

**DEPARTMENT OF ARCHITECTURE  
ANNA UNIVERSITY, CHENNAI**

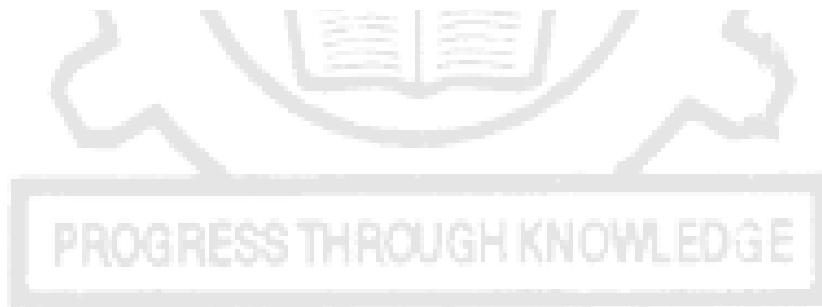
**VISION OF DEPARTMENT OF ARCHITECTURE**

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-actualise as 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 organisations at all scales in order to collectively further the cause of appropriate architecture.



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**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. Further knowledge as well as contribute to it in 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 demands.
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 life in a building.
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 scales.
9	Skill in Building Analysis and Optimisation of Design	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 change.

**PEO / PO Mapping:**

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

**Mapping of Course Outcome and Programme Outcome**

Year	Semester	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
I	1	Introduction to Architecture	✓	✓	✓	✓									
		Structural Mechanics							✓						
		Mathematics for Architects		✓					✓				✓		
		Geometrical Understanding and Representation		✓					✓						
		Art as Cognition and Expression			✓										
		Foundational Design Studio	✓	✓	✓	✓	✓								
	2	World Architecture and Urbanism: Early Civilisations to Renaissance				✓	✓								
		Structural Systems and their Analysis		✓					✓						
		Introduction to Language and English Skills			✓		✓								
		Building Components and their Representation		✓					✓		✓				
		Diagrammatic Thinking and Representation	✓	✓	✓		✓								
		Basic Space Design Studio	✓	✓	✓	✓	✓	✓			✓				
II	3	Architecture in India: Early Civilisations to Colonialism				✓	✓								
		Environment and Architecture						✓		✓					
		Water Supply and Sanitation in Buildings							✓	✓					
		Non Structural Building Elements and Finishes							✓	✓	✓				
		Digital Drawing, Visualisation and Representation	✓	✓	✓										
		Advanced Space Design Studio	✓	✓	✓	✓	✓	✓		✓	✓				
	4	Regional and Vernacular Built Environments in India				✓					✓				✓
		Structural Design of Masonry and Timber							✓						
		Electricity, Lighting and Acoustics in Buildings							✓	✓	✓				
		Building Construction with Basic Materials							✓		✓				✓
		Site Surveying and Planning	✓						✓	✓	✓				
		Rural Habitat Design Studio	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
III	5	Architecture and Urbanism of Colonialism and Modernity				✓	✓							✓	
		Structural Design of Concrete						✓							
		Specification, Estimation and Budgeting							✓			✓			
		Concrete in Building Construction							✓						
		Professional Elective I	✓	✓				✓	✓			✓			Attested
		Urban Architecture Design Studio	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓

6	Environmental Sciences								✓				
	Structural Design of Steel						✓						
	Advanced Building Services						✓	✓	✓				
	Professional Elective II						✓	✓	✓	✓			
	Steel, Glass and Plastic in Building Construction						✓		✓				
	Environmental Design Studio	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
7	Contemporary Architecture: Theories and Practice				✓	✓							
	Professional Practice of Architecture										✓	✓	✓
	Professional Elective III	✓	✓	✓	✓	✓							
	Open Elective I			✓	✓	✓							✓
	Critical Writing			✓	✓	✓						✓	
	Critical Design Studio	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	Practical Training	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
9	Urban Design		✓	✓	✓	✓			✓				✓
	Landscape and Ecology				✓				✓	✓			
	Professional Service Firm: Management and Excellence				✓	✓	✓				✓	✓	✓
	Professional Elective IV				✓	✓				✓		✓	✓
	Dissertation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Urbanism and Architecture Design Studio	✓	✓	✓	✓	✓			✓		✓	✓	✓
10	Open Elective II				✓	✓							✓
	Thesis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

**Induction Programme** (Please refer AICTE Model Curriculum **Appendix-A** for guidelines. Details of Induction programme also available in the curriculum of Mandatory courses.)

<b>Induction Programme (mandatory)</b>	<b>2 weeks duration</b> (Please refer Appendix- A for guidelines and also details available in the curriculum of Mandatory courses)
Induction programme for students to be offered right at the start of the first year.	<ul style="list-style-type: none"> <li>• Physical activity</li> <li>• Creative Arts</li> <li>• Universal Human Values</li> <li>• Literary</li> <li>• Proficiency Modules</li> <li>• Lectures by Eminent People</li> <li>• Visits to Local Areas</li> <li>• Familiarisation to Dept./ Branch and Innovations</li> </ul>

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**ANNA UNIVERSITY: : CHENNAI  
UNIVERSITY DEPARTMENTS**

**B. ARCH. FULL-TIME PROGRAMME**

**REGULATIONS 2019  
CHOICE BASED CREDIT SYSTEM  
CURRICULA AND SYLLABI FOR I TO X SEMESTER**

**SEMESTER I**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>THEORY</b>								
1.	AR5101	Introduction to Architecture	PCC	3	0	0	3	3
2.	AR5102	Structural Mechanics	ESC	3	0	0	3	3
3.	AR5103	Mathematics for Architects	BSC	3	0	0	3	3
<b>THEORY CUM STUDIO</b>								
4.	AR5111	Geometrical Understanding and Representation	ESC	1	0	4	5	3
5.	AR5112	Art as Cognition and Expression	HSMC	1	0	4	5	3
<b>STUDIO</b>								
6.	AR5121	Foundational Design Studio	PCC	0	0	14	14	7
<b>TOTAL</b>				<b>11</b>	<b>0</b>	<b>22</b>	<b>33</b>	<b>22</b>

**SEMESTER II**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>THEORY</b>								
1.	AR5201	World Architecture and Urbanism: Early Civilisations to Renaissance	HSMC	3	0	0	3	3
2.	AR5202	Structural Systems and their Analysis	ESC	3	0	0	3	3
3.	AR5203	Introduction to Language and English Skills	HSMC	2	1	0	3	3
<b>THEORY CUM STUDIO</b>								
4.	AR5211	Building Components and their Representation	PCC	1	0	4	5	3
5.	AR5212	Diagrammatic Thinking and Representation	PCC	1	0	4	5	3
<b>STUDIO</b>								
6.	AR5221	Basic Space Design Studio	PCC	0	0	14	14	7
<b>TOTAL</b>				<b>10</b>	<b>1</b>	<b>22</b>	<b>33</b>	<b>22</b>

### SEMESTER III

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>THEORY</b>								
1.	AR5301	Architecture in India: Early Civilisations to Colonialism	HSMC	3	0	0	3	3
2.	AR5302	Environment and Architecture	PCC	3	0	0	3	3
3.	AR5303	Water Supply and Sanitation in Buildings	ESC	3	0	0	3	3
		Audit Course I*	AC	3	0	0	3	0
<b>THEORY CUM STUDIO</b>								
4.	AR5311	Non Structural Building Elements and Finishes	PCC	1	0	4	5	3
5.	AR5312	Digital Drawing, Visualisation and Representation	PCC	1	0	4	5	3
<b>STUDIO</b>								
6.	AR5321	Advanced Space Design Studio	PCC	0	0	14	14	7
<b>TOTAL</b>				<b>14</b>	<b>0</b>	<b>22</b>	<b>36</b>	<b>22</b>

\* Audit Course is optional

### SEMESTER IV

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>THEORY</b>								
1.	AR5401	Regional and Vernacular Built Environments in India	HSMC	3	0	0	3	3
2.	AR5402	Structural Design of Masonry and Timber	ESC	3	0	0	3	3
3.	AR5403	Electricity, Lighting and Acoustics in Buildings	BSC	3	0	0	3	3
		Audit Course II*	AC	3	0	0	3	0
<b>THEORY CUM STUDIO</b>								
4.	AR5411	Building Construction with Basic Materials	PCC	1	0	4	5	3
5.	AR5412	Site Surveying and Planning	PCC	1	0	4	5	3
<b>STUDIO</b>								
6.	AR5421	Rural Habitat Design Studio	PCC	0	0	14	14	7
<b>TOTAL</b>				<b>14</b>	<b>0</b>	<b>22</b>	<b>36</b>	<b>22</b>

\* Audit Course is optional

**SEMESTER V**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>THEORY</b>								
1.	AR5501	Architecture and Urbanism of Colonialism and Modernity	HSMC	3	0	0	3	3
2.	AR5502	Structural Design of Concrete	ESC	3	0	0	3	3
3.	AR5503	Specification, Estimation and Budgeting	PCC	3	0	0	3	3
<b>THEORY CUM STUDIO</b>								
4.	AR5511	Concrete in Building Construction	PCC	1	0	4	5	3
5.		Professional Elective I	PEC	1	0	4	5	3
<b>STUDIO</b>								
6.	AR5521	Urban Architecture Design Studio	PCC	0	0	14	14	7
<b>TOTAL</b>				<b>11</b>	<b>0</b>	<b>22</b>	<b>33</b>	<b>22</b>

**SEMESTER VI**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>THEORY</b>								
1.	GE5251	Environmental Sciences	BSC	3	0	0	3	3
2.	AR5601	Structural Design of Steel	ESC	3	0	0	3	3
3.	AR5602	Advanced Building Services	ESC	3	0	0	3	3
4.		Professional Elective II	PEC	3	0	0	3	3
<b>THEORY CUM STUDIO</b>								
5.	AR5611	Steel, Glass and Plastic in Building Construction	PCC	1	0	4	5	3
<b>STUDIO</b>								
6.	AR5621	Environmental Design Studio	PCC	0	0	16	16	8
<b>TOTAL</b>				<b>13</b>	<b>0</b>	<b>20</b>	<b>33</b>	<b>23</b>

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**SEMESTER VII**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>THEORY</b>								
1.	AR5701	Contemporary Architecture: Theories and Practice	HSMC	3	0	0	3	3
2.	AR5702	Professional Practice of Architecture	PCC	3	0	0	3	3
3.		Professional Elective III	PEC	3	0	0	3	3
4.		Open Elective I	OEC	3	0	0	3	3
<b>STUDIO</b>								
5.	AR5721	Critical Writing	HSMC	0	0	6	6	3
6.	AR5722	Critical Design Studio	PCC	0	0	16	16	8
<b>TOTAL</b>				<b>12</b>	<b>0</b>	<b>22</b>	<b>34</b>	<b>23</b>

**SEMESTER VIII**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>STUDIO</b>								
1.	AR5821	Practical Training	EEC	x	x	x	x	12
<b>TOTAL</b>				<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>12</b>

**SEMESTER IX**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>THEORY</b>								
1.	AR5901	Urban Design	HSMC	3	0	0	3	3
2.	AR5902	Landscape and Ecology	BSC	3	0	0	3	3
3.	AR5903	Professional Service Firm: Management and Excellence	EEC	3	0	0	3	3
4.		Professional Elective IV	PEC	3	0	0	3	3
<b>STUDIO</b>								
5.	AR5921	Dissertation	PCC	0	0	6	6	3
6.	AR5922	Urbanism and Architecture Design Studio	PCC	0	0	16	16	8
<b>TOTAL</b>				<b>12</b>	<b>0</b>	<b>22</b>	<b>34</b>	<b>23</b>



**SEMESTER X**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>THEORY</b>								
1.		Open Elective II	OEC	3	0	0	3	3
<b>STUDIO</b>								
2.	AR5091	Thesis	EEC	0	0	32	32	16
<b>TOTAL</b>				<b>3</b>	<b>0</b>	<b>32</b>	<b>35</b>	<b>19</b>

