1977.
- Gaston Bachelard, 'Poetics of Space', Beacon Press, 1994.
- JuhaniPallasmaa, 'The Eyes of the Skin - Architecture and the Senses', John Wiley,2012.
- Joseph De Chiara, Michael J Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional 2001.
- Julius Panero, Martin Zelnik, 'Human Dimension and Interior Space,' Whitney Library of Design, 1975.
- Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2017.

REFERENCES

1. Hideaki Hareguchi, A Comparative Analysis of 20th Century Houses, Academy Editions, 1988.
2. Sam F.Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995.
3. Ernst Neuferts Architects Data, Wiley, 2012.
4. Philip Plowright, 'Revealing Architectural Design: Methods, Frameworks and Tools', Routledge, 2014.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	2	2	2	3	2	-	2	-	-	-	1
2	3	2	2	2	3	2	-	2	-	-	-	1
Avg.	**3**	**2**	**2**	**2**	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3301 ARCHITECTURE IN INDIA: EARLY CIVILISATIONS TO COLONIALISM L T P/S C
3 0 0 3

OBJECTIVES

- To give an overall understanding of the architecture in India up to the colonial period as parallel and sequential productions rising from the cumulative effect of forces operating and intersecting in the Indian subcontinent.
- To inform about prominent modes of architecture in India terms of evolution, function, morphology and character.
- To give exposure to works that are architecturally exemplary and/or representative.
- To appreciate architecture as giver of particular and universal meaning.

UNIT I EARLY INDIA AND ITS CULTURAL PRODUCTIONS 8

Overview of early history of the Indian subcontinent bringing out different conjectures. Indus Valley Civilisation and its society, culture and urbanism. Vedic culture, settlements and architecture through textual and inscriptional sources as well as conjectures. Outline of textual sources related to architecture and town planning in ancient India.

Political, religious and cultural history of India in the first millennium outlining various empires. Evolution of Hinduism, Buddhism and Jainism. Interrelationships among them and timelines.

Architecture of early Mauryan empire. Buddhist architecture and art. Stupas, chaitya halls and viharas. Hindu temple form – principles, morphology, meaning, symbolism, iconography and rituals, classification. Early Hindu temple architecture and rock cut architecture of Guptas, Chalukyas and Pallavas. Influence of Buddhist architecture on them. Study of important monuments for all the above.

UNIT II ARCHITECTURE OF SOUTHERN INDIA 11

Outline history of South India with particular emphasis on Bhakthi movement and evolution of temple town urbanism and architecture. Art and architecture under the Pallavas, Cholas, Pandyas, Nayaks and Vijayanagara kingdom with specific focus on Hindu temple architecture. Influence of social and political history on them. Hoysala architecture. Study of important monuments for all the above.

UNIT III ARCHITECTURE OF NORTHERN INDIA 8

Architecture of Gujarat, Orissa, Madhya Pradesh and Rajasthan with specific focus on Hindu temple architecture. Study of important monuments. Architecture of step wells in Northern India and their socio-cultural importance.

UNIT IV INTRODUCTION TO ISLAMIC ARCHITECTURE AND EARLY ISLAMIC ARCHITECTURE IN INDIA 8

Brief history of Islam. Islamic architecture of the world as rising from Islam as a socio-cultural and political phenomenon. Evolution of building types in terms of forms and functions. Principles and characteristics of Islamic architecture - to include aspects of religion, geometry, structure, materials, decoration, light.

Early political history of Islam in India. Evolution of Islamic architecture under the Delhi Sultanate - Slave, Khaji, Tughlaq, Sayyid and Lodi dynasties. Study of important monuments. Early Islamic architecture of Punjab.

UNIT V REGIONAL ISLAMIC ARCHITECTURE, MUGHAL ARCHITECTURE AND AFTER 10

Spread of Islam into other regions of India and their architectural expressions - Gujarat, Bengal, Malwa and the Deccan. Study of important monuments.

Political History of the Mughals. Mughal architecture and urbanism under Humayun, Akbar, Shahjahan and Aurangazeb. Study of important monuments.

Outline of Post Mughal Islamic architecture. Outline of architecture related to Islam in Tamil Nadu.

TOTAL: 45 PERIODS

COURSE OUTCOME

CO1: An understanding of the diversity of architecture in India and sensitivity towards its syncretic aspects.

CO2: Ability to appreciate particular cultural, symbolic, spatial and material qualities in architecture and cities as givers of meaning and continuity.

CO3: Ability to appreciate universal qualities of architecture and their effects.

TEXTBOOKS

1. Percy Brown, 'Indian Architecture (Buddhist and Hindu Period)', Taraporevala and Sons, Bombay, 2014.
2. Percy Brown, 'Indian Architecture (Islamic Period)', Taraporevala and Sons, Bombay, 2014.
3. Christopher Tadgell, 'The History of Architecture in India - From the Dawn of Civilization to the End of the Raj', Phaidon, 2002.
4. Robert Hillenbrand, 'Islamic Architecture - Form, Function and Meaning', Columbia University Press, 2004
5. RomilaThapar, 'The Penguin History of Early India', Penguin, 2015.
6. Burton Stein, A History of India, John Wiley and Sons, 2010.
7. K.A. NilakantaSastri, 'A History of South India: From the Prehistoric Times to the Fall of Vijayanagar', Oxford University Press, 2007.

REFERENCES

1. George Michell, 'The Hindu Temple', University of Chicago Press, 1988.
2. Stella Kramrisch, 'The Hindu Temple', MotilalBanarsidass, Vol I 2002,Vol II1996.
3. Satish Grover, 'Buddhist and Hindu Architecture in India', CBS, 2008.
4. Satish Grover, 'Islamic Architecture in India', CBS, 2012.
5. Catherine Asher, 'Architecture of Mughal India', Cambridge University Press, 2001.
6. Ananda K. Coomaraswamy, 'The Dance of Siva: Essays on Indian Art and Culture', Rupa Publications, 2013.
7. A.L. Basham, 'The Wonder that was India', Picador, 2004.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	-	-	3	2	-	-	-	-	-	-	-
2	1	-	-	3	2	-	-	-	-	-	-	-
3	2	-	-	3	2	-	-	-	-	-	-	-
Avg.	**1.99**	**-**	**-**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3302 STRUCTURAL SYSTEMS AND THEIR ANALYSIS L T P/S C

3 0 0 3

OBJECTIVES

- To introduce the principles of loads and distribution.
- To enable understanding of the basic concepts of shear force and bending moment under different load conditions and determination of bending and shearing stress acting on beam sections.
- To give knowledge about how to calculate slope and deflection of beams using different methods.
- To explain theory and analysis of columns subjected to axial and eccentric loading.To give understanding of the concept of statically indeterminate structures and their analysis.

UNIT I LOADS AND LOAD DISTRIBUTION 6

Types of Load - Gravity, Wind, Dead, Live Load. Introduction to structural systems, Load flow and distribution. Concept of load distribution for structural systems and overall stability like a) One way slab b) Two way slab c) Arches d) portal frames e) Space Structures.

UNIT II BENDING OF BEAMS 11

Beams and supporting conditions. Types of supports. Shear force and bending moment for simply supported, cantilever and over hanging beams. Theory of simple bending. Stress distribution at a cross section due to bending moment and shear for Rectangular, I and T sections. Concept of Flitched beams (no mathematical calculation).

UNIT III DEFLECTION OF BEAMS 11

Relation between slope, deflection and curvature. Determination of deflection and slope for simply supported and Cantilever beams using Double Integration Method, Macaulay's method and Moment Area Method.

UNIT IV COLUMNS 8

Columns- Concept of Axial and eccentric loads on columns. Combined bending and axial Load. Euler's and Rankine formulae for columns. Simple problems.

UNIT V STATICALLY INDETERMINATE STRUCTURES 9

Introduction. Determination of degree of statical indeterminacy for beams and frames. Advantages and disadvantages of statically indeterminate structures. Method of consistent deformation. Method of Moment distribution for continuous beams and Single portal frames. Application to simple problems.

TOTAL: 45 PERIODS

COURSE OUTCOME

On completion of the course, the student is expected to be able to

CO1 Categorise loads and their distribution paths for various structural systems.
CO2 Solve problems of shear force and bending moment calculation of beams.
CO3 Calculate the slope and deflection of beams by different methods.
CO4 Anlayse columns for combination of axial and eccentric loads.
CO5 Recall various methods used for the analysis of statically indeterminate structures.

TEXTBOOKS

1. R.K. Bansal, 'A Text Book on Strength of Materials', 6th Edition, Laxmi Publications, New Delhi, 2018.
2. B.C. Punmia et al, 'SMTS-I, Strength of Materials', 10th Edition, Laxmi Publications, 2018.
3. Paul W. McMullin, Jonathan S. Price, 'Introduction to Structures, Routledge, 2016.

REFERENCES

1. M.M. Ratwani and V.N. Vazirani, 'Analysis of Structures, Vol. 1 ', Khanna Publishers, Delhi, 2015
2. M.M. Ratwani and V.N. Vazirani, 'Analysis of Structures, Vol. 2 ', Khanna Publishers, Delhi, 2015.
3. Timoshenko, S.P. and D.H. Young, 'Elements of Strength of Materials', 5th edition, East West Press, 2011.
4. A.R. Jain and B.K. Jain, 'Theory and Analysis of Structures', Vol. 1, Nemchand and Bros, Roorkee, 1987.
5. R.K. Rajput, 'Strength of Materials', S.Chand, 2015.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	3	-	-	-	1	-	-	-	-	-	-
2	-	3	-	-	-	1	-	-	-	-	-	-
3	-	3	-	-	-	1	-	-	-	-	-	-
4	-	3	-	-	-	1	-	-	-	-	-	-
5	-	3	-	-	-	1	-	-	-	-	-	-
Avg.	**-**	**3**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3303 CLIMATE AND BUILT ENVIRONMENT L T P/S C
3 0 0 3

OBJECTIVES

- To introduce climate and concept of human comfort.
- To inform about the effects of sky and sun on the earth and building.
- To inform about the effects of wind and air with respect to siting and design of buildings.
- To inform about principles of day lighting in architecture.
- To understand architecture as a response to environment in totality, including climate, sun, sky, wind, lighting, vegetation, microclimate.

UNIT I CLIMATE, HUMAN COMFORT AND HEAT 9

Climate and Civilisation. Components and characteristics of climate. Classification of climate for building designers in tropics. Human body heat balance and heat loss. Effects of climatic factors on human body heat loss. Effective temperature, human thermal comfort. Use of C. Mahoney's tables.

UNIT II BUILDING RESPONSE TO SUN AND SKY 13

Movement of sun. Locating the position of sun. Sun path diagram. Azimuth and altitude angles. Overheated period. Solar shading. Shadow angles. Exercise in the design of shading devices through models/ calculations/ drawings/ software.

Concepts and principles of daylight in buildings- transmission, reflection, glare, daylight factor, room proportion, opening size and distribution.

UNIT III HEAT FLOW THROUGH BUILDING ENVELOPE- CONCEPTS 7

The transfer of heat through solids. Definitions- Conductivity, Resistivity, Specific heat, Conductance, Resistance and Thermal capacity. Surface resistance and air cavities. Air to air transmittance (U value). Time lag and decrement. Material qualities of envelopes.

Exercise involving heat flow through building envelope involving calculations. Demonstration of software for design analysis.

UNIT IV AIR MOVEMENT AND BUILDINGS 9

The wind. The effects of topography on wind patterns. Air currents around building. Air movement through buildings. The use of fans. Thermally induced air currents – Stack effect, Venturi effect, scoop, court yards.

Exercise exploring air movement in architecture with physical models. Demonstration of simulation through software.

UNIT V ENVIRONMENT AND DESIGN OF BUILDINGS 7

Design strategies in warm humid climates, hot humid climates, hot and dry climates and cold climates.

Understanding through case studies and site visits.

TOTAL: 45 PERIODS

COURSE OUTCOME

CO1 An understanding of climate, comfort and heat balance in human beings.
CO2 An understanding of material effects in buildings.
CO3 Ability to conceptually design buildings considering the effect of sun and wind on buildings

TEXTBOOKS

1. O.H. Koenigsberger and Others, 'Manual of Tropical Housing and Building- Climatic Design', Orient Longman, Madras, India, 2010.
2. Bureau of Indian Standards IS 3792, 'Hand book on Functional Requirements of Buildings other than Industrial Buildings- Part I – IV', New Delhi,1987.
3. Benjamin H. Evans, 'Day lighting in Architecture', Mcgraw Hill, 1981.

REFERENCES

1. Martin Evans, 'Housing Climate and Comfort', Architectural Press, London, 1980.
2. B. Givoni, Man, 'Climate and Architecture', Architectural Sciences Series, Applied Science Publishers Ltd., London, 1981.
3. B. Givoni, 'Passive and Low Energy Cooling of building', Van Nostrand Reinhold, NewYork,1994.
4. Galloe Salam and Sayigh A.M.M, 'Architecture, Comfort and Energy', Elsevier Science Ltd, Oxford,1998.
5. Arvind Krishnan, Szokolay et.al, 'Climate Responsive Architecture- A Design Handbook for Energy Efficient Buildings', Tata McGraw Hill, 2017.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	2	-	3	-	-	-	-
2	-	-	-	-	-	2	-	3	-	-	-	-
3	-	-	-	-	-	2	-	3	-	-	-	-
Avg.	-	-	-	-	-	**2**	-	**3**	-	-	-	-

'1' = Low; '2' = Medium; '3' = High

AR3311 BUILDING CONSTUCTION WITH BASIC MATERIALS L T P/S C
1 0 3 4

OBJECTIVES

- To introduce basic building materials including lime, mud, stone, brick and thatch.
- To give knowledge about building construction using the above materials.
- To facilitate in the design of buildings using wood and wood based materials

UNIT I LIME, MUD AND STONE 18

Lime as basic binding material/mortar. Extracting, slaking, hardening, storage, precautions in handling. Lime putty. Lime as finishing material. Lime based finishing materials and products.

Mud as basic material for construction, Mud plaster and mortar. Types of soil and soil stabilisation. Mud products- stabilised blocks, etc., Mud walls construction - cob, rammed earth, wattle and daub, adobe, compressed stabilised earthen blocks. Foundation and plinth for mud structures. Damp and weatherproofing of mud structures. Mud flooring. Mud domes.

Stone in building construction. Sources, characteristics selection, seasoning, dressing, testing, deterioration, preservation and durability of stone.

Basic principles of masonry with stone. Different types of stone masonry walls. Mortar, plastering, pointing and finishes for stone masonry. Structural use of stone masonry in foundation, walls, piers, columns, arches and lintels. Masonry integrated elements such as openings, cornices and copings. Structural use of stone for beams and slabs.

Understanding all the above through sketches/ drawing/ models/ product catalogues/site visits. Drawings of typical examples.

UNIT III BRICK AND CLAY PRODUCTS 18

Outline manufacture of brick. Types of brick and clay products in building construction. Brick for masonry walls. Roof tiles- pan/ pot tiles, Mangalore pattern tiles. Flooring and paving- brick tiles, clay tiles, ceramic tiles and vitrified tiles.

Basic principles of masonry with brick. Types of brick bonding. Mortar, plastering, pointing and finishes for brick masonry. Structural use of brick masonry in foundation, walls, piers, columns, arches and lintels. Masonry integrated elements such as openings, cornices and copings. Structural use of stone for beams and slabs. Structural use of brick for roofing as Madras Terrace.

Introduction to innovative and composite construction using brick and clay products - prefabricated brick panels, precast curved brick arch panels, reinforced brick/ reinforced brick concrete slabs, prefabricated floor/ roof using structural clay units, Hourdi block roofing,

Understanding construction principles and procedures through sketches/ drawings/ models / site visits/ documentation. Drawings of typical examples.

UNIT III STRAW AND THATCH IN BUILDING CONSTRUCTION 12

Straw and thatch as building materials. Physical aspects. Properties with respect to fire, moisture, insects and pests. Thatch and straw bale roofing details.

Understanding construction principles and procedures through sketches/ drawings/ models / site visits/ documentation.

UNIT IV DESIGN AND DETAILING USING BASIC MATERIALS 12

Innovative design and detailing of a small and simple structure for a specific purpose using basic materials applying the knowledge of materials and construction principles studied in the previous units. Design to be submitted in the form of sketches/ drawings/ detailing/ model.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Familiarity with the properties and uses of some basic building materials.

CO2 Knowledge about the construction details of the materials for structural and non structural use.

CO3 Ability to design and detail buildings using basic materials.

TEXTBOOKS

1. Don A. Watson, 'Construction Materials and Processes', McGraw Hill, 1972.
2. W.B. McKay, 'Building Construction', Person India, Vol, 1 2013,Vol II, 2013.
3. B.C.Punmia et al, 'Building Construction', Laxmi Publications, 2016.
4. S.K.Sharma, 'A Text book of Building Construction', S. Chand and Co Ltd., New Delhi, 1998.
5. S.K. Duggal, 'Building Materials', New Age International Publishers, 2016.
6. R.J. S. Spence and D.J. Cook, 'Building Materials in Developing Countries', John Wiley and sons 1983.
7. S. C. Rangwala, 'Engineering Materials', Charotar Publishing House India, 2015.
8. Roy Chudley, Roger Greeno, 'Building Construction Handbook', Routledge, 2017.

REFERENCES

1. American Institute of Timber Construction (AITC), 'Timber Construction Manual', Wiley Publishers, 2004.
2. Francis D.K Ching, 'Building Construction Illustrated', John Willey and Sons, 2014.
3. Willis H Wagner and Howard Bud Smith, 'Modern Carpentry', Good Heart–Wilcox Publishers, Portland, 2007.
4. Barry, 'Construction of Buildings, Volume 1and2', Blackwell Publishing Ltd., Oxford, 2005.
5. S.P Arora and S.P Bindra, 'A Text Book of Building Construction', Dhanpat Rai Publishing Company Pvt. Ltd, 2010.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	-	-	-	-	3	-	2	-	-	-	-
2	1	-	-	-	-	3	-	2	-	-	-	-
3	2	-	-	-	-	3	-	2	-	-	-	-
Avg.	**2**	**-**	**-**	**-**	**-**	**3**		**2**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3312 SITE SURVEYING AND PLANNING L T P/S C
1 0 3 4

OBJECTIVES

- To inform about the ways in which the characteristics of sites can be understood.
- To enable an understanding of the macro and micro impact of buildings on it.
- To give understanding of the potential/ limitations site offers to the design of buildings.
- To give exposure to different terminologies and techniques associated with site, site surveying, site analysis and site planning.
- To explore all the above through a project.

UNIT I INTRODUCTION TO SITE AND SITE SURVEYING 15

Definition of plot, site, land and region, units of measurements. Introduction to survey and need for surveying. Methods of surveying and context of use. Chain survey and Triangulation - instruments used, method of survey and plotting into survey drawing. Plain table, Compass and the odolite surveys - method, instruments used and application. Modern surveying Instruments such as EDMs and Total Stations and their application.

Understanding of administrative maps and site drawings, including FMB.

Introduction to measuring a site, drawing out a site plan from measurements and computing area by geometrical figures and other methods. Introduction to marking plans, layout plans and centre-line plans. Importance and procedure for making these drawings and dimensioning. Procedure and precautions of setting out a plan on site.

Understanding the above through site visits to real projects.

UNIT II SITE CONTEXT AND ANALYSIS 15

Detailed understanding of context of the site. Introduction to master plans, land use for cities, development control rules. Site selection criteria for different building typologies. Impact of building developments on the surroundings including aspects such as traffic, noise, pollution, microclimate, etc., especially in the context of large scale projects. Understanding the above through real projects/ case studies.

Site as offering potential/ limitations to architectural design. Importance of site analysis. On site and off site factors. Analysis of natural, cultural and aesthetic factors. Factors to include topography, hydrology, soils, vegetation, climate and microclimate, surface drainage, accessibility, size and shape, infrastructure, sources of water supply and means of disposal system, visual aspects, context of built environment. Introduction to detailed analysis involving aspects like contours, slope analysis, grading process, grading criteria, functional and aesthetic considerations. Maps of matrix analysis and composite analysis methods. Understanding the above through real projects/ case studies.

UNIT III PRINCIPLES OF SITE LAYOUT AND DEVELOPMENT 15

Organisation of pedestrian and vehicular circulation. Geometric calculation for movement. Types of roads, hierarchy of roads, networks, road widths and parking regulations. Principles of positive drainage and grading for drainage. Location and design of sewage treatment plants. Methods to control soil erosion. Location of utility lines to simplify maintenance. Planning for rain water harvesting. Incorporation of services such as drinking water pipelines, fire hydrants, communication and networking facilities at site. Vegetation, landforms and water as modifiers of microclimate.

Understanding the above through real projects/ case studies.

UNIT IV EXERCISE IN SITE SURVEYING AND PLANNING 15

Application of all the knowledge gained in previous units through a real/ hypothetical project involving a real site. The process would involve choosing site for a building typology or vice versa, field exercise in measuring and drawing the site, detailed site analysis, schematic site layout and development. The project will be explored through analysis/ models/ sketches/ drawings.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Sensitivity towards aspects of site at macro and micro contexts.
CO2 Ability to exploit potential of site to design the built environment.
CO3 Ability to measure, draw, analyse and plan a particular site for a specific purpose.

TEXTBOOKS

1. Kevin Lynch, 'Site Planning', Third Edition, MIT Press, 1984.
2. Edward. T. White, 'Site Analysis', Archi Basic Press, 2014.
3. B.C.Punmia et al, 'Surveying Vol.I', Seventeenth Edition, Laxmi Publications, 2016..

REFERENCES

1. Joseph De. Chiarra and Lee Coppleman, 'Urban Planning and Design Criteria', Van Nostrand Reinhold Co., 1982.
2. Strom Steven, 'Site Engineering for Landscape Architects', John Wiley and Sons, 2013.
3. P.B. Shahani, 'Text of Surveying Vol.I', Oxford and IBH Publishing Co, 1980
4. 'Development Control Rules', CMDA 2008.
5. Genevieve S. Baudoin, 'Interpreting Site: Studies in Perception, Representation, and Design', Routledge, 2015.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2	-	-	-	-	2	3	3	-	-	-	-
2	2	-	-	-	-	2	3	3	-	-	-	-
3	2	-	-	-	-	2	3	3	-	-	-	-
Avg.	**2**	**-**	**-**	**-**	**-**	**2**	**3**	**3**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3321 ADVANCED SPACE DESIGN STUDIO L T P/S C
0 0 9 9

OBJECTIVES

- To enable an understanding of the fundamental possibilities of architectural form and space in relation to human experience and use within the context of the immediate living environment.
- To get the above understanding through personal, first hand exploration as well as through theoretical and literature studies.
- To use this understanding to create meaningful built environment in the context of small scale projects that involve simple function and experience.

CONTENT

Designing a built environment requires the development of individual capacity for thought with respect to subjective and objective aspects. Studying and designing projects of small scale that involve a more immediate and basic experience is important in this context. The study and project exploration will involve the following aspects from first principles as well as through live studies and

theory – human behaviour, activities and needs for various purposes, role of specific form/space in creating particular experiences and effects, built form-open space relationships, spatial organisation, environment behaviour aspects (especially those relating to children), lighting and ventilation, site as a positive tool in all scales, potential of materials and construction. Through this, both the qualitative and quantitative attributes of design can be understood and engaged. This would give training in the ingenious use of architecture to fulfil goals towards a responsive and stimulating environment.

The techniques used for study and presentation can align themselves towards the above, such as cognitive maps, sketches, manual drawings, physical models with simple materials.

The scale and complexity of projects will be commensurate with this - small to medium size projects involving buildings/ small campuses with simple circulation, passive energy, multiples of single unit space, single use buildings. Some suggestive projects are small buildings or small campuses involving civic/ cultural use, uses related to children such as schools, facilities for people with special requirements. The number of projects is left to the discretion of the faculty based on scale and complexity.

TOTAL: 135 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to perceive, understand and represent fundamental attributes of form-space with respect to human experience and use.

CO2 Ability to ideate, innovate and create meaningful built environment in basic human situations.

TEXTBOOKS

1. Joseph De Chiara, Michael J Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional, 2001.
2. Kevin Lynch, 'Site Planning', MIT Press, Cambridge, 1967.
3. Steen Eiler Rasmussen, Experiencing Architecture, MIT Press, 1962.
4. Kent C. Bloomer and Charles W. Moore, 'Body, Memory, and Architecture', Yale University Press, 1977.
5. JuhaniPallasmaa, 'The Eyes of the Skin - Architecture and the Senses', John Wiley: New York, 2005.

REFERENCES

1. Julius Panero, Martin Zelnik, 'Human Dimension and Interior Space', Whitney Library of Design, 1975.
2. Richard P. Dober, 'Campus Planning', Society for College and University Planning ,1996
3. Sam F.Miller, 'Design Process: A Primer for Architectural and Interior Design', Van Nostrand Reinhold, 1995.
4. Dudek M, 'Schools and Kindergartens', Birkhauser 2007.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	2	2	2	3	2	1	2	-	-	-	1
2	3	2	2	2	3	2	1	2	-	-	-	1
Avg.	**3**	**2**	**2**	**2**	**3**	**2**	**1**	**2**	**-**	**-**	**-**	**1**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3401 REGIONAL AND VERNACULAR BUILT ENVIRONMENTS IN INDIA **L T P/S C**
3 0 0 3

OBJECTIVES

- To introduce the nature of evolution/ determinants of human settlements.
- To give an understanding of regional manifestations in settlements and architecture as evolving from contextual forces.
- To give familiarity to the methods and approaches for the study of regional/ vernacular built environment.
- To study the important manifestations of regional/ vernacular architecture and settlements in different regions of India.

UNIT I HUMAN SETTLEMENTS AND THEIR DETERMINANTS 7

Determinants of morphology of human settlements – climate, culture, socio-economic aspects, geography, etc, Differentiating between rural and urban settlements. Overview of settlement evolution in India. Relation between settlement morphology and architecture. Discussion of the terms traditional architecture, regional architecture, indigenous architecture, vernacular architecture, etc.,

UNIT II STUDY OF VERNACULAR/ REGIONAL ARCHITECTURE 8

Vernacular/ regional architecture as a process and responsive design. Concepts, approaches, survey and study of vernacular/ regional architecture -aesthetic, architectural, anthropological, etc., General aspects to be studied in vernacular/ regional architecture of India –climatic response, forms, spatial planning, socio-cultural aspects, symbolism, colour, art, materials of construction and construction technique, etc.,

UNIT III SETTLEMENT MORPHOLOGY AND REGIONAL ARCHITECTURE OF GUJARAT AND RAJASTHAN 10

Determinants and morphology of rural and urban settlements in Gujarat. Vernacular/ regional architecture of Gujarat as particular productions. Determinants and morphology of rural and urban settlements in Rajasthan. Vernacular/ regional architecture of Rajasthan as particular productions.

UNIT IV SETTLEMENT MORPHOLOGY AND REGIONAL ARCHITECTURE OFKASHMIR AND BENGAL 10

Determinants and morphology of settlements in Kashmir. Vernacular/ regional architecture of Kashmir as particular productions. Determinants and morphology of settlements in Bengal. Vernacular/ regional architecture of Bengal as particular productions. Colonial and modern influences.

UNIT V SETTLEMENT MORPHOLOGY AND REGIONAL ARCHITECTURE OF TAMILNADU AND KERALA 10

Determinants and morphology of settlements in Kerala. Vernacular/ regional architecture of Kashmir as particular productions. Determinants and morphology of rural and urban settlements in Tamil Nadu. Vernacular/ regional architecture of Tamil Nadu as particular productions. Colonial and modern influences.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of the built environment as a process and knowledge of its determinants.
CO2 Ability to analyse built environment through the knowledge of approaches to its study.
CO3 Knowledge of settlement morphologies and regional/ vernacular architecture in specific regions of India.

TEXTBOOKS

1. Bernard Rudofsky, 'Architecture without Architects', University of New Mexico Press, 1987.
2. Paul Oliver, 'Encyclopedia of Vernacular Architecture of the World', Routledge, 2007.
3. Amos Rapoport, 'House, Form and Culture', Prentice Hall Inc. 1969.
4. Carmen Kagal, 'Vistara- The Architecture of India', The Festival of India, 1986.

REFERENCES

1. Kosambi D.D, 'The Culture and Civilisation of Ancient India in Historical Outline', Vikas,1997.
2. R W Brunskill, 'Illustrated Handbook on Vernacular Architecture', Faber and Faber, 2000.
3. V.S. Pramar, 'Haveli – Wooden Houses and Mansions of Gujarat', Mapin, 1989.
4. Kulbushanshan Jain and Minakshi Jain, 'Mud Architecture of the Indian Desert', Aadi Centre, Ahmadabad, 1992.
5. G.H.R. Tillotson, 'The Tradition of Indian Architecture: Continuity, Controversy, Change since 1850', Oxford University Press, Delhi, 1989.
6. S. Muthiah et al, 'The Chettiar Heritage', Chettiar Heritage, 2017.
7. Weber. W and Yannas. S, 'Lessons from Vernacular Architecture', Routledge, 2014.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	3	2	-	-	3	-	-	-	2
2	-	-	-	3	2	-	-	3	-	-	-	2
3	-	-	-	3	2	-	-	3	-	-	-	2
4	-	-	-	3	2	-	-	3	-	-	-	2
Avg.	**-**	**-**	**-**	**3**	**2**	**-**	**-**	**3**	**-**	**-**	**-**	**2**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3402 STRUCTURAL DESIGN OF MASONRY AND TIMBER L T P/S C
3 0 0 3

OBJECTIVES

- To enable the learning of design of masonry walls.
- To introduce concepts of reinforced masonry design
- To understand design of timber beams.
- To enable the learning of timber column design.
- To understand the analysis and design of timber trusses.

UNIT I BASIC MASONRY DESIGN 9

Analysis and design of masonry wall with and without openings. Use of nomograms. Design of masonry wall subjected to combined action of axial load and bending.

UNIT II REINFORCED MASONRY DESIGN 6

Introduction to reinforced masonry design. Application to simple problems.

UNIT III DESIGN OF TIMBER BEAMS 9

Grading of timber. Permissible stresses. Design of solid timber beams. Madras terrace roof design.

UNIT IV DESIGN OF TIMBER COLUMNS 9

Design of solid timber columns. Built-up Column. Spaced Column.

UNIT V DESIGN OF TIMBER TRUSSES 12

Analysis of plane trusses. Introduction to Determinate and Indeterminate plane trusses. Analysis of simply supported and cantilevered trusses by Method of Joints and Method of Sections. Analysis and design of timber trusses.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to design structural masonry walls.
CO2 Ability to design reinforced masonry walls
CO3 Ability to design timber beams, columns and trusses by applying the code provisions.

