DEPARTMENT OF

ARCHITECTURE

PERIYAR MANIAMMAI
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University)
Established Under Sec. 3 of UGC Act, 1956 • NAAC Accredited
think • innovate • transform

CURRICULUM & SYLLABUS

FOR

B.Arch

(Bachelor of Architecture)

(Based on Outcome Based Education)

(I - X Semester)

REGULATIONS – 2019

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PERIYAR MANIAMMAI UNIVERSITY

Our University is committed to the following Vision, Mission and core values, which guide us in carrying out our Architecture Department mission and realizing our vision:

INSTITUTION VISION	
To be a University of global dynamism with excellence in knowledge and innovation ensuring social responsibility for creating an egalitarian society.	
INSTITUTION MISSION	
UM1	Offering well balanced programmes with scholarly faculty and state-of-art facilities to impart high level of knowledge.
UM2	Providing student - centered education and foster their growth in critical thinking, creativity, entrepreneurship, problem solving and collaborative work.
UM3	Involving progressive and meaningful research with concern for sustainable development.
UM4	Enabling the students to acquire the skills for global competencies.
UM5	Inculcating Universal values, Self-respect, Gender equality, Dignity and Ethics.

INSTITUTION CORE VALUES

- **Student – centric vocation**
- **Academic excellence**
- **Social Justice, equity, equality, diversity, empowerment, sustainability**
- **Skills and use of technology for global competency.**
- **Continual improvement**
- **Leadership qualities.**
- **Societal needs**
- **Learning, a life – long process**
- **Team work**
- **Entrepreneurship for men and women**

- **Rural development**
- **Basic, Societal, and applied research on Energy, Environment, and Empowerment.**

DEPARTMENT OF ARCHITECTURE

DEPARTMENT VISION	
To be a unique department in creating eminent architects with excellent creativity and sound technical knowledge, competent enough for adapting the changing trends and culture of mankind and in turn applying them for the societal needs with environmental consciousness.	
DEPARTMENT MISSION	
DM1	To produce Undergraduate, Postgraduate and Research scholars in Architecture at par with current global demands and trends.
DM2	To inspire and provide challenging ambience to evolve as leaders to advance in the field of Architecture.
DM3	To provide a platform for innovation, critical thinking and research in the field of architecture and allied disciplines
DM4	To serve as a reliable, highly capable resource for the profession, academia, and the society.

MEMBERS OF THE BOARD OF STUDIES

Sl.No.	Name	Designation	Membership
1.	Ar.V.S.Kavitha	Associate Professor & Head Dept. of Architecture, PMIST	Chairperson
2.	Dr. C.V.Subramanian	Dean i/c, Faculty of Architecture and Planning, PMIST	Member
3.	Prof. Dr. P.Jayasudha	Professor , Dept. of Architecture, PMIST	Member
4.	Prof.N.Joseph Fernando	Professor , Dept. of Architecture, PMIST	Member
5.	Ar.K.Manonmani	Associate Professor, Dept. of Architecture, PMIST	Member
6.	Ar. N.RameshBabu	Associate Professor , Dept. of Architecture, PMIST	Member
7.	Ar.K.Jasmine Vidhya	Associate Professor, Dept. of Architecture, PMIST	Member
8.	Prof.S.Ravi	Professor (Design Chair), MEASI Academy of Architecture, Royapettah, Chennai.	Special Invitee Representing Academia
9.	Ar.P.Chandranesan	Principal Architect, PCNesan Architects, Thillai Nagar, Trichy.	External Member Representing Industry
10.	Dr.R.Shanthi Priya	Professsor, Kalasalingam Academy of Reseach & Higher education, Krishnankovil.	External Member representing Alumni

The current Bachelor of Architecture (B.Arch) Curriculum is undergoing its **Eleventh Board of studies on 24.04.2019** to tune the syllabus towards Outcome based Education and meet the

CoA recommendations and in turn the suggestions provided will be implemented in Regulations 2019-20.

To produce Architects in par with International standards and to accommodate the recent trends, it is felt that there is a need to modify the present curriculum with appropriate inclusions and deletions which will enhance the competency of the budding Architects. With the above perspective the Vision and Mission of the department is framed in line with that of the University. The objective of the BoS is set to ensure the expected outcome of the programme and the curriculum refinement is done by the members with due consideration to guidelines given by the Council of Architecture and in consultation with the faculty members and competent authorities of our University.

Department Vision and Mission Definition Process

The development of vision and mission of the department is carried out as per the following steps.

Step: I	Brainstorming carried out at different levels
	First level - Department faculty by the HOD
	Second level – Current students by the faculty
	Third level - Employers, alumni and academia and industry experts
Step: II	Benchmarking with other Universities: Understanding the Vision and Mission
Step: III	Validation by the Board of studies and then Academic Council
Step: IV	Wide publicity in the department and institution

The University Vision is split up into small elements and verifies its compliance with Department Vision

UNIVERSITY VISION	DEPARTMENT VISION
global dynamism	creating eminent architects
excellence in knowledge and innovation	excellent creativity and sound technical knowledge, competent enough for adapting the changing trends and culture of mankind

ensuring social responsibility **Creating an egalitarian society**	applying them for the societal needs with environmental consciousness.

To accomplish the vision stated, well-structured mission is established with consultation with administrators, faculty members and other officials.