**Total No. of Credits:210**

**HUMANITIES AND SOCIAL SCIENCES INCLUDING MANAGEMENT COURSES (HSMC)**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
1.	AR5112	Art as Cognition and Expression	HSMC	1	0	4	5	3
2.	AR5201	World Architecture and Urbanism: Early Civilisations to Renaissance	HSMC	3	0	0	3	3
3.	AR5203	Introduction to Language and English Skills	HSMC	2	1	0	3	3
4.	AR5301	Architecture in India: Early Civilisations to Colonialism	HSMC	3	0	0	3	3
5.	AR5401	Regional and Vernacular Built Environments in India	HSMC	3	0	0	3	3
6.	AR5501	Architecture and Urbanism of Colonialism and Modernity	HSMC	3	0	0	3	3
7.	AR5701	Contemporary Architecture: Theories and Practice	HSMC	3	0	0	3	3
8.	AR5721	Critical Writing	HSMC	0	0	6	6	3
9.	AR5901	Urban Design	HSMC	3	0	0	3	3

**BASIC SCIENCE COURSES (BSC)**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
1.	AR5103	Mathematics for Architects	BSC	3	0	0	3	3
2.	AR5403	Electricity, Lighting and Acoustics in Buildings	BSC	3	0	0	3	3
3.	GE5251	Environmental Sciences	BSC	3	0	0	3	3
4.	AR5902	Landscape and Ecology	BSC	3	0	0	3	3

### ENGINEERING SCIENCE COURSES (ESC)

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
1.	AR5102	Structural Mechanics	ESC	3	0	0	3	3
2.	AR5111	Geometrical Understanding and Representation	ESC	1	0	4	5	3
3.	AR5202	Structural Systems and their Analysis	ESC	3	0	0	3	3
4.	AR5303	Water Supply and Sanitation in Buildings	ESC	3	0	0	3	3
5.	AR5402	Structural Design of Masonry and Timber	ESC	3	0	0	3	3
6.	AR5502	Structural Design of Concrete	ESC	3	0	0	3	3
7.	AR5601	Structural Design of Steel	ESC	3	0	0	3	3
8.	AR5602	Advanced Building Services	ESC	3	0	0	3	3

### PROFESSIONAL CORE COURSES (PCC)

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
1.	AR5101	Introduction to Architecture	PCC	3	0	0	3	3
2.	AR5121	Foundational Design Studio	PCC	0	0	14	14	7
3.	AR5211	Building Components and their Representation	PCC	1	0	4	5	3
4.	AR5212	Diagrammatic Thinking and Representation	PCC	1	0	4	5	3
5.	AR5221	Basic Space Design Studio	PCC	0	0	14	14	7
6.	AR5302	Environment and Architecture	PCC	3	0	0	3	3
7.	AR5311	Non Structural Building Elements and Finishes	PCC	1	0	4	5	3
8.	AR5312	Digital Drawing, Visualisation and Representation	PCC	1	0	4	5	3
9.	AR5321	Advanced Space Design Studio	PCC	0	0	14	14	7
10	AR5411	Building Construction with Basic Materials	PCC	1	0	4	5	3
11	AR5412	Site Surveying and Planning	PCC	1	0	4	5	3
12	AR5421	Rural Habitat Design Studio	PCC	0	0	14	14	7
13	AR5503	Specification, Estimation and Budgeting	PCC	3	0	0	3	3
14	AR5511	Concrete in Building Construction	PCC	1	0	4	5	3
15	AR5521	Urban Architecture Design Studio	PCC	0	0	14	14	7

16	AR5611	Steel, Glass and Plastic in Building Construction	PCC	1	0	4	5	3
17	AR5621	Environmental Design Studio	PCC	0	0	16	16	8
18	AR5702	Professional Practice of Architecture	PCC	3	0	0	3	3
19	AR5722	Critical Design Studio	PCC	0	0	16	16	8
20	AR5921	Dissertation	PCC	0	0	6	6	3
21	AR5922	Urbanism and Architecture Design Studio	PCC	0	0	16	16	8

**PROFESSIONAL ELECTIVE COURSES (PEC)**

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
<b>ELECTIVE I</b>								
1.	AR5001	Interior Design	PEC	1	0	4	5	3
2.	AR5002	Product Design	PEC	1	0	4	5	3
3.	AR5003	Architectural Design Detailing	PEC	1	0	4	5	3
4.	AR5004	Digital Tools for Building Modelling and Analysis	PEC	1	0	4	5	3
5.	AR5005	Digital Art	PEC	1	0	4	5	3
<b>ELECTIVE II</b>								
1.	AR5006	Sustainable Design	PEC	3	0	0	3	3
2.	AR5007	Disaster Management	PEC	3	0	0	3	3
3.	AR5008	Earthquake Resistant Architecture	PEC	3	0	0	3	3
4.	AR5009	Construction Technology	PEC	3	0	0	3	3
<b>ELECTIVE III</b>								
1.	AR5010	Contemporary Processes in Architectural Design	PEC	3	0	0	3	3
2.	AR5011	Creativity and the Design Process	PEC	3	0	0	3	3
3.	AR5012	Human Behaviour and Built Environment	PEC	3	0	0	3	3
4.	AR5013	Contemporary Housing	PEC	3	0	0	3	3
<b>ELECTIVE IV</b>								
1.	AR5014	Architectural Conservation	PEC	3	0	0	3	3
2.	AR5015	Chennai- Evolution and Architecture	PEC	3	0	0	3	3
3.	AR5016	Human Settlements Planning	PEC	3	0	0	3	3
4.	AR5017	Construction and Project Management	PEC	3	0	0	3	3

  
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## EMPLOYABILITY ENHANCEMENT COURSES (EEC)

SI. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	S		
1.	AR5903	Professional Service Firm: Management and Excellence	EEC	3	0	0	3	3
2.	AR5821	Practical Training	EEC	x	x	x	x	12
3.	AR5091	Thesis	EEC	0	0	32	32	16

## AUDIT COURSES (AC)

Registration for any of these courses is optional to students

SI. No	COURSE CODE	COURSE TITLE	PERIODS PER WEEK			CREDITS	SEMESTER
			Lecture	Tutorial	Practical		
1.	AD5091	Constitution of India	3	0	0	0	3/4
2.	AD5092	Value education	3	0	0	0	
3.	AD5093	Pedagogy Studies	3	0	0	0	
4.	AD5094	Stress Management by Yoga	3	0	0	0	
5.	AD5095	Personality Development through Life Enlightenment	3	0	0	0	
6.	AD5096	Unnat Bharat Abhiyan	3	0	0	0	
7.	AD5097	Essence of Indian Knowledge Tradition	3	0	0	0	
8.	AD5098	Sanga Tamil Literature Appreciation	3	0	0	0	
<b>Total Credits:</b>						0	

## SUMMARY

SI. No	Subject Area	Credits per Semester										Credits Total
		I	II	III	IV	V	VI	VII	VIII	IX	X	
1	HSMC	3	6	3	3	3		6		3		27
2	BSC	3			3		3			3		12
3	ESC	6	3	3	3	3	6					24
4	PCC	10	13	16	13	13	11	11		11		98
5	PEC					3	3	3		3		12
6	OEC							3			3	6
7	EEC									12	3	16
	<b>Total</b>	<b>22</b>	<b>22</b>	<b>22</b>	<b>22</b>	<b>22</b>	<b>23</b>	<b>23</b>	<b>12</b>	<b>23</b>	<b>19</b>	<b>210</b>
8.	Non Credit/ Audit course	Induction Programme		Audit Course I	Audit Course II							0

  
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**B.ARCH REG 2019 CBCS - ANNA UNIVERSITY- UNIVERSITY DEPARTMENTS  
AIMS AND BASIS FOR CURRICULUM STRUCTURE AND SYLLABUS**

- Meta understanding of content studied, reasons of study and how different content studied are connected.
- Vertical streams corresponding to different areas of study.
- Horizontal connections of courses in a semester.
- Vertical progression from the basics such as geometry, nature, art, language, etc., to space, materials, settlements, etc., to contemporary needs of urban architecture to environment and technology to critical thinking to urbanism to thesis.
- Learning outcome is the focus and courses are framed based on cognition, fundamental principles, application oriented or knowledge as provoking thought. Towards this end, some existing courses are reframed. For example, the course Geometrical Understanding and Representation gives cognitive assimilation of knowledge rather than Architectural Drawing I.
- New or reframed courses that improve cognitive and critical skills in spatial and language understanding.
- History is reframed with isolations and connections as per evolution of human society.
- Topics in Materials and Building Construction are integrated with Structural Design in the same semester.
- All the courses have unique title and not in series like History of Architecture I II III, etc., to create a clear idea in the mind about the area of study.
- Architectural Design Studio focus and outcomes are unique for each semester and are clearly articulated in the title. Courses relevant to each Architectural Design Studio are in the same semester, or if they are tool based, they could be in the previous semester.
- The idea behind the focus in each semester is that there are specific streams/approaches/ fields of architecture and design and each of these can be explored explicitly rather than implicitly in order to have a clearer grasp of what is explored.
- Courses in a semester feeding into a particular architectural design studio may not necessarily be useful at all stages of design. However, the intent is not only application of courses to design but also so that the synergy of courses can create a strong cognitive space in the mind of the student.
- Electives are also grouped semester wise so that selection would be among a similar nature of topics aiding the broad area of focus of the semester.
- All these points are attempted for the best possible actualisation in the final curriculum within constraints of structure.
- The intents are explicitly outlined here in order for those involved in teaching/learning to understand the principles and act accordingly, to the best of their abilities within the ideals and frameworks of the curriculum and syllabus.

**VERTICALS**

**History/ Theory/ Critical Thinking** -Courses that give knowledge and trigger thinking in various areas of humanities, social sciences and art such as Architecture in India.

**Tools** –Courses that impart technical and artistic skills that help in the act of designing such as Geometrical Understanding and Representation.

**Making** – Courses that help develop knowledge to build, incorporating theory and application knowledge of materials, construction and structural design such as Structural Design of Concrete.

**Supporting** - Courses that give knowledge of supporting aspects involved in creating a building such as Advanced Building Services.

**Environment and Context** – Courses that help architecture to be looked at with reference to larger and immediate environment such as Environment and Architecture.

**Design** – Courses that encompass the primary core act of architectural design at various scales such as Basic Space Design Studio.

**Profession** – Courses that lay a foundation to the profession such as Practical Training.

**Electives** – A range of courses directly or indirectly related to the discipline of Architecture and from which the requisite courses can be chosen.

## CURRICULUM STRUCTURE

Sem	History/ Theory/ Critical Thinking	Making	Tools and Expression	Environment and Context	Design	Supporting	Profession	Electives
I	Introduction to Architecture	Structural Mechanics	Geometrical Understanding and Representation		Foundational Design Studio			
		Mathematics for Architects	Art as Cognition and Expression					
II	World Architecture and Urbanism: Early Civilisations to Renaissance	Structural Systems and their Analysis	Introduction to Language and English Skills		Basic Space Design Studio			
		Building Components and Their Representation	Diagrammatic Thinking and Representation					
III	Architecture in India: Early Civilisations to Colonialism	Non Structural Building Elements and Finishes	Digital Drawing, Visualisation and Representation	Environment and Architecture	Advanced Space Design Studio	Water Supply and Sanitation in Buildings		
IV	Regional and Vernacular Built Environments in India	Structural Design of Masonry and Timber		Site Surveying and Planning	Rural Habitat Design Studio	Electricity, Lighting and Acoustics in Buildings		
		Building Construction with Basic Materials						
V	Architecture and Urbanism of Colonialism and Modernity	Structural Design of Concrete			Urban Architecture Design Studio			Interior Design
		Specification, Estimation and Budgeting						Product Design
		Concrete in Building Construction						Architectural Design Detailing
		Digital Tools for Building Modelling and Analysis						
								Digital Art

VI		Structural Design of Steel		Environmental Sciences	Environmental Design Studio	Advanced Building Services		Sustainable Design
		Steel, Glass and Plastic in Building Construction						Disaster Management Earthquake Resistant Architecture Construction Technology
VII	Contemporary Architecture: Theories and Practice				Critical Design Studio		Professional Practice of Architecture	Contemporary Processes in Architectural Design Creativity and the Design Process
	Critical Writing							Human Behaviour and Built Environment Contemporary Housing Open Elective I
VIII							Practical Training	
IX	Urban Design			Landscape and Ecology	Urbanism and Architecture Design Studio		Professional Service Firm: Management and Excellence	Architectural Conservation Chennai-Evolution and Architecture Human Settlements Planning
	Dissertation							Construction and Project Management
X					Thesis			Open Elective II

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**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 FORMS GEOMETRIC ELEMENTS 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****OUTCOME**

- An understanding of the nature of design.
- Ability to recognise different facets of architecture.
- 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.
- Kumar Vyas, 'Design and Environment- A Primer', National Institute of Design, 2009.
- 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. Antoniadis, 'Poetics of Architecture: Theory of Design', John Wiley and Sons, 1992.