TEXTBOOKS

1. P. Dayaratnam and P. Sarah, 'Brick and Reinforced Brick Structures', Medtech, 2018
2. A.S.Arya, 'Structural Design in Steel, Masonry and Timber', Nemchand and Bros, Roorkee, 1971.
3. B. C. Punmia, Ashok Kumar Jain , Arun Kumar Jain, , 'Comprehensive Design of Steel Structures', Laxmi Publications (P) Ltd, 2014.
4. K. S. Jagadish, 'Structural Masonry', 3rd Edition, Wiley, 2021.
5. Harbhajan Singh, 'Design of Masonry and Timber Structure with Earthquake Resistant Measures', Abhishek Publications, 2015.

REFERENCES

1. National Building Code of India, Part VI, Structural Design,1983.
2. IS 883 – Code of Practice for Design of Structural Timber in Buildings.
3. IS 1905- Code of Practice for Structural use of Unreinforced Masonry-1987.
4. IS 2212 (1991): Code of practice for brickworks.
5. SP10- Nomograms for Thickness of Masonry Walls–1975
6. Arun Menon, NPTEL course on Design of Masonry Structures.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	3	-	-	-	-	-	-
2	-	-	-	-	-	3	-	-	-	-	-	-
3	-	-	-	-	-	3	-	-	-	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3403 WATER SUPPLY AND SANITATION IN BUILDINGS L T P/S C
3 0 0 3

OBJECTIVES

- To introduce and give knowledge about the different environmental services for human environment- water supply, sewerage, drainage, waste management and plumbing systems.
- To give familiarity about sustainable practices and systems for environmental services.
- To enable the conceptual design of small buildings/ campuses for environmental services.

UNIT I WATER SUPPLY 10

Water supply system at macro level - sources, pumping, reservoirs, water treatment, tanks, piping systems and materials. Quantitative and qualitative requirements of water for different activities in a small building/campus of simple typologies. Overhead tanks, underground sumps, fire fighting storage, water meter, R.O. Plant, water heating systems, solar water heaters, fixtures and fittings for a small building/ campus. Design calculations for the same and related mechanical equipment. Sustainable practices and systems.
Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT II SEWERAGE 10

Sewage and sullage. Sewerage systems. Different types/stages of sewage treatment at city level. Sewer line, gradients, manholes, inspection chambers. One pipe/ two pipe plumbing systems. Sewage treatment at campus/ building level -sewage treatment plants, septic tank, leach pits.

Sustainable practices and systems.
Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT III DRAINAGE AND WASTE MANAGEMENT 6

Storm water drains at city level. Types of pipe. Storm water gutter. Drainage systems in small building/campus. Roof drainage. Rain water harvesting and storage sumps. Sustainable practices and systems.
Solid waste- types, segregation and refuse collection. Disposal - Incinerator, composting, vermicomposting, sanitary land filling, bio gas system, modern renewable energy system.
Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT IV PLUMBING SYSTEMS IN BUILDINGS 9

Basic principles of plumbing. Plumbing, sanitary fittings and their requirements for a small building - wash basins, water closets, urinals, bidets, sinks, gate valve, float valve, flap valve, ball valve, flush valve, etc, different types of taps, faucets, stop cocks, bib cocks, 'P', 'Q', 'S', floor/bottle traps.
Understanding of products, product catalogues, service drawings. Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT V DESIGN FOR ENVIRONMENTAL SERVICES 10

Site planning, building and room design principles for water supply, sewage and storm water in an integrated manner for a small building and campus. Understanding of service drawings. Site visits and documentation in the form of sketches/ drawings/ photos. Conceptual design for a small building.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to understand environmental services from macro to micro level human environment.
CO2 Ability to adopt sustainable practices and systems for environmental services.
CO3 Ability to design environmental services in a building/ small campus.

TEXTBOOKS

1. 'Manual of Water Supply and Treatment', II Edition, CPHEEO, Ministry of Works and Housing, New Delhi, 1999.
2. AFE Wise, JA Swaffied Water, 'Sanitary and Waste Services in buildings', V Edition, Mitchell Publishing, Co. Ltd., 2002.
3. Punmia B.C, 'Waste Water Engineering', Laxmi Publications, 2009.
4. Arceivala S.J, 'Waste Water Treatment for Pollution Control', Tata McGraw Hill, 2008.
5. 'National Building Code', Bureau of Indian Standards.
6. 'Indian Standard Code of Practice for Water Supply in Buildings, IS :2065 – 1983'

REFERENCES

1. G.M. Fair, J.C. Geyer and D.Okin, 'Water and Waste Water Engineering Volume II', John Wiley and Sons, Inc. New York, 2010.
2. S.C.Rangwala, 'Water Supply and Sanitary Engineering', Charotar Publishing House, 2016.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	2	3	-	-	-	-	-
2	-	-	-	-	-	2	3	-	-	-	-	-
3	-	-	-	-	-	2	3	-	-	-	-	-
AVG	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

NCC Credit Course Level 2*

NX3451	(ARMY WING) NCC Credit Course Level - II	L T P C 3 0 0 3
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7
DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
ARMED FORCES		**6**
AF 1	Armed Forces, Army, CAPF, Police	6
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

NCC Credit Course Level 2*

NX3452	(NAVAL WING) NCC Credit Course Level - II	L T P C 3 0 0 3
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7

DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
NAVAL ORIENTATION		**6**
AF 1	Armed Forces and Navy Capsule	3
EEZ 1	EEZ Maritime Security and ICG	3
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2
	TOTAL: 45 PERIODS	

NCC Credit Course Level 2*

NX3453	**(AIR FORCE WING) NCC Credit Course Level - II**	**L T P C** **3 0 0 3**

PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7
DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
GENERAL SERVICE KNOWLEDGE		**6**
GSK 1	Armed Forces & IAF Capsule	2
GSK 2	Modes of Entry in IAF, Civil Aviation	2
GSK 3	Aircrafts - Types, Capabilities & Role	2

ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

AR3411 WOOD IN BUILDING CONSTRUCTION L T P/S C
1 0 3 4

OBJECTIVES

- To give introduction to wood as a material for construction straw and timber.
- To give knowledge about construction using wood.
- To facilitate in the design of buildings using wood and wood based materials.

UNIT I BAMBOOIN BUILDING CONSTRUCTION 12

Bamboo- anatomy, properties, strength, processing, harvesting. Working with bamboo. Treatment, preservation and uses of bamboo. Joints in Bamboo. Framed construction for walls and floors. Techniques of construction of roofs with bamboo.
Finishes for construction of all the above.

UNIT II TIMBER FOR STRUCTURAL USE 18

Types of timber, their classification and characteristics. Timber sources, defects, conversion, seasoning, storage, preservation, finishes.
Joints in timber. Timber frames for walls. Timber flooring. Timber staircase. Construction of timber roof trusses (to include lean to, couple, collar, king post, queen post and roof covering material).
Understanding construction principles and procedures through sketches/ drawings/ models / site visits/ documentation/ drawing of typical example.

UNIT III TIMBER FOR NON STRUCTURAL USE 18

Timber as a material for doors, windows, ventilators, partitions, floor finish, false ceiling, panelling, handrails. Types and characteristics of timber and timber based materials such as plywood, blockboard, particle board, other types of industrial timber.

Types of timber doors, windows and ventilators as applicable- swing (single, double, degree of swing), mechanisms of operation (fixed, openable, sliding, folding, sliding and folding, pivoted, revolving, top hung, bottom hung, louvred), nature (french, corner, bay). Understanding through sketches/product literature/ case studies.

Basic components for timber door, window, ventilator of different types- outer frame, shutter frame, shutter material, hardware, fixtures, etc.,. Their joining and fixing procedures, insect screens. Finishing materials and procedures. Understanding of detailed drawings/ published work. Site visits with documentation in the form of sketches/ drawings/ photos. sketches/models of the principles. Drawings of typical examples.

Basic components of timber in building interior elements such as partitions, flooring, false ceiling, panelling, handrails, etc., and their different types. Different kinds of systems and methods. Drawings/ sketches of the principles. Understanding of product literature. Site visits with documentation in the form of sketches/ photos.Sketches/models of the principles. Drawings of typical examples.

Finishes for timber in all the above uses.

UNIT IV DESIGN AND DETAILING WITH WOOD 12

Innovative design and detailing of a small and simple structure for a specific purpose using wood as a material applying the knowledge of materials and construction principles studied in the previous units. Design to be submitted in the form of sketches/drawings/detailing/model.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Familiarity with the properties and uses of wood as a building material.
CO2 Knowledge about the construction details of woodfor structural and non structural use.
CO3 Ability to design buildings using wood.

TEXTBOOKS

1. Don A. Watson, 'Construction Materials and Processes', McGraw Hill, 1986.
2. W.B. McKay, 'Building Construction', Person India, Vol, 1 2013,Vol II, 2013.
3. S.C Rangwala 'Building Construction' Charotar Publishing House, India, 2016.
4. S.K.Sharma, 'A Text book of Building Construction', S. Chand and Co Ltd., New Delhi,1998.
5. S.K. Duggal, 'Building Materials', New Age International Publishers, 2016.
6. R.J. S. Spence and D.J. Cook, 'Building Materials in Developing Countries', John Wiley and sons 1983.
7. S. C. Rangwala, 'Engineering Materials', Charotar Publishing House India, 2015.
8. Roy Chudley, Roger Greeno, 'Building Construction Handbook', Routledge, 2010.
9. KlansDukeeberg, Bambus – Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000.
10. National Building Code Of India 2016- Part 6 Structural Design- Section 3 Timber and Bamboo.

REFERENCES

1. Francis D.K Ching, 'Building Construction Illustrated', John Willey and Sons, 2014.
2. Willis H Wagner and Howard Bud Smith, 'Modern Carpentry', Good Heart–Wilcox Publishers, Portland, 2016.
3. Barry, 'Construction of Buildings, Volume 1and2', Blackwell Publishing Ltd., Oxford, 2005.
4. Ghanshyam Pandya, M.P. Ranjan, NilamIyer, 'Bamboo and Cane Crafts of Northeast India', National Institute of Design, 2004.
5. American Institute of Timber Construction (AITC), 'Timber Construction Manual', Wiley Publishers, 2004.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	2	-	3	-	-	-	-
2	-	-	-	-	-	3	-	2	-	-	-	-
3	-	-	-	-	-	3	-	2	1	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**	**1**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3412 DIGITAL DRAWING, VISUALISATION AND REPRESENTATION L T P/S C
1 0 3 4

OBJECTIVES

- To introduce computer operation principles and explore image editing through a graphical composition.
- To impart training in computer aided 2D drafting and 3D modelling through projects.
- To enable the use of computer applications to develop a design from the initial stages to the

final outcome.

- To enable the rendering of a building so as to create a photo realistic image.

UNIT I INTRODUCTION TO COMPUTER AND IMAGE EDITING 9

Technology of small computer system. Computer terminology. Operation principles of P.C. Introduction to application software, graphic system, use of printers, scanner, plotter, file management, etc. Understanding bitmap images and vector graphics, image size and resolution. Basic tools for editing and creating graphics.

Exercise in creating visual compositions using digital graphics (pixels/vector).

UNIT II BASICS OF BUILDING MODELLING AND VIEWING THE BUILDING MODEL 18

Creating a basic floor plan. Temporary dimensions. Adding and modifying walls. Working with compound walls. Using editing tools. Adding and modifying doors. Adding and modifying windows. Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, and text, dimensioning. Transparent overlays, hatching utilities, line type, line weight and colour. Multiline, polyline, etc. Styles, blocks and symbol library.

2D Drafting exercise of a simple building.

UNIT III INTRODUCTION TO 3D MODELLING 18

Slide facilities script attributes, V-port, editing session. Introduction to 3D-modelling technique and construction planes, drawing objects, 3D surfaces setting up elevation thickness and use of dynamic projections. Solid modelling with primitive command and Boolean operation.

3D sculpture exercise using 3D primitives (cubes, spheres etc.)

UNIT IV 3D RENDERING AND SETTING 15

Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filling.

Exercise on visualising a building and exploring the potential of lights and camera.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to express using digital tools in the realm of visual composition, drafting, 3D visualisation and rendering.

TEXTBOOKS

1. Deke McClelland, 'Photoshop Ver (8)CS Bible ', John Wiley and Son, New York, 2004.
2. Aouad, 'Computer Aided Design guide for Architecture, Engineering and construction', Spon Process, 2012.
3. Mohammed Saleh Uddin, 'Digital Architecture – 3D Computer Graphics from 50 Top Designers', 1999.
4. Douglas R. Seidler, 'Digital Drawing for Designers', Bloomsbury, 2014.

REFERENCES

1. Scott Onstott, 'AutoCAD 2015 and AutoCAD LT 2015 Essentials', Auto Desk Official press, 2014.
2. Fiorello. J. A., 'CAD for Interiors Beyond the Basics', Wiley Publications, 2011.
3. Ryan Duell and Tobias Hathorn, 'Auto Desk Revit Architecture 2016: Essentials', Auto Desk Official Press, Sybex, 2015.
4. Eric Wing, 'Auto Desk Revit Architecture 2017: No Experience Required', Auto Desk Official Press, Sybex, 2016.
5. Alexander C. Schreyer, 'Architectural Design with SketchUp', Wiley, 2012.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2	2	3	-	-	-	-	-	-	-	-	-
2	2	2	3	-	-	-	-	-	-	-	-	-

3	2	2	3	-	-	-	-	-	-	-	-	-
4	2	2	3	-	-	-	-	-	-	-	-	-
Avg.	**2**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3421 **RURAL HABITAT DESIGN STUDIO** **L T P/S C**

0 0 9 9

OBJECTIVES

- To create understanding of human built environment as a holistic, living entity from macro to micro scales, and shaped by geographic and socio-cultural forces as well as by historic, political and economic factors, through study of and design within the context of rural settlements.
- To enable a comprehensive study of rural settlement and architecture in order to understand them as exemplar of collective design that evolved through various parameters.
- To observe changes in the above, analyse their nature and causes for them.
- If required, to explore possible policy and physical interventions towards positive changes within the context studied.
- To enable design process that engages context and community.

CONTENT

Rural settlements offer an opportunity to understand basic aspects of human built environment and what goes into its making/ influences it. The interrelationship between built form and society will be studied, understood and established, starting from either end as required. Study of specific modes of rural/vernacular/traditional architecture including their morphology, local materials and construction techniques, details, meaning, etc., will be done to give an insight into the particulars and universals of architecture.

Appropriate tools and processes can be used to aid the understanding. These include different methods of historical and socio-cultural study, oral history, discussions, information collection, surveys, maps, perceptual sketches, documentation through drawings, demographic study, assimilation and analysis.

Transformations across time need to be traced to understand constants and dynamics in human society. They will also be critically evaluated through discussions with experts. Rising from this, future changes can be projected/ envisaged and if found required, policy and physical interventions can be suggested/ explored. The physical interventions found necessary will be taken up as design situations. This could range from individual to community level and involve any aspect of the physical environment (including building projects) as the situation/viewpoint warrants.

If the context does not warrant a building need, a small community oriented building design will be given as a separate project in addition to the rural project. For building projects, the scale and complexity of planning and construction usually involved will be simple - small or medium span, ground plus two storeyed maximum, simple horizontal and vertical movement, simple/ local materials and construction, passive energy.

TOTAL: 135 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to collect, assimilate and integrate knowledge in a holistic manner.

CO2 Sensitivity towards the nature and values of unselfconscious and collective design as well as the interconnectedness of human society and environment.

CO3 Ability to observe and analyse changes in the above.

CO4 Ability to project future transformations and give possible/ appropriate ways to address issues, if any.

CO5 Sensitivity in design approach in community oriented projects with respect to context, collective values and needs.

TEXTBOOKS

1. Amos Rapoport, 'House, Form and Culture', Prentice Hall, 1969.
2. Bernard Rudofsky, 'Architecture without Architects', University of New Mexico Press, 1987.
3. Rajendra Kumar Sharma, 'Rural Sociology', Atlantic, 2011.
4. Joseph De Chiara, Michael J Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional 2001.

REFERENCES

1. Ramachandran H, 'Village Clusters and Rural Development', Concept Publications, 1980.
2. Thorbeck D, 'Rural Design', Routledge,2012.
3. Hassan Fathy, 'Architecture for the Poor', University of Chicago Press, 1973.
4. R. C. Arora, 'Integrated Rural Development', S. Chand, 1979.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2	2	2	3	1	3	2	3	-	-	2	2
2	2	2	2	3	1	3	2	3	-	-	2	2
3	2	2	2	3	1	3	2	3	-	-	2	2
4	2	2	2	3	1	3	2	3	-	-	2	2
5	2	2	2	3	1	3	2	3	-	-	2	2
Avg.	**2**	**2**	**2**	**3**	**1**	**3**	**2**	**3**	**-**	**-**	**2**	**2**

'1' = Low; '2' = Medium; '3' = High

AR3501 ARCHITECTURE AND URBANISM OF COLONIALISM AND MODERNITY L T P/S C

3 0 0 3

OBJECTIVES

- To introduce the condition of modernity and outline its impact on society, cities and architecture.
- To give a detailed understanding of modern architecture as new expression with different strands rising from various aspects and effects of modernity.
- To create an overall understanding of the architectural developments in India rising out of colonialism, modernity and nationalism.

UNIT I COLONIALISM, INDUSTRIAL REVOLUTION AND MODERNITY 9

Voyages of trade, colonialism, political and economic strategies and socio-cultural intersections. Modernity as historical phenomenon and its various aspects and manifestations, encompassing social, cultural, technological, economic and political changes. Strands of modernity in architecture. Enlightenment ideals, Neo Classical architecture and its types. Outline of Industrial Revolution and associated changes. Urban transformations in Europe and America. Housing projects. New building types and spaces. Industrial material of steel, glass and concrete. New construction techniques and standardisation. Split of design education into architecture and engineering streams. Industrial exhibitions. Chicago School, skyscraper development and Louis Sullivan.

UNIT II REACTIONS TO INDUSTRIALISATION 7

Reactions to industrialisation in design. Arts and Crafts in Europe and America. Works of Morris and

Webb. Art Nouveau. Works of Horta, Van De Velde, Gaudi, Guimard and Mackintosh. Vienna Secession.

UNIT III EVOLUTION OF MODERN ARCHITECTURE - IDEOLOGIES, MOVEMENTS AND STYLES 10

Early modernism in Europe and America. Critique of ornamentation and Raumplan of Adolf Loos. Peter Behrens and Werkbund. Modern art and architecture - Expressionism, Futurism, Constructivism, Cubism, Suprematism and De–Stijl. Art Deco. Functionalism. Bauhaus. CIAM. International Style. Outline of works and architects associated with all the above. Ideas, works and evolution of Gropius, Corbusier, Aalto, Wright, Mies, Neutra.

UNIT IV ARCHITECTURE OF COLONIALISM, MODERNITYAND NATIONALISM IN INDIA 9

Colonial rule in the Indian subcontinent and ambiguous modernity through colonialism. Colonial architecture and urbanism- forts, bungalows, cantonments, colonial urbanism, civic buildings, buildings of infrastructure, education, power, trade and other typologies. Characteristics and styles of colonial architecture based on chronology and changing intent/typology - Neo-Classicism, Gothic Revival and Indo-Saracenic. Influence of colonial modernity on Indians and their architecture. Building of New Delhi showcasing imperial power. Diverse directions and searches in early 20th century architecture of India. Art Deco and modern architecture in pre-independence India.

UNIT V MODERN ARCHITECTURE – SPREAD AND LATER DIRECTIONS 10

Brutalism. Team X. Ideas, works and evolution of Philip Johnson, Louis Kahn, Paul Rudolph, Eero Saarinen, SOM, Eames, I.M.Pei. Modern architecture and post independence India - national building, institutions and PWD architecture. Chandigarh and Corbusier's other works in India. Outline of evolution of the architectural profession in India, influences on architects. Outline of modernist architecture of India. Works of Kanvinde, Habib Rehman, Raje, early works of B.V. Doshi,Charles Correa, Uttam C.Jain, Hasmukh Patel

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of modernity as a fundamental transformation in Western society that spread across the world and the resultant architectural production.

CO2 An insight into the development of various strands of modernism and modern architecture.

CO3 An understanding of architecture of colonialism, nationalism and modernity in India.

TEXTBOOKS

1. Kenneth Frampton, 'Modern Architecture: A Critical History', Oxford University Press, 2016.
2. William J. Curtis, 'Modern Architecture since 1900', Phaidon Press, 1996.
3. Manfredo Tafuri, 'Modern Architecture', Rizzoli Publications,1991.
4. Leonardo Benevolo, 'History of Modern Architecture Vol 1 and 2', Reprint, MIT Press, 1977.
5. G. H. R. Tillotson, 'The Tradition of Indian Architecture: Continuity, Change, and the Politics of Style since 1850', Yale University Press, 1989.
6. Miki Desai et. al., 'Architecture and Independence: The Search for Identity- India 1880 to 1980', Oxford University Press, 2000.

REFERENCES

1. Thomas Metcalf, 'An Imperial Vision', Oxford University Press, 2002.
2. Christian Norburg-Schulz., 'Meaning in Western Architecture', Rizzoli, Revised Edition, 1993.
3. Bill Risebero, 'Modern Architecture and Design: An Alternative History', MIT Press, 1985.
4. Norma Evenson, 'The Indian Metropolis: A View Toward the West', Yale University Press, 1989.
5. Francis D. K. Ching, Mark M. Jarzombek, Vikramaditya Prakash, 'A Global History of Architecture', John Wiley and Sons, 2017.
6. K.R.Sitalakshmi, 'Architecture of Indian Modernity- The Case of Madras', Palaniappa

Brothers, 2015.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	2	-	3	2	2	-	-	-	-	-	1
2	-	2	-	3	2	2	-	-	-	-	-	1
3	-	2	-	3	2	2	-	2	-	-	-	1
Avg.	**-**	**2**	**-**	**3**	**2**	**2**	**-**	**2**	**-**	**-**	**-**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3502 STRUCTURAL DESIGN OF CONCRETE L T P/S C
3 0 0 3

OBJECTIVES

- To inform about different methods of design of structures.
- To enable design of concrete beams.
- To enable design of slabs, staircase.
- To enable design of column.
- To enable design of foundations under axial loading.

UNIT I DESIGN METHODS - INTRODUCTION 5

Concept of elastic method, Ultimate load method and limit state method. Advantages of limit state method over other methods.

UNIT II LIMIT STATE DESIGN OF BEAMS 10

Analysis and design of singly and doubly reinforced rectangular and flanged beams for bending and shear. Design of Continuous Beams using IS 456 codal coefficients.

UNIT III LIMIT STATE DESIGN OF SLABS 11

Behavior of one way and two way slabs. Design of one way and two way slabs for various edge conditions. Torsion effects. Design of simply supported and fixed circular slabs subjected to uniformly distributed loads. Types of staircases. Design of dog legged staircase.

UNIT IV LIMIT STATE DESIGN OF COLUMNS 8

Long and short column. Axially loaded rectangular and circular column. Columns subjected to uniaxial and biaxial bending. Design of column using column interaction diagram. Use of SP16.

UNIT V LIMIT STATE DESIGN OF FOUNDATION AND RETAINING WALL 11

Basics of soil Mechanics -Concept of Safe bearing capacity of soil - Upward pressure distribution for different types of soil. Types of foundation. Design of Wall footing. Design of loaded rectangular and sloped footing. Design of combined rectangular footings. Types of Retaining wall. Design concepts of cantilever retaining wall (Theory only).

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to understand the different concepts of WSM and LSM.
CO2 Ability to design RCC beams, slabs, staircase, columns, foundations and retaining wall.

TEXTBOOKS

1. Dr. B.C. Punmia, 'Reinforced Concrete Structures' Vol, 1 and 2', Laxmi Publication, Delhi, 2015.
2. S.Unnikrishnan Pillai and Devados Menon, 'Reinforced Concrete Design', Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2017.
3. S.N. Sinha, "Reinforced Concrete Design", Tata McGraw Hill , 2017.

REFERENCES

1. P.Dayaratnam, 'Design of Reinforced Concrete Structures', Medtech, 2017.
2. C. Sinha and S.K. Roy, 'Fundamentals of Reinforced Concrete', S. Chand and Co., New Delhi,2007.
3. N. Krishna Raju, 'Design of Reinforced Concrete Structures', CBS Publishers and Distributors, 2016.
4. IS 456-2000, 'Indian Standard, Plain and Reinforced Concrete, Code of Practice', Bureau of Indian Standards, 2000.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	2	-	-	-	-	-	-
2	-	-	-	-	-	3	-	-	-	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3503 ELECTRICITY, LIGHTING AND ACOUSTICS IN BUILDINGS L T P/S C
3 0 0 3

OBJECTIVES

- To give familiarity about the different requirements of electrical services in a building.
- To give knowledge about sources, principles, products and design of lighting from artificial sources.
- To give knowledge about basics of acoustics and acoustical design of buildings.

UNIT I GENERATION OF ELECTRICITY AND DISTRIBUTION IN BUILDINGS 11

Generation of electricity. Ohms and Kirchoffs laws. Units: watt, volt, amps. Distribution from grid to facilities. Two phase and three phase systems. Substation, transformers, wires and conduits, distribution boards, meters, switch boards, earthing, lightning conductors. Generators, inverters. Electrical load estimation and electrical wiring design for a small building/ campus.

Site visits with documentation in the form of sketches/ drawings/ photos. Understanding of products, product catalogues for a small building.

UNIT II ELECTRIC LIGHTING 9

Laws and terminologies of light and lighting. Light from artificial sources, quantity and quality. Types of lamps and luminaires. Applications and choice of luminaires. Lighting level for different uses in outdoor and indoor environment. Supplementary electrical lighting.

Site visits with documentation in the form of sketches/ photos. Understanding of products, product catalogues.

UNIT III LIGHTING DESIGN FOR BUILDINGS 8

Lighting calculations. Brief overview of lighting simulation and performance analysis using software. Design exercise involving lighting design for appropriate projects of simple scale through choice, calculations, layout, drawings, physical models.

UNIT IV FUNDAMENTALS OF ACOUSTICS 9

Fundamentals – sound waves, frequency, intensity, wave length, measure of sound, decibel scale, speech and music frequencies. NC curves. Permissible noise limits. Material property - absorption,

reflection, scattering, diffusion, transmission. Absorption co-efficient, NRC, Sound Transmission Class (STC), Impact Insulation Class (IIC).Understanding acoustic properties of materials/ products through study of product literature/ site visits. Environmental noise and its control. Structure borne and air borne noise control. Site selection. Sound in enclosed space: Reverberation time, optimum reverberation time, echo, early decay time. Architectural acoustics. Importance of shape volume, treatment for interior surfaces, etc.

UNIT V DESIGN FOR ACOUSTICS 8

Basic principles in acoustic designing of classroom, lecture and conference hall, offices, open air theatre, auditorium, concert hall, theatre, cinema, recording studio. Understanding of drawings/ details related to real acoustic design projects. Site visits with documentation in the form of sketches/ drawings/ photos Simple problems based on reverberation time and absorption coefficients.

TOTAL:45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to understand electrical services in a building.
CO2 Ability to design artificial lighting in a building.
CO3 Knowledge of principles of acoustic design in different building typologies.

TEXTBOOKS

1. Derek Phillips and John Howard, 'Lighting in Architectural Design', McGraw Hill. New York, 1964.
2. David Egan, Victor Olgyay 'Architectural Lighting', McGraw-Hill, 2001.
3. Gary Gordon, 'Interior Lighting for Designers', 5th Edition, John Wiley and Sons Inc., New York, 2015.
4. David Egan, 'Architectural Acoustics', J. Ross Publishing, 2007.
5. David Lee Smith, 'Environmental Issues for Architecture', Wiley, 2011.
6. National Building Code - Bureau of Indian Standards.

REFERENCES

1. 'The Lighting Handbook', IES, 2011.
2. 'National Lighting Code', SP 27:2010.
3. Descottes, Herve and Cecilia E. Ramos, 'Architectural Lighting: Designing with Light and Space, Princeton Architectural Press, Princeton, 2013.
4. A.K.Mittal, 'Electrical and Mechanical Services in High Rise Building: Design and Estimation Manual', CBS, 2015.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	2	3	3	-	-	-	-
2	-	-	-	-	-	2	3	3	-	-	-	-
3	-	-	-	-	-	2	3	3	-	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**3**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3511 CONCRETE IN BUILDING CONSTRUCTION L T P/S C

1 0 3 4

OBJECTIVES

- To give an introduction to cement and concrete as materials for building construction.
- To help understand the principles, types, methods of construction and applications of concrete for structural and non-structural building components.
- To enable design and detail using concrete in buildings.

UNIT I INTRODUCTION TO CEMENT AND CONCRETE 12

Cement and concrete as building materials. Brief history of their use through examples. Composition, manufacture, properties, types and uses of cement. Tests for cement. Introduction to cement mortar and plastering and their composition. Concrete and its composition. Mix design. Nature of aggregates for mix including classification, sources, shape, size, grading, sampling and analysis. Proportioning, water-cement ratio, workability. Stages in concrete construction- formwork, mixing, placing, curing. Cement and concrete finishes including roughcast, dry dash, textured, stucco. Water proofing and damp proofing of concrete.

Cement and cement based paints and finishes including types, composition, characteristics, context of usage, preparation and application techniques and methods.

Understanding of product literature. Site visits with documentation in the form of sketches/ photos.

UNIT II CAST IN-SITU CEMENT CONCRETE IN BUILDING CONSTRUCTION 21

Construction principles and procedures for building components using cast in situ cement concrete (plain and reinforced). Components to include different types of foundations, columns, beams, slabs, walls, lintels and sun shades, staircases, sump, water tank, flooring.

Drawings/ models/ sketches of the principles. Understanding of detailed drawings/ published work. Site visits with documentation in the form of sketches/ photos.Drawings of typical examples.

UNIT III PRECAST CONCRETE, SPECIAL CONCRETES AND INNOVATIONS 15

Types and characteristics of simple precast concrete products. Construction principles and procedures for structural and nonstructural building components using precast concrete. Components to include different types of blocks/ tiles for walls, floors and roof, jali, parapet, paving. Outline of manufacture, laying/constructing and finishing.

Types of special concretes, to include lightweight concrete, aerated concrete, no-fines concrete, polymer concrete, pre-stressed concrete, fibre-reinforced concrete, ready-mixed concrete, ferrocement. Advanced concrete components like flat slabs, waffle slabs, shear walls. Surface active structures – plates, folded plates, shells, domes and vaults. Insulated concrete forms (ICF).

Building materials and components developed by research organisations like CBRI, SERC, NBO, and BMTPC. Techniques for renovation and retrofitting. Basic principles for seismic design in concrete.

Sketches/ drawings/ models of the principles. Understanding of product literature/ published work. Site visits with documentation in the form of sketches/ photos.