UNIVERSITY MISSION	DEPARTEMNT MISSION
to impart high level of knowledge	par with current global demands and trends.
student - centered education and foster their growth in critical thinking, creativity, entrepreneurship, problem solving and collaborative work.	A platform for innovation, critical thinking
progressive and meaningful research	research in the field of architecture and allied disciplines
Skills for global competencies.	To evolve as leaders to advance in the field of Architecture.
Inculcating Universal values, Self-respect, Gender equality, Dignity and Ethics.	To serve as a reliable, highly capable resource for society, the profession, academia, and the society.

Table: 1 Mapping of University Mission (UM) and Department Mission (DM)

	UM 1	UM 2	UM 3	UM 4	UM 5
DM 1	3	3	1	3	2
DM 2	3	3	1	1	1
DM 3	1	3	3	3	1
DM 4	2	1	2	2	3
	9	**10**	**7**	**9**	**7**

1-Low 2- Medium 3 – High

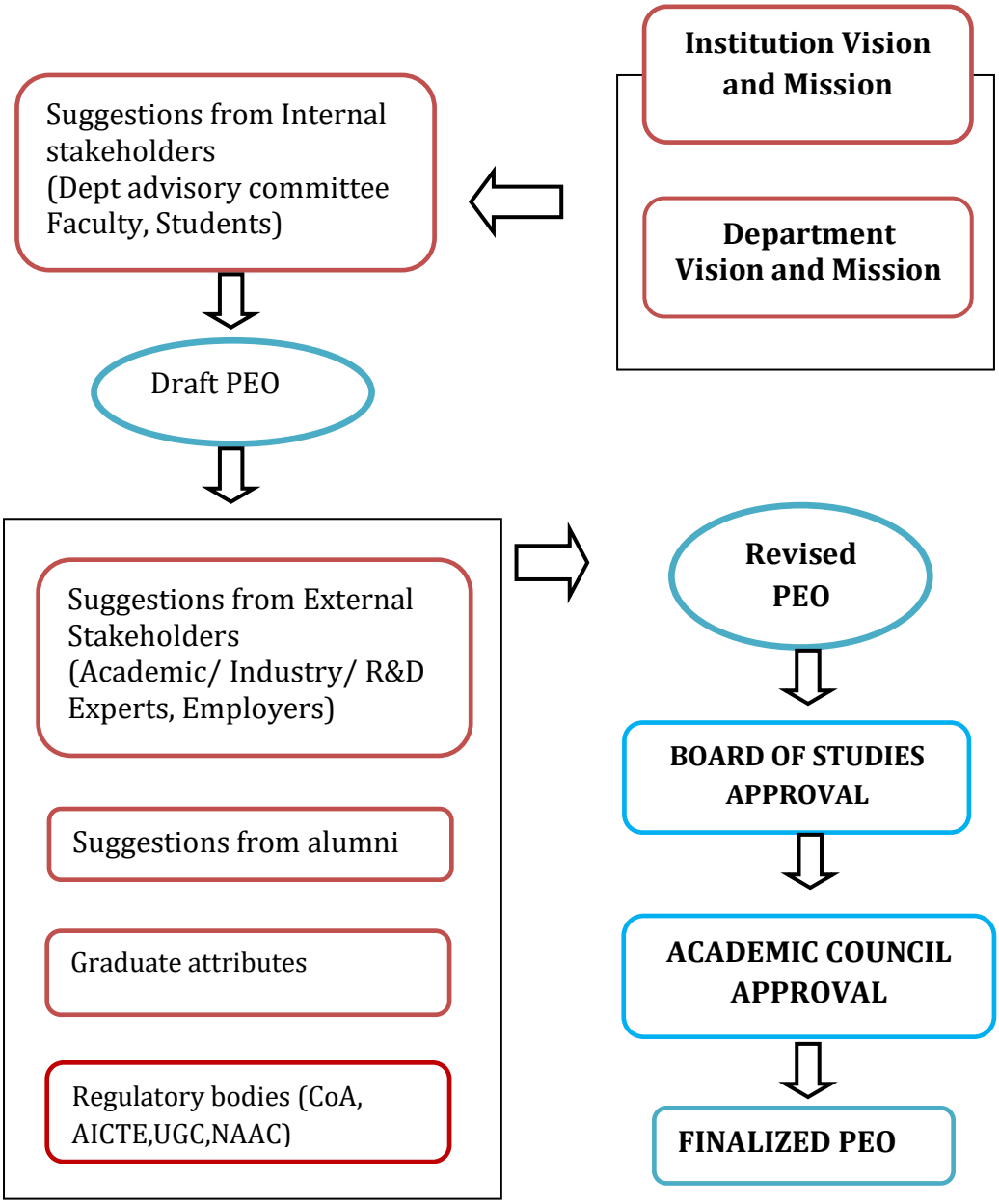
PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

Based on the mission of the department, the programme educational objectives is formulated as

PEO1	**A successful professional to lead and coordinate the project team consisting of professionals from different disciplines in the design and execution of projects irrespective of the scale at locally and globally**
PEO2	Able to understand the societal and individual's spatial needs and requirements with respect to the context, their culture and tradition and to come up with innovative unique and aesthetical design solutions.
PEO3	An environmentally and socially responsible person, able to design an optimum solution in terms of human, materials and energy resource utilization and take conscious efforts to transfer the essence of the past to the present and the future through his creations.
PEO4	Prepared for continued education in architecture or entry into architectural field or the building industries.

PEO PROCESS ESTABLISHMENT

After a series of discussion with the faculty of the Department of Architecture the set of PEOs are drafted. This will help us to assess the graduates few years after graduation.



The framework for the review and revision of the PEOs at the departmental level involving all the faculty members comprised the following broad stages.

1. Using the key words and phrases extracted from the Mission Statement of the institution and department to identify attributes to gauge graduates.
2. Capturing the distinction between the educational objective and the student outcomes.
3. Formulating each objective to be measurable.