## REFERENCES

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

**AR5102**

**STRUCTURAL MECHANICS**

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

## OBJECTIVES

- To make students aware of how structural resolutions are important in realisation of architectural design concept.
- To expose students to forces, moments and resolution of forces.
- To make the students understand basic properties of solids and sections which influence their behavior under the effect of various types of forces and 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. Simple problem

### UNIT II SUPPORTS AND REACTIONS 6

Types of supports and loadings. Determination of reactions for simply supported beams. Simple problems.

### UNIT III SECTIONAL PROPERTIES 10

Properties of section – Centroid, Moment of Inertia, Section modulus, Radius of gyration. Theorem of perpendicular axis. Theorem of parallel axis. Simple problems.

### 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. Application to problems.

### UNIT V COMPLEX STRESSES 8

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

**TOTAL: 45 PERIODS**

## OUTCOME

- Ability to apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
- Understanding of basic geometric properties and the behavior of materials under effect of forces.

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## 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

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

**AR5103**

**MATHEMATICS FOR ARCHITECTS**

**LT 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- Moivre'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**

## OUTCOME

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

## REQUIRED READING

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

## REFERENCES

- Bali N., Goyal M. and Watkins C., 'Advanced Engineering Mathematics', Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
- Ramana B.V., 'Higher Engineering Mathematics', Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.

- Greenberg M.D., 'Advanced Engineering Mathematics', Pearson Education, New Delhi, 2nd Edition, 5th Reprint, 2009.
- Gupta S.C and Kapoor V.K., 'Fundamentals of Mathematical Statistics', Sultan Chand and Sons, New Delhi, 9th Edition,1996.

**AR5111**

**GEOMETRICAL UNDERSTANDING AND REPRESENTATION**

**L T P/S C  
1 0 4 3**

**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**

**15**

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 generative models of all the above.

**UNIT II**

**20**

Introduction to concept and principles of projections- orthographic, isometric, axonometric and perspective projections. Viewing the models from Unit I from different angles and sketching them in order to understand the different types of projections. Drawing problems on orthographic, isometric and axonometric projections of lines and planes of different types in different positions. 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.

**UNIT III**

**25**

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 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. Perspective projection of simple solids.

**UNIT IV**

**15**

Understanding sections of solid and true shape of sections through cutting of block models, viewing them from different angles and sketching them. Understanding 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: 75 PERIODS**


**OUTCOME**

- Ability to understand the relationship between geometry and architectural form.
- Understanding of various attributes of geometric forms and skill in their creation and dissection.
- 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

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## REFERENCES

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

AR5112

ART AS COGNITION AND EXPRESSION

L T P/S C

1 0 4 3

## OBJECTIVES

- To understand 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

15

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 RECORDING OF HUMAN EXPERIENCE

25

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: 75 PERIODS

## OUTCOME

- Sensitivity and knowledge of art as basic human endeavour.
- Ability and skill to record experience through art.
- 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.

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## REFERENCES

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

AR5121

FOUNDATIONAL DESIGN STUDIO

L T P/S C

0 0 14 7

## 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: 210 PERIODS**

## OUTCOME

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

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**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 Basic-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**

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

**AR5201 WORLD ARCHITECTURE AND URBANISM: EARLY CIVILISATIONS TO RENAISSANCE L T P/SC  
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 from the decline of Roman empire to Renaissance and have knowledge about the architecture and urbanism during this period.

**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**

### OUTCOME

- An overall understanding of the timelines and early history of civilisations and their contributions across the world.
- Knowledge about the contributions of Greece and Rome to architecture and urbanism.
- Familiarity with the intersecting forces in Europe from Medieval times to Renaissance 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', 2<sup>nd</sup> Ed, Oxford University Press, 1995.
- Leland M Roth, 'Understanding Architecture: Its Elements, History and Meaning', Westview Press, 2013.

### REFERENCES

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

**AR5202**

**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 acting on beams subjected to various loading conditions through exercises.
- To give knowledge about how to determine stresses in beams and strength of sections.
- To give knowledge about how to calculate deflection of beams using different methods and to explain theory and analysis of columns.
- 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 e) portal frames f) 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**

**OUTCOME**

- Understanding of concept of loads.
- Ability to apply the concepts of determining the techniques of finding the stresses.
- Ability to use the theory of simple bending to find the deflection in beams.
- Ability to analyse and solve the different types of columns and analyse the different types of indeterminate beams.

**REQUIRED READING**

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

**REFERENCES**

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

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**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****OUTCOME**

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

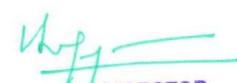
**REQUIRED READING**

- Sharon Hendenreich, 'English for Architects and Civil Engineers', Springer, 2014
- [www.cambridgescholars.com](http://www.cambridgescholars.com)
- [www.robertdwatkins.com/Englishworkbook.pdf](http://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.

**REFERENCES**

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

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**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 BUILDING COMPONENTS AND THEIR NOMENCLATURE 10**

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, paving 3) basic materials for the components.

**UNIT II MEASURED DRAWING AND PROJECTIONS OF SIMPLE COMPONENTS 20**

Introduction to concept of scale and measured drawing through simple 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 SIMPLE HISTORICAL BUILDING 25**

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

**UNIT IV MEASURED DRAWING OF SIMPLE CONTEMPORARY BUILDING 20**

Understanding a simple building (contemporary) in totality through measuring drawing.

**TOTAL: 75 PERIODS****OUTCOME**

- Ability recognise and name components of a building.
- Ability to measure and draw simple components of a building as well as total building
- Ability make isometric and perspective projections of a building.

**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**

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

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**OBJECTIVES**

- To introduce diagrams as representation of reality and thought.
- To enable understanding of the important attributes of a building through diagrams.
- To give knowledge about contemporary advances in the diagramming of architecture.
- To enable diagrammatic thought towards design.

**UNIT I DIAGRAMS AS REPRESENTATION OF REALITY AND THOUGHT 20**

Introduction to diagrams as basic representation of reality and thought. Historical evolution of diagrams with key examples, illustrating how attributes are identified and diagrammed. Ideal diagrams towards projected future.

Diagrammatic representation of key characteristics of real life situations involving objects, environments, nature, urban phenomena, etc., at all scales.

**UNIT II BUILDINGS AS DIAGRAMS 20**

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 CASE STUDIES OF CONTEMPORARY DIAGRAMS 20**

Overview of contemporary approaches to diagramming in architecture. Analysing the works of Tschumi, Koolhaas, Eisenman. Analysing contemporary examples whose key ideas and concepts are manifest as diagrams.

**UNIT IV DIAGRAMS AS PROPOSITIONS TOWARDS FUTURE 15**

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

**TOTAL: 75 PERIODS****OUTCOME**

- An understanding of diagrams as a mode of thought and analysis.
- An ability to discern the important attributes of a building through diagrams.
- Familiarity with contemporary approaches to diagram.
- Ability to project thoughts towards the future through diagrams.

**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.

**REFERENCES**

- Peter Cook, 'Drawing: The Motive Force of Architecture', Wiley, 2014.
- Juhani Pallasmaa, 'The Thinking Hand', John Wiley, 2009.
- Anthony Vidler, 'Diagrams of Diagrams: Architectural Abstraction and Modern Representation', Representations, No. 72. (Autumn, 2000), pp. 1-20.
- 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/>
- Matt Bua, 'Architectural Inventions: Visionary Drawing of Buildings', Laurence King Publishing, 2012.

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**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: 210 PERIODS****OUTCOME**

- Ability to design simple spaces for human use addressing spatial, social, cultural and temporal human needs.
- 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.
- Juhani Pallasmaa, '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**

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

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**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 Aurangzeb. Study of important monuments.

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

**TOTAL:45 PERIODS**

## OUTCOME

- An understanding of the diversity of architecture in India and sensitivity towards its syncretic aspects.
- Ability to appreciate particular cultural, symbolic, spatial and material qualities in architecture and cities as givers of meaning and continuity.
- Ability to appreciate universal qualities of architecture and their effects.

## REQUIRED READING

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

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- George Michell, 'The Hindu Temple', University of Chicago Press, 1988.
- Stella Kramrisch, 'The Hindu Temple', MotilalBanarsidass, Vol I 2002, Vol II 1996.
- Satish Grover, 'Buddhist and Hindu Architecture in India', CBS, 2008.
- Satish Grover, 'Islamic Architecture in India', CBS, 2012.
- Catherine Asher, 'Architecture of Mughal India', Cambridge University Press, 2001.
- Ananda K. Coomaraswamy, 'The Dance of Siva: Essays on Indian Art and Culture', Rupa Publications, 2013.
- A.L. Basham, 'The Wonder that was India', Picador, 2004.

AR5302

ENVIRONMENT AND ARCHITECTURE

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.

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**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 calculation/ 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/ simulation through software.

**UNIT IV 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**

**OUTCOME**

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

**REQUIRED READING**

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

**REFERENCES**

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

PROGRESS THROUGH KNOWLEDGE

**AR5303**

**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.

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**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**

**OUTCOME**

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

**REQUIRED READING**

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

**REFERENCES**

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

**AR5311 NON STRUCTURAL BUILDING ELEMENTS AND FINISHES L T P/S C  
1 0 4 3**

**OBJECTIVES**

- To give knowledge about building finishes.
- To introduce the different types of doors, windows, ventilators, etc., in a building and to enable an understanding of their making, fixing and operating mechanisms in different materials- timber, steel, aluminium, PVC/UPVC.
- To give familiarity about building interior components.



**UNIT I BUILDING FINISHES AND NON STRUCTURAL BUILDING ELEMENTS 15**

Introduction to building finishes. Different types of paints, their composition, characteristics and uses. Types to include enamels, distemper, plastic emulsion, polyurethane, special paints such as fire retardant, luminous and bituminous paints. Preparation of surface and application for different paints/ finishes. Gypsum and POP finishes. Adhesives and sealants. Basic waterproofing of buildings. Understanding of product literature. Understanding construction techniques through site visits/ case studies.

Introduction to non structural building elements such as doors, windows and ventilators. Their types according to material (timber, industrial timber, steel, aluminium, concrete), swing (single, double, degree of swing), mechanisms of operation (fixed, openable, sliding, folding, sliding and folding, pivoted, revolving, top hung, bottom hung, louvered), nature (french, corner, bay). Understanding through sketches/product literature/ case studies.

**UNIT II TIMBERDOORS, WINDOWS AND VENTILATORS 25**

Outline of timber as a material for doors, windows and ventilators (including industrial timber such as plywood, blockboard, particle board, etc.,). 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. Drawings/models of the principles. Understanding of detailed drawings/ published work. Site visits with documentation in the form of sketches/ drawings/ photos.

**UNIT III STEEL, ALUMINIUM AND PVC/ UPVC DOORS, WINDOWS AND VENTILATORS 25**

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.

**UNIT IV INTERIOR ELEMENTS 10**

Introduction to building interior elements such as partitions, flooring, false ceiling, panelling, handrails, etc., and their different types. Materials for them- timber, industrial timber, gypsum, steel, aluminium, PVC/UPVC, glass, etc.,. 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.