UNIT IV DESIGN AND DETAILING USING CONCRETE 12

Design and detailing exercise involving concrete as primary construction material in an appropriate typology involving a simple scale project. The project will integrate knowledge from all the previous units. Design and construction details in the form of drawings, sketches and models.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to use concrete as a versatile material in different contexts.
CO2 An understanding of the concepts of concrete as a building construction material.
CO3 Ability to design and detail specific components in concrete where there is scope for architectural design.
CO4 Ability to use concrete innovatively in simple projects.

TEXTBOOKS

1. M.S. Shetty, 'Concrete Technology', S.Chand, 2005.
2. S.K. Duggal, 'Building Materials', New Age International Publishers, 2016.
3. B.C.Punmia et al, 'Building Construction', Laxmi Publications, 2016.
4. T.D Ahuja and G.S. Birdie, 'Fundamentals of Building Construction', Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1996
5. S.P Arora and S.P Bindra, 'A Text Book of Building Construction', Dhanpat Rai Publishing Company Pvt. Ltd, 2010.
6. Roy Chudley, Roger Greeno, 'Building Construction Handbook', Routledge, 2016.

REFERENCES

1. Arthur Lyons, 'Materials for Architects and Builders - An Introduction', Routledge,2017.
2. Don A.Watson, 'Construction Materials and Processes', McGraw Hill Co., 1986.
3. S.N Sinha, 'Reinforced Concrete Design', Tata-McGraw Hill, New Delhi, 2002
4. Howard Kent Preston, 'Prestressed Concrete for Architects and Engineers', McGraw Hill, New York, 1964.
5. Alan Blanc, 'Stairs, Steps and Ramps', Butterworth, Heinemann Ltd., 1999
6. R. Chudley et al**, '**Construction Technology', Heinemann, 2011.
7. 'Standards and Specifications for Cost Effective Innovative Building Materials and Techniques'', BMPTC Publication, New Delhi.
8. Pamphlet and Manuals of SERC, BMPTC, HUDCO and other research organisations.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	3	-	-	-	-	-	-
2	-	-	-	-	-	3	-	-	-	-	-	-
3	-	-	-	-	-	3	-	-	-	-	-	-
4	-	-	-	-	-	3	-	-	-	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3521 **URBAN ARCHITECTURE DESIGN STUDIO** **L T P/S C**
0 0 10 10

OBJECTIVES

- To introduce the challenges involved in the design of projects and typologies related to diverse needs and ways of contemporary urban life.
- To enable exploration of the above projects and typologies with perception, socio-cultural awareness and innovation.

CONTENT

Human environment today is synonymous with heterogeneity of populace and their diverse needs and lifestyles. Private and public spaces for varied programmes such as living, working and socio-cultural needs bring individuals and groups in intersection or proximity to each other. Further, current transformations in urban society have led to many changes in buildings. The challenge within the discipline of architecture is not only to create conducive spaces for contemporary ways of life within particular contexts, but also to identify issues and programmes and address them in innovative ways. These would include urban living, urban working, socio-cultural life, urban recreation, etc., Achieving comfort without sacrificing on density would also be a concern, along with exposure to building byelaws and barrier free environment. The approach and projects will be directed towards

one or more of these aspects.
The tools and techniques engaged for study and design can be those which are best suited to study the above, including mapping of urban patterns/ways of life and needs, demographics, socio-cultural aspects, densities, land use, etc.,
Projects will address specific situations/scenarios/typologies characteristic of urban life and context, either single or mixed use. They will be of medium to large scale, involving repetitive or unique spaces, low or mid rise buildings with passive/active energy. The number of projects is left to the discretion of the faculty based on scale and complexity.

TOTAL: 150 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to understand the nature, needs and ways of contemporary urban society as well as relate the existing built environment as a reflection of this.

CO2 Ability to draw from this understanding and identify issues/ challenges involving contemporary urban life and the built environment.

CO3 Ability to give appropriate/ innovative design solutions in the above context.

TEXTBOOKS

1. Joseph De Chiara, Michael J Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional, 2001.
2. 'Ernst Neuferts Architects Data', Blackwell ,2002.
3. Stephen A. Kliment, Editor, 'Building Type Basics' Series, Wiley.
4. Wolfgang Preiser, Korydon H. Smith, 'Universal Design Handbook', 2nd Edition, McGraw-Hill, 2010.

REFERENCES

1. Rem Koolhaas et al, 'Project on the City II: The Harvard Guide to Shopping', Taschen, 2001.
2. Peter Coleman, 'Shopping Environments: Evolution, Planning and Design', Routledge, 2006.
3. LMVRDV, 'FARMAX- Excursions on Density', 010 Publishers, 2006.
4. Jos Boys, 'Disability, Space, Architecture: A Reader', Routledge, 2017.
5. Emily Talen, 'Design for Diversity', Routledge, 2012.
6. Luis Alexandre Casanovas Blanco (Ed), 'After Belonging: Objects, Spaces, and Territories of the Ways We Stay in Transit', Lars Muller Publishers, 2016.
7. Manuel Gausa, 'Housing: New Alternatives, New Systems', Birkhäuser Basel 1999
8. Mark Hutter, 'Experiencing Cities (The Metropolis and Modern Life)', Routledge, 2015.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	2	3	3	1	-	3	-	-	-	1
2	3	-	2	2	3	1	-	-	-	-	-	1
3	3	3	2	1	3	1	3	-	-	-	-	1
Avg.	**3**	**2**	**2**	**2**	**3**	**1**	**1**	**1**	**-**	**-**	**-**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3601 SPECIFICATION, ESTIMATION AND BUDGETING L T P/S C
3 0 0 3

OBJECTIVES

- To give basic understanding of specification writing and how to draw specification for the different items of a building.
- To give knowledge about different types of estimates and introduction to cost estimation.

- To prepare detailed estimates and basic rate analysis.
- To give understanding of how to prepare valuation of real and rental property.
- To give exposure to budgeting in projects..
-

UNIT I SPECIFICATION AND SPECIFICATION WRITING 9

Necessity of specification, importance of specification. How to write specification. Types of Specification. Principles of Specification writing. Important aspects of the design of specification. Sources of information. Classification of Specification. Brief Specification for1st class, 2nd class, 3rd class building. Detailed specification for earthwork excavation, plain cement concrete, reinforced concrete, first class and second class brickwork, damp proof course, ceramic tiles/marble flooring and dado, woodwork for doors, windows frames and shutters, cement plastering, painting and weathering course in terrace.

UNIT II ESTIMATION 9

Types and purpose. Approximate estimate of buildings. Bill of quality, factors to be considered. Principles of measurement and billing. Contingencies. Measurement of basic materials like brick, wood, concrete and unit of measurement for various items of work. Abstract of an estimate. Costs associated with constructed facilities. Approaches to cost estimation. Type of construction cost estimates. Cost Indices.

UNIT III DETAILED ESTIMATE 11

Deriving detailed quantity estimates for various items of work for a single storied building. To include earthwork excavation, brick work, plain cement concrete, reinforced cement concrete works, wood work, iron works, plastering, painting, flooring, weathering course. Rate analysis for some basic items of work.

UNIT IV VALUATION 8

Valuation. Explanation of terms. Types of values. Sinking fund. Years of purchase. Depreciation. Types of depreciation. Valuation of real properties. Types, methods and purpose of valuation.

UNIT V BUDGETING 8

Elements of cash flow. Time value of money. Capital investment decision. Types of business firms. Budget and Budgetary Control. Types of Budgets. Preparation of financial budget.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of the art of building construction through specification writing.
CO2 Ability to work out the approximate estimate and detailed estimate for small scale building projects.
CO3 An understanding of valuation and budgeting.

TEXTBOOKS

1. Rangwala. S.C, 'Estimating, Costing and Valuation (Professional practice)', Charotar Publishing House,1984
2. M.Chakraborthi, 'Estimating, Costing, Specification and Valuation in Civil Engineering, Chakraborthi, 2010.
3. B.N. Dutta, 'Estimating and Costing' UBS Publishers and Distributors,2016.
4. S.SangaReddi and P.L.Meiyappan, 'Construction Management', Kumaran Publication, Coimbatore.
5. Gurcharan Singh and Jagdish Singh, 'Estimating Costing and Valuation', Standard Publishers Distributors, 2012.

REFERENCES

1. 'I.S.1200-1968 Methods of Measurements of Buildings and Civil Engineering works'.

2. Latest Schedule of Rates of P.W.D.
3. Latest Data book of P.W.D.
4. PWD Standard Specifications. India Govt Publication.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	2	-	-	-	-	-	-
2	-	-	-	-	-	3	-	-	3	-	-	-
3	-	-	-	-	-	3	-	-	3	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**2**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3602 STRUCTURAL DESIGN OF STEEL L T P/S C
3 0 0 3

OBJECTIVES

- To introduce basic structural members in steel.
- To enable an understanding of the types, efficiency and strength, advantages and disadvantages of bolted and welded joints.
- To enable the design of tension members, beams and columns under different conditions.

UNIT I INTRODUCTION TO STRUCTURAL STEEL 6

Introduction to properties of steel, Standard sections, advantages and disadvantages of steel as construction material.

UNIT II BOLTED AND WELDED JOINTS 10

Assumptions. Types of Joints and Failure–Advantages and Disadvantages. Design of joints for axially loaded members using limit state method. (excluding eccentric connections).

UNIT III TENSION MEMBERS 10

Introduction. Net sectional area. Permissible stresses. Design of axially loaded tension member using limit state method. Lug angle. Tension splice.

UNIT IV COMPRESSION MEMBERS 10

Introduction. Different sections. Built up section. Design of columns using limit state method (excluding lacing, battening).

UNIT V FLEXURAL MEMBERS 9

Introduction. Laterally supported and unsupported beams. Design of laterally supported beams using limit state method.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to design steel joints for maximum efficiency and strength.

CO2 Ability to design tension and compression members for different conditions by applying the code provisions.

CO3 Ability to design different types of laterally unsupported and supported steel beams for different conditions.

TEXTBOOKS

1. S.K. Duggal, 'Limit State Design of Steel Structures', McGraw Hill Education, Private Limited,2017.
2. N. Subramanian, 'Design of Steel Structures', Oxford, 2015.

REFERENCES

1. M.R. Shiyekar, 'Limit State Design in Structural Steel', PHI Learning Private Limited, 2013.

2. Dr. V. L. Shah and Prof.Veena Gore, 'Limit State Design of Steel Structures', Structures Publications, Pune, 2012.
3. S.S. Bhavikatti, 'Design of Steel Structures by Limit State Method as per IS800-2007', I.K.International Publishing House Pvt, Ltd, 2012.
4. IS 800 - 2007 – Code of Practice for use of Structural Steel in General Building Construction.
5. SP 6 IS Handbook for Structural Engineers.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	3	-	-	-	-	-	-
2	-	-	-	-	-	3	-	-	-	-	-	-
3	-	-	-	-	-	3	-	-	-	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3603 ADVANCED BUILDING SERVICES L T P/S C
3 0 0 3

OBJECTIVES

- To give exposure to the science behind air-conditioning systems, the different types and applications.
- To enable understanding of architectural aspects related to air-conditioning systems and take appropriate design decisions.
- To inform about fire protection, fire safety and fire fighting in buildings and how to plan for the same
- To inform about mechanical transportation systems for buildings and how to plan for the same.

UNIT I PRINCIPLES AND SYSTEMSOF AIR CONDITIONING 12

Thermodynamics. Transfer of heat. Refrigeration cycle components. Vapor compression cycle. Refrigerant, Compressor, condenser, evaporator, refrigerant control devices, electric motors, air handling units, cooling towers. Cooling load. Air conditioning systems for buildings of different scales and their requirements- window type, split system, package unit, direct expansion system, chilled water system, fan coil unit, district cooling systems. Energy efficient systems, environmental aspects and latest innovations.
Understanding all the above through product literature/ field visits.

UNIT II DESIGN ASPECTS OF AIRCONDITIONING SYSTEMS 9

Design criteria for selection of air conditioning. Configuring/ sizing of mechanical equipment, equipment and spaces for them. Horizontal and vertical distribution of services for large buildings.
Exercise on the above through choice, calculations, layout, drawings.

UNIT III FIRE SAFETY 6

Causes of fire in buildings. Stages of fire and how it spreads. Fire drill. Heat/ fire/ smoke detection. Alarm and extinguisher systems. Fire safety standards. General guidelines for egress design for multi-storey buildings.
Understanding all the above through product literature/ field visits. Exercise on design of fire safety systems for different building types through choice, calculations, layout and drawings.

UNIT IV MECHANICAL, COMMUNICATION AND SECURITY SYSTEMS 9

Lifts and escalators - types and applications. Round trip time for lifts. Design of lift lobby and vertical transportation core. Conveyors, travelators, dumb waiters. Standards for all. Latest technologies in vertical transport systems. Integration of lifts and escalators with building automation systems. Understanding all the above through product literature/ field visits. Design exercise on the above through choice, calculations, layout and drawings.
Access control CCTV system. Security and surveillance systems. Telecommunication and related information technology based facilities. Understanding the above through product literature/ field

visits.

UNIT V INTEGRATION OF SERVICES INTO ARCHITECTURAL DESIGN 9

Principles of grouping and integrating of all services for horizontal and vertical distribution in a multi-storeyed building/ large building. Services to include vertical transportation, electrical, communication, air conditioning and fire safety, communication and security systems.

Integrating service requirements into architectural design in an appropriate typology involving a simple scale project through sketches/ conceptual layout and sections/ drawings.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Familiarity with different air conditioning systems, their context of use and basics of planning involved.

CO2 An understanding of fire safety, fire fighting, fire prevention and installations in buildings.

CO3 An understanding of mechanical, communication and security systems in a building.

CO4 Ability to design building layouts and sections for service integration.

TEXTBOOKS

1. William H. Severns and Julian R Fellows, 'Air conditioning and Refrigeration', John Wiley and Sons, London, 1988.
2. National Building Code - Bureau of Indian Standards.
3. 'ISHRAE Handbook for Refrigeration', 2015.
4. George R. Strakosch (Editor), Robert S. Caporale, 'The Vertical Transportation Handbook' 4th Edition, Wiley and Sons, 2010.
5. David Lee Smith, 'Environmental Issues for Architecture', Wiley, 2011.

REFERENCES

1. A.F.C. Sherratt, 'Air Conditioning and Energy Conservation', The Architectural Press, London, 1980.
2. Andrew H Buchanan; 'Structural Design for Fire Safety', Wiley, 2017.
3. Swenson S. Don, 'Heating, Ventilating and Air Conditioning', American Technical Publishers, 2003.
4. ISHRAE, 'All about AHUs- Air Handling Units'.
5. CIBSE Guide D, 'Transportation Systems in Buildings',2015.
6. A.K.Mittal, 'Electrical and Mechanical Services in High Rise Building: Design and Estimation Manual', CBS, 2012.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	3	-	-	-	-	-	-
2	-	-	-	-	-	3	-	-	-	-	-	-
3	-	-	-	-	-	3	-	-	-	-	-	-
4	-	-	-	-	-	-	-	2	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**2**	**3**	**3**	**-**	**-**	**-**	**-**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

NCC Credit Course Level 3*

NX3651	**(ARMY WING) NCC Credit Course - III**	**L T P C** **3 0 0 3**
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Team Work	2
PD 4	Career Counselling, SSB Procedure & Interview Skills	3
PD 5	Public Speaking	4
BORDER & COASTAL AREAS		**4**
BCA 2	Security Setup and Border/Coastal management in the area	2
BCA 3	Security Challenges & Role of cadets in Border management	2
ARMED FORCES		**3**
AF 2	Modes of Entry to Army, CAPF, Police	3
COMMUNICATION		**3**
C 1	Introduction to Communication & Latest Trends	3
INFANTRY		**3**
INF 1	Organisation of Infantry Battalion & its weapons	3
MILITARY HISTORY		**23**
MH 1	Biographies of Renowned Generals	4
MH 2	War Heroes - PVC Awardees	4
MH 3	Study of Battles - Indo Pak War 1965, 1971 & Kargil	9
MH 4	War Movies	6

TOTAL: 45 PERIODS

NCC Credit Course Level 3*

NX3652	**(NAVAL WING) NCC Credit Course - III**	**L T P C** **3 0 0 3**
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Team Work	2
PD 4	Career Counselling, SSB Procedure & Interview Skills	3
PD 5	Public Speaking	4
BORDER & COASTAL AREAS		**4**
BCA 2	Security Setup and Border/Coastal management in the area	2
BCA 3	Security Challenges & Role of cadets in Border management	2
NAVAL ORIENTATION		**6**
NO 3	Modes of Entry - IN, ICG, Merchant Navy	3
AF 2	Naval Expeditions & Campaigns	3
NAVAL COMMUNICATION		**2**
NC 1	Introduction to Naval Communications	1
NC 2	Semaphore	1

NAVIGATION		**2**
N 1	Navigation of Ship - Basic Requirements	1
N 2	Chart Work	1
SEAMANSHIP		**15**
MH 1	Introduction to Anchor Work	2
MH 2	Rigging Capsule	6
MH 3	Boatwork - Parts of Boat	2
MH 4	Boat Pulling Instructions	2
MH 5	Whaler Sailing Instructions	3
FIRE FIGHTING FLOODING & DAMAGE CONTROL		**4**
FFDC 1	Fire Fighting	2
FFDC 2	Damage Control	2
SHIP MODELLING		**3**
SM	Ship Modelling Capsule	3

TOTAL : 45 PERIODS

NCC Credit Course Level 3*

NX3653	**(AIR FORCE WING) NCC Credit Course Level - III**	**L T P C**
		3 0 0 3
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Team Work	2
PD 4	Career Counselling, SSB Procedure & Interview Skills	3
PD 5	Public Speaking	4
BORDER & COASTAL AREAS		**4**
BCA 2	Security Setup and Border/Coastal management in the area	2
BCA 3	Security Challenges & Role of cadets in Border management	2
AIRMANSHIP		**1**
A 1	Airmanship	1
BASIC FLIGHT INSTRUMENTS		**3**
FI 1	Basic Flight Instruments	3
AERO MODELLING		**3**
AM 1	Aero Modelling Capsule	3
GENERAL SERVICE KNOWLEDGE		**2**
GSK 4	Latest Trends & Acquisitions	2
AIR CAMPAIGNS		**6**
AC 1	Air Campaigns	6

PRINCIPLES OF FLIGHT		**6**
PF 1	Principles of Flight	3
PF 2	Forces acting on Aircraft	3
NAVIGATION		**5**
NM 1	Navigation	2
NM 2	Introduction to Met and Atmosphere	3
AERO ENGINES		**6**
E 1	Introduction and types of Aero Engine	3
E 2	Aircraft Controls	3

TOTAL : 45 PERIODS

AR3611 STEEL, GLASS AND PLASTIC IN BUILDING CONSTRUCTION L T P/S C
1 0 3 4

OBJECTIVES

- To give an introduction to metals, predominantly iron and in building construction.
- To give an overview about glass and plastics, especially in building envelope/ roofing.
- To give detailed knowledge about the principles, methods of construction and applications of steel in building construction.
- To enable design and detail using steel, glass and plastic in buildings.

UNIT I METAL, GLASS AND PLASTIC 12

Introduction to different types of metals in building construction- iron, steel, aluminium, brass, etc., Brief history of iron in building construction through examples. Types of iron and their uses in building. Outline of manufacture of steel and steel alloys. Their properties, types, uses, protection and finishes. Corrosion of ferrous metals and its prevention. Fire protection of steel. Steel sections and products for structural and non-structural use including current innovations. Joints in steel- welding, riveting, bolting. Stainless steel.

Glass as a building material. Brief history of its use through examples. Manufacture, properties and uses of glass. Types of glass - float glass, cast glass, glass blocks, foamed glass, decorative glass, solar control, toughened glass, wired glass, laminated glass, fire-resistant glass, glass blocks, structural glass. Glass and energy efficiency in buildings. Current innovations

Plastic as a building material. Brief history of their use through examples. Manufacture. properties, types, uses and application of plastics in building industry. Plastic based finishes and paints including types, composition, characteristics, context of usage, preparation and application techniques and methods. Different types of adhesives and sealants. Water proofing using plastic based materials. Plastic based materials for roofs such as fibre glass, etc., Specific materials such as polycarbonate sheet and teflon. Current innovations.

Understanding of product literature and site visits with documentation in the form of sketches/ photos for all the above.

UNIT II STEEL IN BUILDING CONSTRUCTION 18

Construction principles and procedures for structural building components using steel of different sections. Components to include foundations, columns, beams, staircases, roofs (different types of trusses, space frames, etc), roofing and glazing material.Connections between the different components and fixing. Sketches/ models of the principles. Understanding of product literature/ shop drawings. Site visits with documentation in the form of sketches/ drawings/ photos.Drawings of typical examples.

Overall understanding of total structures such as geodesic dome, space frame, diagrid, etc., Outline of prefabrication in steel. Preco beams, cellular beams, composite slim floor beam. Steel curtain wall glazing. Recent trends in roofing materials like corrugated GI Sheets, corrugated hypar shells, pre-coated metal sheets. Cable Structures.

UNIT III METAL, PLASTIC AND GLASS IN DOORS, WINDOWS VENTILATORS AND INTERIOR COMPONENTS 18

Outline of steel, aluminium, PVC/UPVC material for doors, windows and ventilators. Comparing their characteristics and context of use. Basic components for door/ window/ ventilator of different types-typical sections for outer and shutter frame, shutter material, hardware and fixtures, etc., Their joining and fixing procedures, insect screens. Finishing materials and procedures. Sketches/models of the principles. Understanding of product literature/shop drawings. Site visits with documentation in the form of sketches/ photos. Outline of specialised products such as steel rolling shutters.

Steel, aluminium, PVC/UPVC, glass,partitions, flooring, false ceiling, panelling, handrails, etc., and their different types. Different kinds of systems and methods. Sketches of the principles. Understanding of product literature. Site visits with documentation in the form of sketches/ photos. Drawings of typical examples.

Basic waterproofing of buildings. Understanding of product literature. Understanding construction techniques through site visits/ case studies.

UNIT IV DESIGN AND DETAILING USING STEEL, GLASS AND PLASTIC 12

A design and detailing exercise involving steel as primary construction material with glass and plastic in building envelope in an appropriate typology involving a simple scale project. The project will integrate knowledge from all the previous units. Design and construction details in the form of sketches/ drawings/ models.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Knowledge of properties of ferrous and non ferrous metals as materials for buildings.
CO2 Knowledge of the use of glass and plastics in building industry.
CO3 An understanding of possibilities of steel as an important building construction material.
CO4 Ability to use steel, glass and plastic appropriately in building projects.

TEXTBOOKS

1. Gorenc, Tinyou, Syam, 'Steel Designer's Handbook', CBS Publishers and Distributors, New Delhi, Bangalore, 2012.
2. P.C Vargheese, 'Building Materials', Prentice Hall of India, 2015.
3. S.K. Duggal, 'Building Materials', New Age International Publishers, 2016.
4. B.C.Punmia et al, 'Building Construction', Laxmi Publications, 2016.
5. Roy Chudley, Roger Greeno, 'Building Construction Handbook', Routledge, 2010.

REFERENCES

1. Alan Blanc, 'Architecture and Construction in Steel', E and FN Spon, London, 1993
2. Allan Brookes, 'Cladding of Buildings', Taylor and Francis,2008.
3. Mark Lawson, Peter Trebilcock, 'Architectural Design in Steel', Taylor and Francis, 2004.
4. Terri Meyer Boake, 'Understanding Steel Design', Birkhauser, 2011.
5. R.M. Davis, 'Plastics in Building Construction', Battersea College of Technology, Blackie, London, 1966
6. Ralph Monletta, 'Plastics in Architecture– A Guide to acrylic and Polycarbonate', Marcel Dekker Inc, New York, 1989
7. 'IS 7883. Code of Practice for the Use of Glass in Buildings ', Bureau of Indian Standards,2013.
8. Billie Faircloth, 'Plastics Now: On Architecture's Relationship to a Continuously Emerging Material', Routledge, 2015.

CO-PO Mapping

CO	PO											
	1	2	3	4	5	6	7	8	9	10	11	12
1	-	-	-	-	-	3	-	-	-	-	-	-
2	-	-	-	-	-	3	-	-	-	-	-	-
3	-	-	-	-	-	3	-	-	-	-	-	-
4	-	-	-	-	-	-	-	2	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-
Avg.	-	-	-	-	-	3	-	2	-	-	-	-

'1' = Low; '2' = Medium; '3' = High

AR3621 ENVIRONMENTAL DESIGN STUDIO L T P/S C
0 0 10 10

OBJECTIVES

- To introduce buildings as consumers of resources for human needs and to enable responsible, creative addressing of this fact through design choices.
- To enable an understanding of architectural design as integrating diverse functional concerns in a complex building through analysis and innovation.
- To impart training in the resolving of spatial considerations with other physical aspects such as structures, services and climate.

CONTENT

Architecture is a man made addition to the world and is resource intensive. The questions in this regard are how to simplify needs and means. Concerns of sustainability drive the basic act of designing through the act of making. Further, architecture today is also required to integrate several physical concerns in a building as human needs in built environment have become more complex with respect to intensity, distribution and interdependency of activities/ programmes. Here the challenge is to address complex, service intensive needs in an efficient and innovative manner so as to conserve/ optimise resources and use them in an ingenious manner. Appropriate tools and techniques can be used in study and design.

Following this, the nature of projects can be either or both of these- 1) simple scale, ordinary or special use projects examining design through resources of different types 2) large, complex projects (multi storeyed buildings, office complexes, buildings for healthcare, performing art centre, etc.,) that need technical resolution and/or balance of various aspects. Aspects to be addressed can be urban land as resource, planning integration and detailing, sustainable building practices, green issues, alternative energy, intelligent building techniques and service integration, advanced building practices, appropriate materials and construction, sensitive and optimal use of resources. The number of projects are left to the discretion of the faculty based on scale and complexity.

TOTAL: 150 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to critically and sensitively understand and address issue of resources.
CO2 Ability to balance diverse aspects/concerns of buildings by making informed choices and innovative design in the context of buildings with intense or complex programmes.
CO3 Ability to apply knowledge intensively in realms such as sustainable built environment, services.

TEXTBOOKS

1. Daniel Williams, 'Sustainable Design, Ecology, Architecture and Planning', John Wiley and Sons Inc, NJ, 2007.
2. MiliMazumdar, 'Energy Efficient Buildings in India', TERI, New Delhi, 2012.
3. 'Sustainable Building Design Manuals I and II', TERI, 2004.

4. Derek Clements-Croome, 'Intelligent Buildings: An Introduction', Routledge, 2013.
5. Stephen A. Kliment, Editor 'Building Type Basics' Series, Wiley.

REFERENCES

1. Lara Menzel, 'Office - Architecture + Design', Braua Publishers, 2009.
2. Sheri Koones, 'Prefabulous+Sustainable, Building and Customizing an Affordable, Energy Efficient Home', ABRAMS, 2010.
3. Edward Ng, 'Designing High-density Cities for Social and Environmental Sustainability, Routledge, 2009.
4. Robin Guenther, Gail Vittori, 'Sustainable Healthcare Architecture', 2nd Edition, Wiley 2013.
5. Marian Keeler, Bill Burke, 'Fundamentals of Integrated Design for Sustainable Building', Wiley, John Wiley and Sons, 2009.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	1	1	2	3	3	1	1	1	-	-	1
2	3	3	1	1	2	1	1	1	3	-	-	1
3	3	1	3	1	1	1	3	3	1	-	-	1
Avg.	**3**	**2**	**2**	**1**	**2**	**2**	**2**	**2**	**2**	**-**	**-**	**2**

'1' = Low; '2' = Medium; '3' = High

AR3701 CONTEMPORARY ARCHITECTURE: THEORIES AND PRACTICE L T P/S C
3 0 0 3

OBJECTIVES

- To introduce the large scale changes from 1960s as context for new thought in architecture.
- To give exposure to the critiques of modern architecture.
- To study in detail the different post modern directions in architecture.
- To give an outline of architectural approaches across the world from late 20th century.
- To give an understanding of the trajectory of post independence architecture of India till the present.

UNIT I THE POSTMODERN WORLD- CRITIQUE AND THEORIES 7

The postmodern world and multiple world views- to include the realms of literature, economics, technology, culture, society, environment. Critique of modernist cities by Jane Jacobs. Theories and works of Christopher Alexander. Aldo Rossi's ideas on the city. Neorationalism. Semiology. Writings of Venturi and Umberto Eco. Poststructuralism and Deconstruction.

UNIT II TECHNOLOGY AND ARCHITECTURE 7

Urban ideas/works of Soleri, Archigram and Metabolism. High Tech architecture, works of Stirling, Rogers and Piano.

UNIT III POSTMODERNISM AND DECONSTRUCTIVISM 9

Postmodernism. Works of Venturi Scott Brown, Graves and Moore. Deconstructivism as new architectural movement. Ideas and works of Eisenmann, Hadid, Gehry, Libeskind, Tschumi.

UNIT IV CONTEXT AND MODERN ARCHITECTURE 10

Critical Regionalism as a category of architecture. Ideas and works of Fathy, Ando, Bawa, Barragan, Siza. Evolution of the architecture of Raje, Doshi, Correa, Raj Rewal. Philosophy and works of Nari Gandhi, Laurie Baker. Outline of contextual approaches in Indian architecture after the 60s.

UNIT V CONTEMPORARY ARCHITECTURE 12

Nature of contemporary society. Architectural responses and movements today -parametric design and digital processes, sustainability, globalisation, phenomenology, complexity. Ideas and works of ZHA, contemporary Dutch architecture, Bjarke Engels and BIG, OMA and Rem Koolhaas, Steven

Holl, Mcdonough, Yeong, Zumthor, Pallasma, Murcutt. Outline of contemporary architecture in the non Western world. Large scale changes in India from the 90s. Outline of post 1990s architecture of India.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An awareness of the spread and varied later directions of modern architecture across the world.

CO2 An understanding of architectural production from the 1960s as driven by large scale changes across the world.

CO3 Familiarity with contemporary forces and directions in architecture across the world.

CO4 An understanding of post independence architecture in India contemporaneous with the rest of the world, along with its own particular influences.

TEXTBOOKS

1. Kenneth Frampton, 'Modern Architecture: A Critical History', Thames and Hudson, London, 2007.
2. William J. Curtis, 'Modern Architecture since 1900', Phaidon Press, 1996.
3. Diane Ghirardo , 'Architecture after Modernism', Thames and Hudson, London, 1996.
4. Elie G. Haddad, David Rifkind, 'A Critical History of Contemporary Architecture: 1960-2010', Routledge, 2016.
5. Bhatt and Scriver, 'Contemporary Indian Architecture- After the Masters', Grantha Corporation, 1999
6. Bahga et al, 'Modern Architecture in India - Post Independence Perspective', Galgotia, 1993
7. Miki Desai et. al., 'Architecture and Independence', Oxford University Press, 2000.
8. Harrry Francis Malgrave and David Goodman, 'An Introduction to Architectural Theory 1968 to the Present', Wiley Blackwell, 2011.
9. Rahul Mehrotra, 'Architecture in India since 1990', HatjeCantz, 2011.