The program educational objectives for the Architecture program describe accomplishments that graduates are expected to attain within six years after graduation. Graduates might have applied their expertise to contemporary problem solving, be engaged professionally, and have continued to learn and adapt, and have contributed to their organizations through leadership and teamwork.

Mapping of Program Educational Objectives (PEOs) with Department Mission (DM)

	DM 1	DM 2	DM3	DM 4
PEO 1	3	3	2	2
PEO 2	3	2	1	3
PEO 3	2	3	3	3
PEO 4	1	1	3	2
	9	**9**	**9**	**10**

1- Low 2 – Medium 3-High

The development of vision, mission and programme educational objectives is tuned in line with the global and national standards and it is assured that the department vision and mission will facilitate in meeting the vision and mission of the University.

The Program Educational Objectives shall cover both technical and professional aspects of the expected achieve-Achievement in terms of technical skills required in the profession for which the program prepares students

- Achievements in terms of professional, ethical, and Communicational aspects required by the profession for which the program prepares students (team work, ethical behavior, effective communication, etc.)

- Achievements in terms of management and leadership skills (project managers, directors, CTOs, CEOs, etc.)
- Achievements in terms of life-long learning and continuous education (certifications, conferences and workshops attendance, etc.)
- Achievements in terms of advanced and graduate studies pursuing (graduate studies, research careers, etc.)
- Other aspects could be considered when defining educational objectives such as the ability to engage in entrepreneurship activities

SUMMARY OF THE FEED BACKS OBTAINED

Total number of feedbacks collected: 25

In that the following important observations were made,

1. Real life projects can be given as assignment with the application of software in developing schedule of project management
2. Instead of Study skills the syllabus shall focus on improving the reading, speaking, writing and listening skills.
3. Skill development related courses shall be provided as Value added courses - at least one in a semester.
4. Valuation shall be included in the course Cost estimation.
5. Vertical studios shall be tried among all the year of students.
6. Landscape design, interior design shall be offered as core courses.
7. Structures shall be taught in more practical oriented.
8. Open Electives shall be offered
9. Professional Practice shall be offered before the Practical Training.
10. Passing the Architectural design course in a semester shall be set as a Pre-requisite for registering for the Architectural design courses offered in the subsequent semesters.
11. Rhino and Grass Hopper softwares shall be offered as they are widely used in most of the firms in abroad and in India.

Based on the stakeholders‟ input and the attainment results from stakeholder survey, PEO statements and targets were revised.

PROGRAMME OUTCOME (PO)

At the time of graduation, competency of the student is measured through the attainment of programme outcomes. The quantification of programme outcomes attainment is measured through the assessment of established course outcomes for each subject.

PROGRAM OUTCOMES	
PO 1	Ability to effectively use basic architectural theories and principles in design process.
PO 2	Ability to understand and frame the design requirements considering the diverse points of view to reach well-reasoned conclusions based on the relevant criteria and standard.
PO 3	Ability to diagnostic survey record and analyze, interpret, apply, and develop a proposal at the individual building and urban level.
PO 4	Ability to prepare technically clear drawings, writes outline estimation and specifications, and prepares models illustrating and clarifying the assembly of materials, systems, and components appropriate for a building design.
PO 5	Ability to use traditional and digital media representational skills to analyze and convey essential design idea at each stage of the design process.
PO 6	Understanding of the architect's responsibility to work in the public interest, to respect historic resources, and to improve the quality of life for local and global neighbours.
PO 7	Work collaboratively with teams of architects and various interdisciplinary design teams involved in the building industry, incorporating the financial implications,

	negotiating contracts, selecting service consultants.
PO 8	Ability to design a sustainable built environment to provide healthful environments and reduce the environmental impacts.
PO 9	Sensitive enough to strictly adhere to the code of conduct prescribed by the competent authority to practice the profession in the country with respect to building codes and regulations, safety aspects and upheld the value of the profession at its highest.
PO 10	Ability to upgrade required skills in the domain of construction technology, design process methods using software's to meet the changing scenario.

PROGRAM SPECIFIC OUTCOME	
PSO1	Understand the concept of energy in buildings and the impact of energy crisis in building industry and ability to design energy efficient buildings.
PSO2	Understand the planning aspects from the macro to micro level and ability to develop a planning, urban design proposal.

GRADUATE ATTRIBUTES

1. **Knowledge base on architecture:** Possess knowledge on fundamental architectural theories and sciences.
2. **Design analysis and solution:** Identify, formulate, analyze and provide architectural design solution.
3. **Investigation skills:** Conduct investigation of complex issues, skills to conduct investigation, interpret the observed the data to provide appropriate solution.
4. **Architectural communication Skills:** Convey design ideas through drawings and reports by manual and digital tools.
5. **Modern tool usage:** Skills to operate and work with the data manipulation, analytical tools.
6. **Architect and society:** Sensitive towards the culture, heritage and betterment of the society while planning and executing the project.
7. **Project & Finance Management:** Manage the diverse range of projects considering the available resources, technology and time frame.

8. **Environment and sustainability:** Possess knowledge on sustainable development principles and sensitive enough to safeguard the environment.
9. **Professional Practice & Ethics:** Upheld ethical values, standards while working as individual and group in the professional practice.
10. **Lifelong learning:** Update the required technical skills to upgrade the competency level in the fast pacing challenging environment.