**TOTAL: 75 PERIODS****OUTCOME**

- Knowledge about building finishes.
- Ability to design and detail appropriate doors, windows, ventilators, etc., for a building.
- Familiarity with building interior elements and systems.

**REQUIRED READING**

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

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- American Institute of Timber Construction (AITC), 'Timber Construction Manual', Wiley Publishers, 2004.
- Francis D.K Ching, 'Building Construction Illustrated', John Willey and Sons, 2014.

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- Barry, 'Construction of Buildings, Volume 1 and 2', Blackwell Publishing Ltd., Oxford, 2005.
- S.P Arora and S.P Bindra, 'A Text Book of Building Construction', Dhanpat Rai Publishing Company Pvt. Ltd, 2010.

**AR5312      DIGITAL DRAWING, VISUALISATION AND REPRESENTATION      L T P/S C**  
**1 0 4 3**

**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      10**

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      25**

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      20**

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      20**

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: 75 PERIODS**

**OUTCOME**

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

**REQUIRED READING**

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

*Attested*

*[Signature]*  
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## REFERENCES

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

AR5321

ADVANCED SPACE DESIGN STUDIO

L T P/S C  
0 0 14 7

## 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: 210 PERIODS**

## OUTCOME

- Ability to perceive, understand and represent fundamental attributes of form-space with respect to human experience and use.
- Ability to ideate, innovate and create meaningful built environment in basic human situations.

## REQUIRED READING

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

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## REFERENCES

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

**AR5401 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 OF KASHMIR 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**

## OUTCOME

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

## REQUIRED READING

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

## REFERENCES

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

**AR5402                      STRUCTURAL DESIGN OF MASONRY AND TIMBER                      L T P/S C**  
**3 0 0 3**

## OBJECTIVES

- To introduce soil mechanics.
- To enable the learning of design of masonry walls.
- To give knowledge to design different timber components in a building.

<b>UNIT I      SOIL MECHANICS</b>	<b>6</b>
Introduction to Soil Mechanics. Concept of Safe bearing capacity. Types of soil. Distribution of upward pressure in different types of soil.	
<b>UNIT II      BASIC MASONRY DESIGN</b>	<b>9</b>
Analysis and design of masonry wall with and without openings. Use of nomograms. Code requirements.	
<b>UNIT III      DESIGN OF TIMBER BEAMS</b>	<b>9</b>
Grading of timber. Permissible stresses. Design of solid timber beams. Madras terrace roof design.	
<b>UNIT IV      DESIGN OF TIMBER COLUMNS</b>	<b>9</b>
Design of solid timber columns. Built-up Column. Spaced Column.	
<b>UNIT V      ANALYSIS AND DESIGN OF TIMBER TRUSSES</b>	<b>12</b>
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**

## OUTCOME

- Knowledge about soil mechanics.
- Ability to design structural masonry walls.
- Ability to design timber beams, columns and trusses by applying the code provisions.

## REQUIRED READING

- P. Dayaratnam, 'Brick and Reinforced Brick Structures', CBS Publishers and Distributors Pvt Ltd, 2017.
- A.S.Arya, 'Structural Design in Steel, Masonry and Timber', Nemchand and Bros, Roorkee, 1971.
- B. C. Punmia, Ashok Kumar Jain , Arun Kumar Jain , 'Comprehensive Design of Steel Structures', Laxmi Publications (P) Ltd, 2014.

- B. C. Punmia, Ashok Kumar Jain , Arun Kumar Jain , 'Soil Mechanics and Foundations', Laxmi Publications, 2017
- R.K. Bansal, 'A Text Book on Strength of Materials', Laxmi Publications, New Delhi, 2009.

## REFERENCES

- National Building Code of India, Part VI, Structural Design, 1983.
- IS 883 – Code of Practice for Design of Structural Timber in Buildings.
- IS 1905- Code of Practice for Structural use of Unreinforced Masonry-1987.
- Sp 10- Nomograms for Thickness of Masonry Walls - 1975

**AR5403 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 III 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**

## OUTCOME

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

## REQUIRED READING

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

## REFERENCES

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

<b>AR5411</b>	<b>BUILDING CONSTRUCTION WITH BASIC MATERIALS</b>	<b>L T P/S C</b>
		<b>1 0 4 3</b>

## OBJECTIVES

- To give introduction to the basic materials such as lime, mud, stone, brick, bamboo, thatch, straw and timber.
- To give knowledge about construction using basic materials in simple situations.
- To facilitate in the design of buildings using a combination of the basic materials.

### **UNIT I LIME, MUD AND STONE FOR STRUCTURAL USE AND FINISHES 15**

Lime as basic binding material/mortar. Extracting, slaking, hardening, storage, precautions in handling. Lime putty.

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.

### **UNIT II BRICK AND CLAY PRODUCTS FOR STRUCTURAL USE AND FINISHES 20**

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.

### **UNIT III BAMBOO, STRAW, THATCH AND TIMBER FOR STRUCTURAL USE AND FINISHES**

**25**

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.

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

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). Timber partitions, panelling and false ceiling.

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

### **UNIT IV DESIGN WITH BASIC MATERIALS**

**15**

Design of a small and simple structure for a specific purpose using basic building materials in appropriate and innovative combinations and design. Design to be submitted in the form of sketches/drawings/detailing/model.

**TOTAL: 75 PERIODS**

### **OUTCOME**

- Familiarity with the properties and uses of basic building materials.
- Knowledge about the construction details of the basic building materials.
- Ability to design buildings using a combination of basic materials.

### **REQUIRED READING**

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

### **REFERENCES**

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



**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****20**

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****20**

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.

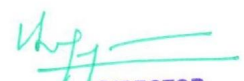
Understanding the above through real projects/ case studies.

**UNIT IV EXERCISE IN SITE SURVEYING AND PLANNING****20**

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: 75 PERIODS****OUTCOME**

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

*Attested*


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## REQUIRED READING

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

## REFERENCES

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

AR5421

RURAL HABITAT DESIGN STUDIO

L T P/S C  
0 0 14 7

## 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: 210 PERIODS**

## OUTCOME

- Ability to collect, assimilate and integrate knowledge in a holistic manner.
- Sensitivity towards the nature and values of unconscious and collective design as well as the interconnectedness of human society and environment.
- Ability to observe and analyse changes in the above.

- Ability to project future transformations and give possible/ appropriate ways to address issues, if any.
- Sensitivity in design approach in community oriented projects with respect to context, collective values and needs.

### REQUIRED READING

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

### REFERENCES

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

<b>AR5501</b>	<b>ARCHITECTURE AND URBANISM OF COLONIALISM AND MODERNITY</b>	<b>L T P/S C</b> <b>3 0 0 3</b>
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### 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, MODERNITY AND 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 20<sup>th</sup> 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 Doshi.

**TOTAL: 45 PERIODS**

**OUTCOME**

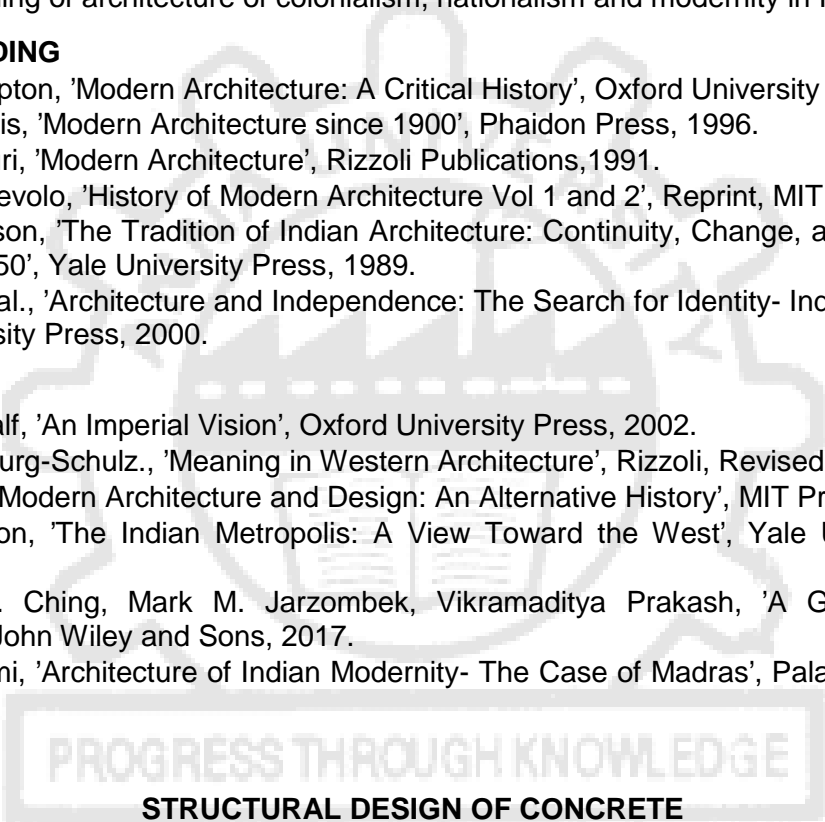
- An understanding of modernity as a fundamental transformation in Western society that spread across the world and the resultant architectural production.
- An insight into the development of various strands of modernism and modern architecture.
- An understanding of architecture of colonialism, nationalism and modernity in India.

**REQUIRED READING**

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

**REFERENCES**

- Thomas Metcalf, 'An Imperial Vision', Oxford University Press, 2002.
- Christian Norburg-Schulz., 'Meaning in Western Architecture', Rizzoli, Revised Edition, 1993.
- Bill Risebero, 'Modern Architecture and Design: An Alternative History', MIT Press, 1985.
- Norma Evenson, 'The Indian Metropolis: A View Toward the West', Yale University Press, 1989.
- Francis D. K. Ching, Mark M. Jarzombek, Vikramaditya Prakash, 'A Global History of Architecture', John Wiley and Sons, 2017.
- K.R.Sitalakshmi, 'Architecture of Indian Modernity- The Case of Madras', Palaniappa Brothers, 2015.



**AR5502**

**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, slabs, staircase, column, foundations under different conditions using limit state method of design.

**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**

Types of foundation. Design of Wall footing. Design of loaded rectangular and sloped footing. Design of combined rectangular footings. Types of Retaining wall. Design of cantilever retaining wall.

**TOTAL: 45 PERIODS****OUTCOME**

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

**REQUIRED READING**

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

**REFERENCES**

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

**AR5503****SPECIFICATION, ESTIMATION AND BUDGETING**

L	T	P/S	C
3	0	0	3

**OBJECTIVES**

- To facilitate choosing materials for building based on building performance, economy, etc., and give knowledge about calculating quantities, estimating costs.
- To enable understanding with respect to quality and quantity of materials, quantity and classes of skilled and unskilled labours, and tools and plants required for projects.
- To give an understanding of how to draw up specifications for the different items of a building project and also to prepare the schedule of programming of the project.
- To give knowledge on how to prepare approximate as well as detailed estimates and to have a clear picture of the project expenditure.
- To help calculate the exact quantities of items of work done for effecting payment especially when direct measurements are difficult and also to determine the quantities of different materials required for various items of work.
- To give understanding of how to prepare valuation report of real and landed 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 for 1<sup>st</sup> class, 2<sup>nd</sup> class, 3<sup>rd</sup> 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.

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**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. Applications of cost indices to estimating. Estimate based on engineer's list of quantities. Estimation of operating costs.

**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.

**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****OUTCOME**

- An understanding of the art of building construction through specification writing.
- Ability to work out the approximate estimate and detailed estimate for small scale building projects and low cost housing.
- An understanding of valuation and budgeting.

**REQUIRED READING**

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

**REFERENCES**

- 'I.S.1200-1968 Methods of Measurements of Buildings and Civil Engineering works'.
- Latest schedule of rates of P.W.D.
- Latest Data book of P.W.D.
- PWD Standard Specifications. Govt Publication.

**AR5511****CONCRETE IN BUILDING CONSTRUCTION****L T P/S C****1 0 4 3****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.