REFERENCES

1. Jane Jacobs, 'Deaths and Life of Great American Cities', Modern Library, 2011.
2. Christopher Alexander, ' A Pattern Language', Oxford University Press, Oxford, 2015.
3. Robert Venturi , 'Complexity and Contradiction in Architecture', 1977.
4. Kate Nesbitt, Ed, 'Theorising a New Agenda for Architecture', Princeton University Press, 1996.
5. Jagan Shah, 'Contemporary Indian Architecture', Lustre, 2008.
6. Francis D. K. Ching, Mark M. Jarzombek, Vikramaditya Prakash, 'A Global History of Architecture', John Wiley and Sons, 2017.
7. 'Architecture in India', Exhibition Catalogue, ElectaMoniteur, 1985.
8. 'Vistara- The Architecture of India', Festival of India, 1986.
9. K.R.Sitalakshmi, 'Architecture of Indian Modernity- The Case of Madras', Palaniappa Brothers, 2015.
10. Bipin Chandra et al, 'India After Independence', Penguin, 2017.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	3	2	-	-	-	-	-	-	1
2	-	-	-	3	2	-	-	-	-	-	-	1
3	-	-	-	3	2	-	-	-	-	-	-	1
4	-	-	-	3	2	-	-	-	-	-	-	1
Avg.	**-**	**-**	**-**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3702 PROFESSIONAL PRACTICE OF ARCHITECTURE L T P/S C

3 0 0 3

OBJECTIVES

- To introduce the evolution of the architectural profession.
- To give familiarity about the role of professional and statutory bodies as well as ethics of the profession.
- To introduce the basic aspects of running an architectural practice – fees, services, project management, etc.,
- To inform about legal aspects and legislations associated with the profession.
- To give exposure to the larger implications of professional practice in the globalised world today.

UNIT I INTRODUCTION TO ARCHITECTURAL PROFESSION CODE OF CONDUCT AND ETHICS 9

Historical evolution of the architectural profession and changing role of architects in society. Registration of architects. Role of the Indian Institute of Architects. Architects Act 1972- intent, objectives, provisions with regard to architectural practice. Council of Architecture- role and functions. Importance of ethics in professional practice. Code of conduct for architects. Punitive action for professional misconduct of an architect.

Architecture as a professional service towards clients. Architect's office and its management - organisational structure, infrastructure requirement, skills required, elementary accounts, tax liabilities. Setting up architectural practice.

UNIT II ARCHITECT'S SERVICES, SCALE OF FEES and COMPETITIONS 9

Mode of engaging an architect. Comprehensive services, partial services and specialised services. Scope of work of an architect. Schedule of services. Scale of fees - Council of Architecture norms. Mode of payment. Terms and conditions of engagement. Letter of appointment. Importance of Architectural competitions. Types of competitions - open, limited, ideas competition, single and two stage competitions. Council of Architecture guidelines for conducting architectural competitions. National and international Competitions. Case studies.

UNIT III PROJECT MANAGEMENT - TENDER and CONTRACT 12

Tender - Definition. Types of Tenders - open and closed tenders. Conditions of tender. Tender notice. Tender documents. Concept of EMD. Submission of tender. Tender scrutiny. Tender analysis. Recommendations. Work order. E-tendering - advantages, procedure, conditions.

Contract – definition. Contract agreement and its necessity. Contents - articles of agreement, terms and conditions, bills of quantities and specifications, appendix. Certification of contractors. Bills at different stages. New trends in project formulation and different types of execution - BOT, DBOT, BOLT, BOO, etc., Role of architect in project execution stage.

UNIT IV LEGAL ASPECTS 6

Arbitration - definition and advantages. Sole and joint arbitrators. Role of umpires, award. Arbitration clause in contract agreement -role of architect, excepted matters. Easement – meaning, types of easements. Copy rights and patenting – provisions of copy right acts in India, copy right in architectural profession. Consumer Protection Act - intent, architects responsibility towards his clients.

UNIT V IMPORTANT LEGISLATIONS AND CURRENT TRENDS 9

Planning parameters at various scales. DTCP rules. Second Master Plan CMDA as case study. Chennai Corporation Building Rules 1972. Panchayat Rules. Building rules in National Building Code. Factories Act. Persons with Disabilities Act. Barrier Free Environment. Coastal Regulation Zone. Heritage Act. Globalisation and its impact on architectural profession. Preparedness for international practice. Entry of foreign architects in India. Information technology and its impact on architectural practice. Emerging specialisations in the field of architecture -architect as construction/ project manager, architectural journalism, architectural photography.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding about the evolution of the architectural profession.
CO2 An awareness of the role and responsibilities of an architect in all realms.
CO3 Familiarity with the laws related to architecture.
CO4 Knowledge about current issues and aspects related to the architectural profession.

TEXTBOOKS

1. Acts and Regulations of Council of Architecture
2. Roshan Namavati, 'Professional Practice', Lakhani Book Depot, Mumbai, 2016.
3. Ar. V.S. Apte, 'Architectural Practice and Procedure', Mrs. PadmajaBhide, 2008.
4. MadhavDeobhakta, 'Architectural Practice in India', COA, 2007.
5. Manual of Architectural Practice 2022 (Published by Registrar Council of Architecture, India)

REFERENCES

1. J.J. Scott, 'Architectural Practice', Butterworth, London 1985.
2. Tamil Nadu Combined Building Rules 2019
3. Master plans of CMDA.
4. Chennai City Corporation Building Rules 1972.
5. T.N.D.M. Buildings rules, 1972.
6. Consumer Protection Act, 1986.
7. Arbitration Act, 1996.
8. Factories Act, 1948.
9. Persons with Disabilities Act, 1995.
10. Tamil Nadu Cinematography Act. DTCP Act.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	-	-	-	-	3	-	-
2	-	-	-	-	-	-	-	-	-	-	-	3
3	-	-	-	-	-	-	-	-	-	3	-	-
4	-	-	-	-	-	-	-	-	-	-	2	-
5	-	-	-	-	-	-	-	-	-	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**2**	**3**

'1' = Low; '2' = Medium; '3' = High

AR3703 CONTEMPORARY HOUSING L T P/S C
3 0 0 3

OBJECTIVES

- To introduce housing in the Indian context and the various agencies involved in the production of housing.
- To outline factors, aspects and standards related to housing.
- To inform about the various housing design typologies and the processes involves in housing project development.
- To inform about current issues and aspects in housing.

UNIT I INTRODUCTION TO HOUSING AND HOUSING ISSUES IN INDIA 9

Housing and its importance in architecture, its relationship with neighborhood and city planning. Housing demand and supply. National Housing Policy. Housing agencies and their role in housing development. Impact of life style. Rural Housing. Public and private sector housing.

UNIT II SOCIO-ECONOMIC ASPECTS 9

Economics of housing. Social economic factors influencing housing affordability. Formal and informal sector. Equity in housing development. Sites and services. Slum housing, up gradation and redevelopment. Low Cost Housing. Health principles in housing. Legislation for housing development. Cost-effective materials and technologies for housing. Case studies in India and developing countries.

UNIT III HOUSING STANDARDS 8

UDPFI guide lines, standard and regulations. DCR. Performance standards for housing.

UNIT IV SITE PLANNING AND HOUSING DESIGN 11

Site Planning for housing. Selection of site for housing, consideration of physical characteristics of site, location factors, orientation, climate, topography, landscaping. Integration of services and parking. Housing design relating to Indian situations – traditional housing, row housing, cluster housing, apartments, high-rise housing. Case studies in India of the various types.

UNIT V CURRENT ASPECTS AND ISSUES IN HOUSING 8

Green building and sustainable practices. Disaster resistance and mitigation. Prefabrication Community participation.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Knowledge of various issues concerning housing and housing development in Indian and global context covering a cross section of income groups.

CO2 Ability to appreciate socio-economic aspects in housing.

CO3 An understanding of housing standards, site planning principles, housing concepts and types.

CO4 An understanding of key issues in housing today.

TEXTBOOKS

1. Christopher Alexander, 'A Pattern Language', Oxford University Press, New York 1977.
2. Leuris S, 'Front to Back: A Design Agenda for Urban Housing', Architectural Press, 2006.
3. S.K.Sharma, 'Mane A New Initiative in Public Housing', Housing and Urban Development Corporation, 1991.

REFERENCES

1. Richard Kintermann and Robert Small, 'Site Planning for Cluster Housing', Van Nostrand Reinhold Company, London/New York, 1982.
2. Joseph de Chiara et al, 'Time Saver Standards for Housing and Residential Development', McGraw Hill Co, New York, 2011.
3. Forbes Davidson and Geoff Payne, 'Urban Projects Manual', Liverpool University Press, Liverpool 1983.
4. HUDCO Publications, 'Housing for Low Income, Sector Model'.
5. 'Sustainable Building Design Manual: Vol 1 and 2',The Energy Research Institute, 2015.
6. A.K.Lal, 'Handbook of Low Cost Housing', New Age International Private Limited, 2011.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	2	-	-	-	-	-	-	-	-
2	-	-	-	2	-	-	-	2	-	-	-	-
3	-	-	-	-	2	1	1	-	-	-	-	-
4	-	-	-	-	-	-	-	2	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-
Avg.	**-**	**-**	**-**	**2**	**2**	**1**	**1**	**2**	**-**	**-**	**-**	**-**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3721 **CRITICAL DESIGN STUDIO** **L T P/S C**

0 0 11 11

OBJECTIVES

- To enable an understanding of architecture as having the capacity to critically interpret and transform status quo in the built environment and society through the act of design.
- To guide in the taking of critical/ philosophical/ ideological positions respect to various aspects of contemporary life and to explore architectural morphology as an expression of those positions.
- To encourage propositions/projections directed at positive future transformations.

CONTENT

Architecture as a discipline balances many concerns in the creation of buildings. However, it also represents ideas and production reacting to/ reinforcing/ anticipating/ transforming specific aspects of the existing world towards a more desirable future. This could spring from individual perspectives as well as through concerted efforts which then become movements. Architecture can thus seek to understand, reflect, strengthen, question, change status quo. The process of design can thus offer a possible, intended future.

Projects/ design situations will be given in this regard which address issues/ programmes of current society with a larger impact in terms of scale or importance. Different realms/ aspects of contemporary life can be explored. Some possible projects/ area of inquiry are institutional campuses of significance, mixed use projects involving diverse user groups, culturally and socially important buildings, urban life, technological developments, culture, globalisation, place, meaning, identity, appropriate architecture, etc.,

Suitable processes can be engaged for critical and creative thinking which could include wide and interdisciplinary reading to take critical positions, social processes, contemporary processes such as mapping and diagramming, methods related to technical or empirical aspects, etc.,

The particular line of thought will be taken through to completion through the processes. It is preferable to have one major project with small exercises under it if required.

TOTAL: 165 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to understand the wider implication of design decisions and their interdependency with larger processes of society.

CO2 Ability to take creative, critical and informed decisions in the context of significant projects that could shape society in positive ways.

TEXTBOOKS

1. Kate Nesbitt, 'Theorizing a New Agenda for Architecture', Princeton Architectural Press, 1996.
2. Neil Leach, 'Rethinking Architecture', Routledge, 2005.
3. Harry Francis Mallgrave and David Goodman, 'An Introduction to Architectural Theory- 1968 to the Present', Wiley Blackwell, 2011.
4. Stephen A. Kliment, Editor 'Building Type Basics' Series, Wiley.

REFERENCES

1. Mitchell WJ, 'Imagining MIT: Designing a campus for the 21st century', MIT Press,2011.
2. HimanshuBurte, 'Space For Engagement', Seagull Books, 2008.
3. Mark Garcia, 'The Diagrams of Architecture', Wiley 2010.
4. BjarkeIngels, 'Yes is More', Taschen, 2009.
5. Steven Holl, JuhaniPallasmaa, Alberto Pérez Gómez, 'Questions of perception: Phenomenology of Architecture', William Stout, 2006.
6. Richard Coyne, ‘Interpretation in Architecture: Design as Way of Thinking’, Routledge, 2005.
7. Adam Sharr, ‘Reading Architecture and Culture’, Routledge,2012.
8. Wendy Gunn, Ton Otto, Rachel Charlotte Smith, ‘Design Anthropology: Theory and Practice’, Berg, 2013.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	1	2	3	1	1	2	1	1	2	2
2	3	3	3	2	3	1	1	2	1	1	2	2
Avg.	**3**	**3**	**2**	**2**	**3**	**1**	**1**	**2**	**1**	**1**	**2**	**2**

'1' = Low; '2' = Medium; '3' = High

AR3821 **PRACTICAL TRAINING** **L T P/S C**

0 0 0 26

OBJECTIVES

- To give overall exposure to the practice of architecture, its scope, needs and challenges.
- To give familiarity about different stages in real life architectural projects.
- To create involvement in these stages as much as possible within the scope of a specific architectural practice.

CONTENT

Practical Training will be done in offices/ firms in India, empaneled by the institution, in which the principal architect is registered with the Council of Architecture. The student will attempt to learn as much of aspects involved in real life projects as possible through direct involvement, and wherever that is not possible, through study and indirect observation. The aspects include initiation and ideation of project (including competitions), study research in specific areas, development of concepts into schematic drawings, or approval process, presentations and working drawings, involvement in office discussions and client meetings, integrating structural and service concerns, estimation and tendering processes, site supervision and coordination in the construction process. The progress of practical training will be assessed periodically internally through submission of log books along with work done by the students in terms of drawings, reports, etc., along with the regular progress report from the employers.

The students will be evaluated based on the criteria related to their contribution in the office some of which are given below.

- Understanding and involvement in the process of architectural practice within the scope of the specific office in which training is undertaken.
- Adherence to time schedule, overall responsibility and professional conduct.
- Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings and skill in this regard.
- Ability to participate and contribute to research, study, ideation.
- Ability to work as part of a team in an office and contribute to related activities.
- Ability to participate in client meetings and discussions.
- Involvement in supervision at project site.
- Involvement/ initiative/ participation in any other aspects during the course of the training.

At the end of the Practical Training, a portfolio of the specific work done by the student during the period of internship certified by the office should be submitted for evaluation through a viva voce examination.

TOTAL: PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An overall idea of the nuances of architectural practice.
CO2 An understanding about the total process that goes into the making of a building.
CO3 Clarity about the field of architecture that could be carried forth to the higher semester(s).

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2	2	3	2	2	3	3	3	2	3	2	3
2	2	2	3	2	2	3	3	3	2	3	2	3
3	2	2	3	2	2	3	3	3	2	3	2	3
Avg.	**2**	**2**	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**3**	**2**	**3**

'1' = Low; '2' = Medium; '3' = High

AR3901 URBAN DESIGN L T P/S C
3 0 0 3

OBJECTIVES

- To create an understanding of urbanism and urban morphology as rising from various forces through history.
- To introduce the components of the modern city and their interdependencies.
- To introduce the scope and nature of urban design as a discipline
- To introduce key theories associated with urbanism and cities.
- To create awareness of contemporary urban issues and how they are addressed.
- To give exposure to ways of perceiving, documenting and analysing cities.

UNIT I URBANISM IN HISTORY 9

Outline of forces shaping urbanism. Urbanism of river valley civilisations. Morphology of pre-industrial European cities to include Greek and Roman cities, medieval European towns, Renaissance urbanism and ideal cities. Outline of historic cities of India. Temple town urbanism of Tamil Nadu. Mughal city form. Medieval cities of India. Colonial urbanism in India.

UNIT II MODERN URBANISM 9

Industrialisation and impact on urbanism. American grid iron planning. Theories, ideas and practice of good urban planning/cities/urbanism in early 20th century. Outline of modernist cities and urbanism across the world. Morphology of Indian modernist cities of Chandigarh, Bhuvaneshwar and Gandhi Nagar. Components of modern urbanism such as blocks, density, neighbourhood, streets etc., and their interdependencies. Evolution of urban design as a discipline, its scope and objectives.

UNIT III CITIES AND URBANISM THROUGH TEXTS AND THEORIES 9

Introduction to and discussion of key texts and theories of cities and urbanism - Imageability and Lynch, Townscape and Cullen, Genius Loci and Schulz, historic city and Rossi, social aspects of urbanism and the works of Jane Jacobs, William Whyte and Jan Gehl, Collage City and Colin Rowe, current theories and texts.

UNIT IV CONTEMPORARY URBANISM AND URBAN INTERVENTIONS 9

Understanding aspects, issues and solutions related to urbanism today through study of literature and best practices/case studies in urban design. Topics to include urban decay, change and renewal, place making, heritage, conservation, identity, suburban sprawl, gated communities, generic form, privatisation of public realm, role of real estate, transportation, zoning, globalisation, technology, digital age, sustainability, community participation, gender, class, power.

UNIT V URBAN STUDIES 9

Introduction to study and interpretation of cities (especially Indian) through understanding published studies/ analysis. The focus will be on components/aspects as well as tools/ methods. Tools and

methods to include different types of maps/mapping, drawings, sketches, photo documentations, reading, data collection, analysis. Aspects to include topography, geology, hydrology, micro climate, vegetation, urban density, growth, city limits/boundaries, history, urban architecture, typologies, infrastructure, land parcels, public space, demographics, patterns of usage, land use.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Awareness of the evolution and characteristics of urban forms, their components and interdependencies.
CO2 Understanding of urbanism through theories, aspects, issues and solutions.
CO3 Knowledge of ways to look at and interpret urbanism today.

TEXTBOOKS

1. A.E.J. Morris, 'History of Urban Form before the Industrial Revolution', Routledge, 2013.
2. Edmund Bacon, 'Design of Cities', Penguin, 1976.
3. Gordon Cullen, 'The Concise Townscape', The Architectural Press, 1978.
4. Michelle Provoost et al., 'Dutchtown', NAI Publishers, Rotterdam, 1999.
5. 'Time Saver Standards for Urban Design', Donald Natson, McGraw Hill, 2017.
6. Kevin Lynch, 'The Image of the City', MIT Press, 1960.
7. Rithchie. A, 'Sustainable Urban Design: An Environmental Approach', Taylor and Francis, 2009.
8. Tridib Banerjee, Anastasia Loukaitou-Sideris, Editors, 'Companion to Urban Design', Routledge, 2014.

REFERENCES

1. Jonathan Barnett, 'An Introduction to Urban Design', Harper Row, 1982.
2. Lawrence Halprin, 'Cities', MIT Press, 1972.
3. Gosling and Maitland, 'Concepts of Urban Design', St. Martin's Press, 1984.
4. Malcolm Moor, 'Urban Design Futures', Routledge, 2006.
5. Geoffrey Broadbent, 'Emerging Concepts in Urban Space Design', Taylor and Francis, 2003.
6. AnuradhaMathu, 'Deccan Traverses', Rupa, 2006.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	-	3	2	-	-	2	-	-	-	3
2	1	1	-	3	2	-	-	2	-	-	-	3
3	1	1	3	3	2	-	-	2	-	-	-	3
Avg.	**1**	**1**	**1**	**3**	**2**	**-**	**-**	**2**	**-**	**-**	**-**	**3**

'1' = Low; '2' = Medium; '3' = High

AR3902 LANDSCAPE AND ECOLOGY L T P/S C
3 0 0 3

OBJECTIVES

- To introduce the different ways in which humans have shaped and designed landscapes across history and region in terms of need, culture and experience.
- To give an overview of ecological balance and impacts of human activities today and stress on the role and scope of landscape design in sustainability and environmental conservation.
- To provide familiarity with the various elements and principles of landscape design and its contribution to human built environment.
- To introduce analytical, artistic and technical aspects involved in site planning, open space and outdoor design.

UNIT I LANDSCAPES IN HISTORY 10

Human civilisations and attitude to nature and landscapes across history and cultures. Outline of Japanese, Italian Renaissance and English gardens. Outline of landscape and garden design in Indian history. Gardens depicted in Sanskrit literature, Nandavanams and residential gardens of South India. Moghul gardens. Public parks and residential gardens of the colonial period. Contemporary public landscape projects. Study of notable examples. Spatial development in landscape design.

UNIT II BASICS OF ECOLOGY 7

Introduction to landscape architecture as a discipline and field. Basic concepts of ecology and the impact of human activities on them. Bio, Geo, chemical cycles including water cycle, carrying capacity of an ecosystem. Environmental impact assessment. Reclamation and restoration of derelict lands.

UNIT III ELEMENTS IN LANDSCAPE DESIGN 10

Introduction to hard and soft landscape elements. Different types of hard landscape elements. Plant materials, water and landform - classification, characteristics, use and application in landscape design.

UNIT IV SITE PLANNING 10

Organisation of spaces in the outdoor environment. Role of circulation and built form in shaping the environment. Role of landscape design in design of neighbourhood parks, children's play area and campus development.

UNIT V LANDSCAPING OF FUNCTIONAL AREAS 8

Urban open spaces and principle of urban landscape. Street landscaping, landscape design for waterfront areas and functional areas in urban centres. Green infrastructure including green roofs and walls.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of reasons for evolution of landscapes across time and context.
CO2 Ability to discern the role of natural and human actions with respect to macro scale of sustainability and ecology as well as in the micro scale of shaping of outdoor environments.
CO3 Knowledge about the elements of landscape design and their scope.
CO4 An understanding of landscape design with respect to site planning and different functional typologies of spaces.

TEXTBOOKS

1. Motloch, J.L., 'An Introduction to Landscape Design', John Wiley and Sons,2001.
2. Michael Laurie, 'Introduction to Landscape Architecture', Elsevier, 1986.
3. Sauter D; 'Landscape Construction', Cengage Learning, Third edition, 2010.
4. Geoffrey And Susan Jellico, 'The Landscape of Man', Thames And Hudson, 1985.

REFERENCES

1. 'Time Saver Standards for Landscape Architecture', McGraw Hill, Inc, 1997.
2. Grant W Reid, 'From Concept to Form in Landscape Design', Wiley, 2007.
3. Albert J. Rutledge, 'Anatomy of a Park', McGraw-Hill Book Company, 1971.
4. Richard P. Dober, 'Campus Landscape', John Wiley and Sons; 2000.
5. Strom Steven, 'Site Engineering for Landscape Architects', John Wiley and Sons, 2013.
6. Brian Hacket, 'Planting Design', Mc Graw Hill Inc, 1976.
7. T.K. Bose and Chowdhury, 'Tropical Garden Plants in Colour', NayaUdyog, 2011.
8. Rahoul B Singh, 'Gardens of Delight- Indian Gardens through the Ages', Lustre Press, Roli Books, 2008.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	2	-	-	1	3	-	-	-	-
2	-	-	-	2	-	-	1	3	-	-	-	-
3	-	-	-	2	-	-	1	3	-	-	-	-
4	-	-	-	2	-	-	1	3	-	-	-	-
Avg.	**-**	**-**	**-**	**2**	**-**	**-**	**1**	**3**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3903 CONSTRUCTION AND PROJECT MANAGEMENT L T P/S C
3 0 0 3

OBJECTIVES

- To introduce different management techniques suitable for planning and construction projects.
- To enable understanding of management systems for accomplishing the task efficiently in terms of quality, time and cost.

UNIT I INTRODUCTION TO PROJECT MANAGEMENT 7

Project management concepts. Objectives, planning, scheduling. Controlling and role of decision. In project management. Traditional management system. Gantt's approach. Load chart. Progress chart. Development of bar chart, merits and demerits. CPM networks, merits and demerits. PERT network. Introduction to the theory of probability and statistics.

UNIT II PROJECT PROGRAMMING AND CRITICAL PATH METHOD 11

Project network. Events activity. Dummy. Network rules. Graphical guidelines for Network. Numbering the events. Cycles. Development of network-planning for network construction. Models of network construction. Steps in development of network. Work break down structure. Hierarchies. Critical path method - process, activity time estimate, earliest event time, latest allowable occurrence time, start and finish time of activity, float, critical activity and critical path problems.

UNIT III RESOURCE PLANNING 7

Cost model- project cost, direct cost, indirect cost, slope curve, total project cost. Optimum duration contracting the network for cost optimisation. Steps in cost optimisation, updating, resource allocation, resource smoothing, resource leveling.

UNIT IV COMPUTERISED PROJECT MANAGEMENT 11

Creating a new project, building task. Creating resources and assessing costs, refining project. Project tracking, recording actual. Reporting on progress. Analysing financial progress. Introduction to BIM.

UNIT V CONCEPT TO COMMISSIONING 9

Project feasibility study. Real estate and regulatory strategies. Facility programming and planning. Design management. EPC. testing and commissioning.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Summarize the concepts of project management.
CO2 Construct critical path diagrams for construction projects.
CO3 Organise resources for effective project execution.
CO4 Demonstrate the use of computers for project management.
CO5 Inspect feasibility reports and projects before commissioning.

TEXTBOOKS

1. Dr. B.C. Punmia and K.K. Khandelwal, 'Project Planning and Control with PERT and CPM', Laxmi Publications, 2018.
2. Elaine Marmel, 'Microsoft Project 2016 Bible', Prentice Hall, 2016.

3. Sam Kubba, 'Green Construction Project Management and Cost Oversight', Elsevier, 2010.

REFERENCES

1. Jerome D. Wiest and Ferdinand K. Levy, 'A Management Guide to PERT/CPM', Prentice Hall of India, 1982.
2. Bert Bielefeld, 'Basics Project Management Architecture', Birkhauser, 2013.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	1	-	1	1	1	1	-	1	1	1
2	-	-	1	-	3	1	2	1	-	1	1	1
3	-	-	1	-	3	2	3	1	-	1	1	1
4	-	-	1	-	2	1	1	1	-	1	1	1
5	-	-	3	-	3	1	1	1	-	1	1	1
Avg.	-	-	**1**	-	**2**	**1**	**2**	**1**	-	**1**	**1**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3921 **DISSERTATION** **L T P/S C**
0 0 3 3

OBJECTIVES

- To inculcate the spirit of exploration and research in architecture.
- To enable the acquisition of in-depth knowledge in a specific aspect/ issue in the discipline of architecture as well as develop perspectives on the same through thought, reading, study, analysis, expression, documentation.
- To enable the conversion of effort into a coherent line of thought through writing/ documentation/models/ any media.
- To serve as prelude to Thesis.

CONTENT

Design studio emphasises on explaining and understanding architecture primarily through the mode of making. However, architecture as a field itself is driven by explicitly stated or implicitly understood ideas/ points of view of particular society and individuals. Dissertation offers an opportunity to look at architecture and built environment through phenomena, ideas, texts, intent. It involves process of observation, reflection and abstraction. Students are encouraged to choose any topic of their interest. Topics may range from analysing the works of an architect, history, typological changes, materiality, visual culture, contemporary society, cities, design process and many more. They could involve research based on primary sources in terms of doing actual field studies and/or secondary sources through reading. The dissertation proposal in about 1000 words stating the topic, issues to be explored and the scope must be submitted for approval. Work on the approved topic should start from the beginning of the semester and would be periodically reviewed.

At the end of the semester, a report that is a maximum of 100 pages should be submitted in the prescribed format. The suggested structure for the report is open- it could be writing, visual, documentation, sketches or analysis based depending on the topic. However, a written structure should tie the research together with the following areas -outline/ background of the area of study, statement of objectives or research questions within the area of study, outline of methodology/way to achieve the objectives or answer the questions of research, core section with necessary content such as study/documentation (any suitable way based on the nature of topic- drawings, sketches, photos, surveys, etc.,)/analysis/ arguments, etc., final conclusion. The report will be presented in the viva-voce exam and defended.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 A dissertation report with a coherent line of thought as reflected in the written structure and the core content which could be open ended.

CO2 Ability to research deeply into a subject and develop depth in thought in any specific area based on point of view, observation, analysis and study.

CO3 Ability to look at architecture from an informed, analysed and well thought out personally unique or objective perspective which would help strengthen the thesis process.

TEXTBOOKS

1. BjarkeIngels, 'Yes is More', Taschen, 2009
2. Bernard Tschumi, 'Manhattan Transcripts', Wiley, 1994.
3. Rem Koolhaas et al, 'Project on the City II: The Harvard Guide to Shopping', Taschen, 201.
4. Charles Correa, 'The New Landscape:Urbanisation in the Third World', Concept Media, 199.
5. Iain Borden and KaaterinaRuedi; 'The Dissertation: An Architecture Student's Handbook', Architectural Press, 2006.
6. Linda Grant and David Wang, 'Architectural Research Methods', John Wiley Sons, 2013.
7. Vian Ahmed, Alex Opoku, Zeeshan Aziz, 'Research Methodology in the Built Environment', Rutledge, 2016.

REFERENCES

1. Wayne C Booth, Joseph M Williams, Gregory G. Colomb, 'The Craft of Reearch',2nd Edition, University of Chicago Press, 2016.
2. Ranjith Kumar, 'Research Methodology- A Step by Step Guide for Beginners', Sage Publications, 2011.
3. John W Creswell, 'Research Design: Qualitative, Quantitative and Mixed Methods Aproaches', Sage Publications, 2014.
4. Richard Coyne, 'Interpretation in Architecture: Design as Way of Thinking', Routledge, 2005.
5. Adam Sharr, 'Reading Architecture and Culture', Routledge,2012.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	2	3	3	2	1	1	1	1	1	3	3
2	1	2	3	3	2	1	1	1	1	1	3	3
3	1	2	3	3	2	1	1	1	1	1	3	3
Avg.	**1**	**2**	**3**	**3**	**2**	**1**	**1**	**1**	**1**	**1**	**3**	**3**

'1' = Low; '2' = Medium; '3' = High

AR3922 URBANISM AND ARCHITECTURE DESIGN STUDIO L T P/S C
0 0 11 11

OBJECTIVES

- To enable an understanding of urbanism as a continuous experience involving the interrelated disciplines of architecture, urban design and town planning.
- To understand architecture as influenced by and influencing the dynamics of cities/urbanism.
- To facilitate the taking of architectural design decisions in the context of the urban environment.

CONTENT

Urbanism is a dynamic phenomenon involving many aspects - urban growth, l and use distribution and change, urban form, demographics including gender and class, cultural aspects such as place and heritage, physical infrastructure such as roads and transportation nodes, public spaces, etc.,

Architecture is an integral and large part of urbanism, shaping and being shaped by it. It can serve to include/ gather society and enrich the urban environment in a seamless manner.
Understanding of this aspect of architecture will be achieved by architectural projects involving interdependencies between architecture and the city. Some of the issues and areas that could be addressed are- transportation nodes, heritage areas, adaptive reuse, suburban sprawl, place making, identity, collective memory, mixed use programming, large scale urban interventions, revitalisation and renewal of urban fragments, urban waterfront development, urban nodes, multi-use urban complexes.
The tools and techniques can include contemporary ways/ tools of perceiving, gathering and analysing data, inclusive, collaborative and participatory approaches, etc.,
It is preferable to have one major project with small exercises under it if required.