Table : 3 Mapping of Program Educational Objectives (PEOs) with Program Outcomes (POs)

PO →	1	2	3	4	5	6	7	8	9	10	PSO1	PSO 2
PEO 1	3	1	3	1	1	2	3	1	1	1	3	3
PEO 2	3	3	3	1	1	3	1	2	1	1	3	2
PEO 3	1	2	2	2	3	3	1	3	3	3	3	3
PEO 4	1	1	1	3	2	2	2	2	2	2	1	1
	8	**7**	**9**	**7**	**7**	**10**	**7**	**8**	**7**	**7**	**10**	**9**

1 - Low 2 – Medium 3 - High

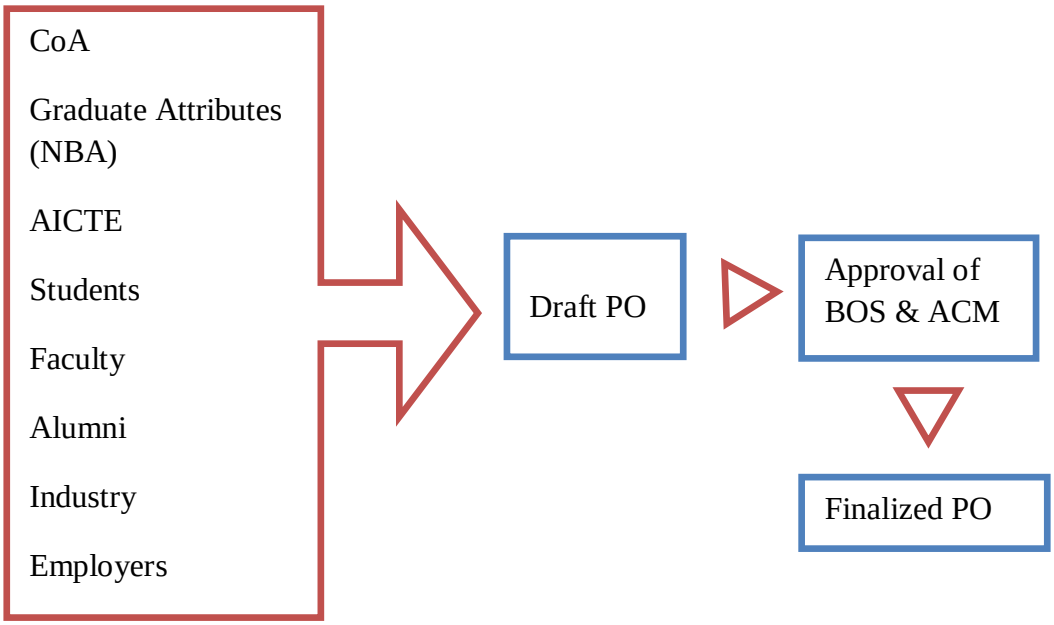
Table :4 Mapping of Program Outcomes (POs) with Graduate Attributes (GAs)

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10
PO1	3	1	2	1	2	2	1	1	1	1
PO2	1	3	1	2	1	1	1	1	2	1
PO3	2	1	3	1	1	2	2	3	2	2
PO4	1	1	1	3	1	1	2	1	1	1
PO5	3	3	2	1	3	1	2	1	1	1
PO6	1	1	2	1	1	3	1	1	3	1
PO7	2	1	1	2	2	1	3	1	2	2
PO8	1	1	3	1	3	2	1	3	1	1
PO 9	1	2	2	1	2	1	2	1	3	1
PO10	1	2	1	1	1	3	1	1	2	3
PSO1	2	1	2	1	2	2	1	3	1	2

PSO2	1	1	1	2	3	1	2	1	2	1

1- Slightly **2 – Supportive** **3 - Highly related**

PO PROCESS ESTABILSHMENT



CURRICULUM DEVELOPMENT

The Architecture curriculum is drawn to define the role of Architects to meet the global challenges and equip them in designing and developing a project and to provide sustainable solutions for PRACTICAL problems of society. In addition to their technical competencies, students must possess engagement skills, sustained learning and adapting, leadership, teamwork with good command in the communication skills.

The faculty members have been allotted for developing the courses and its outcomes as given below. They in turn conducted frequent discussions with each other and with students in drafting the course content.

The curriculum development is ensured that students receive integrated, coherent learning experiences that contribute towards their personal, academic and professional learning and development.

Courses and topics were designed and developed within a framework which comprises a specified curriculum, specified assessment arrangements, and clearly identified educational aims and learning outcomes.