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**UNIT I INTRODUCTION TO CEMENT AND CONCRETE****15**

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.

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

**UNIT II CAST IN-SITU CEMENT CONCRETE IN BUILDING CONSTRUCTION****25**

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

**UNIT III PRECAST CONCRETE, SPECIAL CONCRETES AND INNOVATIONS****20**

Types and characteristics of simple precast concrete products. Construction principles and procedures for structural and non structural 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.

Sketching/ drawing/ 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****15**

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: 75 PERIODS****OUTCOME**

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

**REQUIRED READING**

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

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## REFERENCES

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

AR5521

URBAN ARCHITECTURE DESIGN STUDIO

L T P/S C

0 0 14 7

## 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: 210 PERIODS**

## OUTCOME

- 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.
- Ability to draw from this understanding and identify issues/ challenges involving contemporary urban life and the built environment.
- Ability to give appropriate/ innovative design solutions in the above context.

## REQUIRED READING

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

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## REFERENCES

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

**GE5251**

**ENVIRONMENTAL SCIENCES**

**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 familiarize the 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.

### **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.

### **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 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.

#### **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.

#### **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.

**TOTAL: 45 PERIODS**

#### **OUTCOME**

- To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
- To identify the causes, effects and environmental pollution and natural disasters and contribute to the preventive measures in the immediate society.
- To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
- To recognize different forms of energy and apply them for suitable applications in for technological advancement and societal development.
- To demonstrate the 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.

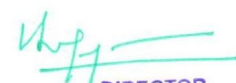
#### **REQUIRED READING**

- Anubha Kaushik and C. P. Kaushik, 'Perspectives in Environmental Studies', 6<sup>th</sup> 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**

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

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AR5601

**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**

**OUTCOME**

- Ability to design steel joints for maximum efficiency and strength.
- Ability to design tension and compression members for different conditions by applying the code provisions.
- Ability to design different types of laterally unsupported and supported steel beams for different conditions.

**REQUIRED READING**

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

**REFERENCES**

- M.R. Shiyekar, 'Limit State Design in Structural Steel', PHI Learning Private Limited, 2013.
- Dr. V. L. Shah and Prof. Veena Gore, 'Limit State Design of Steel Structures', Structures Publications, Pune, 2012.
- S.S. Bhavikatti, 'Design of Steel Structures by Limit State Method as per IS800-2007', I.K. International Publishing House Pvt, Ltd, 2012.
- IS 800 - 2007 – Code of Practice for use of Structural Steel in General Building Construction.
- SP 6 IS Handbook for Structural Engineers.

AR5602

**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 SYSTEMS OF 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**

**OUTCOME**

- Familiarity with different air conditioning systems, their context of use and basics of planning involved.
- An understanding of fire safety, fire fighting, fire prevention and installations in buildings.
- An understanding of mechanical, communication and security systems in a building.
- Ability to design building layouts and sections for service integration.

**REQUIRED READING**

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

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- A.F.C. Sherratt, 'Air Conditioning and Energy Conservation', The Architectural Press, London, 1980.
- Andrew H Buchanan; 'Structural Design for Fire Safety', Wiley, 2017.
- Swenson S. Don, 'Heating, Ventilating and Air Conditioning', American Technical Publishers, 2003.

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- ISHRAE, 'All about AHUs- Air Handling Units'.
- CIBSE Guide D, 'Transportation Systems in Buildings', 2015.
- A.K.Mittal, 'Electrical and Mechanical Services in High Rise Building: Design and Estimation Manual', CBS, 2012.

**AR5611      STEEL, GLASS AND PLASTICS IN BUILDING CONSTRUCTION      L T P/S C**  
**1 0 4 3**

**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 IN BUILDING CONSTRUCTION      15**

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. Different types of adhesives and sealants. Plastic joints. 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 BASIC STRUCTURES      25**

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. Drawings/ models of the principles. Understanding of product literature/ shop drawings. Site visits with documentation in the form of sketches/ drawings/ photos.

**UNIT III      ADVANCED STEEL STRUCTURES      20**

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 IV      DESIGN AND DETAILING USING STEEL, GLASS AND PLASTIC      15**

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: 75 PERIODS**

**OUTCOME**

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

## REQUIRED READING

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

## REFERENCES

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

AR5621

ENVIRONMENTAL DESIGN STUDIO

L T P/S C  
0 0 16 8

## 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: 240 PERIODS**

## OUTCOME

- Ability to critically and sensitively understand and address issue of resources.
- 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.
- Ability to apply knowledge intensively in realms such as sustainable built environment, services.

## REQUIRED READING

- Daniel Williams, 'Sustainable Design, Ecology, Architecture and Planning', John Wiley and Sons Inc, NJ, 2007.
- MiliMazumdar, 'Energy Efficient Buildings in India', TERI, New Delhi, 2012.
- 'Sustainable Building Design Manuals I and II', TERI, 2004.
- Derek Clements-Croome, 'Intelligent Buildings: An Introduction', Routledge, 2013.
- Stephen A. Kliment, Editor 'Building Type Basics' Series, Wiley.

## REFERENCES

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

**AR5701 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 20<sup>th</sup> 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 III 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**

## OUTCOME

- An awareness of the spread and varied later directions of modern architecture across the world.
- An understanding of architectural production from the 1960s as driven by large scale changes across the world.
- Familiarity with contemporary forces and directions in architecture across the world.
- An understanding of post independence architecture in India contemporaneous with the rest of the world, along with its own particular influences.

## REQUIRED READING

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

## REFERENCES

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

AR5702

PROGRESS THROUGH KNOWLEDGE  
**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**

### **OUTCOME**

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

### **REQUIRED READING**

- Architects Act 1972.
- Publications of Council of Architecture
- Roshan Namavati, 'Professional Practice', Lakhani Book Depot, Mumbai, 2016.
- Ar. V.S. Apte, 'Architectural Practice and Procedure', Mrs. PadmajaBhide, 2008.
- MadhavDeobhakta, 'Architectural Practice in India', COA, 2007.

### **REFERENCES**

- J.J. Scott, 'Architectural Practice', Butterworth, London 1985.
- Development Regulations of Second Master Plan for Chennai Metropolitan Area- 2026. (Second Master plan of CMA).
- Chennai City Corporation Building Rules 1972.
- T.N.D.M. Buildings rules, 1972.
- Consumer Protection Act, 1986.
- Arbitration Act, 1996.
- Factories Act, 1948.
- Persons with Disabilities Act, 1995.
- Tamil Nadu Cinematography Act. DTCP Act.

*Attested*

  
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**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 facilitate applying skills 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. These writings 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 essay for this would constitute the first assessment.

Further to 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: 90 PERIODS**

**OUTCOME**

- Ability to think, talk, discuss, read, conclude and write about a specific topic with knowledge, insight and skill.
- Clarity in identifying, connecting and structuring facts and thoughts through writing.
- Ability to write an architectural essay that is perspective based supported by facts and arguments or fact based supported by analysis and argument.
- 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**

- Andrew Goatly, 'Critical Reading and Writing in the Digital Age: An Introductory Course book', Routledge, 2016.
- Richard Coyne, 'Interpretation in Architecture: Design as Way of Thinking', Routledge, 2005.

**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: 240 PERIODS**

## OUTCOME

- Ability to understand the wider implication of design decisions and their interdependency with larger processes of society.
- Ability to take creative, critical and informed decisions in the context of significant projects that could shape society in positive ways.

## REQUIRED READING

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

## REFERENCES

- Mitchell WJ, 'Imagining MIT: Designing a campus for the 21<sup>st</sup> century', MIT Press, 2011.
- Himanshu Burte, 'Space For Engagement', Seagull Books, 2008.
- Mark Garcia, 'The Diagrams of Architecture', Wiley 2010.
- Bjarkel Ingels, 'Yes is More', Taschen, 2009.
- Steven Holl, Juhani Pallasmaa, Alberto Pérez Gómez, 'Questions of perception: Phenomenology of Architecture', William Stout, 2006.
- Richard Coyne, 'Interpretation in Architecture: Design as Way of Thinking', Routledge, 2005.
- Adam Sharr, 'Reading Architecture and Culture', Routledge, 2012.
- Wendy Gunn, Ton Otto, Rachel Charlotte Smith, 'Design Anthropology: Theory and Practice', Berg, 2013.

**AR5821**

**PRACTICAL TRAINING**

**L T P/S C**

**x x x 12**

## 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.

#### OUTCOME

- An overall idea of the nuances of architectural practice.
- An understanding about the total process that goes into the making of a building.
- Clarity about the field of architecture that could be carried forth to the higher semesters.

**AR5901**

**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**

#### OUTCOME

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

#### REQUIRED READING

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

#### REFERENCES

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

AR5902

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.

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**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****OUTCOME**

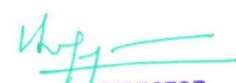
- An understanding of reasons for evolution of landscapes across time and context.
- Ability to discern the role of natural and human actions with respect to macro scale of sustainability and ecology as well as in the micro scale of shaping of outdoor environments.
- Knowledge about the elements of landscape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

**REQUIRED READING**

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

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

*Attested*

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**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**

## REQUIRED READING

- 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.
- David H. Maister, 'Managing the Professional Service Firm', Free Press, 1997.
- Donald A. Schon, 'The Reflective Practitioner: How Professionals Think In Action', Basic Books, 1984.
- Reddy T.S. and Murthy, 'Financial Accounting', Margham Publications, Chennai, 2012

## REFERENCES

- Jagat Trivedi, 'IIM: Insights Into Managing: A Must Read for Leaders, Managers, Aspiring Managers, Students, and Entrepreneurs', Outskirts Press, 2013.

AR5921

DISSERTATION

L T P/S C  
0 0 6 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: 90 PERIODS**

## OUTCOME

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



## REQUIRED READING

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

## REFERENCES

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

AR5922

URBANISM AND ARCHITECTURE DESIGN STUDIO

L T P/S C  
0 0 16 8

## 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, land 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: 240 PERIODS**

## OUTCOME

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

## REQUIRED READING

- Jonathan Barnett, 'An Introduction to Urban Design', Harper and Row; 1982
- Cavallo, R. et al, 'New Urban Configurations', IOS Press, 2014.
- Henriette Steiner and Maximilian Sternberg, 'Phenomenologies of the City: Studies in the History and Philosophy of Architecture', Routledge 2015.

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- Jan Gehl, 'Life between Buildings- Using Public Space', ArkitektensForleg, 2011.
- 'Time Savers Standard for Urban Design', Donald Watson, McGraw Hill, 2017.
- Malcolm Moore and Jon Rowland Eds, 'Urban Design Futures', Routledge, 2006.

## REFERENCES

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

**AR5091**

**THESIS**

**L T P/S C**  
**0 0 32 16**

## 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: 480 PERIODS**

## OUTCOME

- Skill, knowledge and expertise in the domain of architectural design.
- Ability to handle a major architectural project independently through all stages.
- Ability to intensify thought process directed at a specific area of focus and convert it to a product.

## REQUIRED READING

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

## REFERENCES

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

## ELECTIVE I

AR5001

**INTERIOR DESIGN**

**L T P/S C**  
**1 0 4 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 20**

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 15**

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 20**

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 20**

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: 75 PERIODS**

### **OUTCOME**

- An understanding of interior design as an integral part of architecture and as an interdisciplinary and allied field related to architecture.
- An overall exposure to the ways in which interior spaces can be enriched through the design of specific interior components.

### **REQUIRED READING**

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

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

## REFERENCES

- Helen Marie Evans, 'An Invitation to Design', Macmillan Pub Co, 1982.
- Julius PENERO and Martin ZELNIK, 'Human Dimensions and Interior Space', Whitney, Library of Design, 1979.
- Kathryn B. Hiesinger and George H. Marcus, 'Landmarks of Twentieth Century Design; Abbey Ville Press, 1995.
- Susanne Slesinger and Stafford Cliff, 'Indian Style', Thames and Hudson, 1990.
- Rosemary Kilmer, W. Otie Kilmer, 'Construction Drawings and Details for Interiors: Basic Skills', John Wiley and Sons, 2009.