TOTAL: 165 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to perceive and design buildings as contributing to/ transforming the urban fabric.
CO2 Ability to bring inclusivity into the architectural design process.

TEXTBOOKS

1. Jonathan Barnett, 'An Introduction to Urban Design', Harper and Row; 1982
2. Cavallo, R. et al, 'New Urban Configurations', IOS Press, 2014.
3. Henriette Steiner and Maximilian Sternberg, 'Phenomenologies of the City: Studies in the History and Philosophy of Architecture', Routledge 2015.
4. Jan Gehl, 'Life between Buildings- Using Public Space', ArkitektensForleg,2011.
5. 'Time Savers Standard for Urban Design', Donald Watson, McGraw Hill, 2017.
6. Malcolm Moore and Jon Rowland Eds, 'Urban Design Futures', Routledge, 2006.

REFERENCES

1. Michelle Provoost et al., 'Dutchtown', NAI Publishers, Rotterdam, 1999.
2. Lawrence Halprin, 'Cities', MIT Press, 1972.
3. Gosling and Maitland, 'Urban Design', St. Martin's Press, 1984.
4. Kevin Lynch, 'Site Planning', MIT Press, Cambridge 1984.
5. Jeremy Till et al, 'Spatial Agency: Other Ways of Doing Architecture', Routledge, 2011.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	2	2	3	3	-	-	2	-	1	2	3
2	3	2	2	3	3	-	-	2	-	1	2	3
Avg.	**3**	**2**	**2**	**3**	**3**	**-**	**-**	**2**	**-**	**1**	**2**	**3**

'1' = Low; '2' = Medium; '3' = High

AR3081 **THESIS** **L T P/S C**
0 0 23 23

OBJECTIVES

- To ensure consolidation and application of the knowledge gained in preceding years of architectural education in the context of an architectural design project of the student's choice.
- To enable identification and addressing of key issues/aspects inherent in a project or to enable development of thought processes in specific issues/aspects/situations leading organically to an architectural design project.
- To facilitate development of ability to handle and complete projects independently as a precursor to professional life in architecture.

CONTENT

Thesis is the culmination in the journey of architectural education that encapsulates ability of design exploration and skills of design execution. Students should decide a thesis topic of their choice in terms of design potential and/or idea/issue exploration. The topic could be project based with specific areas of study/ approach or study/ approach based leading to a project. If the latter, care should be taken to choose topics that can lead to sufficient architectural design component.

Students should submit the topic for approval with a rough outline of their interest in the topic, the nature of the project, area of focus, study and design scope, challenges, possible case studies, methodology and outcome. The areas of study/research/design can include any of the broad areas of the discipline - contemporary needs of society, history, theory, architectural philosophy, sustainability, structural or service oriented design, projects that involve complex planning and integration of several aspects, appropriate architecture, urban design, contemporary processes, social housing, urban oriented architectural design, conservation oriented architectural design, etc.

The progress of work will be reviewed periodically throughout the semester. At the end of the semester, students should submit the final thesis project for the viva voce exam. The final submission will comprise of study sheets, optional study models, design approach sheets, optional design process models, design presentation sheets, final model, detailed drawings of an important part of the project, project report summarising the entire thesis work and soft copy of all the work.

TOTAL: 345 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Skill, knowledge and expertise in the domain of architectural design.

CO2 Ability to handle a major architectural project independently through all stages.

CO3 Ability to intensify thought process directed at a specific area of focus and convert it to a product.

TEXTBOOKS

1. Linda Grant and David Wang, 'Architectural Research Methods', John Wiley and Sons, 2013.
2. Joseph De Chiara, Michael J Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional, 2001.

REFERENCES

1. Stephen A. Kliment, Editor 'Building Type Basics' Series, Wiley.
2. Igor Marjanović, Katerina RüediRay, LesleyNaaNorleLokko, 'The Portfolio - An Architecture Student's Handbook', Routledge, 2015.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	3	3	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3	3	3	3	3	3
Avg.	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3001 DESIGN PROCESS AND THINKING L T P/S C
2 0 1 3

OBJECTIVES

- To give understanding of design as a broader field and the changing role of designer in society.
- To give exposure to methodologies, theories and models of the design process.
- To give deeper understanding of the process of creativity as well as to introduce techniques which will enable creative thinking.
- To introduce collaborative design and consideration of all stake holders.

UNIT I INTRODUCTION TO DESIGN 7

Definition and understanding of design as a fundamental activity of humans. History of design process -earliest times through Renaissance, Beaux Arts, Bauhaus, contemporary processes. Classification of design - according to scale, process, mode of production, etc., Self-conscious and unselfconscious design. Design through drawing and design through craft. Pragmatic design, iconic design, analogic design, canonic or syntactic design.

UNIT II DESIGN METHODOLOGY 10

Context for the rise of the design methodology movement from the 1950s with the critique of modernism. Theories of the first generation and the second generation design methodologists. Design as wicked problem. Escalation and regression in design. Different approaches to design process- parametric or analysis/ synthesis/ evaluation, conjecture-refutation, paradigmatic. Current ideas on Design Thinking in different disciplines including IDEO. Exercises using different methodologies.

UNIT III CREATIVE THINKING 12

Understanding the term creativity. Theories on thinking - left brain/ right brain, convergent/ divergent thinking, lateral/ vertical thinking. Blocks in creative thinking. Techniques to generate creativity – brainstorming, reversal, metaphor, analogy, generation of alternatives, role playing, attribute listing and morphological analysis. Role of inspiration in creativity. Architectural inspirations. Concept of Creative Flow. Exercises in creative thinking.

UNIT IV CREATIVITY AND PEOPLE 9

Design as social process. Team work and group creativity. Consensus in design decisions. Participatory approach to design. Stakeholders, iteration and the design process. Exercises involving roleplaying.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to think about architecture as one of the many fields under the broader ambit of design as a fundamental human activity.
CO2 Self awareness with respect to the creative process.
CO3 Ability to engage different processes to give creative output in an appropriate manner.
CO4 Awareness of the importance of considering people/ stakeholders in the design process.

TEXTBOOKS

1. Geoffrey Broadbent, 'Design in Architecture - Architecture and the Human Sciences', John Wiley and Sons, New York, 1981.
2. Bryan Lawson, 'How Designers Think', Architectural Press, 2005.
3. James C. Snyder, Anthony J. Catanese, Timothy L. McGinty, 'Introduction to Architecture', McGraw Hill, 1979.
4. Edward De Bono, 'Lateral Thinking- Textbook of Creativity', Penguin Books, 1990.
5. Christopher Jones, 'Design Methods', Wiley, 1992.
6. Tom Heath, 'Method in Architecture', John Wiley and Sons, New York, 1984.
7. Nigel Cross, 'Developments in Design Methodology', John Wiley and Sons, 1984.
8. James L. Adams, 'Conceptual Blockbusting', Basic Books, 2001.
9. C. Thomas Mitchell, 'Redefining Designing: From Form to Experience', Van Nostrand Reinhold, 1992.
10. Design Process in Architecture, Geoffrey Makstutis , Laurence King 2018
11. https://designthinking.ideo.com/

REFERENCES

1. Victor Papanek, 'Design for the Real world, Human Ecology and Social Change', Chicago Review Press, 2005.
2. Paul Alan Johnson, 'Theory of Architecture- Concepts, Themes, Practices', VNR; 1994.
3. Christopher Alexander, 'A Pattern Language', Oxford University Press, 1977.

4. Mihaly Csikszentmihalyi, Flow: The Psychology of Optimal Experience, Harper 2008
5. Jeremy Till et al, 'Spatial Agency: Other Ways of Doing Architecture', Routledge, 2011.
6. Philip Plowright, 'Revealing Architectural Design: Methods, Frameworks and Tools', Routledge, 2014.
7. Anthony Antoniades, 'Poetics of Architecture- Theory of Design', VNR,1992.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	1	-	3	-	-	3	2	-	-	2
2	3	2	3	-	3	2	-	1	3	-	2	-
3	3	3	2	2	3	2	-	2	3	2	2	2
4	3	-	2	2	3	-	-	2	-	2	-	-
Avg.	**3**	**2**	**2**	**1**	**3**	**1**	**-**	**2**	**2**	**1**	**1**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3002 SUSTAINABLE DESIGN L T P/S C
3 0 0 3

OBJECTIVES

- To give understanding of the concept of sustainability and sustainable development in the context of issues like climate change, ecological footprint, etc.
- To inform about concepts of sustainable settlements design.
- To give knowledge about passive building design.
- To inform about the role of material and construction practices in sustainability.
- To inform about the concept of green buildings and rating systems.

UNIT I INTRODUCTION TO SUSTAINABILITY 7

Ecosystems, food chain and natural cycles on earth. Need for sustainable design in the context of anthropogenic activities. Climate change, ecological footprint, carbon footprint, loss of bio-diversity, urban heat islands, energy crisis. Overview of sustainable development. Life cycle analysis. Cradle to cradle concept.

UNIT II SUSTAINABILITY IN SETTLEMENT DESIGN 10

Principles of sustainable settlements. Morphology of historic/vernacular settlements in different climatic zones through case studies. Sustainable community - social, cultural and economic factors. Urban ecology, urban heat island effects, smog etc. Case studies of eco city or communities.

UNIT III SUSTAINABILITY IN BUILDING DESIGN 12

Sustainable site selection and development. Simple passive design considerations involving site conditions, building orientation, plan form and building envelope for sun and wind.
Passive heating of buildings- direct, indirect and isolated gain.
Passive cooling of buildings – shading of buildings, insulation, induced ventilation (air vents, wind tower, etc.,), radiative cooling, evaporative cooling, earth coupling, dessicant cooling.

UNIT IV SUSTAINABILITY IN MATERIALS AND CONSTRUCTION 9

Sustainability in choice of materials and construction techniques/ methods. Embodied energy in buildings. Use of local materials. Recyclable products. Eco building materials and construction. Bio mimicry, Zero energy buildings, Photo voltaic electricity generation. Thermal energy storage. Nano technology and smart materials.

UNIT V BUILDING RATING SYSTEMS 7

Concept of Green Architecture/ Buildings. Rating systems - LEED, TERI, GRIHA and BREEAM.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An overall understanding of sustainability and its relation to human activities.
CO2 Knowledge about sustainable design of settlements, buildings, materials and technology.
CO3 Familiarity with evaluation systems for green buildings.

TEXTBOOKS

1. Dominique Gauzin – Muller 'Sustainable Architecture and Urbanism: Concepts, Technologies and Examples', Birkhauser, 2002.
2. Catherine Slessor, 'Eco-Tech: Sustainable Architecture and High Technology', Thames and Hudson, 1997.
3. Ken Yeang, 'Eco-design : A Manual for Ecological Design', Wiley Academy, 2006.
4. 'Manual on Solar Passive Architecture', IIT Mumbai and Mines, New Delhi, 1999.
5. Arvind Krishnan et al, 'Climate Responsive Architecture A Design Handbook for Energy Efficient Buildings', Tata McGraw Hill Publishing Company Limited, New Delhi, 2001.
6. Majumdar M, 'Energy-efficient Building in India', TERI Press, 2009.
7. Givoni .B, 'Passive and Low Energy Cooling of Buildings', Van Nostrand Reinhold, New York, 1994.

REFERENCES

1. Arian Mostaedi , 'Sustainable Architecture : Low Tech Houses', CarlesBroto, 2002.
2. Sandra F. Mendler and William Odell, 'HOK Guidebook to Sustainable Design', John Wiley and sons, 2005.
3. Richard Hyder, 'Environmental Brief: Pathways for Green Design', Taylor and Francis, 2007.
4. Brenda Vale and Robert Vale, 'Green Architecture: Design for a sustainable future', Thames and Hudson 1996.
5. Sophia and Stefan Behling, 'Solpower The Evolution of Solar Architecture', Prestel, New York, 2000.
6. Dean Hawkes, 'Energy Efficient Buildings: Architecture, Engineering and Environment', W.W. Norton and Company, 2002.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	3	3	1	1	3	-	-	3	3
2	-	-	-	3	3	2	3	3	-	3	3	3
3	-	-	-	-	-	-	2	3	3	-	-	-
Avg.	**-**	**-**	**-**	**2**	**2**	**1**	**2**	**3**	**1**	**1**	**2**	**2**

'1' = Low; '2' = Medium; '3' = High

AR3003 STRUCTURE AND ARCHITECTURE L T P/S C
3 0 0 3

OBJECTIVES

- To outline the evolution of structural systems through history.
- To introduce concepts of structural design through works of architects/ engineers.
- To create understanding about the relationship between architectural expression/ form and structure.
- To give information about contemporary structures and architecture.

UNIT I STRUCTURES IN THE PRE INDUSTRIAL ERA 9

Development of monolithic and rock cut structures. Trabeated construction, arcuate construction, vaults and flying buttresses. Tents and masted structures. Bridges through ancient and medieval history.

UNIT II STRUCTURES IN THE INDUSTRIAL AND POST INDUSTRIAL PERIOD 9

Industrial revolution, evolution of modern typologies such as railway stations, factories, etc., Use of iron and steel. Concrete in modern architecture. Modular construction. Suspension structures. Projects by Pier Nuigi Nervi, Maillart, Candella, Buckminster Fuller, Eero Saarinen, Calatrava.

UNIT II BUILDING TYPOLOGIES AND LARGE SPAN STRUCTURES 9

Evolution of building typologies with need for larger spans - airports, stadia, multiuse architecture, public architecture, exhibition pavilions, etc., Corresponding structural and material innovations based on need. Contemporary use of steel, concrete, glass, plastic and other materials, Examples of different building typologies with large span structures from late 20th century and early 21st century with focus on iconic structures.

UNIT III STRUCTURAL DESIGN AND PARAMETRIC PROCESSES 9

Parametric/ digital processes and structure. Structural calculations. Iterative design process. Material and technical advancements including structural calculations, simulations, etc. Examples of buildings using all this.

UNIT V CASE STUDY 9

Detailed case study of any innovative structure based on history/ typology/ structural innovation/ material innovation/ design process.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Familiarity with concepts of structural design and its influence on the functional and aesthetic domains of architectural design relating to historic and contemporary periods.

CO2 Understanding of architectural expression and its relation to form, structure and changing technology.

CO3 Awareness of contemporary innovations in structures.

TEXTBOOKS

1. Mario Salvadori,Structure in Architecture: The Building of Buildings, Pearson, 2016.
2. Shigeru Ban, McQuaid, Matilda, 'Engineering and Architecture: Building the Japan Pavilion', Phaidon Press Ltd, UK, 2008.
2. 'Cox Architects'(The Millennium Series), Images Publishing Group, 2001.
3. James B Harris, Kevin Li, 'Masted Structures in Architecture', Routledge,2012

REFERENCES

1. Patrizio Bertelli et al, 'Herzog & De Meuron: Prada Aoyama Tokyo', Fondazione Prada, 2004
2. Christopher Beorkrem, 'Material Strategies in Digital Fabrication', Routledge, 2012
3. Angus J. Macdonald, Structure and Architecture, Architectural Press, 2001.
4. Andrew Charleson, Structure as Architecture, Architectural Press, 2005.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	1	3	2	3	-	2	1	-	1	2
2	3	3	2	-	3	3	-	1	2	-	2	-
3	-	-	-	-	1	3	-	-	-	-	-	1
Avg.	**2**	**2**	**1**	**1**	**2**	**3**	**-**	**1**	**1**	**-**	**1**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3004 CONTEMPORARY PROCESSES IN ARCHITECTURAL DESIGN L T P/S C
1 0 2 3

OBJECTIVES

- To introduce theories of media and its influence on the perception of space.
- To enable study of the various aspects of digital architecture and its exploration through emerging phenomena that relies on abstraction of ideas.
- To give understanding of the works of contemporary architects who have illustrated the influence of digital media in architecture.

UNIT I INTRODUCTION 15

Investigation of contemporary theories of media and their influence on the perception of space and architecture. Technology and art. Technology and architecture. Digital technology and architecture.

Aspects of digital architecture. Design and computation. Difference between digital process and non-digital process. Architecture and cyberspace. Qualities of the new space. Issues of aesthetics and authorship of design. Increased Automatism and its influence. Exercises using digital process.

UNIT II CONTEMPORARY PROCESS 10

Emerging phenomena such as increasing formal and functional abstractions. Diagrams, diagrammatic reasoning, diagrams and design process. Animation and design. Digital hybrid. Exercises.

UNIT III GEOMETRIES AND SURFACES 9

Fractal geometry. Shape grammar. Hyper surface. Liquid architecture. Responsive architecture. Exercises

UNIT IV CONTEMPORARY PROCESS AND ARCHITECTURAL WORKS 11

Ideas and works of architects related to contemporary processes. The architects to include Greg Lynn, Reiser + Umemotto, Lars Spuybroek / NOX Architects, UN studio, Diller Scofidio, Dominique Perrault, Decoi, Marcos Novak, Foreign Office Architects, Asymptote, Herzog and de Meuron, Neil Denari, Serie Architects, BIG Architects. Study to be undertaken in the form of assignments/discussions/seminars/presentations.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of the effect of contemporary theories of media on contemporary architectural design.
CO2 Insight into contemporary design process/theories and their relation to computation.
CO3 Ability to understand specific aspects of contemporary processes appropriate to a design situation.
CO4 Familiarity with architectural works derived from contemporary processes.

TEXTBOOKS

1. Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction', in Illuminations, Schocken Books, New York, 1969
2. Ignaci de Sola Morales, Differences: Topographies of Contemporary Architecture', MIT Press,1997.
3. William J Mitchell, 'The Logic of Architecture: Design, Computation and Cognition', MIT Press, 1995.
4. Ali Rahim, 'Contemporary Process in Architecture', John Wiley and Sons, 2000.
5. Ali Rahim (Ed), 'Contemporary Techniques in Architecture', Halsted Press, 2002.
6. Peter Eisenmann; Diagram Diaries, Universe,1999.
7. Grey Lynn, 'The Folded, The Pliant and The Supple, Animate form', Princeton Arch. Press,1999.

REFERENCES

1. Gillian Hunt, 'Architecture in the Cyberspace II', John Wiley and Sons, 2001.
2. L. Convey et al, 'Virtual Architecture', Bats ford, 1995.
3. Rob Shields (ed.), 'Cultures of the internet: Virtual Spaces, Real Histories, Living bodies',Sage, London, 1996.
4. John Beckman, 'The Virtual Dimension, Architecture, Representation and Crash Culture',Princeton Architecture Press, 1998.
5. William J Mitchell, City of Bits: Space, Place and the Infobahn', MIT Press, Cambridge, 1995.
6. Marcos Novak, 'Invisible Architecture: An Installation for the Greek Pavilion', Venice Biennale, 2000.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	1	-	-	-	-	-	1	-	-	-
2	2	2	2	-	-	-	-	-	1	-	-	-
3	3	2	3	-	-	-	-	-	1	-	-	-
4	3	2	2	-	-	-	-	-	1	-	-	-
Avg.	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3005 HUMAN BEHAVIOUR AND BUILT ENVIRONMENT L T P/S C
2 0 1 3

OBJECTIVES

- To introduce the relationship between human behaviour and the built environment.
- To give familiarity about theories and frameworks related to human behaviour and built environment.
- To give knowledge about methods and techniques to study human behaviour in the context of specific situations.
- To give theoretical and practical basis to approach architectural design through the understanding of human behaviour.

UNIT I INTRODUCTION TO ENVIRONMENTAL PSYCHOLOGY 9

Introduction to the term environmental psychology as relation between human behaviour and natural and built environment. Interdisciplinary and multidisciplinary aspect of environmental psychology. Outline of history of study of human behaviour with respect to context.

UNIT II ENVIRONMENTAL PERCEPTION AND COGNITION 12

Theories of environmental perception. Gestalt Theory. Perception and cognition of natural and built environment. Cognitive maps and way finding in larger built environment.

UNIT III ENVIRONMENT AND BEHAVIOUR 12

Proxemics, Personal space. Defensible space. Territoriality. Privacy. Ambient Environment. Stress. Density. Crowding. Behaviour Setting. Patterns and activities. Archetypical spaces.

Place identity and place attachment. Human behaviour in different contexts- nature, residential, work, urban public space, city, etc., Human behaviour and geometry of spaces/ buildings.

UNIT IV ENVIRONMENT BEHAVIOUR STUDIES AND DESIGN 12

Environment behaviour studies. Methods of study such as physical traces, observation, interviews, self reporting, experimental methods, mock up, post occupancy evaluation. Methods and case studies to apply environment-behaviour studies in design.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An overall understanding of the relationship between human behaviour and built environment.
CO2 Knowledge about various terms and aspects related to human behaviour.
CO3 An ability to study physical situations with respect to human behaviour.
CO4 Sensitivity to apply knowledge of human behaviour in design situations.

TEXTBOOKS

1. Francis Andrew, 'Environmental Psychology', Wadsworth, 1993.
2. John Zeisel 'Enquiry by Design: Tools for Environment-Behaviour Research', Cambridge University Press, 1984.
3. Robert Bechtel, 'Enclosing Behaviour', John Wiley, 1977.
4. Clovis Heimsath, 'Behavioural Architecture', McGraw Hill, 1977.
5. Gwen Bell, Edwina Randall, 'Urban Environment and Human Behaviour'- An Annotated Bibliography', Dowden Hutchinson Ross, 1973.

REFERENCES

1. Robert Gifford, 'Environmental Psychology: Principles and Practice', Optimal Books, 2007.
2. RikardKuller, 'Architectural Psychology', McGraw Hill, 1978.
3. Robert Sommer, 'The Behavioural Basis of Design', Englewood Cliffs, 1969.
4. Christopher Alexander, 'A Pattern Language', Oxford University Press, 1977.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	2	3	2	3	-	-	1	-	-	2	2
2	3	3	3	3	2	-	-	2	-	-	3	3
3	3	3	3	3	2	-	-	2	-	-	2	3
4	3	3	3	3	3	-	-	2	-	-	3	3
5	3	3	3	3	3	-	-	3	-	-	3	3
Avg.	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**2**	**-**	**-**	**2**	**3**

'1' = Low; '2' = Medium; '3' = High

AR3006 **TECHNIQUES OF VISUAL ART** **L T P/S C**
1 0 2 3

OBJECTIVES

- To enhance the students in fundamental strategies, methods of making paintings.
- To create and experiment colour concepts and render architecture.
- To produce art works from everyday environment and to effectively communicate theirobservations to others.
- To have a good understanding of the various 3D art techniques.

UNIT I DRAWINGS FROM OBSERVATION 11

Freehand drawing, Leaf study, foliage, Tree. Observational Study: Drawings from Natural objects and Manmade objects. Various shading techniques such as Hatching, Cross catching, stippling, stumbling and Blending. Principles of light and shade: Light and shade, Aware of depth, Illusion of depth, Emulate on a two-dimensional plane.

UNIT II WATERCOLOUR SKETCHES 12

Basic watercolour practices, Painting Techniques, Reproduction, Paintings from direct observations, Still life, Life study, Outdoor study, Landscape Painting, Mixed media, Pen and Colour, Rendering massive drawing.

UNIT III URBANSCAPE 11

Direct observational sketches & Paintings, Buildings, Indoor Sketches, Outdoor Sketches, Street sketches, Garden sketches, Landscape, Seascape, Public space, market, festivals, street scenes, monuments, recreational spaces, etc

UNIT IV 3D VISUAL ART 11

Clay Modelling, Moulding, Casting, Architectural Models, Relief Sculpture, Wall Mural, Terracotta Mural, Installation Art.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Capacity to create art works with understanding of elements and principles of art.
CO2 Ability to experiment with colour techniques and visual language.
CO3 Ability to create illustrations from their direct observation.
CO4 Ability to use 3D modeling techniques and explore the creativity through 3D art.

REFERENCES

1. Webb, Frank, “The Artist guide to Composition”, David & Charles, U.K, 1994.
2. Micheal Reardon, “Watercolour Techniques”, North light Books, U.S, 2016.
3. Ian Robertson, Mind Sculpture, Transworld, U.K, 2011.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	3	1	-	1	-	-	-	-	-	-	-
2	1	3	1	-	1	-	-	-	-	-	-	-
3	1	3	1	-	1	-	-	-	-	-	-	-
4	1	3	1	-	1	-	-	-	-	-	-	-
Avg.	**1**	**3**	**1**	-	**1**	-	-	-	-	-	-	-

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3007 **INTERIOR DESIGN** **L T P/S C**
2 0 1 3

OBJECTIVES

- To provide familiarity with the characteristics of interior spaces and furniture across history.
- To introduce the profession of interior design and bring out its role.
- To inform about the various components of interior space and give an understanding of the design aspects involved in each.

UNIT I INTERIOR SPACES AND FURNITURE ACROSS HISTORY 12

Outline of the characteristics of representative/ exemplary interior spaces, interior decoration and furniture in the Western world from the beginnings to twentieth century. Outline of characteristics of representative/ exemplary interior spaces, interior decoration and furniture in India across the ages, including living folk traditions.

Exercises in understanding historical aspects of interior spaces through literature review and case studies. Exercises involving conceptual design of contemporary interiors inspired by precedents.

UNIT II VOCABULARY OF INTERIOR DESIGN 9

Introduction to the professions of interior decoration, interior design and furniture design, bringing out their origin, evolution and current scope of work. Definition and process of interior design. Introduction to the design of interior spaces as related to typology, function and themes. Vocabulary of design in terms of elements (point, line, shape, form, space, colour, light, pattern, texture) and principles (balance, proportion, scale, rhythm, hierarchy, unity, contrast, harmony, emphasis, movement) with specific reference to examples from interior design.

Exercises in understanding vocabulary of design through case studies and conceptual design.

UNIT III COMPONENTS OF INTERIOR SPACE 12

Role of interior treatment and finishes in the experience of interior spaces. Outline of the design of components such as floors, ceilings, walls, partitions, window treatments and accessories based on parameters such as context, function, ambience, materials, properties, methods of construction, colour, texture.

Role of lighting in the experience of interior spaces. Outline of different types of interior lighting systems and fixtures based on their effects and suitability in different contexts.

Role of landscaping in the experience of interior space. Outline of interior landscaping elements such as rocks, plants, water, flowers, fountains, paving, artefacts. Their physical properties and effects on spaces.

Study of representative examples for all the above. Conceptual design exercises in all the above.

UNIT IV FURNITURE 12

Introduction to furniture design as related to parameters such as human comfort and function (including anthropometrics and ergonomics), built in or freestanding, materials and methods of construction, cultural particularities, changing trends and lifestyles, innovations and design ideas. Study of representative examples.

Furniture design exercises involving conceptual understanding of the above

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of interior design as an integral part of architecture and as an interdisciplinary and allied field related to architecture.

CO2 An overall exposure to the ways in which interior spaces can be enriched through the design of specific interior components.

TEXTBOOKS

1. Francis D.K. Ching, 'Interior Design Illustrated', John Wiley and Sons, 2012.
2. Joseph DeChiara, Julius Panero, Martin Zelnik, 'Time Saver’s Standards for Interior Design', McGraw-Hill Professional, 2001.
3. John F. Pile, 'Interior Design', Pearson Prentice Hall, 2007.

4. Jan Pieper, George Michell, 'The Impulse to Adorn- Studies in Traditional Indian Architecture', Marg Publications, 1982.
5. Aronson J, 'The Encyclopaedia of Furniture', Potter Style, 1965.
6. Pat Kirkham, Susan Weber, Editors, 'History of Design: Decorative Arts and Material Culture, 1400-2000', Yale University Press, 2013.
7. John F.Pile, Judith Gura, 'A History of Interior Design', Wiley, 2013.

REFERENCES

1. Helen Marie Evans, 'An Invitation to Design', Macmillan Pub Co, 1982.
2. Julius Penero and Martin Zelnik, 'Human Dimensions and Interior Space', Whitney, Library of Design, 1979.
3. Kathryn B. Hie singer and George H. Marcus, 'Landmarks of Twentieth Century Design; Abbey Ville Press, 1995.
4. Susanne Sles in and Stafford Cliff, 'Indian Style', Thames and Hudson,1990.
5. Rosemary Kilmer, W. Otie Kilmer, 'Construction Drawings and Details for Interiors: Basic Skills', John Wiley and Sons, 2009.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2	1	-	-	-	3	-	-	-	-	-	-
2	2	1	-	-	-	3	-	-	-	-	-	-
Avg.	**2**	**1**	-	-	-	**3**	-	-	-	-	-	-

'1' = Low; '2' = Medium; '3' = High

AR3008 DESIGN DETAILING L T P/S C
1 0 2 3

OBJECTIVES

- To introduce various aspects involved in the construction of buildings through the understanding of different types of architectural and technical drawings.
- To enable the understanding of architectural design as integrating spatial and technical concerns.
- To enable development of an architectural design project into schematic drawings through integrating concerns of structure, construction and services.
- To give knowledge to create architectural drawings for construction and as a base for structures and services drawings.
- To give knowledge to design, incorporate and detail architectural and interior components of the architectural design project.

UNIT I UNDERSTANDING ARCHITECTURE THROUGH BUILDING DRAWINGS 9

Understanding architecture as a physical, workable product through study of comprehensive set of drawings for any live building project, interpreting them and presenting their characteristics through seminars/ assignments. The drawings to be studied should include architectural working drawings from macro to micro scale- site plan, building plans, staircase details, kitchen and toilet detail of joinery, etc., structural drawings and service drawings to include electrical, plumbing, mechanical and HVAC details.

UNIT II SCHEMATIC DESIGN INTEGRATING ARCHITECTURAL DESIGN WITH STRUCTURAL AND SERVICE CONSIDERATIONS 12

Evolving a conceptual design project into schematic design, balancing different technical considerations. Considerations to include appropriate structural, plumbing, electrical, mechanical

and HVAC systems. Working out schemes to decide and finalise on the best possible design that integrates everything together. Scale of the project could be small to medium and include any typology, involving a newly created, quick, simple design or an older design from previous academic years.

UNIT III ARCHITECTURAL WORKING DRAWINGS 12

Preparation of architectural working drawings for the resolved schematic design. Drawings to include site plan, centre line drawings, building drawings, detailed drawings of specific areas like staircases and wall sections, dimensions explaining the various components, joinery schedule. Design and preparation of layouts of service intensive rooms like kitchens and toilets.

UNIT IV DETAILED DRAWINGS OF ARCHITECTURAL AND BUILT IN COMPONENTS 12

Design and preparation of detailed drawings of joinery including doors, windows and ventilators. Design and detailing out of floor, wall and ceiling finishes/ construction/ laying. Design and preparation of detailed drawings of built in furniture and components based on the room/ typology to include counters, cabinets, wardrobes, storage, fittings and fixtures, display units, workstation.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of all the aspects that go into the making of a building through study of drawings related to construction.
CO2 Ability to resolve spatial concerns with technical aspects of a building.
CO3 Ability to design and detail components within a building.