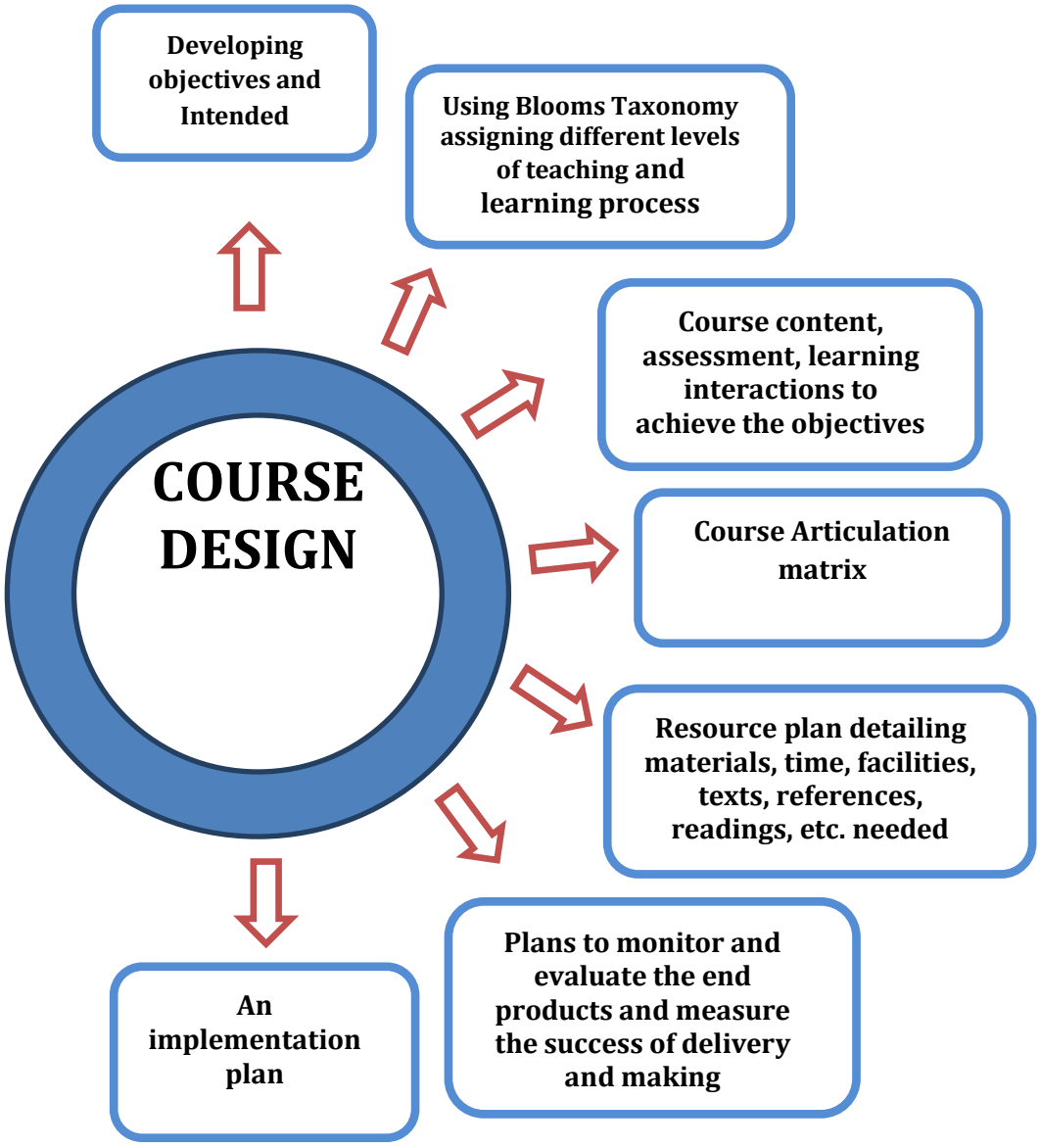
Faculty members assigned for course development

S.No	Course Name	Staff Incharge
1.	History of Architecture – I, II, III	Ar.K.Jasmine Vidhya
2.	Theory of Architecture I, II	Prof. Joseph N Fernando Ar.S.Pratheeba
3.	Architectural Graphics –I, II	Ar.V.S.Kavitha
4.	Materials and Construction – I, II, III, IV, V, VI	Ar.V.S.Kavitha
5.	Study skills and Language lab	Dr.K.Selva
6.	Mechanics of Structures – I, II	Er.R.Latha
7.	Basic Design & Visual Arts - I	Prof. Joseph N Fernando
8.	Model Making & Visual Arts - II	Ar.K.Manonmani
9.	Architectural Design – I, II, III, IV, V, VI, VII	Prof. Joseph N Fernando
10.	Climate and Architecture	Ar.K.Edhaya
11.	Building Services - I, II, III	Ar.N.Rameshbabu
12.	Design of Structures – I, II	Er.R.Sakthi Murugan
13.	Contemporary Architecture II	Prof. Joseph N Fernando
14.	Computer Applications in Architecture	Ar.J.Mullai
15.	Culture and Architecture	Prof .Joseph N Fernando
16.	Site planning and Surveying	Ar.J.Mullai
17.	Computer Applications	Ar.K.Chithra
18.	Human Settlement Planning	Ar.N.Rameshbabu
19.	Costing, Estimation & Valuation	Ar.K.Chithra
20.	Vernacular Architecture	Prof. Joseph N Fernando
21.	Energy Efficient Architecture	Ar.K.Edhaya
22.	Architectural Working Drawing and Specifications	Ar.V.Saranya
23.	Practical Training	Ar.S.Subramanian

24.	Advanced Building Services	Ar.N.Rameshbabu
25.	Professional Practice & Ethics	Ar.S.Subramanian
26.	Dissertation	Ar.R.Tanushree
27.	Thesis	Ar.V.S.Kavitha
28.	Electives	Ar.R.Kiruthiga, Ar.R.Tanushree
29.	Landscape Design	Ar.J.Mullai

COURSE DEVELOPMENT

The following elements were developed by the faculty involved after interaction and discussions.



In aligning programme outcome and graduate attributes, course offered to the degree programme are finalized based on the standard template finalized by the university.