AR5002

PRODUCT DESIGN

L T P/S C  
1 0 4 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

15

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

20

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

20

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.

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## UNIT IV PRODUCT DESIGN PROTOTYPING AND ADVANCED MANUFACTURING PROCESSES

20

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: 75 PERIODS**

### OUTCOME

- An understanding of product design as a discipline.
- Ability to interpret real life situation into design.
- Knowledge about contemporary design process and manufacturing process of design.

### REFERENCES

- H. G. Greet and R. R. Kostellow, 'Elements of Design and the Structure of Visual Relationships', Architectural Press, NY, 2002.
- K. Critchlow, 'Order in Space: A Design Source Book', Thames and Hudson, 2000.
- C. Akner-Koler, 'Three-dimensional Visual Analysis, Institution for Industrial Design', Konftfack, Sweden, 1994.
- Mike Baxter, 'Product Design: Practical Methods for the Systematic Development of New Products', Chapman and Hall, 1995.
- Roozenburg and Eekels, 'Product Design: Fundamentals and Methods', John Wiley and Sons Inc; New Ed edition, 1995.
- Goodrich, Kristina, 'Design Secrets: Products: 50 Real-Life Projects Uncovered', Industrial Designers Society of America, Rockport Publishers, 2001.
- Rouse, William B, 'Design for Success: A Human-Centered Approach to Designing Successful Products and Systems', Wiley-Interscience, 1991.
- J.M. Gordon Jr., 'Industrial Design of Plastics Products', John Wiley and Sons, 2003.
- G. Boothroyd, 'Product Design for Manufacture and Assembly', 2nd Edition, Marcel Dekker Inc., 2002.
- J.W. Priest, S. M. Jose, 'Product Development for Manufacturing', Marcel Dekker Inc., 2001.

AR5003

### ARCHITECTURAL DESIGN DETAILING

L TP/S C

1 0 4 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

15

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 15**

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 25**

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 20**

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: 75 PERIODS**

**OUTCOME**

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

**REQUIRED READING**

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

**REFERENCES**

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

**AR5004 DIGITAL TOOLS FOR BUILDING MODELLING AND ANALYSIS L T P/S C  
1 0 4 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 10**

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, Bentley, 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 25**

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 25**

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 15**

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: 75 PERIODS**

### **OUTCOME**

- An understanding of the importance of modelling information and analysing model for a building.
- A familiarity with making basic models, applying attributes/parameters to the model, understanding aspects of a building design through analysing the model.

### **REQUIRED READING**

- Robert S. Wegant, 'BIM Content Development: Standards, Strategies, and Best Practices', John Wiley, 2011.
- Chuck Eastman et al, 'BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors', John Wiley, 2011.

### **REFERENCES**

- 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.
- Ray Crotty, 'The Impact of Building Information Modeling: Transforming Construction'. Spons Architecture Price Book, 2011.

**AR5005**

**DIGITAL ART**

**L T P/S C  
1 0 4 3**

### **OBJECTIVES**

- To give knowledge about video, image and vector editing using editing software.
- To enable the creation of interactive patterns by introducing scripting.
- To enable synchronisation of sound with patterns generated.
- To enable presentation using voice over and production of CD roms.

## **UNIT I VIDEO EDITING, IMAGE EDITING and VECTOR EDITING 15**

Importing avis and mpegs, sequencing, cutting trimming, decrease and increase the speed of the movie, filters, transitions, output settings, saving the output with the help of video editing software. Image editing (pixel image types) using tools, Vector characters, bizer and grip editing, transform, fill types, text formatting, colour overlays, etc.

**UNIT II OVERLAPPING TECHNIQUE (2D ANIMATION WITH MOVIE) 20**

Importing Movie file in the editing software and overlap the 2D Animation film creation. Synchronize the sound and create a perfect blend of AVI and 2D Animation film.

**UNIT III PATTERNS THROUGH SCRIPTING AND SOUND 25**

Project involving creating 2d interactive patterns using basic scripting. Through this scripting tools will be taught.

Project involving creating forms/ patterns synchronised to sound file, through this relationship between sound and forms/ patterns will be explored. Related software could be explored.

**UNIT IV SPACE GENERATION 15**

Project involving identifying a metaphor (literature, movies, and music albums) would be taken and spaces would be created using the same. Tools used would be importing files using standard and linking options. Using scripts and behaviors, understanding stage, cast and time line, using cast library, tweening, using swf movie, presentation using voice over and presentation demos, creating auto run CD- ROMs

**TOTAL: 75 PERIODS**

**OUTCOME**

- Knowledge to edit video and image using editing software.
- Ability to synchronise sound with patterns generated.
- Ability to create space using themes.
- Ability to make a total presentation.

**REQUIRED READING**

- Adobe Creative Cloud (2015 release): Books, eBooks, and Video.
- Deke McClelland, 'Photoshop Ver (8)CS Bible', Wiley John and Son INC, New York, 2004.
- Curtis Hillman, 'Flash Web Design: The Art of Motion Graph', New Riders Publishing, Indianapolis, IN. U.S.

**REFERENCES**

- M.E. Morris, and R.J. Hinrichs, 'Web Page Design', Prentice Hall, 1996.
- Mark Von Wodtke, 'Mind over Media: Creative Thinking Skills for Electronic Media', McGraw-Hill, New York, 1993.
- Noah Wardrip-Fruin and Nick Montfort, Eds, 'The New Media Reader', MIT Press, 2003.
- Zalanski and Fischer, 'Shaping Space: The Dynamics of Three-Dimensional Design', Cengage, 2006.
- Ocvirk, Stinson, Wigg, Bone and Cayton, 'Art Fundamentals: Theory and Practice', McGraw-Hill Education, 2012
- Mary Stewart, 'Launching the Imagination: A Comprehensive Guide to Basic Design', McGraw Hill 2011.
- Catherine Elwes, 'Video Art: A Guided Tour', Tauris, 2004.
- Peter Ratner, '3-D Human Modeling and Animation', Wiley, 2009.
- Alex Michael, 'Animating with Flash MX: Professional Creative Animation Techniques', Focal Press, 2002.
- Jaejin Choi, 'Maya Character Animation', SybexInc; Bk and CD-Rom Edition, 2002.
- Nikos Sarris and Michael G. Strintzis, '3D Modeling and Animation: Synthesis and Analysis Techniques for the Human Body', IRM Press, 2004.
- 3DTotal.com, 'Digital Art Masters'.

**ELECTIVE II**

**AR5006**

**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 biodiversity, 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, desiccant 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**

**OUTCOME**

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

**REQUIRED READING**

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

**REFERENCES**

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

**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****OUTCOME**

- Ability to differentiate the types of disasters, causes and their impact on environment and society.
- Knowledge about assessing vulnerability and various methods of risk reduction measures as well as mitigation.
- 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.

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## REFERENCES

- Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005.
- Government of India, National Disaster Management Policy,2009.

**AR5008**

**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**

## OUTCOME

- Ability to understand the formation and causes of earthquakes
- An understanding of the factors to be considered in the design of buildings and services to resist earthquakes.

## REQUIRED READING

- 'Guidelines for earthquake resistant non-engineered construction', National Information centre of earthquake engineering (NICEE, IIT Kanpur, India), 2004.
- C.V.R Murthy, Andrew Charlson, 'Earthquake Design Concepts', NICEE, IIT Kanpur, 2006.
- Agarwal.P, 'Earthquake Resistant Design', Prentice Hall of India, 2006.

## REFERENCES

- Ian Davis, 'Safe Shelter within Unsafe Cities: Disaster Vulnerability and Rapid Urbanization', Open House International, UK, 1987
- 'Socio-economic developmental record'- Vol.12, No.1, 2005.
- 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.

**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****OUTCOME**

- Familiarity with advanced construction technology and systems.
- Knowledge about construction practices and equipment.
- Familiarity with construction management, planning and scheduling processes.

**REQUIRED READING**

- R. Chudley, 'Construction Technology', Heinemann, England, 2011.
- R. Barry, 'The Construction of Buildings', The English Language Book Society and Crosby Lockwood, Staples, London, 1999.

**REFERENCES**

- Frank R. Dagostino, 'Materials of Construction', Reston Publishing Company, 1982.
- M. Mohsin, 'Project Planning and Control', Vikas Publishers, New Delhi, 1983.
- National Building Code of India, 1983.
- [http://www.tn.gov.in/tcp/acts\\_rules.htm](http://www.tn.gov.in/tcp/acts_rules.htm)
- <http://www.cmdachennai.gov.in>

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### ELECTIVE III

**AR5010 CONTEMPORARY PROCESSES IN ARCHITECTURAL DESIGN L T P/S C**  
**3 0 0 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 7**

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.

#### **UNIT II ASPECT OF DIGITAL ARCHITECTURE 8**

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.

#### **UNIT III CONTEMPORARY PROCESS 10**

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

#### **UNIT IV GEOMETRIES AND SURFACES 9**

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

#### **UNIT V 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**

#### **OUTCOME**

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

#### **REQUIRED READING**

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

#### **REFERENCES**

- Gillian Hunt, 'Architecture in the Cyberspace II', John Wiley and Sons, 2001.
- L. Convey et al, 'Virtual Architecture', Bats ford, 1995.
- Rob Shields (ed.), 'Cultures of the internet: Virtual Spaces, Real Histories, Living bodies',

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- John Beckman, 'The Virtual Dimension, Architecture, Representation and Crash Culture', Princeton Architecture Press, 1998.
- William J Mitchell, 'City of Bits: Space, Place and the Infobahn', MIT Press, Cambridge, 1995.
- Marcos Novak, 'Invisible Architecture: An Installation for the Greek Pavilion', Venice Biennale, 2000.

**AR5011**

**CREATIVITY AND THE DESIGN PROCESS**

**L T P/S C**

**3 0 0 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 help understand creativity with respect to the discipline of architecture.
- To introduce processes in design.

**UNIT I INTRODUCTION TO DESIGN**

**7**

Definition and understanding of design. History of design process from earliest times through Renaissance, Beaux Arts, Bauhaus. Different classifications of design according to scale, process, mode of production, etc., - self conscious/ unselfconscious, design through drawing/ design through craft, pragmatic/ iconic/ analogic/ canonic or syntactic, hand made/ machine made, product design to city design, functional/ aesthetic, nature vernacular/ technological. Evolutionary, social and cultural aspects of creativity in design.

**UNIT II DESIGN METHODOLOGY MOVEMENT**

**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. Summary by Johnson of various models of the design process - parametric or analysis/ synthesis/ evaluation, conjecture-refutation, paradigmatic, hermeneutical.

**UNIT III CREATIVE THINKING**

**10**

Understanding the term creativity. Theories on thinking - left brain/ right brain, convergent/ divergent thinking, lateral/ vertical thinking. Broadbent's idea of the design spectrum - from the logical to chance. Blocks in creative thinking. Techniques to generate creativity.

**UNIT IV ARCHITECTURAL CREATIVITY**

**8**

Types of architectural concepts - programmatic, analogic, metaphor, essence, etc., Channels to creativity in architecture as put forth by Antoniades. Personal philosophies and strategies of individual designers.

**UNIT V PROCESS AND DESIGN**

**10**

Design as social process. Participatory approach to design. Introduction to contemporary processes in design including diagramming, mapping, parametric exploration, etc.,

**TOTAL: 45 PERIODS**

**OUTCOME**

- Ability to think about architecture as one of the many fields under the broader ambit of design as a fundamental human activity.
- Self awareness with respect to the creative process.
- Ability to engage different processes to give creative output.

**REQUIRED READING**

- Geoffrey Broadbent, 'Design in Architecture - Architecture and the Human Sciences', John Wiley and Sons, New York, 1981.
- Bryan Lawson, 'How Designers Think', Architectural Press, 2005.
- Anthony Antoniades, 'Poetics of Architecture- Theory of Design', VNR, 1992.
- Edward De Bono, 'Lateral Thinking- Textbook of Creativity', Penguin Books, 1990.
- Christopher Alexander, 'A Pattern Language', Oxford University Press, 1977.