TEXTBOOKS

1. Joseph De Chiara, Michael Crosby, 'Time Saver Standards for Building Types', McGraw Hill Co, 2001.
2. Richardson Die truck, 'Big Idea and Small Building', Thames and Hudson, 2002.
3. Edward D Mills, 'Planning–The Architect's Handbook, Butterworths, 1985.
4. Roy Chudley, Roger Greeno, 'Building Construction Handbook', Routledge, 2016.

REFERENCES

1. Susan Dawson, 'Architect's Working Details -Volume 1-10', E- Map Construct, 2004.
2. Nelson L Burbank, 'House Carpentry Simplified', McGraw Hill, 1985.
3. David Sauter, 'Landscape Construction', Delmar Publishers, 2010.
4. Grant W. Reid ,'Landscape Graphics', Watson-Gup till , 2002.
5. Francis. D. K. Ching, 'Building Construction Illustrated', John Wiley and Sons, 2014.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	3	3	-	1	-	-	-
2	-	-	-	-	-	3	3	-	1	-	-	-
3	-	-	-	-	-	3	3	-	1	-	-	-
Avg.	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**-**	**1**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3009 CLIMATIC DESIGN PROCEDURES L T P/S C
1 0 2 3

OBJECTIVES

- To introduce the procedure of climatic design of buildings.
- To emphasize on the climatic significance of architectural “form”.
- To learn through application; the understandings of climatic design in form of design exercises.

UNIT I SITE AND BUILDING FORM 15

Climatic data of a place: sourcing, analysing and inferring. Mahoney tables, periodic chart, Overheated periods, other climatically significant periods, activity charts of building. Site specific climatic factors; identification, listing and analysis. Land form and orientation – its effects on radiation and daylight. Open space and built form – its effects on radiation and air flow. Ground character. Climatic design of outdoor spaces and adjacent outdoor spaces – its design considerations; lowering surface temperature and air temperatures of outdoor spaces. Orientation of building; evaluation of best orientation, optimum orientation climatically. Form and proportion of the overall building and site. Exercises on analysis of the above aspects at different climatic conditions.

The geometrical form of building envelop and its climatic significance; varieties of form and its influence of heat gain and wind flow. Study of various roof forms and Study of various building form in plan, for various climatic conditions. Form and its relation to radiant and convective cooling. Optimum built form. Exercises on the application of the above understandings.

UNIT II FORM, MATERIAL AND HEAT FLOW - 10

Form, material and heat flow. Selection of materials for climatic performance. U value and time lag calculations for various climatic situations. Homogenous material elements and Heterogeneous material elements Thermal properties of commonly used building materials. Thermal performance of some typical building section and building components. Exercises on the application of the above understandings.

UNIT III CLIMATIC DESIGN OF BUILDING ELEMENTS – I 10

Wall opening varieties. Wall opening design considering wind, light and heat gain. Orientation, Size, Position; its climatic significance. Protection and Control of wall openings.
Sunshade and Louver design; its varieties, its performance optimization considering wind, light and heat. Exercises on design and detailing of wall openings for different of climatic conditions.

UNIT IV CLIMATIC DESIGN OF BUILDING ELEMENTS – II 10

Courtyards and its effect on heat gain and heat loss in building interiors. Form, scale and proportion of courtyards; their climatic effect. Courtyards and ventilation inside building. Exercises on design of courtyards for applying the understanding of above aspects. Verandahs, corridors and other transition spaces and their roles. Different varieties of roof openings; their climatic significance. Water bodies in building and evaporative cooling.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of procedures involved in climatic design of buildings
CO2 An understanding on the significance of architectural “form”; climatically.
CO3 Ability to design and generate multiple iterations for various building elements climatically.

TEXTBOOKS

1. O.H. Koenigsberger and Others, 'Manual of Tropical Housing and Building-ClimaticDesign',`Orient Longman, Madras, India, 2010.
2. Arvind Krishnan, Szokolay et.al, 'Climate Responsive Architecture- A Design HandbookFor Energy Efficient Buildings', Tata McGraw Hill, 2010.
3. Bureau of Indian Standards IS 3792, 'Hand book on Functional Requirements of Buildingsother than Industrial Buildings- Part I – IV', New Delhi,1987.

REFERENCES

1. Martin Evans, 'Housing Climate and Comfort', Architectural Press, London, 1980.
2. B. Givoni, Man, 'Climate and Architecture', Architectural Sciences Series, Applied SciencePublishers Ltd., London, 1981.
3. B. Givoni, 'Passive and Low Energy Cooling of building', Van Nostrand Reinhold, NewYork,1994.
4. Galloe Salam and Sayigh A.M.M, 'Architecture, Comfort and Energy', Elsevier Science Ltd.,Oxford,1998.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	2	3	-	3	-	-	2	-
2	-	-	-	-	2	3	-	3	-	-	2	-
3	-	-	-	-	2	3	-	3	-	-	2	-
Avg.	-	-	-	-	**2**	**3**	**-**	**3**	-	-	**2**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3010 EARTHQUAKE RESISTANT ARCHITECTURE L T P/S C
3 0 0 3

OBJECTIVES

- To enable an understanding of the fundamentals of earthquake and the basic terminologies.
- To give basic knowledge of earthquake resistant design concepts.
- To provide familiarity with design codes and building configuration
- To enable understanding of the different types of construction details to be adopted in a seismic prone area.
- To give knowledge for applying earthquake resistant principles in an architectural design project.

UNIT I FUNDAMENTALS OF EARTHQUAKES 7

Earth's structure, seismic waves, plate tectonics theory, origin of continents, seismic zones in India. Predictability, intensity and measurement of earthquake. Basic terms- fault line, focus, epicentre, focal depth etc.

UNIT II SITE PLANNING, PERFORMANCE OF GROUND AND BUILDINGS 10

Historical experience, site selection and development. Earthquake effects on ground, soil rupture, liquefaction, landslides. Behaviour of different types of building structures, equipments, lifelines, collapse patterns. Behaviour of non-structural elements like services, fixtures in earthquake-prone zones

UNIT III SEISMIC DESIGN CODES AND BUILDING CONFIGURATION 10

Seismic design code provisions. Introduction to Indian codes. Building configuration - scale of building, size, horizontal and vertical plane, building proportions, symmetry of building - torsion, re-entrant corners, irregularities in buildings like short storeys, short columns, etc.

UNIT IV DIFFERENT TYPES OF CONSTRUCTION DETAILS 11

Seismic design and detailing of masonry structures, wood structures, earthen structures. Seismic design and detailing of RC and steel buildings. Design of non-structural elements - architectural elements, water supply, drainage, electrical and mechanical components.

UNIT V URBAN PLANNING AND ARCHITECTURAL DESIGN 7

Vulnerability of existing buildings, facilities planning, fires after earthquake, socio-economic impact after earthquakes. Conceptual design for earthquake resistance involving institutional masonry building with horizontal spread and height restriction, multi-storeyed RC framed apartment/commercial building.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to understand the formation and causes of earthquakes
CO2 An understanding of the factors to be considered in the design of buildings and services to resist earthquakes.

TEXTBOOKS

1. 'Guidelines for earthquake resistant non-engineered construction', National Information centre of earthquake engineering (NICEE, IIT Kanpur, India), 2004.
2. C.V.R Murthy, Andrew Charlson, 'Earthquake Design Concepts', NICEE, IIT Kanpur, 2006.
3. Agarwal.P, 'Earthquake Resistant Design', Prentice Hall of India, 2006.

REFERENCES

1. Ian Davis, 'Safe Shelter within Unsafe Cities: Disaster Vulnerability and Rapid Urbanization', Open House International, UK, 1987
2. 'Socio-economic developmental record'- Vol.12, No.1, 2005.
3. Mary C. Comerio, Luigia Binda, 'Learning from Practice- A Review of Architectural Design and Construction Experience after Recent Earthquakes', Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto, Italy.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	3	1	3	2	-	-	-
2	-	-	-	-	-	3	3	3	2	-	-	-
Avg.	-	-	-	-	-	**3**	**2**	**3**	**2**	-	-	-

'1' = Low; '2' = Medium; '3' = High

AR3011 PARAMETRIC MODELLING AND CODING L T P/S C
3 0 0 3

OBJECTIVES

- To introduce parametric platform, various tools and its potentials.
- To impart training in parametric tools by 2D and 3D modelling through projects.
- To enable the use of parametric platform to develop a design from the initial stages to the final outcome.

UNIT I INTRODUCTION TO PARAMETRIC MODELLING 12

Introduction to Parametric Modelling: Difference between Parametric and Non-Parametric Modelling; Advantages of Parametric Modelling; Introduction of Software tools like Rhino/Grasshopper, and its interface; Etc.,

UNIT II INTRODUCTION TO CODING 11

Exercises in Processing (java) /Phython to understand Input/Output; Variable, Integers, Array, Operations, Object, Data Structure, List and Sort, Series/Range, Class, Function, Etc.,

UNIT III DIGITAL FORMATION **11**

Construct Curve, Surface, Solid, Mesh Etc., in parametric setup difference between Polygon & Nurbs modelling, Poly-surfaces, b-reps and meshes, Field, Operations, Modifiers, Manipulations, Etc.,

UNIT IV GENERATIVE & PERFORMATIVE MODELS **11**

(Grasshopper/ Processing/Phython, Etc.),
Computational Geometry: Voronoi, Delaunay Triangle, Etc;
Rule-based System: L-System (LS), Fractals, Etc.,
Performative: Simulation, Analysis, Evaluation, Etc.,

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Familiarity with digital tools and techniques in the realm of contemporary design processes;
CO2 Ability to use parametric software to generate design variants ;
CO3 Understanding of emergent possibilities in digital design, analysis and fabrication;

TEXTBOOKS

1. Form+Code by Casey Reas, Chandler McWilliams, Lust, Princeton Architectural Press/New York;
2. The Nature of Code: Simulating Natural Systems with Processing by Daniel Shiffman;
3. Elements of Parametric Design by Robert Woodbur, Bentley Institute Press & Routledge;
4. From Control to Design Paperback by Tomoko Sakamoto, Actar;
5. The Alphabet and the Algorithm by Mario Carpo, The MIT Press;
6. AAD Algorithms-Aided Design by Arturo Tedeschi, Le Penseur;

REFERENCES:

1. Patrick Schumaker, ‘ Parametricism as Epochal Style n, Antoine. ‘Digital culture in Architecture’
2. Stavric, Milena & Marina, Ognen. (2011). Parametric modeling for advanced architecture. International Journal of Applied Mathematics and Informatics. 5. 9-16.
3. Janssen, Patrick & Stouffs, Rudi. (2015). Types of Parametric Modelling. 10.52842/conf.caadria.2015.157.
4. Pitts, Greg and Datta, Sambit 2009, Parametric modelling of architectural surfaces, in CAADRIA 2009 : Between man and machine-integration, intuition, intelligence : Proceedings of the 14th International Conference on Computer Aided Architectural Design Research in Asia, National Yunlin University of Science and Technology, Yunlin, Taiwan, pp. 635-644.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	2	-	-	3	-	-	3	-	2	-
2	-	3	2	-	-	3	-	-	3	-	-	-
3	3	3	2	-	3	3	-	-	3	-	1	-
Avg.	**2**	**3**	**2**	**-**	**1**	**3**	**-**	**-**	**3**	**-**	**1**	**-**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

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AR3012 DISASTER MANAGEMENT L T P/S C
3 0 0 3

OBJECTIVES

- To provide knowledge about disasters, their significance and types.
- To inform about the relationship between vulnerability, disasters, disaster prevention and risk reduction.
- To give a preliminary understanding of approaches to Disaster Risk Reduction (DRR).
- To enhance awareness of institutional processes in the country.
- To give information about how to respond to surroundings with potential disaster response in familiar areas.

UNIT I INTRODUCTION TO DISASTERS 9

Disaster, hazard, vulnerability, resilience, risks. Types of disasters – earthquake, landslide, flood, drought, fire etc. Classification and causes. Impact including social, economic, political, environmental, health, psychosocial, etc. Differential impacts in terms of caste, class, gender, age, location, disability. Global trends in disasters: urban disasters, pandemics, complex emergencies, climate change. Dos and don'ts during various types of disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9

Disaster cycle.. Culture of safety, prevention, mitigation and preparedness. Structural and non structural measures. Roles and responsibilities of community, Panchayat Raj Institutions/ Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders. Institutional processes and framework at State and Central Level. State Disaster Management Authority (SDMA). Early warning . Advisories from appropriate agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9

Factors affecting vulnerabilities. Differential impacts. Impact of development projects such as dams, embankments, changes in land-use etc. Climate change adaptation. IPCC scenario and scenarios in the context of India. Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9

Hazard and vulnerability profile of India. Components of disaster relief: Water, food, sanitation, shelter, health, and waste management, Institutional arrangements (mitigation, response and preparedness. Disaster Management Act and Policy. Other related policies, plans, programmes and legislation. Role of GIS and Information technology components in preparedness, risk assessment, response and recovery. Phases of Disaster. Disaster Damage Assessment.

UNIT V DISASTER MANAGEMENT: APPLICATIONS, CASE STUDIES AND FIELD WORK 9

Landslide hazard zones - case Studies. Earthquake vulnerability assessment of buildings and infrastructure- case studies. Drought assessment- case studies. Coastal flooding, storm surge assessment, floods (fluvial and pluvial flooding) - case Studies. Forest fire - case studies. Manmade disasters - case studies. Space based inputs for disaster mitigation and management. Field work related to disaster management.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to differentiate the types of disasters, causes and their impact on environment and society.

CO2 Knowledge about assessing vulnerability and various methods of risk reduction measures as well as mitigation.

CO3 Familiarity with real situations and responses during disasters.

REQUIRED READING

- Singhal J.P. 'Disaster Management', Laxmi Publications, 2010.
- Tushar Bhattacharya, 'Disaster Science and Management', McGraw Hill India Education Pvt. Ltd., 2012.
- Gupta Anil K, Sreeja S. Nair. 'Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011.
- KapurAnu, 'Vulnerable India: A Geographical Study of Disasters', IIAS and Sage Publishers, New Delhi, 2010.

REFERENCES

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005.
2. Government of India, National Disaster Management Policy,2009.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	-	-	1	1	-	-	-
2	3	2	-	-	-	3	1	-	-	-	-	-
3	3	-	-	2	-	-	-	3	1	-	-	-
Avg.	**2**	**2**	**-**	**2**	**-**	**3**	**-**	**2**	**2**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3013 ART APPRECIATION L T P/S C
2 0 1 3

OBJECTIVES

- To introduce art as a fundamental human activity, its characteristics and ways in which it can be understood. To introduce the vocabulary of art and to enable the appreciation of art.
- To understand different productions of art as manifestations within particular contexts.

UNIT I INTRODUCTION TO ART AND ANCIENT ART 11

Definition of art, need for art, role of art. Art, reality, perception, representation. Appreciating art in terms of form (means, types, tools and techniques, vocabulary of art - principles and elements), content (story conveyed, meaning) and context (the situation and time of production of art).

Prehistoric Art across the world. Egyptian and Mesopotamian art. Greek and Roman art. Indian Art: Manuscript paintings, Mural paintings, Miniatures, Folk Paintings.

UNIT II WESTERN ART: RENAISSANCE TO MODERN 12

Renaissance and Baroque art. Neoclassicism. Romanticism. Realism. Art in India during colonial period. Impressionism. Post Impressionism. Fauvism. Expressionism. Birth of modern art. Abstract/ Non-Objective art. Cubism. Dadaism. Surrealism. Futurism. Constructivism. Suprematism. De Stijl. Abstract Expressionism. Collage Art. Modern Indian art.

UNIT III INDIAN MODERN ART 12

Art in India during colonial period. Birth of modern art, CollEge of Arts, Madras, Bengal, Mumbai, Baroda. Subaltern art movements in India, Progressive Artists' Group, Delhi Silpi Chakra, Cholamandal Artist's Village, Women Artist.

UNIT IV POSTMODERN AND CONTEMPORARY 12

Postmodernism in Art. Pop art. Conceptual Art. Neo-Conceptual Art. Minimalism & Kinetic Art. Op Art. Photorealism. Post-minimalism. Installation art. Land art. Environmental Art. Virtual Reality and Art. Artificial Intelligence. Major Trends In Modern Art in India: Folk Art, Tantric Art, Abstract Art, Figurative Art, Popular Art, Miniature Art.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding and appreciation of art as basic and varied human creation related to cognition and experience.
CO2 Awareness of important art productions in the West and India.
CO3 Sensitivity towards collective and individual cultural productions as unique expressions of historical and geographic context.

TEXTBOOKS

1. Fred, S. Kleiner, 'Gardener's Art through Ages', Wadsworth Publishing, 2012.
2. Bernard S. Myers, 'Understanding the Arts', Holt Rinehart and Winston Inc, 1964.
3. H.H. Arnason, 'History of Modern Art', Thames and Hudson, 1977.
4. Partha Mitter, 'Indian Art', Oxford University Press, 2001.
5. Edith Tomory, 'A History of Fine Arts in India and the West', Orient Blackswan, 1989.

REFERENCES

1. Peter and Linda Murray, 'The Penguin Dictionary of Art and Artists', Penguin, 1989.
2. E.H. Gombrich, 'The Story of Art', Phaidon, 2002.
3. E.H. Gombrich, 'Art and Illusion', Phaidon, 2002.
4. 'Indian Art since the early 1940s- A Search for Identity', Artists Handicrafts Association of Cholamandal Artists Village, Madras,1974.
5. A.K.Coomaraswamy, Fundamentals of Indian Art, Historical Research Documentation Programme, Jaipur, 1985.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	-	2	3	-	-	-	-	-	-	-	-
2	1	-	1	3	-	-	-	-	-	-	-	-
3	1	-	1	3	-	-	-	-	-	-	-	-
Avg.	**1**	**-**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3014 **CRITICAL WRITING** **L T P/S C**
0 0 3 3

OBJECTIVES

- To enable the building of critical thinking through discussions, reading and writing exercises exploring specific themes.
- To enable a coherent line of thought, connecting and ordering different aspects of a situation/theme.
- To help in verbal and written expression at an advanced level.
- To facilitate applyingskills in critical thinking in the realm of architecture.

CONTENT

Critical writing will help to develop thoughts/ideas/opinion on a topic backed by discussion, research and discernment.

A list of themes will be selected and offered to the class in small groups. The themes will be similar in terms of scope and workload. Students would read up on the themes and come for discussion to class. Based on the discussion, the students will hone their thoughts and read further. They would then write about the themes. Thesewritings would be presented and discussed in class. A further development of the writing would then be done. This process would be iterated a few times so that a coherent thought process and written narrative results about the theme in consideration. The discussions and draft essayfor this would constitute the first assessment.

Furtherto this, themes within architecture will be introduced. The training ensured in the previous

themes would be applied to looking at larger architectural themes. While the process would be the same as for the general themes, in the architectural themes, the scale would be larger and the discussions would be more one to one with faculty. There will be sessions on developing a voice, finding sources, referencing research, narrative building. One well-researched essay on a topic of interest in architecture would ensue. The length and nature of the essay will be based on the topic and will be informed during the course of the semester. The discussions and draft essay on architecture would be evaluated in the second and third assessment.
The final two essays would be submitted for the Viva Voce Examination in the form of a report.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to think, talk, discuss, read, conclude and write about a specific topic with knowledge, insight and skill.
CO2 Clarity in identifying, connecting and structuring facts and thoughts through writing.
CO3 Ability to write an architectural essay that is perspective based supported by facts and arguments or fact based supported by analysis and argument.
CO4 Overall development of skills in critical thinking that would guide design actions.

REQUIRED READING

- Creme, P. and M. Lea, Writing at University: A guide for students. Open University Press, 2008.
- Murray, N. Writing Essays in English Language and Linguistics, Cambridge University Press, 2012.
- Stephen Bailey, 'Academic Writing: A Handbook for International Students', Routledge, 2011.

REFERENCES

1. Andrew Goatly, 'Critical Reading and Writing in the Digital Age: An Introductory Coursebook', Routledge, 2016.
2. Richard Coyne, 'Interpretation in Architecture: Design as Way of Thinking', Routledge, 2005.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	3	2	3	-	-	-	-	-	-	-
2	-	-	3	2	3	-	-	-	-	-	-	-
3	-	-	3	1	2	-	-	-	-	-	-	-
4	-	-	3	1	3	-	-	-	-	-	-	-
Avg.	**-**	**-**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3015 **SOFT SKILLS** **L T P/S C**
3 0 0 3

OBJECTIVES

- To introduce soft skills as important human attribute/ quality to be developed.
- To enable development of communication skills in various scales and media.
- To enable development of skills in terms of group and team behaviour.

UNIT I INTRODUCTION TO SOFT SKILLS **9**

Introduction to Soft Skills. Understanding of self. Self-awareness, Self- Management and Self Development. Values. Attitude. Positive Thinking and optimism. Confidence and excellence. Developing perception. Patience, persistence and flexibility. Empathy and Emotional Intelligence. Interpersonal relations and social behaviour. Stress management. Time Management.

UNIT II INTRODUCTION TO COMMUNICATION SKILLS; LISTENING AND TALKING 9

Classification and types of Communication. Verbal and non-verbal communication. Formal and formal communication. Barriers in communication.

Listening Skills, Types of Listening. Enhancing listening. Understanding context of words. Responding. Speaking. Self development through speaking.

Nonverbal Communication. Body language. Proxemics.

Telephonic Communication. Telephone etiquette.

UNIT III COMMUNICATION SKILLS – READING AND WRITING 9

Reading as cognitive process. Types and rate of reading. Critical Reading. Skimming and scanning. Techniques for effective reading.

Writing Skills. Writing Style. Purpose of writing.

Business writing, Report writing. Writing papers. Email Communication. Strategies based on purpose.

UNIT IV GROUP COMMUNICATION 9

Understanding of cultural, social and economic diversity and adapting to others. Body language and etiquette. Organisational Communication. Group Communication, Communication Breakdown. Conflict Management. Negotiation Skills. Meeting Management. Team Building and Team work. Leadership Skills.

UNIT V PRESENTATIONS, INTERVIEW AND GROUP DISCUSSIONS 9

Advanced Speaking Skills. Body language. Emotional intelligence and Critical Thinking.

Oral Presentations, Speeches and Debates, Combating Nervousness, Patterns and Methods of Presentation, Oral Presentation- Planning and Preparation, Making Effective Presentation, Speaking for Various Occasions.

Planning and Preparation for interviews, Drafting Resume. Facing Job Interview. Group Discussion.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Familiarity with the importance of soft skills.
CO2 Knowledge about how to communicate effectively in various scales and media.
CO3 Exposure to importance of appropriate team and group behaviour.

TEXTBOOKS

1. Soft Skills, K.Alex, S.Chand, 2010
2. Soft Skills, Hariharan S, Sundararajan N, Shanmugapriya S.P, MJB Publishers 2010.
3. The ACE of Soft Skills, Gopalaswamy Ramesh, Mahadevan Ramesh, Pearson 2010.

REFERENCES

1. Understanding Interpersonal Communication, Richard West and Lynn H.Turner, Cengage Learning, 2010.
2. Interpersonal Communication, Steven A. Beebe, Susan J. Beebe, Mark V. Redmond, Pearson 2011.

CO-PO Mapping

CO	PO											
	1	2	3	4	5	6	7	8	9	10	11	12
1	-	-	-	-	-	-	-	-	-	3	-	-
2	-	-	-	-	-	-	-	-	-	3	-	-
3	-	-	-	-	-	-	-	-	-	3	-	-
Avg.	-	-	-	-	-	-	-	-	-	3	-	-

'1' = Low; '2' = Medium; '3' = High

AR3016 DIGITAL TOOLS FOR BUILDING MODELLING AND ANALYSIS L T P/S C
1 0 2 3

OBJECTIVES

- To give knowledge about the importance of analysing a building design on various parameters.
- To give familiarity with digital tools available to model the attributes and information of a building.
- To enable the analysis and simulation of attributes and qualities of a building in order to improve the quality of design from different considerations.

UNIT I INTRODUCTION 6

Importance of analysing a building design based on various parameters- energy performance, attributes of lighting and ventilation, structure, cost estimating, phasing of project, construction, administration and management, etc., Overview of different platforms available to analyse a building on its various parameters. Difference between CAD and BIM. Outline of the whole process- building modelling, giving information in terms of inputs, understanding the attributes/parameters of the model and extracting information in terms of analysis and performance. Various BIM platforms currently available- Revit, Bently, Archicad, Digital Project, Vector works, Tekla Structures, DProfiler, etc., Knowledge required by an architect as designer and as advisor in the building projects with respect to analysis of a building.

UNIT II BASIC BUILDING MODELLING 15

Overview of modelling of a building - components, materials, assemblies, relational structures, objects, libraries, parametric shapes, details, property, attributes, etc., Basic modelling of a building - creating components such as walls, roofs, floors and ceilings, doors and windows, skylights, staircases and railings, etc., Adding information in terms of dimensioning.
Exercise in some of the above.

UNIT III APPLYING DETAILED ATTRIBUTES TO BUILDING MODEL 12

Overview of applying specification, material information, consideration of day lighting and sunpath, artificial lighting fixtures, MEP (Mechanical, Electrical, Plumbing) components, site and landscape components, applying performance information, installation and application info, sustainability information, management information, quality control information, etc., to a basic building model.
Exercise in some of the above.

UNIT IV UNDERSTANDING THE QUALITIES OF BUILDING THROUGH MODEL 12

Overview of how to understand, analyse the qualities and working of a modelled building through knowledge and theoretical concepts studied in previous semesters as well as through simulation of the building model. The qualities will include thermal performance, cooling load, lighting effects, etc., Extracting information from the model in terms of BOQ, cost, etc.,
Exercises in some of the above.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of the importance of modelling information and analysing model for a building.

CO2 A familiarity with making basic models, applying attributes/parameters to the model, understanding aspects of a building design through analysing the model.

TEXTBOOKS

1. Robert S. Wegant, 'BIM Content Development: Standards, Strategies, and Best Practices', John Wiley, 2011.
2. Chuck Eastman et al, 'BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors', John Wiley, 2011.

REFERENCES

1. Eastman, C.; Teicholz, P.; Sacks, R.; Liston, K,.'BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors', Wiley, 2011.
2. Ray Crotty, 'The Impact of Building Information Modeling: Transforming Construction'. Spons Architecture Price Book,2011.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	2	-	-	1	2	-	-	3	-	-	-
2	-	2	-	-	1	2	-	-	3	-	-	-
Avg.	**-**	**2**	**-**	**-**	**1**	**2**	**-**	**-**	**3**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3017 CONTEMPORARY BUILDING MATERIALS L T P/S C
3 0 0 3

OBJECTIVES

- To introduce current materials and products in architecture that are eco-friendly, composite, durable, advanced, smart.
- To inform about innovations in materials and practices in building industry.
- To focus on materials and systems, their properties and connections, intrinsic relationship with structural systems and environmental performance.

UNIT I INTRODUCTION 7

Introduction and need for ultra-performance materials in building design as a substitute to conventional materials. Newer application for special performance, thermal/ sound/ moisture protection, fitting, equipment and furnishing. Properties of contemporary materials – multidimensional, repurposed ,recombinant ,intelligent , interfacial, transformant, etc.

UNIT II ADVANCED CONCRETE AND COMPOSITE REINFORCEMENT 10

Types of advanced concrete and its applications. Workability and mechanical properties, durability and reliability of advanced concrete materials. Manufacturing and application in buildings. Bendable concrete, light transmitting concrete, translucent concrete, pervious concrete, eco-cement, etc., Introduction to manufacture, types, properties and performance of new reinforcement materials in concrete - Aramid fibres, bio-steel, carbon (Graphite) Fibres and fibre glass etc.

UNIT III COMPOSITE MATERIALS 10

Types, terminology and classification of composite materials based on particle reinforced, fiber reinforced, structural and composite benefit in building construction. Composite materials manufacturing process. Use of composite materials namely Polymer Matrix Composites (PMCs) and Fibre- Reinforced Polymers (FRPs) along with cement, steel, aluminium ,wood, glass, etc., for thermal insulation, fire protection, coating, painting and structural monitoring, etc.

UNIT IV NANO-MATERIALS AND NANO-COMPOSITES 9

Definition, manufacture and types of nano materials. Properties, performance of nano materials in building construction, types and application of nano-materials like carbon, nanotubes etc., Nano composite used with cement, steel, aluminium, wood, glass for thermal insulation, fire protection, coating and painting and structural monitoring etc.. Nano technologies in building and construction.

UNIT V DIGITAL AND TENSILE MATERIALS 9

Types of materials and its constitution, manufacturing and construction technology requirement for 3D printed buildings structure and Extraterrestrial printed structures. Tensile fabric structure by digital printing. Translucent fabric, thin-film photovoltaics, texlon foil, PVC (poly vinyl chloride) coated polyester cloth and PTFE (poly tetra fluro ethlene) (teflon) coated glass cloth.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Exposure to the need and use of various contemporary materials in creating innovationand ultra-performance in building design.

CO2 An understanding of characteristics and performance of the newer materials in terms of detailing and application to the context.

TEXTBOOKS

1. 1Christiane Sauer, 'Made of...New Materials Sourcebook for Architecture and Design', Prestel Pub, 2010.
2. Mel Schwart, 'Encyclopaedia of Smart Materials -Vol 1,2', Wiley-Interscience, 2001.
3. Senem Özgönül Şensan, 'Smart Materials and Sustainability: Application of Smart Materials in Sustainable Architecture', LAP Lambert Academic Publishing, 2010.
4. Axel Ritter, 'Smart Materials in Architecture, Interior Architecture and Design', Birkhäuser Architecture, 2002.

REFERENCES

1. Michelle Addington, & Daniel LSchodek, 'Smart Materials and New Technologies: for the Architecture and Design Professions, Architectural Press, 2005.
2. Michael. F. Ashby, Paulo Ferreira, Daniel L. Schodek, 'Nanomaterials, Nanotechnologies and Design: An Introduction for Engineers and Architects', Butterworth- Heinemann, 2009.
3. Blaine Brownell, 'Transmaterial 2', Princeton Architectural Press, 2008.
4. John Fernandez, 'Material Architecture: Emergent Materials for Innovative Buildings and Ecological Construction', Taylor & Francis, 2006.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	3	-	-	-	-	-	-
2	-	-	-	-	2	-	-	-	-	-	-	-
Avg.	**-**	**-**	**-**	**-**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3018 DIGITAL FABRICATION AND ARCHITECTURE L T P/S C
3 0 0 3

OBJECTIVES

- To give exposure to various digital production tools to build artefacts as part of creative design process.
- To give knowledge about utilising prototyping and modelling as a design medium that supports the full spectrum of digital design as a paperless process.
- To give knowledge about fabrication process in Digital Architecture as a way to bring software models into reality.