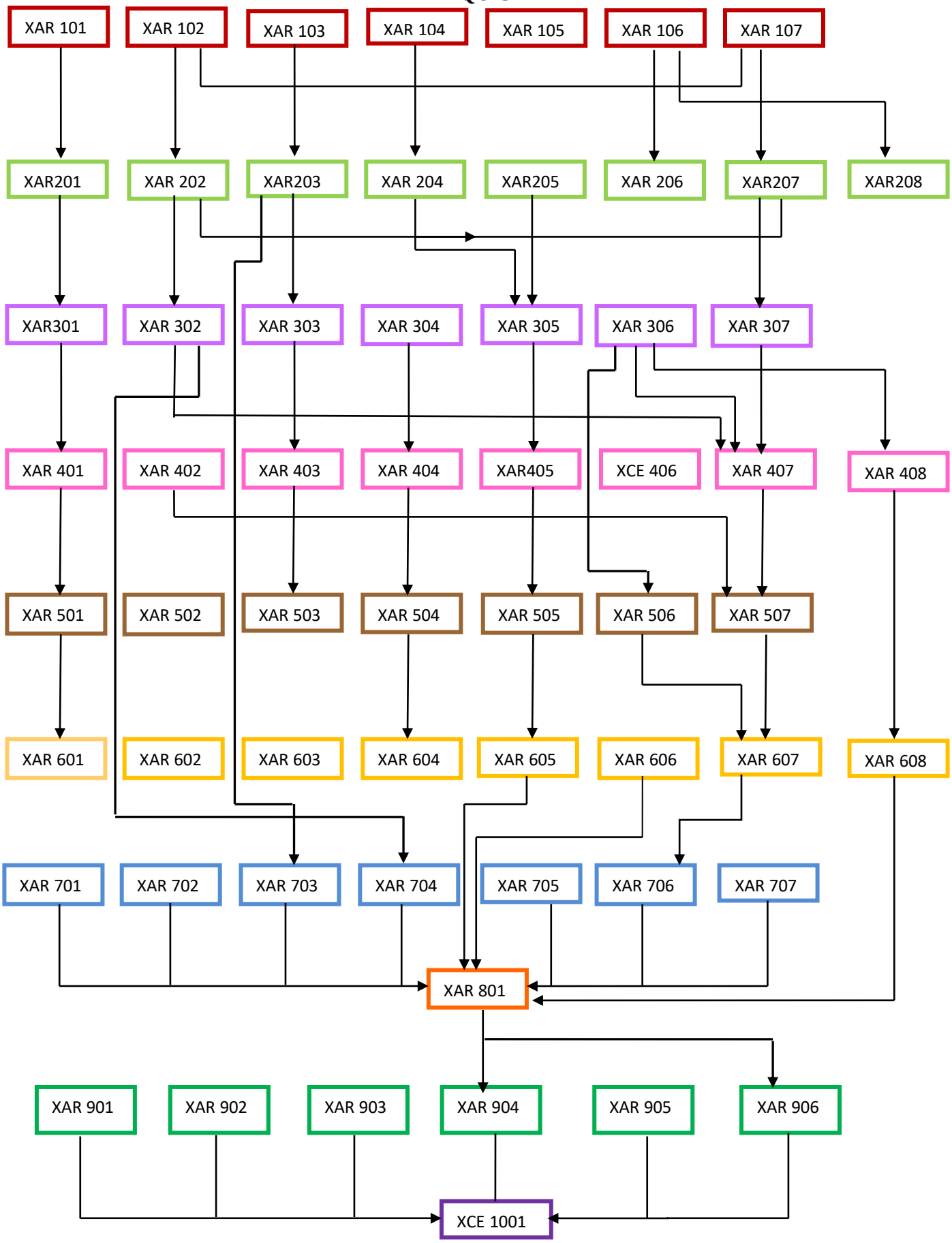
Distribution of Subjects to be included as per CoA, UGC and NAAC

S.No	Category	Symbol
1.	Professional Core Courses	PC
2.	Building Science and Applied Engineering	BS & AE
3.	Professional Electives	PE
4.	Open Electives	OE
5.	Professional Ability Enhancement Compulsory Courses	PAECC
6.	Skill Enhancement Courses	SEC
7.	Mandatory Courses (UGC Mandatory)	MC
8.	Non-credit Course	ELS
9.	NCC/NSS/YRC/RRC/Sports	

SUMMARY OF CREDITS

Category	I	II	III	IV	V	VI	VII	VIII	IX	X	Total	As suggested By CoA Model curriculum
PC	23	22	15	12	12	15	21		15	18	153	
BS & AE	2	7	10	13	13	3					48	
PE						6	3		6		15	
OE				2							3	
PAECC							3	12	6		21	
SEC	3		2		3	2					10	
MC												
ELS												
Total	28	29	27	27	29	26	27	12	27	18	250	250 to 275

PRE REQUISITE



B. ARCH – CURRICULUM

REGULATIONS – 2019

(Applicable to the students admitted from the Academic year 2019-20)

SEMESTER – I							
Sl.No	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**H**	**C**
1.	XAR101	History of Architecture – I (Hindu & Buddhist)	3	-	-	3	3
2.	XAR102	Theory of Architecture – I	3	-	-	3	3
3.	XAR103	Architectural Mathematics	2	-	-	2	2
		THEORY CUM STUDIO					
4.	XAR104	Architectural Graphics –I	1	-	2	5	4
5.	XAR105	Communication skills	1	-	1	3	3
		STUDIO					
6.	XAR106	Visual Arts I	-	-	3	6	4
7.	XAR107	Basic Design	-	-	6	12	9
8.		NSS / NCC / JRC*	Minimum 30 hours				
		SUB TOTAL	**10**	**-**	**12**	**34**	**28**

***The student can take either in I or II semester**

SEMESTER – II							
Sl.No.	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**H**	**C**
	Pre-requisite: A pass is required in Basic Design						
1.	XAR201	History of Architecture – II (Indo Islamic)	3	-	-	3	3
2.	XAR202	Theory of Architecture – II	3	-	-	3	3
3.	XAR203	Mechanics of Structures – I	3	-	-	3	3
		THEORY CUM STUDIO					
4.	XAR204	Architectural Graphics –II	1	-	2	5	4
5.	XAR205	Materials and Construction –I	2	-	2	5	4
		STUDIO					
6.	XAR206	Model making & Visual Arts II	-	-	2	4	3
7.	XAR207	Architectural Design – I	-	-	6	12	9
8.	XAR208	Value added course – I (Workshop on Arts)	Minimum 30 hours				