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- James C. Snyder, Anthony J. Catanese, Timothy L. McGinty, 'Introduction to Architecture', McGraw Hill, 1979.
- Mark Garcia, 'The Diagrams of Architecture', Wiley 2010.
- C. Thomas Mitchell, 'Redefining Designing: From Form to Experience', Van Nostrand Reinhold, 1992.

## REFERENCES

- Victor Papanek, 'Design for the Real world, Human Ecology and Social Change', Chicago Review Press, 2005.
- Paul Alan Johnson, 'Theory of Architecture- Concepts, Themes, Practices', VNR; 1994.
- Christopher Jones, 'Design Methods', John Wiley and Sons; 1980.
- Tom Heath, 'Method in Architecture', John Wiley and Sons, New York, 1984.
- Nigel Cross, 'Developments in Design Methodology', John Wiley and Sons, 1984.
- James L. Adams, 'Conceptual Blockbusting', Basic Books, 2001.
- Jeremy Till et al, 'Spatial Agency: Other Ways of Doing Architecture', Routledge, 2011.
- Philip Plowright, 'Revealing Architectural Design: Methods, Frameworks and Tools', Routledge, 2014.

**AR5012**

**HUMAN BEHAVIOUR AND BUILT ENVIRONMENT**

**L T P/S C**  
**3 0 0 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 7**

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 COGNITION 9**

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 BASIC CONCEPTS 11**

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

### **UNIT IV PLACE AND CONTEXT 9**

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 V ENVIRONMENT BEHAVIOUR STUDIES AND DESIGN 9**

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**

## OUTCOME

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

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## REQUIRED READING

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

## REFERENCES

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

AR5013

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**

## OUTCOME

- Knowledge of various issues concerning housing and housing development in Indian and global context covering a cross section of income groups.
- Ability to appreciate socio-economic aspects in housing.
- An understanding of housing standards, site planning principles, housing concepts and types.
- An understanding of key issues in housing today.

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## REQUIRED READING

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

## REFERENCES

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

## ELECTIVE IV

AR5014

ARCHITECTURAL 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**

## OUTCOME

- An understanding of the importance of heritage and scope of conservation.
- Familiarity with issues and practices of conservation through case studies.
- Knowledge about methods for preserving and repairing historic buildings.
- Familiarity with conservation strategies through principles and project case studies.

## REQUIRED READING

- Bernard Fielden, 'Conservation of Historic Buildings', Architectural Press, 2003.
- Bernard Fielden, 'Guidelines for Conservation - A Technical Manual', INTACH, 1989.
- MS Mathews, 'Conservation Engineering', University at Karlsruhe, 1998.
- J. Kirk Irwin, 'Historic Preservation Handbook', McGraw Hill, 2003.
- Donald Appleyard, 'The Conservation of European Cities', M.I.T. Press, Massachusetts, 1979.
- Publications of INTACH

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- James M. Fitch, 'Historic Preservation: Curatorial Management of the Built World', University Press of Virginia, Reprint Edition, 1990.
- Robert E. Stipe, 'A Richer Heritage: Historic Preservation in the Twenty-First Century', University of North Carolina Press, 2003.
- B.P. Singh, 'India's Culture- The State, The Arts and Beyond', Oxford University Press, 2009
- A.G. K. Menon (Ed), 'Conservation of Immovable Sites', INTACH Publication, N. Delhi.
- John H. Stubbs and Emily G Makas. 'Architectural Conservation in Europe and the Americas', John Wiley and Sons, 2011.

AR5015

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 19<sup>th</sup> century. Political and economic changes from late 19<sup>th</sup> century/ early 20<sup>th</sup> century in Chennai. City planning in early 20<sup>th</sup> 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 20<sup>th</sup> century Chennai. Corresponding architecture of regionalism, postmodernism, material changes in buildings, etc.,

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**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 21<sup>st</sup> 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****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**

- S. Muthiah, 'Madras Miscellany – People, Places and Potpourri' , East West Press Pvt Ltd, 2011.
- Nandhitha Krishna, 'Madras- Chennai- Its History and Environment', C.P. RamaswamiAiyer Foundation 2009.
- David Waltner et al, 'The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability', Columbia University Press, 2008.
- C.S. Srinivasachari, 'History of the City of Madras', Varadachary, 1939.

**AR5016****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****OUTCOME**

- Ability to understand morphology of settlements and their generating forces and characteristics.
- An understanding of the role of planning processes in making positive changes to settlements.
- Awareness of planning interventions with respect to the current world.

**REQUIRED READING**

- C.L. Doxiadis, Ekistics, 'An Introduction to the Science of Human Settlements', Hutchinson, London, 1968.
- Thooyavan K R, 'Human Settlements- A Planning guide to Beginners', M.A. Publications, 2005.
- Ministry of Urban affairs and Employment, Government of India, New Delhi, 'UrbanDevelopment Plans: Formulation and Implementation-Guidelines', 1996.
- Andrew D Thomas, 'Housing and Urban Renewal', Harper Collins, 1986.

**REFERENCES**

- S. B. Golahit, 'Rural Development Programmes In India', Neha Publishers and Distributors, 2010.
- 'CMDA Second Master Plan for Chennai Metropolitan Area 2026: Vision, Strategies and Action Plans (Vol.I, II and III)', Chennai, India, 2008.
- V. Nath, 'Regional Development And Planning In India', Concept Publishing Company, 2011.
- Government of India, 'Report of the National Commission on Urbanisation', 1988.
- Hansen N., 'Regional Policy and Regional Integration', Edward Elgar, UK, 1996.

**AR5017****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 V 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.

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**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****OUTCOME**

- Ability to understand a project from concept to commissioning, feasibility study and facility programme, design, construction to commissioning.
- Ability to apply project management techniques in achieving objectives of a project like client needs, quality, time and cost.
- An understanding of principles of management, construction scheduling, scope definition and team roles.

**REQUIRED READING**

- Dr. B.C. Punmia and K.K. Khandelwal, 'Project Planning and Control with PERT and CPM', Laxmi Publications, 2018.
- Elaine Marmel, 'Microsoft Project 2016 Bible', Prentice Hall, 2016.
- Sam Kubba, 'Green Construction Project Management and Cost Oversight', Elsevier, 2010.

**REFERENCES**

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

**AUDIT COURSES (AC)****AD5091****CONSTITUTION OF INDIA****L T P C  
3 0 0 0****OBJECTIVES:**

- Teach history and philosophy of Indian Constitution.
- Describe the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- Summarize powers and functions of Indian government.
- Explain emergency rule.
- Explain structure and functions of local administration.

**UNIT I INTRODUCTION****9**

History of Making of the Indian Constitution-Drafting Committee- (Composition & Working) - Philosophy of the Indian Constitution-Preamble-Salient Features

**UNIT II CONTOURS OF CONSTITUTIONAL RIGHTS & DUTIES****9**

Fundamental Rights-Right to Equality-Right to Freedom-Right against Exploitation Right to Freedom of Religion-Cultural and Educational Rights-Right to Constitutional Remedies Directive Principles of State Policy-Fundamental Duties

**UNIT III ORGANS OF GOVERNANCE****9**

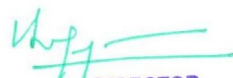
Parliament-Composition-Qualifications and Disqualifications-Powers and Functions-Executive President-Governor-Council of Ministers-Judiciary, Appointment and Transfer of Judges, Qualifications Powers and Functions

**UNIT IV EMERGENCY PROVISIONS****9**

Emergency Provisions - National Emergency, President Rule, Financial Emergency

**UNIT V LOCAL ADMINISTRATION****9**

District's Administration head- Role and Importance-Municipalities- Introduction- Mayor and role of Elected Representative-CEO of Municipal Corporation-Pachayati raj- Introduction- PRI- Zila

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Pachayat-Elected officials and their roles- CEO ZilaPachayat- Position and role-Block level- Organizational Hierarchy (Different departments)-Village level- Role of Elected and Appointed officials-Importance of grass root democracy

**TOTAL: 45 PERIODS**

**OUTCOMES:**

CO1: Able to understand history and philosophy of Indian Constitution.

CO2: Able to understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.

CO3: Able to understand powers and functions of Indian government.

CO4: Able to understand emergency rule.

CO5: Able to understand structure and functions of local administration.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1									✓			✓
CO2									✓			✓
CO3									✓			✓
CO4									✓			✓
CO5									✓			✓

**TEXTBOOKS:**

1. Basu D D, Introduction to the Constitution of India, Lexis Nexis, 2015.
2. Busi S N, Ambedkar B R framing of Indian Constitution, 1st Edition, 2015.
3. Jain M P, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. The Constitution of India (Bare Act), Government Publication, 1950

**AD5092**

**VALUE EDUCATION**

**L T P C  
3 0 0 0**

**OBJECTIVES:**

- Develop knowledge of self-development
- Explain the importance of Human values
- Develop the overall personality through value education
- Overcome the self destructive habits with value education
- Interpret social empowerment with value education

**UNIT I INTRODUCTION TO VALUE EDUCATION**

**9**

Values and self-development –Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non- moral valuation, Standards and principles, Value judgements

**UNIT II IMPORTANCE OF VALUES**

**9**

Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness. Honesty, Humanity, Power of faith, National Unity, Patriotism, Love for nature, Discipline

**UNIT III INFLUENCE OF VALUE EDUCATION**

**9**

Personality and Behaviour development - Soul and Scientific attitude. Positive Thinking, Integrity and discipline, Punctuality, Love and Kindness, Avoid fault Thinking, Free from anger, Dignity of labour, Universal brotherhood and religious tolerance, True friendship Happiness Vs suffering, love for truth.

**UNIT IV REINCARNATION THROUGH VALUE EDUCATION**

**9**

Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature Character and Competence –Holy books vs Blind faith, Self-management and Good health, Science of reincarnation

**UNIT V VALUE EDUCATION IN SOCIAL EMPOWERMENT****9**

Equality, Non violence, Humility, Role of Women, All religions and same message, Mind your Mind, Self-control, Honesty, Studying effectively

**TOTAL: 45 PERIODS****OUTCOMES:**

CO1 – Gain knowledge of self-development

CO2 – Learn the importance of Human values

CO3 – Develop the overall personality through value education

CO4 – Overcome the self destructive habits with value education

CO5 – Interpret social empowerment with value education

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1							✓	✓				✓
CO2							✓	✓	✓			✓
CO3							✓	✓	✓			✓
CO4							✓	✓				✓
CO5							✓	✓				✓

**REFERENCES:**

1. Chakroborty , S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press ,New Delhi

**AD5093****PEDAGOGY STUDIES****L T P C  
3 0 0 0****OBJECTIVES:**

- Understand the methodology of pedagogy.
- Compare pedagogical practices used by teachers in formal and informal classrooms in developing countries.
- Infer how can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.
- Illustrate the factors necessary for professional development.
- Identify the Research gaps in pedagogy.

**UNIT I INTRODUCTION AND METHODOLOGY:****9**

Aims and rationale, Policy background, Conceptual framework and terminology - Theories of learning, Curriculum, Teacher education - Conceptual framework, Research questions - Overview of methodology and Searching.

**UNIT II THEMATIC OVERVIEW****9**

Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries - Curriculum, Teacher education.

**UNIT III EVIDENCE ON THE EFFECTIVENESS OF PEDAGOGICAL PRACTICES****9**

Methodology for the in depth stage: quality assessment of included studies - How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? - Theory of change - Strength and nature of the body of evidence for effective pedagogical practices - Pedagogic theory and pedagogical approaches - Teachers' attitudes and beliefs and Pedagogic strategies.

**UNIT IV PROFESSIONAL DEVELOPMENT****9**

Professional development: alignment with classroom practices and follow up support - Peer support - Support from the head teacher and the community - Curriculum and assessment - Barriers to learning: limited resources and large class sizes

**UNIT V RESEARCH GAPS AND FUTURE DIRECTIONS****9**

Research design – Contexts – Pedagogy - Teacher education - Curriculum and assessment - Dissemination and research impact.