UNIT I INTRODUCTION TO DIGITAL FABRICATION 9

Introduction to Digital Fabrication; Advantages of Digital Fabrication; Evolution of digital fabrication in architecture, overview of the impact the technology, new realm of possibilities for architectural expression, Etc.,

UNIT II ADDITIVE FABRICATION 9

3d Printing, Process of 3d printing, it's Possible Materials Etc., Case studies of Application of 3d printing in practice at different scales;

UNIT III SUBTRACTIVE FABRICATION 9

Laser Cut, CNC Milling, Water Jet Cutting, Etc., it's Possible Materials Etc., Case studies of Application of Subtractive Fabrication in practice at different scales;

UNIT IV TRANSFORMATIVE FABRICATION 9

Robotic Fabrication, Mechanically Transformative Process, Etc., it's Possible Materials Etc., Case studies of Application of Transformative Fabrication in practice at different scales;

UNIT V FILE TO FACTORY PROCESS 9

Preparation of File to Factory Process, Optimization of meshes/files, STL Formats, Etc.,

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Awareness to the machines, different methods of fabrication and the workability with materials.

CO2 Ability to correlate between the design processes and Digital Prototype or Model attribute.

REFERENCES

1. Branko Kolarevic and Kevin Klinger, Manufacturing Material Effects: Rethinking Design and Making in Architecture, 2014
2. Digital Fabrication, Paul Andersen, David Salomon, Sanford Kwinter, David Carson, Architecture of Patterns, W. W. Norton & Co, 2010
3. Heino Engel, Structure Systems, 1997
4. Lisa Iwamoto, Digital Fabrications: Architectural and Material Techniques, Princeton: Princeton Architectural Press, 2009
5. Branko Kolarevic, Architecture in the Digital Age: Design and Manufacturing, London: Taylor & Francis 2005
6. Bob Shiel, Ruairi Glynn, Fabricate: Making Digital Architecture, Toronto: Riverside Architectural Press, 2011
7. Emergent Design Group, Morphogenetic Design Strategies AD, 2004
8. Farshid Moussavi, Daniel Lopez, Garrick Ambrose, Ben Fortunato, Ryan R. Ludwig and Ahmadreza Schricker, The Function of Form
9. Rivka Oxman and Robert Oxman, The New Structuralism: Design, Engineering and Architectural Technologies
10. Michael Weinstock, Michael Hensel, Achim Menges (eds.), Emergence: Morphogenetic Design Strategies, AD, Vol 74, No. 3, May/June 2004

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	1	-	-	-	3	-	-	1
2	-	-	-	-	1	-	-	-	3	-	-	1
Avg.	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**3**	**-**	**-**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3019 CHENNAI- EVOLUTION AND ARCHITECTURE L T P/S C
3 0 0 3

OBJECTIVES

- To give an overview of the historic evolution of Chennai city.
- To introduce its different and distinguishing characteristics including geography, topography, hydrology, ecology, demographics, economics, culture, politics, art, etc.,
- To give knowledge of the evolution of the architecture and urbanism of Chennai in the context of its history.
- To outline the current issues and characteristics of Chennai.

UNIT I PRE-COLONIAL CHENNAI REGION 7

Natural history and geography of Chennai region including its ecology, topography, rivers, coastal ecosystems, sea, estuary, wetlands, indigenous forests, lakes, tanks, flora and fauna. Pre-colonial history of Chennai region – Tamilagam, fishing hamlets, urban settlements, rural areas. Pallava architecture. Historic settlements such as Mylapore, Triplicane, West Mambalam.

UNIT II COLONIAL CHENNAI 11

Advent of colonial rule in Chennai and its politics. Trade, commerce, economics and education in the context of colonial rule. Colonialism and its modernity- urbanism, building typologies- educational institutions, stations, buildings for justice, law and civics, houses and housing. Architectural styles and their intent- Classical, Indo-Saracenic, indigenous, hybrid. Impact of colonialism on culture and cultural modernity.

UNIT III MODERN CHENNAI 11

Urbanisation in Chennai from late 19th century. Political and economic changes from late 19th century/ early 20th century in Chennai. City planning in early 20th century Chennai. Modernity in architecture- office buildings, concrete, Art Deco. Independence and city planning- Gandhi Nagar, Anna Nagar, etc., Modern architecture in Chennai. Urbanisation and Master plans in the 1970s. New typologies such as shopping and office complexes, apartment buildings, etc., The local and the global in late 20th century Chennai. Corresponding architecture of regionalism, postmodernism, material changes in buildings, etc.,

UNIT IV URBAN CULTURE 8

Overview of demographics of Chennai today. Diversity and distinctness of Chennai's culture and corresponding expressions- art, religious festivals, literature, cuisine, dance, theatre, cinema, politics, geographic differences in culture within Chennai.

UNIT V URBAN ISSUES AND SOLUTIONS 8

Changes in 21st century Chennai- urbanisation, migration, globalisation, growth of IT, new industries and economic opportunities. Corresponding issues- urban poor and housing scenario, traffic issues, encroachment of water bodies and marshlands, waste management issues, etc., Solutions- mass transit, housing schemes, ecological restoration measures, etc., .

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of the overview of the historic evolution of Chennai city and its urbanism.
CO2 Knowledge about different and distinguishing characteristics.
CO3 An overall exposure to the current issues and characteristics of Chennai.

REQUIRED READING

- S. Muthiah, 'Madras Rediscovered', Westland Ltd, 2014.
- K. Kalpana and Frank Schiffer, 'Madras- The Architectural Heritage -An INTACH Guide', INTACH Publication, 2003.
- A.R.Venkatachalapathy, 'Chennai- Not Madras- Perspectives on the City', Marg Publications, 2006.

- K.R.Sitalakshmi, 'Architecture of Indian Modernity, The Case of Madras', Palaniappa Brothers, 2015.
- Nandhitha Krishna and TishaniDoshi,' Madras Then- Chennai Now', Roli Books, 2013.
- KV Raman, 'The Early History of Madras Region', Published by C.P.RamaswamiAiyar Foundation, Chennai, 2008.
- P. Rajaraman, 'Chennai Through The Ages', Poompozhil Publishers, 1997.

REFERENCES

1. S. Muthiah, 'Madras Miscellany – People, Places and Potpourri' , East West Press Pvt Ltd, 2011.
2. Nandhitha Krishna, 'Madras- Chennai- Its History and Environment', C.P.RamaswamiAiyer Foundation 2009.
3. David Waltner et al, 'The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability', Columbia University Press, 2008.
4. C.S. Srinivasachari, 'History of the City of Madras', Varadachary, 1939.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	3	2	-	-	-	-	-	-	2
2	-	-	-	3	2	-	-	-	-	-	-	2
3	-	-	-	3	2	-	-	-	-	-	-	2
4	-	-	-	3	2	-	-	-	-	-	-	2
Avg.	**-**	**-**	**-**	**3**	**2**	**-**	**-**	**3**	**-**	**-**	**-**	**2**

'1' = Low; '2' = Medium; '3' = High

AR3020 HISTORY OF NON-WESTERN ARCHITECTURE L T P/S C
3 0 0 3

OBJECTIVES

- To create awareness about the history of non-Western Architecture
- To give outline knowledge of various non-Western Architectural traditions.
- To inform about colonial influences on non-Western architecture.

UNIT I CHINESE, JAPANESE AND KOREAN ARCHITECTURE 11

China - Prehistoric history, regional architecture, dynasty architecture, architecture of the general public, imperial architecture, religious architecture, Horizontality, Enclosure, hierarchy, symmetry, influences of Chinese architecture on neighbouring regions, influence of neighbouring regions on Chinese architecture

Japanese - Prehistoric history, regional architecture and architecture of different periods, pagodas, shrines, temples, wooden structures, zen architecture, gardens, castles, imperial architecture, early minimalism, Japanese-Western eclectic architecture, colonial architecture, FLW, Corbusier, Tange's architecture in Japan.

Korea – Dolmens, Buddhist architecture, hanoks, semi-subterranean houses, Korean forts, pagodas, differences from Chinese and Japanese pagodas, tombs.

UNIT II SOUTH-EAST ASIAN ARCHITECTURE 11

Historic architecture of Thailand, Cambodia, Laos, Myanmar and Indonesia, Khmer architecture, Buddhist architecture, Dutch architecture of Indonesia, British colonial architecture of Singapore and

Sri Lanka, French architecture of Vietnam, Spanish colonial architecture of Philippines, temple complexes, Angkor wat, Borobudur, Angkor thom, Luang Prabang, Preah Vihear.

UNIT III AFRICAN ARCHITECTURE 9

Early history – Egyptian, Phoenician, Nubian, Roman architecture, Aksumite architecture, Nigerian dry stone buildings, Islamic and Moorish architecture of north Africa- in the regions of Tunisia, Egypt, Morocco, Great Mosque of Djenné, Tomb of Aksia, Ibwami of Rwanda, Swahili architecture, Colonial architecture of Cape Town, Saint-Louis, Grand-Bassam, Gold Coast, etc.

UNIT IV RUSSIA AND MONGOLIA AND KOREA 7

Russia - Slav medieval forts, Christian architecture of Kievan Rus, Veliky Novgorod, Kiev, Murom. Muscovite architecture, Imperial architecture of Russia – castles, cathedrals and palaces, post-revolution architecture.

Mongolia – Stupas, Yurts, Imperial architecture at Karakorum, Buddhist monasteries.

UNIT V OCEANIA 7

Indigenous architecture of Oceania. Colonial Architecture of Australia and New Zealand.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Familiarity with the architecture of non-Western traditions
CO2 Exposure to colonial influence on non-Western cultures
CO3 Broader awareness of historical processes across the world in the realm of architecture

TEXTBOOKS

1. Banister Fletcher, A History of Architecture, CBS 1999
2. Ching et Al, A Global History of Architecture, Wiley 2017

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	3	2	-	-	3	-	-	-	2
2	-	-	-	3	2	-	-	3	-	-	-	2
3	-	-	-	3	2	-	-	3	-	-	-	2
Avg.	**-**	**-**	**-**	**3**	**2**	**-**	**-**	**3**	**-**	**-**	**-**	**2**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3021 PRODUCT DESIGN L T P/S C
1 0 2 3

OBJECTIVES

- To give understanding about the evolution of form and space in product design.
- To facilitate the interpretation of design concepts in different ways and layers.

UNIT I INTRODUCTION TO PRODUCT DESIGN 9

Concept of Form and Space. Form elements and their properties - Volume, Plane, Line, Point. Form: Dimensions, Proportions, 3-D Primary Geometric Forms. Movement and Forces Relationships: Axis, Axial Movement, Forces, Curves and their application in Form. Study of Form relationships – Order, Joined Forms, Transitional Forms, Evolution of Form. Organisation of form – Spatial, Matrix. Static, Dynamic and Organic. Symmetry and Asymmetry. Balance: Structural, Visual. Orientation of form: Direction, Position. Overall Proportion. Considerations of Colour, Pattern, Texture and Proportion in

products and product environments. Relating Form to Materials and Processes of Manufacture. Use of Computers for Form generation.

UNIT II PRODUCT DESIGN 12

Selection of the projects is based on the possibility of user interaction leading to innovation. Projects end with a comprehensive presentation through working/ mock up models, design drawing and a report. The project is supported by detailed discussion on various stages in the design process emphasising the complementary nature of systematic and creative thinking. This is achieved by short supporting assignment in following topics: Creativity techniques like brain storming and synectics to develop creative attitude and open mind, design opportunity, problem perception , Idea Sketching ,clustering of ideas for concept development, exploratory mock up models for concept development, evaluation of concepts, final concept selection, concept development, refinement and detailing.

UNIT III PRODUCT DETAILING 12

Batch production and mass production of products. Technical considerations of internal subsystems of a product and their influence on product detailing. Selection of natural, synthetic and manmade materials and their processes for detailing products for manufacture. Detailing mechanisms for foldable, stackable and collapsible considerations of the product. Design detailing of components vis-à-vis considerations of manufacture, maintenance and assembly. Detailing of products to be manufactured in Plastics. Component design of electronic products. Detailing for conditions of use including knock-down systems and its joinery. Usability and Ergonomic issues in product detailing. Design assignments on detailing of a given product component.

UNIT IV PRODUCT DESIGN PROTOTYPING AND ADVANCED MANUFACTURING PROCESSES 12

Introduction to automation and Computer Aided Design (CAD), Principles of Basic Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM). Hardware and graphics software in CAD. CAD applications and integration with other software packages. Evolution of Numerically Controlled (NC) machines and Computer Numerically Controlled (CNC) machines, programming of CNC machine. Free form or generative manufacturing processes (Rapid Prototyping). Working Principles of Rapid Prototyping machines. Types of Rapid Prototyping machines with technology employed. Rapid Tooling (RT): Soft tooling, Vacuum casting, Room temperature vulcanisation (RTV). Input devices, Contact and non-contact type digitisers such as Co-ordinate measuring machines, Laser and White light scanners. Product Modeling using CAD software and Rapid Prototyping machine. Production using Rapid Tooling approach.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of product design as a discipline.
CO2 Ability to interpret real life situation into design.
CO3 Knowledge about contemporary design process and manufacturing process of design.

REFERENCES

1. H. G. Greet and R. R. Kostellow, ‘Elements of Design and the Structure of Visual Relationships’, Architectural Press, NY, 2002.
2. K. Critchlow, ‘Order in Space: A Design Source Book’, Thames and Hudson, 2000.
3. C. Akner-Koler, ‘Three-dimensional Visual Analysis, Institution for Industrial Design’, Konftfack, Sweden, 1994.
4. Mike Baxter, ‘Product Design: Practical Methods for the Systematic Development of New Products’, Chapman and Hall, 1995.
5. Roozenburg and Eekels, ‘Product Design: Fundamentals and Methods’, John Wiley and Sons Inc; New Ed edition, 1995.
6. Goodrich, Kristina, ‘Design Secrets: Products: 50 Real-Life Projects Uncovered’, Industrial Designers Society of America, Rockport Publishers, 2001.

7. Rouse, William B, 'Design for Success: A Human-Centered Approach to Designing Successful Products and Systems', Wiley-Interscience, 1991.
8. J.M. Gordon Jr.,' Industrial Design of Plastics Products', John Wiley and Sons, 2003.
9. G. Boothroyd, 'Product Design for Manufacture and Assembly', 2nd Edition, Marcel Dekker Inc., 2002.
10. J.W. Priest, S. M. Jose, 'Product Development for Manufacturing', Marcel Dekker Inc., 2001.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	-	-	-	-	-	-	-
2	3	-	3	-	2	-	-	-	-	-	1	1
3	3	-	-	-	1	-	-	-	-	-	2	2
Avg.	**2**	**-**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3022 DESIGN COMMUNICATION L T P/S C
1 0 2 3

OBJECTIVES:

- To introduce design communication as an important part of an architect's work.
- To give knowledge about different modes and media for design communication/ presentation.
- To give exposure to the current trends in architectural design communication.
- To provide opportunities for experimentation through study and implementation.

UNIT I INTRODUCTION TO DESIGN COMMUNICATION 10

Introduction to design communication as an integral part of the architectural design process. Outline of attributes of architecture that can be communicated and the modes of communication- text, visuals, drawings etc., Brief overview of how design has been communicated across history through popular diagrams and drawings of notable architecture/ architects' works. Design Communication by contemporary architects/ visualisers – Diagrams by BIG, Models by Richard Meier, Visualisations by Squint/Opera, Presentations by Heatherwick Studio, Social Media by Malone Maxwell Borson Architects. Analysis of award-winning competition drawings and media.

Understanding of popular modes of design communication through exercises based on case studies of architects' work through first hand study, websites, other collected data,etc

UNIT II COMMUNICATING STUDY, SITE ANALYSIS AND CONCEPT 12

Exercises in design communication involving presenting of study, requirements, site analysis and concept. Exercises can be based on a studio project completed in the previous semester by students themselves or other students' work. Discussion and dialogue on the various attributes to be communicated and finalising best way to communicate. Use of various modes and media- Software/plug-ins like Modelur, climate consultant etc., Storyboarding and hand drawn art, Combination of hand -drawn and digital techniques of design context and site models. Montage techniques. Concept visualisation sketches, Sketch animation, 2D and 3D Zoning, Form evolution using Rhino, Sketch-up. Block models – Manual, Laser cutting and 3D Printing.

UNIT III COMMUNICATING DESIGN INTENT IN THE DESIGN PRODUCT 13

Exercises in design communication involving bringing out the design intent inherent in the design product. Exercises can be based on a studio project completed in the previous semester by students themselves or other students' work. Discussion and dialogue on the various attributes to be communicated and finalising best way to communicate. Sheet sizing, scale and composition. Manual sketching and rendering. 2D & 3D Digital Drawings Revit, Sectional Perspective, Exploded

Axonometry, Hybrid Visualisation, Interactive 3D rendering, Immersive 3D, Presentations in Videos, GIFS, Visualisation overlays on Videos. Projection mapping and interactive 3D printed models, VR Animation, Augmented Reality and Immersive Experiences - exploring design studio projects using any of the tools like Unity 3D, Maya, 3DS Max. Autodesk Live, Fuzor, Shapespark, Unreal Engine, Autodesk Stingray, Steam Unigine, Arki.

UNIT IV DESIGN NARRATIVE AND WRITING 10

Exercises in design communication involving descriptive writing about a studio project. Exercises can be based on a studio project completed in the previous semester by students themselves or other students' work. Discussion and dialogue on the various attributes to be communicated and finalising best way to communicate. Communicating Design with the help of relevant vocabulary - Design Narratives, Project Description, salient points, key design ideas. Narrative to mix visual and verbal in a composite manner. Putting together everything in different modes- social media, paper, digital, etc.,

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Awareness of the importance of design communication as a necessary part of architect's work.
CO2 Knowledge about current trends in design presentation and communication.
CO3 Ability to employ latest technology in expressing design intent and programs.
CO4 Exposure to allied fields that are associated with architectural design communication.

TEXTBOOKS:

1. Visual Communication for Architects and Designers - Constructing the Persuasive Presentation by Margaret Fletcher, First Edition, 2020 by Routledge
2. Graphic Design for Architects: A Manual for Visual Communication, Karen Lewis, Routledge, 2015
3. Hybrid Drawing Techniques by Contemporary Architects and Designers by M. Saleh Uddin, Wiley & Sons, Incorporated, John, 1999

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	-	3	-	2	-	-	-	-	-	-	-
2	3	-	3	-	2	-	-	-	-	-	-	-
3	3	-	3	-	3	-	-	-	-	-	-	-
4	3	-	3	-	3	-	-	-	-	-	-	-
Avg.	**3**	**-**	**3**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3023 BUILDING AUTOMATION AND CONTROL SYSTEMS L T P/S C
3 0 0 3

OBJECTIVES:

- To giveintroduction to automation and management systems in buildings.
- To give knowledge about specific systems in the field of fire safety, security, communication, HVAC, lighting, climate control, etc.,
- To give information about integration of systemswith each other and with building construction.

UNIT I INTRODUCTION TO BUILDING AUTOMATION AND CONTROL SYSTEMS 9

Introduction to and History of Building Automation Systems (BAS). Building Types and Key Requirements. Different systems in BAS which includes HVAC, security and surveillance, communication, fire, lighting systems, climate control, etc. Ideas of intelligent buildings, Human Machine Interface (HMI), facilities management and life cycle costs. The fundamental concepts of building control, and building automation. Control Theory. Building automation topics include device technology (sensors, control elements), direct digital control, control applications, communication systems, and Building Automation Protocols.

Role of different stakeholders (Architect, contractor, consultant, application engineer and engineer) in BAS system design.

UNIT II FIRE SAFETY SYSTEMS 9

Statutory Standards and codes for fire safety. Objective and essential components and working of a Fire Alarm System. Type of detection technology in the Fire alarm system.Basic knowledge on working, design and installation of Fire alarm system. Fire suppression systems. Components, working and installation.

various types of technologies currently in use.

UNIT III SECURITY, SURVEILLENCEAND COMMUNCATION SYSTEMS 6

Introduction to Access Control, Intruder Alarm, Essential Components of each System, and Various types of Technologies employed in the system, Basic knowledge as how they work, are designed and installed. Introduction to CCTV, Perimeter protection system, Essential Components of each System, and Various types of Technologies employed in the system, Basic knowledge as how they work, are designed and installed.

Public Address System and other communication systems and their requirements.

UNIT IV HVAC, LIGHTING, CLIMATE CONTROL 12

Building Automation and Control Systems for HVAC, Lighting and Climate Control. Energy Conservation Control Strategies.

UNIT V INTEGRATED BUILDING MANAGEMENT SYSTEM 9

Overview of various components, technology, sensors, etc., that are common to more than one system. Integrated Building Management System IBMS.Integrated approach in design, maintenance and management system. Current trend and innovation in building automation systems. Impact of Information Technology.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Outline the various building management systems.
CO2 Choose appropriate fire safety systems for buildings.
CO3 Categorise the various systems of security and surveillance for buildings.
CO4 Demonstrate the basics of HVAC, lighting and climate control.
CO5 Recall the use of integrated building management system.

TEXTBOOKS:

1. Building Automation Systems – A Practical Guide to Selection and Implementation, Maurice Eyke
2. National Building Code of India

REFERENCES

1. George Clifford , Modern Heating Ventilating and Air Conditioning
2. Vaughn Bradshaw , Building control Systems
3. Roger W. Haines, HVAC Systems Design Handbook, Fifth Edition by 5.
4. James E. Brumbaugh, HVAC Fundamentals
5. Herman Kruegle, CCTV Surveillance,
6. John L. Bryan, Fire Suppression Detection System

7. Vivian Capel, Security Systems and Intruder Alarm System,
8. Mike Constant & Peter Turnbull, The Principles and Practice of Closed Circuit Television.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2	-	-	-	-	1	3	1	-	-	-	-
2	2	-	-	-	-	1	3	3	-	-	-	-
3	2	-	-	-	-	1	3	3	-	-	-	-
4	2	-	-	-	-	1	3	3	-	-	-	-
5	2	-	-	-	-	3	3	1	-	-	-	-
Avg.	**2**	**-**	**-**	**-**	**-**	**1**	**3**	**2**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3024 CONSTRUCTION TECHNOLOGY L T P/S C
3 0 0 3

OBJECTIVES

- To inform about the technology involved in the construction of buildings, especially situations requiring advanced construction.
- To give familiarity about advanced construction technology in concrete and steel.
- To inform about the construction practices and equipment in different situations.
- To give an overview of construction planning and scheduling.

UNIT I SOIL AND FOUNDATIONS 7

Soil investigations including geo-technical information. Soil / ground improvement techniques. Deep excavations. Outline of foundation systems for special conditions and situations. Foundations for multi-storeyed, tall and super tall buildings. Basement construction and water proofing.

UNIT II ADVANCED CONSTRUCTION TECHNOLOGY 11

Advanced construction techniques for concrete, to include pre-stressed and pre-cast concrete construction. Fabrication and erection of steel structures. Re-bar technologies and structural steel materials and jointing.

Pre-engineered buildings. Pre-fabricated systems, Off-site technologies. Modular coordination. Design and detailing of joints. Quality assurance in jointing.

UNIT III CONSTRUCTION PRACTICE 11

Modern Construction Materials. Manufacture, storage, transportation and erection of precast component forms. Types of moulds and scaffoldings in construction. Safety in erection and dismantling of constructions .Formwork systems (including slip-form), temporary works and enabling works. Insitu/ field tests for materials.

UNIT IV CONSTRUCTION METHODS AND EQUIPMENT 9

Choice and use of equipment for different situations and materials. Tractors, bulldozers, shovels draglines, cableways and belt conveyors, batching plants, transit mixers and agitator trucks for ready mix concrete, guniting equipment, air compressors, welding equipment, cranes and other lifting devices.

UNIT V CONSTRUCTION PLANNING AND SCHEDULING 7

Planning and scheduling for high rise building. Simulation. Typical floor construction cycle. Appropriate working schedule. Planning and scheduling for pre-engineered buildings. Resource allocation.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Familiarity with advanced construction technology and systems.
CO2 Knowledge about construction practices and equipment.
CO3 Familiarity with construction management, planning and scheduling processes.

TEXTBOOKS

1. R. Chudley, 'Construction Technology', Heinemann, England, 2011.
2. R. Barry, 'The Construction of Buildings', The English Language Book Society and Crosby Lockwood, Staples, London, 1999.

REFERENCES

1. Frank R. Dagostino, 'Materials of Construction', Reston Publishing Company, 1982.
2. M. Mohsin, 'Project Planning and Control', Vikas Publishers, New Delhi, 1983.
3. National Building Code of India, 1983.
4. http://www.tn.gov.in/tcp/acts_rules.htm
5. http://www.cmdachennai.gov.in

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	-	-	1	-	-	-	3
2	-	-	-	-	-	3	-	1	-	-	-	-
3	-	-	-	-	-	3	-	1	-	-	-	2
Avg.	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**1**	**-**	**-**	**-**	**2**

'1' = Low; '2' = Medium; '3' = High

AR3025 DATA VISUALISATION AND ANALYSIS L T P/S C
2 0 1 3

OBJECTIVES

- To give exposure to the importance of understanding Information through visual thinking.
- Enabling skill in exploring the various ways of visualising and analysing data.
- To enable generating innovative diagrams from the collected data to discern and recognise patterns and phenomena.

UNIT I INTRODUCTION TO DATA VISUALISATION 9

Introduction to data visualisation. Principles of data visualisation. Conventional methods of visualisation.various applications. Types of Digital Data and Data structures. Terminologies Used in Big Data Environments. Various ways of Collection, Processing and Analysing the data. Classification of Data. Analytics frameworks. Open data platforms.

UNIT II OUTLINE OF DATA VISUALISATION TOOLS 12

Overview on Visual analysis languages. Interactive data visualisations. Multivariate visualisation. Geospatial visualisation. Data Visualisation platforms-Tableau,Polaris,GGplot2,Matplotlib,PowerBI, etc.

Exercises using some of the above platforms using sample datasets.

UNIT III DATA VISUALISATION IN ARCHITECTURE 12

Introduction to mapping and data visualisation in architecture. Types of visualisation tools -2D/3D. Architectural design process outline. Various Data collection techniques. Basics sets of architecture and urban design data required. Quantitative and Qualitative data. Spatial and Non-Spatial data. Introduction to functional visualisation of various attributes of buildings -Activity, zoning, matrix, proximity chart, human behaviour, demographics, circulation patterns, etc.

Exercises related to above.

UNIT IV ANALYSIS OF ARCHITECTURAL AND URBAN DATA 12

Overview of recent design approach related to study and design for people and space with help of big data. Analysis and visualisation of data. Quantitative and Qualitative data. Programme, Micro climate, Geospatial Analysis, Energy modelling, Vegetation,User behaviour studies, Sensory analysis, Post occupancy studies, Participatory/Interactive approach etc.

Case studies of Data Visualisation as design process- Works of Rem Koolhaas, UN Studio, FOA etc.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Knowledge about the importance of data visualisation.

CO2 Familiarity with different methods and techniques of data visualisation.

CO3 Skill in working out simple exercises related to data visualisation in the realm of architecture and urban design.

TEXTBOOKS

1. Winifred E. Newman, Data Visualisation for Design Thinking: Applied Mapping, Routledge 2017
2. C. J. Date, A. Kannan, S. Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
3. Andy Kirk, “Data Visualization: a successful design process”, Second Edition, Packt publishing limited,2012
4. Andy Kirk , “Data Visualisation: A Handbook for Data Driven Design”,Second Edition,SAGE Publication Ltd,2019
5. David McCandless ,”Knowledge is Beautiful”,William Collins,2014
6. David McCandless ,”Information is wealth”,William Collins,2012
7. Anthony Vidler, ‘Diagrams of Diagrams: Architectural Abstraction and Modern Representation’, Representations, No. 72. (Autumn, 2000), pp. 1-20
8. Mark Garcia, 'The Diagrams of Architecture', Wiley 2010.
9. Iain Fraser and Rod Henmi, ‘Envisioning Architecture – An Analysis of Drawing, 1991’,John Wiley and Sons, 1993.

REFERENCES

1. Robert S. Wegant, ‘BIM Content Development: Standards, Strategies, and Best Practices’, John Wiley, 2011.
2. Chuck Eastman et al, ‘BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors’, John Wiley, 2011.
3. Joseph Clarke, ‘Energy Simulation in Building Design’, Routledge, 2007
4. BIM Handbook: A guide to building information modeling for owners, managers, designers, engineers and contractors (second edition) by Chuck Eastman, Paul Teicholz, Rafael Sacks, and Kathleen Liston Available online (e.g. $55 on Amazon) - please use the second edition ISBN-13: 978-0470541371 ISBN-10: 0470541377

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1			1									
2			2									
3	3		3									
4												
Avg.	**3**		**2**									

1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3026 HERITAGE CONSERVATION L T P/S C
3 0 0 3

OBJECTIVES

- To introduce the need for heritage and rationale for architectural conservation and to provide familiarity with the history of conservation.
- To give familiarity about various agencies involved in the field of conservation worldwide.
- To give an overview of conservation of architecture and heritage towns of India.
- To give detailed information about the materials and methods of heritage preservation.
- To give an overview of conservations practice and strategies in India.

UNIT I INTRODUCTION TO HERITAGE AND CONSERVATION 12

Importance of heritage. Need, debate and purpose of conservation. History of conservation movement. International agencies like ICCROM, ICOMOS, UNESCO and their role in conservation. Charters. principles and ethics of conservation. Scope and approaches to conservation - material based, value based, living heritage. Issues of historicity, authenticity, preservation, restoration, transformation, conservation. Conservation, preservation and adaptive reuse.

UNIT II CONSERVATION IN INDIA 7

Museum conservation. Monument conservation and the role of ASI, SDA, INTACH. Central and state government policies and legislations. Inventories and projects. Selected case studies of sites such as Hampi, Golconda, Mahabalipuram. Craft Issues of conservation.

UNIT III CONSERVATION MATERIALS, METHODS AND STRUCTURAL SYSTEMS 10

Investigation techniques and tools. Behaviour of historic materials and structures. Problems with masonry, foundation. Repair methods, traditional and modern methods. Seismic retrofit, services additions and disabled access to historic buildings. Moisture and pollution problems.

UNIT IV CONSERVATION PRACTICE 7

Listing of monuments. Documentation of historic structures. Assessing architectural character. Historic structure report. Guidelines for preservation, rehabilitation and adaptive re-use of historic structures. Case studies of palaces in Rajasthan, dwellings in Chettinad and Swamimalai. Heritage site management.

UNIT V URBAN CONSERVATION STRATEGIES 9

Understanding the character and issues of historic towns. Cultural landscapes. Selected case studies. Historic districts and heritage precincts. Conservation through planning. Heritage economics. Financial incentives and planning tools such as TDR. Heritage tourism. Community based approach to conservation. Conservation management. Case studies of sites like Cochin, Pondicherry French town.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of the importance of heritage and scope of conservation.
CO2 Familiarity with issues and practices of conservation through case studies.
CO3 Knowledge about methods for preserving and repairing historic buildings.
CO4 Familiarity with conservation strategies through principles and project case studies.