9.		NCC / NSS / JRC			Minimum 30 hours		
		SUB TOTAL	**12**	**-**	**12**	**35**	**29**

*The student can take either in I or II semester

SEMESTER – III							
Sl. No	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**H**	**C**
	Pre-requisite: A pass is required in Architectural Design - I						
1.	XAR301	History of Architecture – III	3	-	-	3	3
2.	XAR302	Site Surveying and Planning	3	-	-	3	3
3.	XAR303	Mechanics of Structures – II	3	-	-	3	3
		THEORY CUM STUDIO					
4.	XAR304	Building Services - I	2	-	1	4	3
5.	XAR305	Materials and Construction –II	2	-	2	5	4
		STUDIO					
6.	XAR306	Computer Applications in Architecture - I	-	-	2	4	2
7.	XAR307	Architectural Design – II	-	-	6	12	9
		SUB TOTAL	**13**	**-**	**11**	**34**	**27**

SEMESTER– IV							
Sl.No	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**H**	**C**
	Pre-requisite: A pass is required in Architectural Design - II						
1.	XAR401	History of Architecture – IV (Western)	3	-	-	3	3
2.	XAR402	Climate and Architecture	3	-	-	3	3
3.	XAR403	Design of Structures – I	3	-	-	3	3
		THEORY CUM STUDIO					
4.	XAR404	Building Services – II	2	-	1	4	3
5.	XAR405	Materials and Construction – III	1	-	2	5	4
		STUDIO					
6.	XAR406	Open Elective (To be attended in other department)	-	-	2	4	3

7.	XAR407	Architectural Design – III	-	-	6	12	9
8.	XAR408	Value added course – II (BIM)	Minimum 30 hours				
		SUB TOTAL	**12**	**-**	**11**	**34**	**28**

SEMESTER V							
Sl.No	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**H**	**C**
	Pre-requisite: A pass is required in Architectural Design - III						
1.	XAR501	Contemporary Architecture	3	-	-	3	3
2.	XAR502	Environmental Sciences	3	-	-	3	3
3.	XAR503	Design of Structures – II	3	-	-	3	3
		THEORY CUM STUDIO					
4.	XAR504	Building Services – III	2	-	1	4	3
5.	XAR505	Materials and Construction- IV	2	-	2	5	4
		STUDIO					
6	XAR506	Computer Applications in Architecture - II	-	-	2	4	3
7.	XAR507	Architectural Design – IV	-	-	7	14	10
		SUB TOTAL	**13**	**0**	**12**	**36**	**29**

SEMESTER VI							
Sl.No	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**H**	**C**
	Pre-requisite: A pass is required in Architectural Design - IV						
1.	XAR601	Vernacular Architecture	3	-	-	3	3
2.	XAR602	Professional Elective - I	3	-	-	3	3
3.	XAR603	Estimation, Costing & Valuation	2	-	-	2	2

		THEORY CUM STUDIO					
4.	XAR604	Professional Elective - II	2	-	1	4	3
5.	XAR605	Materials and Construction – V	1	-	2	5	3
		STUDIO					
6.	XAR606	Architectural Working Drawing and Specifications	-	-	2	4	2
7.	XAR607	Architectural Design – V	-	-	7	14	10
8.	XAR608	Value added course – III (Rhino & Grasshopper)	Minimum 30 hours				
		SUB TOTAL	**11**	**-**	**12**	**35**	**26**

SEMESTER VII							
Sl.No	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**H**	**C**
	Pre-requisite: A pass is required in Architectural Design - V						
1.	XAR701	Human Settlement Planning	3	-	-	3	3
2.	XAR702	Professional Practice & Ethics	3	-	-	3	3
3.	XAR703	Professional Elective - III	3	-	-	3	3
		THEORY CUM STUDIO					
4.	XAR704	Landscape Design	2	-	1	4	3
5.	XAR705	Materials and Construction – VI	1	-	2	5	4
		STUDIO					
6.	XAR706	Architectural Design – VI	-	-	8	16	12
7.	XAR707	Educational Tour	Around 2 weeks during the vacation				
		SUB TOTAL	**12**	**0**	**11**	**34**	**28**

SEMESTER VIII						
Sl.No	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**C**
	Pre-requisite: A pass is required in Architectural Design - VI					
1.	XAR801	Practical Training	-	-	-	12

SEMESTER IX							
Sl.No.	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**H**	**C**
	Pre-requisite: A pass is required in Practical Training						
1.	XAR901	Urban Design	3	-	-	3	3
2.	XAR902	Project Management	3	-	-	3	3
3.	XAR903	Housing	3	-	-	3	3
		THEORY CUM STUDIO					
4.	XAR904	Professional Elective – IV	2	-	1	4	3
		STUDIO					
5.	XAR905	Dissertation	-	-	3	6	4
6.	XAR906	Architectural Design – VII	-	-	8	16	12
		SUB TOTAL	**11**	**0**	**12**	**35**	**28**

SEMESTER X						
Sl.No	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**C**
	Pre-requisite: A pass is required in Architectural Design - VII					
1.	XAR1001	Thesis	-	-	35	18