**TOTAL: 45 PERIODS****OUTCOMES:**

- Understand the methodology of pedagogy.
- Understand Pedagogical practices used by teachers in formal and informal classrooms in developing countries.
- Find how can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.
- Know the factors necessary for professional development.
- Identify the Research gaps in pedagogy.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												✓
CO2												✓
CO3												✓
CO4												✓
CO5												✓

**REFERENCES:**

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272-282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.

**AD5094****STRESS MANAGEMENT BY YOGA****LT PC  
3 0 0 0****OBJECTIVES:**

- Develop healthy mind in a healthy body thus improving social health also improve efficiency
- Invent Do's and Don't's in life through Yam
- Categorize Do's and Don't's in life through Niyam
- Develop a healthy mind and body through Yog Asans
- Invent breathing techniques through Pranayam

**UNIT I INTRODUCTION TO YOGA****9**

Definitions of Eight parts of yog.( Ashtanga )

**UNIT II YAM****9**

Do's and Don't's in life.

Shaucha, santosh, tapa, swadhyay, ishwarpranidhan

**UNIT III NIYAM****9**

Do's and Don't's in life.

Ahinsa, satya, astheya, bramhacharya and aparigraha

**UNIT IV ASAN****9**

Various yog poses and their benefits for mind &amp; body

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**UNIT V PRANAYAM**

9

Regularization of breathing techniques and its effects-Types of pranayam

**TOTAL: 45 PERIODS****OUTCOMES:**

CO1 – Develop healthy mind in a healthy body thus improving social health also improve efficiency

CO2 – Learn Do's and Don't's in life through Yam

CO3 – Learn Do's and Don't's in life through Niyam

CO4 – Develop a healthy mind and body through Yog Asans

CO5 – Learn breathing techniques through Pranayam

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1							✓	✓				✓
CO2							✓	✓				✓
CO3							✓	✓				✓
CO4							✓	✓				✓
CO5							✓	✓				✓

**REFERENCES:**

1. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata

2. 'Yogic Asanas for Group Training-Part-I' : Janardan Swami Yogabhyasi Mandal, Nagpur

AD5095

**PERSONALITY DEVELOPMENT THROUGH LIFE  
ENLIGHTENMENT SKILLS****LT PC  
3 0 0 0****OBJECTIVES:**

- Develop basic personality skills holistically
- Develop deep personality skills holistically to achieve happy goals
- Rewrite the responsibilities
- Reframe a person with stable mind, pleasing personality and determination
- Discover wisdom in students

**UNIT I NEETISATAKAM-HOLISTIC DEVELOPMENT OF PERSONALITY - I**

9

Verses- 19,20,21,22 (wisdom) - Verses- 29,31,32 (pride &amp; heroism) – Verses- 26,28,63,65 (virtue)

**UNIT II NEETISATAKAM-HOLISTIC DEVELOPMENT OF PERSONALITY - II**

9

Verses- 52,53,59 (don't's) - Verses- 71,73,75,78 (do's)

**UNIT III APPROACH TO DAY TO DAY WORK AND DUTIES**

9

Shrimad Bhagwad Geeta: Chapter 2-Verses 41, 47,48 - Chapter 3-Verses 13, 21, 27, 35 Chapter 6-Verses 5,13,17,23, 35 - Chapter 18-Verses 45, 46, 48

**UNIT IV STATEMENTS OF BASIC KNOWLEDGE – I**

9

Statements of basic knowledge - Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68 Chapter 12 -Verses 13, 14, 15, 16,17, 18

**UNIT V PERSONALITY OF ROLE MODEL - SHRIMAD BHAGWADGEETA**

9

Chapter2-Verses 17, Chapter 3-Verses 36,37,42 - Chapter 4-Verses 18, 38,39 Chapter18 – Verses 37,38,63

**TOTAL: 45PERIODS****OUTCOMES:**

CO1: To develop basic personality skills holistically

CO2: To develop deep personality skills holistically to achieve happy goals

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**CO3:** To rewrite the responsibilities

**CO4:** To reframe a person with stable mind, pleasing personality and determination

**CO5:** To awaken wisdom in students

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1									✓			✓
CO2									✓			✓
CO3									✓			✓
CO4									✓			✓
CO5									✓			✓

#### REFERENCES:

1. Gopinath, Rashtriya Sanskrit Sansthanam P, Bhartrihari's Three Satakam , Niti-sringar-vairagya, New Delhi,2010
2. Swami Swarupananda , Srimad Bhagavad Gita, Advaita Ashram, Publication Department, Kolkata,2016

AD5097

ESSENCE OF INDIAN KNOWLEDGE TRADITION

LT P C

3 0 0 0

#### COURSE OBJECTIVES

The course will introduce the students to

- get a knowledge about Indian Culture
- Know Indian Languages and Literature religion and philosophy and the fine arts in India
- Explore the Science and Scientists of Ancient, Medieval and Modern India
- Understand education systems in India

#### UNIT I INTRODUCTION TO CULTURE

9

Culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian Culture, Ancient India, Medieval India, Modern India.

#### UNIT II INDIAN LANGUAGES AND LITERATURE

9

Indian Languages and Literature – I: Languages and Literature of South India, – Indian Languages and Literature – II: Northern Indian Languages & Literature

#### UNIT III RELIGION AND PHILOSOPHY

9

Major religions practiced in India and Understanding their Philosophy – religious movements in Modern India (Selected movements only)

#### UNIT IV FINE ARTS IN INDIA (ART, TECHNOLOGY & ENGINEERING)

9

Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in India, development of science in ancient, medieval and modern India

#### UNIT V EDUCATION SYSTEM IN INDIA

9

Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India

TOTAL: 45PERIODS

## COURSE OUTCOMES

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

- Understand philosophy of Indian culture.
- Distinguish the Indian languages and literature.
- Learn the philosophy of ancient, medieval and modern India.
- Acquire the information about the fine arts in India.
- Know the contribution of scientists of different eras.
- Understand education systems in India

## REFERENCES:

1. Kapil Kapoor, "Text and Interpretation: The India Tradition", ISBN: 81246033375, 2005
2. "Science in Samskrit", Samskrita Bharti Publisher, ISBN 13: 978-8187276333, 2007
3. NCERT, "Position paper on Arts, Music, Dance and Theatre", ISBN 81-7450 494-X, 200
4. Narain, "Examinations in ancient India", Arya Book Depot, 1993
5. Satya Prakash, "Founders of Sciences in Ancient India", Vijay Kumar Publisher, 1989
6. M. Hiriyanna, "Essentials of Indian Philosophy", Motilal Banarsidass Publishers, ISBN 13: 978- 8120810990, 2014

AD5098

SANGATAMIL LITERATURE APPRECIATION

LT P C  
3 0 0 0

## COURSE OBJECTIVES:

The main learning objective of this course is to make the students an appreciation for:

1. Introduction to Sanga Tamil Literature.
2. 'Agathinai' and 'Purathinai' in Sanga Tamil Literature.
3. 'Attruppada' in Sanga Tamil Literature.
4. 'Puranaanuru' in Sanga Tamil Literature.
5. 'Pathitru paththu' in Sanga Tamil Literature.

<b>UNIT I</b>	<b>SANGA TAMIL LITERATURE AN INTRODUCTION</b>	<b>9</b>
Introduction to Tamil Sangam–History of Tamil Three Sangams–Introduction to Tamil Sangam Literature–Special Branches in Tamil Sangam Literature- Tamil Sangam Literature's Grammar- Tamil Sangam Literature'sparables.		
<b>UNIT II</b>	<b>'AGATHINAI' AND 'PURATHINAI'</b>	<b>9</b>
Tholkappiyar's Meaningful Verses–Three literature materials–Agathinai's message- History of Culture from Agathinai–Purathinai–Classification–Mesaage to Society from Purathinai.		
<b>UNITIII</b>	<b>'ATTRUPPADAI'</b>	<b>9</b>
Attruppada' Literature–Attruppada' in 'Puranaanuru'-Attruppada' in 'Pathitru paththu'- Attruppada' in 'Paththu aattu'.		
<b>UNITIV</b>	<b>'PURANAANURU'</b>	<b>9</b>
Puranaanuru on Good Administration, Ruler and Subjects–Emotion & its Effect in Puranaanuru.		
<b>UNITV</b>	<b>'PATHITRU PATHTHU'</b>	<b>9</b>
Pathitru paththu in 'Ettuthogai'–Pathitru paththu's Parables–Tamil dynasty: Valor, Administration, Charity in Pathitru paththu- Mesaage to Society from Pathitru paththu.		

**Total (L:45) = 45 PERIODS**

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**COURSE OUTCOMES:**

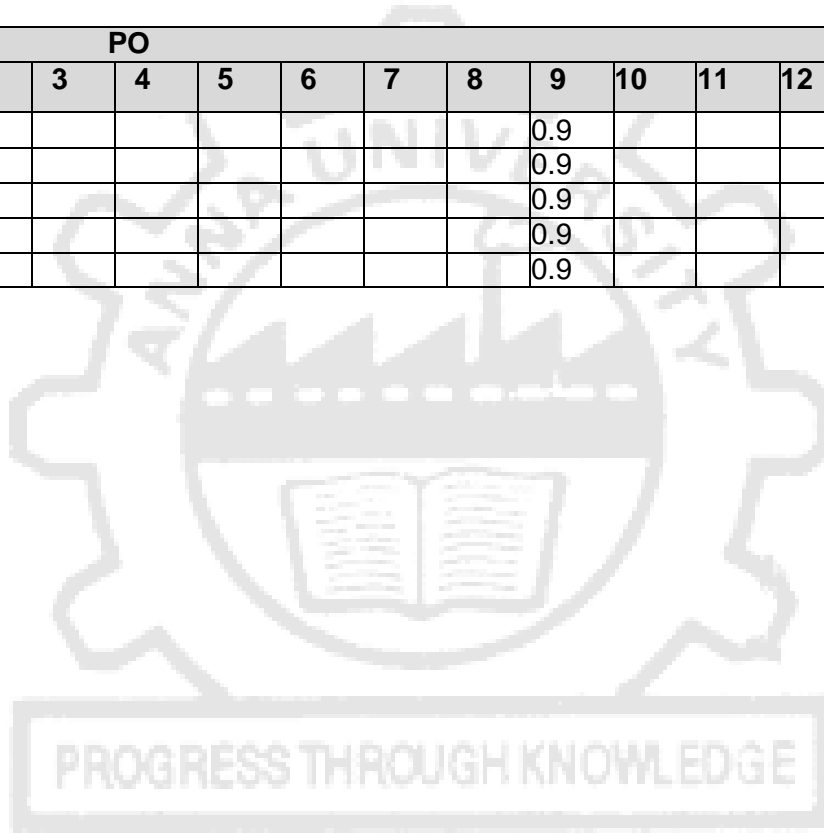
Upon completion of this course, the students will be able to:

1. Appreciate and apply the messages in Sanga Tamil Literature in their life.
2. Differentiate 'Agathinai' and 'Purathinai' in their personal and societal life.
3. Appreciate and apply the messages in 'Attruppadaai' in their personal and societal life.
4. Appreciate and apply the messages in 'Puranaanuru' in their personal and societal life.
5. Appreciate and apply the messages in 'Pathitru paththu' in their personal and societal life.

**REFERENCES:**

1. Sivaraja Pillai, The Chronology of the Early Tamils, Sagwan Press, 2018.
2. Hank Heifetz and George L. Hart, The Purananuru, Penguin Books, 2002.
3. Kamil Zvelebil, The Smile of Murugan: On Tamil Literature of South India, Brill Academic Pub, 1997.
4. George L. Hart, Poets of the Tamil Anthologies: Ancient Poems of Love and War, Princeton University Press, 2015.
5. Xavier S. Thani Nayagam, Land scape and poetry: a study of nature in classical Tamil poetry, sia Pub. House, 1967.

CO	PO												PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1									0.9							0.6
2									0.9							0.6
3									0.9							0.6
4									0.9							0.6
5									0.9							0.6



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