TEXTBOOKS

1. Bernard Fielden, 'Conservation of Historic Buildings', Architectural Press, 2003.
2. Bernard Fielden, 'Guidelines for Conservation - A Technical Manual', INTACH, 1989.
3. MS Mathews, 'Conservation Engineering', University at Karlsruhe, 1998.
4. J. Kirk Irwin, 'Historic Preservation Handbook', McGraw Hill, 2003.
5. Donald Appleyard, 'The Conservation of European Cities', M.I.T. Press, Massachusetts, 1979.
6. Publications of INTACH

REFERENCES

1. James M. Fitch, 'Historic Preservation: Curatorial Management of the Built World', University Press of Virginia, Reprint Edition,1990.
2. Robert E. Stipe, 'A Richer Heritage: Historic Preservation in the Twenty-First Century', University of North Carolina Press, 2003.
3. B.P. Singh, 'India's Culture- The State, The Arts and Beyond', Oxford University Press, 2009
4. A.G. K. Menon (Ed), 'Conservation of Immovable Sites', INTACH Publication, N. Delhi.
5. John H. Stubbs and Emily G Makas. 'Architectural Conservation in Europe and the Americas', John Wiley and Sons, 2011.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	3	2	2	-	-	-	1	-	1
2	-	-	-	3	2	2	-	-	-	1	-	1
3	-	-	-	3	2	2	-	-	-	-	-	1
4	-	-	-	3	2	2	-	-	-	-	-	1
Avg.	**-**	**-**	**-**	**3**	**2**	**2**	**-**	**-**	**-**	**1**	**-**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3027 TECHNIQUES OF DIGITAL ART L T P/S C
1 0 2 3

OBJECTIVES

- To give introduction to digital art as a domain.
- To give exposure to different types of and media for digital art.
- To develop skills in basic techniques of digital art.

UNIT I INTRODUCTION TO DIGITAL ART 9

Definition of digital art. Origin and history of digital art. Classification of different types of digital art – photography, photopainting, digital collage, Digital painting, 3D Digital painting, vector drawing, algorithmic art, mixed media, video art, interactive digital installations. Critical theories of digital art. Famous digital art works. Elements and principles of art as applicable to digital art- as light, colour, texture, scale, motion, etc., through examples.

UNIT II 2D ART 12

Software and techniques for raster image editing. Editing and creating digital raster images through various kinds of manipulation based on elements and principles for a selected theme. Creating 2D vector art based on elements and principles for a selected theme.

UNIT III 3D ART 12

Software and techniques for3D drawing and video. Creating 3D art based on elements and principles for a selected theme.

UNIT IV MIXED MEDIA 12

Introduction to different types of mixed media in digital art. Project involving mixed media on any theme.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Awareness of digital art as a domain.
CO2 Knowledge about the types and media for digital art.
CO3 Skill in basic techniques for digital art.

TEXTBOOKS

1. Thomson-Jones, Katherine and Shelby Moser, "The Philosophy of Digital Art", The Stanford Encyclopedia of Philosophy (Spring 2021 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/spr2021/entries/digital-art/>.

REFERENCES

1. Mark Von Wodtke, 'Mind over Media: Creative Thinking Skills for Electronic Media', McGraw-Hill, New York, 1993.
2. Noah Wardrip-Fruin and Nick Montfort, Eds, 'The New Media Reader', MIT Press, 2003.
3. Zalanski and Fischer, 'Shaping Space: The Dynamics of Three-Dimensional Design', Cengage, 2006.
4. Ocvirk, Stinson, Wigg, Bone and Cayton, 'Art Fundamentals: Theory and Practice', McGraw-Hill Education, 2012
5. Mary Stewart, 'Launching the Imagination: A Comprehensive Guide to Basic Design', McGraw Hill 2011.
6. Catherine Elwes, 'Video Art: A Guided Tour', Tauris, 2004.
7. Peter Ratner, '3-D Human Modeling and Animation', Wiley, 2009.
8. Jaejin Choi, 'Maya Character Animation', SybexInc; Bk and CD-Rom Edition, 2002.
9. Nikos Sarris and Michael G. Strintzis, '3D Modeling and Animation: Synthesis and Analysis Techniques for the Human Body', IRM Press, 2004.
10. 3DTotal.com, 'Digital Art Masters'.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2	-	3	-	1	-	-	-	-	-	-	-
2	2	-	3	-	1	-	-	-	-	-	-	-
3	2	-	3	-	1	-	-	-	-	-	-	-
Avg.	**2**	**-**	**3**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3028 PROFESSIONAL SERVICE FIRM: MANAGEMENT AND EXCELLENCE L T P/S C
3 0 0 3

OBJECTIVES

- To introduce the idea of profession, professional and professional service firm.
- To introduce the key areas of attention involved in a professional service firm.
- To inform about ways to maximise the potential of human resource for individual, organisational and societal benefit.
- To give familiarity about the different ways to protect ideas and knowledge.
- To introduce the idea of reflective practice to enable lifelong learning and professional excellence.

UNIT I PROFESSION, PROFESSIONAL AND PROFESSIONAL SERVICE FIRM 9

Definition of profession and professional. Attributes of a profession- unique body of knowledge, standards of entry, code of ethics, service orientation to the profession, sanctioning organisation. Professional service firm. Differences between a professional service firm and business firm, manufacturing firm and other services firm. Brief outline of aspects involved in a professional service firm - ethical and professional vision of firm, legal foundation of firm, form of organisation, organisational structure, financial strategies, project implementation, client relationship, professional conduct, human resource practices, team work, leadership, nurturing of key competencies, innovation and excellence, perception of firm by clientele and public, future vision.

UNIT II EFFECTIVE PROFESSIONAL 9

Need to understand external environment and internal working. Client attraction, responding to clients needs, service and retention/relationship management. Conflicts of interest. Relational versus transactional services. Role of reputation/legitimacy. Professional values, attitude and skill development. Professional socialisation and acquiring of knowledge and values related to the profession. Role of mentorship. Managing career transitions. Global expansion of professional services. Managing across cultures. Multidisciplinary practices. Developing key competencies, creating value through innovation and excellence.

Literature and live case studies of architectural consulting firms to understand the above.

UNIT III HUMAN RESOURCE MANAGEMENT 9

Importance of skills and sensitivity in working as teams and organisations. Human performance and capabilities. Importance of human resources management at the individual, organisational and societal levels. Individual behaviour and organisational behaviour. Perception, attitude, values, morals, ethics, responsibilities. Communication process and information management. Group behaviour and teams. Role of effective leadership. Motivation concepts and processes. Conflict management. Stress management. Transactional analysis. Leadership in professional service firms. Challenges of building a high performance team of professionals.

UNIT IV KNOWLEDGE MANAGEMENT 9

Introduction to intellectual property rights (IPR). Processes involved in IPR. Introduction to patents and patent laws. Procedure for obtaining a patent licensing and assignment of patent. Infringement of Patents. Concept of Copyright. Assignment/ registration of Copyright. Copyright Infringement and Remedies. Concept of Industrial Designs. Registration of Designs. Piracy of registered designs and remedies.

UNIT V REFLECTIVE PRACTICE 9

Reflective practice as approach to enable professionals use their knowledge explicitly in practical situations, combine action and learning effectively, give flexibility and openness to innovate and evolve. Concept of Reflective Practice. Approaches to address problems. Theory in Use and Espoused Theory. Reflective practice as thinking in action. Ways of generating knowledge to solve issues and problems- Experimentation, Speculation, Imagination, Scientific Method, Statistical Analysis, cycle SECI, Modelling, Mental models and virtual worlds. Framing (tacit framing, Analysing and understanding assumptions and values, reframing, paradigm shifts), Conceptual innovation, Design. New democratic, collaborative and innovative approaches to reflective practice. Social enterprises and entrepreneurship.

Literature case studies and first hand studies of practices in different creative disciplines, including architecture, in the above topics.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Knowledge about how to run and maximise the potential of professional services firm.

CO2 Knowledge about how to protect ideas.

CO3 Understanding of how to run a reflective practice

TEXTBOOKS

1. Ceasar McDowell, Claudia Canepa, and Sebastiao Ferriera, ‘Reflective Practice: An Approach for Expanding Your Learning Frontiers’. MIT Course No. 11.965,As Taught in January IAP 2007, Massachusetts Institute of Technology: MIT OpenCourseWare, https://ocw.mit.edu. License: Creative Commons BY-NC-SA.
2. David H. Maister, ‘Managing the Professional Service Firm’, Free Press, 1997.
3. Donald A. Schon, ‘The Reflective Practitioner: How Professionals Think In Action’, Basic Books, 1984.
4. Reddy T.S. and Murthy, ‘Financial Accounting’, Margham Publications, Chennai, 2012

REFERENCES

1. Jagat Trivedi, 'IIM: Insights Into Managing: A Must Read for Leaders, Managers, Aspiring Managers, Students, and Entrepreneurs', Outskirts Press, 2013.
2. Familiarity with the basics of what a professional services firm is.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	3	-	-	-	-	-	-	2
2	-	-	-	-	-	-	-	-	3	1	-	2
3	-	-	-	-	-	-	-	-		3	-	2
4	-	-	-	-	-	-	-	-		2	-	3
Avg.	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**2**	**-**	**2**

'1' = Low; '2' = Medium; '3' = High

AR3029 GREEN BUILDING L T P/S C
3 0 0 3

OBJECTIVES

- To give introduction to the concept of green building.
- To give exposure to the different systems and organisations associated with green building concept.
- To give knowledge about the various areas/ realms of architecture in which green building concepts can be applied.

UNIT I INTRODUCTION TO CONCEPT OF GREEN BUILDING 9

Evolution and definition of the term Green Building. Benefits of green building. History and role of different organisations. World Green Building Council, LEED, BREEAM, GREENSTAR, ECBC, GRIHA, IGBC, etc., Different methods and systems to rate a building. Criteria in different systems. Salient points common to all systems.Typology wise parameters for green building. Sustainable Development Goals.

UNIT II SITE AND RESOURCES 9

Green building and site selection. Working with the site and optimal utilisation of resources. available. Soil, ecology, landscape, water, circulation, microclimate, lighting, air quality, noise. Site planning principles. Accessibility for differently abled. Recycling and reuse of materials. Rain water management. Waste management. Health and well being. Case studies.

UNIT III ARCHITECTURAL MORPHOLOGY 9

Building footprint, shape, size and proportion to optimise comfort and energy consumption. Building components such as openings, courtyards, skylights, shading devices, fenestration, etc., Designing for lighting, ventilation and rain within the local climatic context.Case studies.

UNIT IV ENERGY AND MATERIALS 9

Embodied energy of materials. Thermal performance of materials. Optimising energy performance. Reducing energy demand. Life Cycle Cost. Building system management. Finishes and fenestration. Recycling and reuse of materials. Air quality in buildings. Non Toxic materials. Renewable energy for buildings. Case studies.

UNIT V ZERO CARBON BUILDING **9**

Different techniques and methods for zero carbon building. Case studies.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Recall green building concepts and various rating systems.
CO2 Identify sites and resources for sustainable building performance.
CO3 Analyse buildings and their components for sustainable architectural design.
CO4 Examine buildings for their life cycle performance.
CO5 List techniques for design of zero carbon buildings.

TEXTBOOKS

1. GRIHA Manuals
2. Francis D.K.Ching, Green Building Illustrated, Wiley 2014
3. Michael Bauer, Peter Mösle, Michael Schwarz, Green Building, Guidebook for Sustainable Architecture, Springer 2010

REFERENCE

1. Bill Maclay, The New Net Zero, Chelsea Green Publishing Co 2014

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	1	-	-	-	-	-	3	1	-	-	-
2	3	1	-	-	-	-	-	3	1	-	-	-
3	3	3	-	-	-	-	-	2	3	-	-	-
4	3	2	-	-	-	-	-	2	3	-	-	-
5	3	1	-	-	-	-	-	2	1	-	-	-
Avg.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3030 ADVANCED STRUCTURES **L T P/S C**
3 0 0 3

OBJECTIVES

- To give an understanding of the loss of pre- stress and design requirements for determinate pre-stressed concrete beams.
- To provide familiarity with the concept of industrial structures and high rise structures.
- To enable the study of concepts of tensile structures, domes, shells and folded plate

UNIT I PRESTRESSED CONCRETE **10**

Losses of Prestress. Design requirements. Design of determinate beams.

UNIT II INDUSTRIAL STRUCTURES **8**

Classification, planning and layout requirements, functional requirements. Types of industrial structures- power plants, bunkers and silos, cooling towers, containment structures, chimneys. Merits. Case studies.

UNIT III HIGH–RISE BUILDINGS **7**

Introduction. Load action in high rise buildings. Various structural systems. Waffle slab. Approximate analysis of frames for gravity and horizontal loadings. Case studies.

UNIT IV TENSILE STRUCTURES 10

Concept, development, laws of formation, merits and demerits of pneumatic structures. Basic principles, forms, merits and demerits of cable structures. Case studies.

UNIT V SHELLS, DOMES AND FOLDED PLATES 10

Shells of translation. Shells of revolution. Classification of shells and different forms. Domes. Types of folded plates. Space frames. Case studies.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 An understanding of concepts and applications of pre-stressed concrete.
CO2 An understanding of concepts and application of industrial structures and sky scrapers.
CO3 Familiarity with the theory and applications of tensile structures, grids, domes, shells and folded plates.

TEXTBOOKS

1. B.C. Punmia, 'Reinforced Concrete Structures, Vol. 1 & 2', Laxmi Publications, New Delhi, 1994.
2. N. Subramanian, 'Principles of Space Structures', Wheeler, 1998.
3. Thandavamoorthy T.S, 'Advanced Structures of Architecture', Eswar Press, 2008.
4. Council on Tall Buildings and Urban Habitat, 'Structural System for Tall Buildings', McGraw Hill, 1995.
5. Milo.S.Ketchum and Mark.A. Ketchum, 'Types and Forms of Shell Structures, 1997.

REFERENCES

1. P. Dayaratnam, P.Sarah, 'Prestressed Concrete Structures', Medtech, 2017.
2. Wolfgang Schueller, 'High Rise Building Structures', John Wiley & Sons,1976.
3. Frei Otto, 'Tensile Structures Volume 1 & 2' The MIT Press, 1973.
4. Bryan Stafford Smith, Alex Coull, 'Tall Building Structures - Analysis & Design', John Wiley, 1991.
5. Thomas Herzog, 'Pneumatic Structures', Crosby Lockwood Staples, London, 1977.
6. Bandyopadhyay J.N, 'Thin Shell Structures: Classical and Modern Analysis', New Age International, 2007.
7. Ramaswamy G.S, 'Design and Construction of Concrete Shell Roofs', CBS, 2005.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	2	3	-	-	-	-	-	1
2	-	-	-	-	2	3	-	-	-	-	-	1
3	-	-	-	-	2	3	-	-	-	-	-	1
Avg.	**-**	**-**	**-**	**-**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**1**

'1' = Low; '2' = Medium; '3' = High

AR3031 ARTIFICIAL INTELLIGENCE IN DESIGN PROCESS LT P/S C
3 0 0 3

OBJECTIVES

- To give knowledge and understanding about the discipline of Artificial Intelligence as a totality and its potential in Architectural Design.
- To give understanding about the relationship between architecture and computing within methodological design process.

UNIT I INTRODUCTION TO AI

Introduction to Artificial Intelligence; Introduction to Internet of Things (IoT), Big Data, Machine Learning (MI), Block Chain, Etc.,

UNIT II CYBERNETICS & MACHINES

Definition of Cybernetics; Cybernetic architecture; Cyberspace; Virtual-Reality; The Architectural Relevance of Cybernetics;

UNIT III DESIGN INTELLIGENCE SYSTEM

Algorithm in Architecture; Data driven/informed process; Multi-Agent Design System; Automation in Design; Swarm Intelligence, Neural Networks, Morphogenetic, Self-Organising, Behavioural; Evolutionary and cognitive aspects;

UNIT IV CONSTRUCTION INTELLIGENCE SYSTEM

Robotic construction, 4d Printer, Real-time Fabrication, Virtual/Augmented Reality, Flying Robots; Human-free construction process;

UNIT V STUDENT SEMINAR

Application of AI in Architectural Projects/by Architects: Zaha Hadid Architects (ZHA), Foster + Partners, Buro Happold, Arup Group, Matias Del Campo, Sidewalk Labs/Delve, Regen Villages, Phil Bernstein, Etc.,.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Knowledge about artificial intelligence as a domain.
CO2 Familiarity with artificial intelligence in architectural design process.
CO3 Exposure to various intelligence design processes and new trans-disciplinary design methodologies.

TEXTBOOKS:

1. Architecture in the Age of Artificial Intelligence: An Introduction to AI for Architects, Neil Leach, Bloomsbury Visual Arts.
2. The Routledge Companion to Artificial Intelligence in Architecture, Imdat As, Prithwish Basu, Routledge;
3. Artificial Intelligence and Architecture, From Research to Practice, Stanislas Chaillou, Birkhäuser.

REFERENCES

1. Johnston, John, 'Cybernetics and the New Complexity of Machines', pp.27-62 in The Allure of the Machinic Life: Cybernetics, Artificial Life, and the New A.I, The MIT Press, 2008.
2. Nicholas Negroponte, 'Soft Architecture Machines', MIT Press 1975. Pp.6-49.
3. Michael Speaks, 'Design Intelligence', in Latent Utopias: Experiments within Contemporary Architecture (Graz, 2002), pp.73-76.
4. Frazer J.H., 'The Cybernetics of Architecture: A Tribute to the Contribution of Gordon Pask', Kybernetes, Vol.20, No.5/6 2001, pp 641-651.
5. Frazer J.H., 'The Architectural Relevance of Cybernetics', Systems Research, Vol 10, No.3, 1993, pp.43-48.
6. Johnston, John, 'The New AI: Behaviour-based Robotics, Autonomous Agents, and Artificial Evolution, pp.27-64 in The Allure of the Machinic Life: Cybernetics, Artificial Life, and the New A.I., The MIT Press, 2008.
7. Andrew Pickering, 'Grey Walter' in the Cybernetic Brain: Sketches in Another Future, The University of Chicago Press, 2010.
8. McCarthy, John., Minsky, L, Marvin., Rochester, Nathaniel., Shannon, E, Claude., A proposal for the dartmouth summer research project on artificial intelligence, august 31,1955., AI magazine, 27,(2006), 4, pp. 12-13.
9. Carta, Silvio., Big data, code and the discrete city: shaping public realms, Routledge, London, UK, 2019.

10. Bini, Stefano, A., Artificial intelligence, machine learning, deep learning, and cognitive computing: what do these terms mean and how will they impact health care?, The Journal of arthroplasty, 33, (2018), 8, pp. 2358-2361.
11. Silver, David., Schrittwieser, Julian., Simonyan, Karen., Antonoglou, Ioannis., Huang, Aja.,Guez, Arthur., Hubert, Thomas., et al. Mastering the game of go without human knowledge, Nature, 550, (2017), 7676, pp. 354-359.
12. Cellan-Jones, Rory, Stephen Hawking warns artificial intelligence could end mankind /03.03.2020 / BBC, https://www.bbc.com/news/technology-30290540.
13. Morel, Philippe., The Origins of Discretism: Thinking Unthinkable Architecture, Architectural Design, 89, (2019), 2, pp.14-21.
14. Cudzik, Jan., Radziszewski, Kacper., Artificial Intelligence Aided Architectural Design, Computing for a better tomorrow, proceedings of eCAADe Education and Research in Computer Aided Architectural Design in Europe conference, eCAADe 2018, Lodz, Poland,2018, pp. 77-84
15. Holmes, Aaron, AI could be the key to ending discrimination in hiring, but experts warn itcan be just as biased as humans / 03.03.2020 / Business insider, https:// www.businessinsider.com/ai-hiring-tools-biased-as-humans-experts-warn-2019-10?IR=T
16. Gallo, Giuseppe., Wirz, Fulvio., Tuzzolino, G, Francesco., Architects as tool consumers: discovering trends in software and programming languages for architecture with google trends, Archtheo 19, proceedings of Dakam Archtheo conference, Archtheo 19, Istanbul,Turkey, 2019, pp. 197-206.
17. Davis, Daniel., Evaluating Buildings with Computation and Machine Learning, Posthuman frontiers: data, designers and cognitive machines, proceedings of ACADIA Association for Computer Aided Design in Architecture conference, ACADIA 2016, AnnArbor, USA, 2016, pp. 116-123.
18. Bonabeau, E., DORIGO, M and THERAULAZ, G 1999,Swarm Intelligence: From Natural to Artificial Sys-tems., Oxford University Press, New York;

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	2	2	-	-	-	1	-	-	2	-	-	-
2	2	2	-	-	-	1	-	-	2	-	-	-
3	2	2	-	-	-	1	-	-	2	-	-	-
Avg.	**2**	**2**	**-**	**-**	**-**	**1**	**-**	**-**	**2**	**-**	**-**	**-**

'1' = Low; '2' = Medium; '3' = High

AR3032 **SMART CITIES** **LT P/S C**
3 0 0 3

OBJECTIVES

- To give exposure to the concept of smart cities.
- To give familiarity to different realms in which smart cities concepts operate in practice.
- To give knowledge about case studies relating to smart cities.

UNIT I INTRODUCTION TO SMART CITIES

Origin of the term smart cities. Different interpretations of smart cities. Evolution of the term till today. Overview of smart cities as integrating physical planning effectively with other parameters - economy, infrastructure of various types, energy, climate change, urban governance, social aspects, mobility, quality of life, etc., ICT, GIS and remote sensing as tools to enable smart cities.

UNIT II URBAN PHYSICAL INFRASTRUCTURE AND SMART CITIES

Different types of urban infrastructure – sewage, water, electricity and lighting, mobility of people and goods, parking. Case studies for each as well as for integrated approach.

UNIT III ECONOMIC, SOCIAL AND CULTURAL ASPECTS AND SMART CITIES

Smart city concepts and city economy. Urban governance and smart city. Smart city concepts in slum area development. Historic core regeneration/ preservation and smart city. Case studies for each.

UNIT IV ECOLOGY, ENERGY AND SMART CITY

Geography of the city. Ecological aspects. Climate change. Flooding patterns. Energy and Sustainability in cities. Incorporating smart concepts to enhance and mitigate positive and negative effects with respect to these areas. Case studies.

UNIT V SMART CITIES MISSION INDIA

Smart cities in the context of India. Urban projects in India- JNNURM, Smart city mission. Detailed case studies with focus on technology as enabling mechanism.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Familiarity with the concepts of smart cities.
CO2 Knowledge about different domains/ areas in which smart cities can be realised.
CO3 Exposure to smart city practices.

TEXTBOOKS

1. Rajeswari Ray, GIS for Smart Cities, Ane Books 2017
2. Binti Singh and Manoj Parmar, Smart City in India, Routledge 2020
3. Mike Barlow and Cornelia Levy-Bencheton, Smart Cities Smart Future, Wiley 2019
4. Charanjit Singh Shah, Redefining Indian Smart and Sustainable Cities, I K International Publishing House 2017
5. Antoine Picon, Smart Cities: A Spatialised Intelligence, Wiley 2015

REFERENCES

1. Mohammad S. Obaidat and Petros Nicopolitidis, Smart Cities and Homes, Morgan Kaufmann 2016.
2. Poonam Sharma, Swati Rajput, Sustainable Smart Cities in India, Springer 2019
3. Ricardo Armentano,Parag Chatterjee et al, The Internet of Things, CRC Press, Taylor and Francis 2018

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	1	-	-	-	3	-	-	2	3
2	-	-	-	2	-	-	-	3	-	-	2	3
3	-	-	-	1	-	-	-	3	-	-	2	3
Avg.	-	-	-	**2**	-	-	-	**3**	-	-	**2**	**3**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High

AR3033 HUMAN SETTLEMENTS PLANNING L T P/S C
3 0 0 3

OBJECTIVES

- To introduce the vocabulary, elements and classification of human settlements.
- To give exposure to planning concepts at different scales of settlements.
- To give an understanding of planning addressing current issues.

UNIT I INTRODUCTION TO HUMAN SETTLEMENTS 9

Introduction to planning as a discipline and brief evolution of the profession. Elements of human settlements. Human beings and settlements. Nature, shells and net works- their functions and linkages. Anatomy and classification of human settlements- locational, resource based, population size and occupational structure.

UNIT II FORMS OF HUMAN SETTLEMENTS 9

Structure and form of settlements - linear, non- linear and circular, combinations. Reasons for development. Advantages and disadvantages. Case studies. Factors influencing the growth and decay of human settlements.

UNIT III RURAL AND REGIONAL DEVELOPMENT IN INDIA 9

Rural development plans, programmes and policies from case studies. Regional Plan. Area delineation, land utilisation plan, hierarchical system of settlements, their sizes and functions.

UNIT IV URBAN PLANNING AND URBAN RENEWAL 9

Introduction to urban planning in India. Scope, content and limitations of master plan. Structure plan, DDP/ZDP, planned unit development. Development control rules. Urban renewal, redevelopment, rehabilitation and conservation. Urban development projects – case studies.

UNIT V ASPECTS IN CONTEMPORARY URBAN PLANNING IN INDIA 9

Globalisation and its impact on cities. Sustainable planning concepts. New forms of developments, to include self sustained communities, SEZ, transit oriented development (TOD), integrated townships, smart cities. Case studies.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Ability to understand morphology of settlements and their generating forces and characteristics.

CO2 An understanding of the role of planning processes in making positive changes to settlements.

CO3 Awareness of planning interventions with respect to the current world.

TEXTBOOKS

1. C.L. Doxiadis, Ekistics, 'An Introduction to the Science of Human Settlements', Hutchinson, London, 1968.
2. Thooyavan K R, 'Human Settlements- A Planning guide to Beginners', M.A. Publications, 2005.
3. Ministry of Urban affairs and Employment, Government of India, New Delhi, ‘UrbanDevelopment Plans: Formulation and Implementation-Guidelines’, 1996.
4. Andrew D Thomas, ‘Housing and Urban Renewal', Harper Collins, 1986.

REFERENCES

1. S. B. Golahit, 'Rural Development Programmes In India', Neha Publishers and Distributors, 2010.
2. 'CMDA Second Master Plan for Chennai Metropolitan Area 2026: Vision, Strategies and Action Plans (Vol.I, II and III)', Chennai, India, 2008.
3. V. Nath, 'Regional Development And Planning In India', Concept Publishing Company, 2011.
4. Government of India, 'Report of the National Commission on Urbanisation', 1988.
5. Hansen N., 'Regional Policy and Regional Integration', Edward Elgar, UK, 1996.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	3	-	-	-	2	-	-	-	2
2	-	-	-	3	-	-	-	-	-	-	-	3
3	-	-	-	3	-	-	-	2	-	-	-	3
Avg.	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**

'1' = Low; '2' = Medium; '3' = High

AR3034 ARCHITECTURAL JOURNALISM AND PHOTOGRAPHY L T P/S C
2 0 1 3

OBJECTIVES

- To give an overview of the domain of journalism, its various aspects and strategies.
- To give particular exposure to architectural journalism.
- To give knowledge about aspects and techniques of architectural photography.

UNIT I INTRODUCTION TO JOURNALISM 9

Introduction to journalism, key concepts and objectives of journalism. Overview of different types of specialised journalism.Outline of journalism skills: research, reporting, writing, editing, photography, columnists, public relationships, criticism. Introduction to copyright, code of ethics, press laws, Press Council of India.

UNIT II ASPECTS OF JOURNALISM 12

Journalism and public realm. Issues in public realm related to various domains, including architecture. Reading, investigation, interviewing, argument and debate as a techniques in the investigation of problems in different realms of society. Evidence, proof, refutation, persuasion. Training in argumentative speaking. Role of the editor. Editing in the context of different media. Text preparation, mode of presentation, standards and guidelines for documentation.

Introduction to software needed in journalism and photography, video coverage. Understanding the individual demands in the context of newspapers, radio, film, and television. Multimedia/ online journalism and digital developments.

UNIT III ARCHITECTURAL PHOTOGRAPHY AND VIDEOGRAPHY 12

Introduction to architectural photography and role of the photographic image in the global world. Equipment - cameras and lenses. Techniques- film speed, exposure measurement, gray scale, photo- finishing and editing digital images. Perspectives- single point, two- point, three- point and methods of correcting distortions. Lighting - external and interior.

UNIT IV ARCHITECTURAL JOURNALISM 12

Outline to the history of architectural journalism. Types of architectural journals. Works of key architectural journalists. Issues and themes related to contemporary architectural journalism at local, national and global levels. Public discourse on the internet. Mass media and public opinion. Analysing selected pieces of journalism. Individual architectural journalism exercises on a particular theme.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to be able to

CO1 Exposure to the domain of journalism and architectural journalism in particular.
CO2 Skills with respect to architectural photography.
CO3 Knowledge about important themes and works of architectural journalism.
CO4 Ability to critically think, analyse and write about architecture.

TEXTBOOKS

1. Edward Jay Friedlander and John Lee, 'Feature Writing for Newspapers and Magazines', 4th edition, Longman, 2000.
2. David Fuller & Patricia Waugh, eds., 'The Arts and Sciences of Criticism', Oxford: Oxford University Press, 1999.
3. James Foust, 'Online Journalism Principles and Practices of News for the Web', Holcomb Hathaway Publishers, Scottsdale, AZ, 2005.
4. M. Harris, 'Professional Architectural Photography', Focal Press, 2001.
5. M. Harris, 'Professional Interior Photography', Focal Press, 2002

REFERENCES

1. Martin Huckerby, 'The Net for Journalists: A Practical Guide to the Internet for Journalists in Developing Countries'. UNESCO/Thomson Foundation/ Common wealth Broadcasting Association, 2005.
2. S. J. A.Ward, 'Philosophical Foundations of Global Journalism Ethics', Journal of Mass Media Ethics, Vol. 20, No. 1, 3-21, 2005.
3. M. Heinrich, 'Basics Architectural Photography', Bikhauser Verlag AG, 2008.
4. Gerry Kopelow, 'Architectural Photography: The Professional Way', Princeton Architectural Press, 2007.

CO-PO Mapping

CO	PO											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	2	2	3	-	-	-	-	3	2	3
2	1	1	3	2	2	-	-	-	-	2	2	3
3	1	1	3	3	2	-	-	-	-	1	2	3
4	1	1	2	3	3	-	-	-	-	1	3	3
5	1	1	3	3	3	-	-	-	-	3	3	3
Avg.	**1**	**1**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**2**	**3**	**3**

‘1’ = Low; ‘2’ = Medium; ‘3’ = High