LIST OF PROFESSIONAL ELECTIVES

PROFESSIONAL ELECTIVE - I (Sixth Semester)						
Sl.No.	**Code No.**	**COURSE TITLE**	**L**	**T**	**P**	**C**
1.	XAR602A	Culture and Architecture	3	-	-	3
2.	XAR602B	Digital Design Processes in Architecture	3	-	-	3
3.	XAR602C	Architecture and Structure	3	-	-	3
4.	XAR602D	Architecture of South East Asia	3	-	-	3

PROFESSIONAL ELECTIVE- II (Sixth Semester)

Sl.No.	Code No.	COURSE TITLE	L	T	P	C
1.	XAR604A	Glass in Architecture	2	-	1	3
2.	XAR604B	Cyber Security System	2	-	1	3
3.	XAR604C	Advanced Building Technology	2	-	1	3
4.	XAR604D	Building Automation and Management	2	-	1	3

PROFESSIONAL ELECTIVE – III (Seventh semester)

Sl.No.	Code No.	COURSE TITLE	L	T	P	C
1.	XAR703A	Disaster Resistance Architecture	3	-	-	3
2.	XAR703B	Architectural Lighting and Acoustics	3	-	-	3
3.	XAR703C	Behavioural Studies in Built Environment	3	-	-	3
4.	XAR703D	Steel in Architecture	3	-	-	3

PROFESSIONAL ELECTIVE – IV (Ninth semester)

Sl.No.	Code No.	COURSE TITLE	L	T	P	C
1.	XAR904A	Architectural Conservation	2	-	1	3
2.	XAR904B	Interior Design	2	-	1	3
3.	XAR904C	Energy Efficient Architecture	2	-	1	3
4.	XAR904D	Materials & Technologies for Sustainable Architecture	2	-	1	3

Total no. of credits: 253

Note:

L - Lecture T- Tutorial P – Practical C-Credit

B. ARCH – SYLLABUS

XAR101 – HISTORY OF ARCHITECTURE – I 3 – 0 – 0 - 3

Course Objectives:

1. To understand architecture as evolving within specific cultural contexts including aspects of
   politics, society, religion and climate.
2. To gain knowledge on the development of architectural form with reference to Technology, Style and Character in the Indus valley Civilization, Vedic period and manifestation of Buddhist, Hindu and Islamic architecture in various parts of the country

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Understand*** the origin of various civilization and Architecture in India at different points of time.	Cognitive	Understand
CO2	***Understanding*** the architectural responses with respect to materials, technology, style and character in the Buddhist, Hindu and Dravidian Architecture	Cognitive	Understand
CO3	***Gain Knowledge*** on the history related to design thinking, cultural aspiration, social needs, and the evolution of the built environment	Cognitive	Understand

SUBCODE	SUB NAME	L	T	P	C
XAR 101	**HISTORY OF ARCHITECTURE - I**	**3**	**0**	**0**	**3**
C:P:A	**3:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**

UNIT – I	**ANCIENT INDIA**	**7**

Indus Valley Civilization - Culture and pattern of settlement.

Aryan civilization - Evolution of early Aryan architectural forms - origins of early Hinduism - Vedic culture

Vedic village and the rudimentary forms of bamboo and Wooden construction under the Mauryan rule - origins of Buddhism and Jainism.

UNIT–II	**BUDDIST ARCHITECTURE**	**10**

Hinayana and Mahayana Buddhism - Architectural Production during Ashoka's rule - Ashokan Pillar. Salient features of a Chaitya hall and Vihara- Karli , Rani Gumpha

UNIT–III	**HINDU ARCHITECTURE**	**8**

Evolution of Hindu temple - Early shrines of the Gupta and Chalukyan periods – Tigawa temple, Ladh Khan Aihole, Papanatha and Virupaksha temples, Pattadakal. A comparative study of the Buddhist and Hindu styles

UNIT–IV	**DRAVIDIAN ARCHITECTURE**	**10**

. Rock cut productions under Pallavas –Shore temple, Mahaballipuram - Kailasanathar temple & Vaikunthaperumal temple, Kanchipuram, Dravidian Order – Evolution of Gopuram, city planning, Brihadeeswara Temple, Tanjore -

Meenakshi temple, Madurai - Srirangam temple.

UNIT–V INDO ARYAN STYLE 10

Salient features of an Indo Aryan temple - Lingaraja Temple- Bhuvaneswar , Sun temple-Konarak. Kunds and Vavs – vav - Adalaj - Surya kund, Modhera – Khandharia Mahadev temple, Khajuraho - Dhilwara temple, Mt. Abu. A comparative study of the Dravidian and Indo-Aryan styles.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Percy Brown, “Indian Architecture (Buddhist and Hindu Period)”, Taraporevala and Sons, Bombay, 1983.
2. Satish Grover, “The Architecture of India (Buddhist and Hindu Period)”, Vikas Publishing Housing Pvt. Ltd., New Delhi, 2003.
3. Christoper Tadgell, “The History of Architecture in India from the Dawn of civilization to the End of the Raj”, Longmon Group U.K.Ltd., London, 1990.

REFERENCES

1. George Michell, “The Hindu Temple”, BI Pub., Bombay, 1977.
2. Stella Kramrisch, “The Hindu Temple”, Motilal Banarsidass, 1976.
3. Parameswaranpillai V.R., “Temple culture of south India”, Inter India Publications,
4. George Michell Ed, “Temple Towns of Tamil Nadu”, Marg Pubs, 1995.
5. Raphael D., “Temples of Tamil Nadu Works of Art”, Fast Print Service Pvt Ltd., 1996.

Mapping of Cos with Pos:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PSO 1	PSO 2
CO1	3	1										
CO2	3	3	3									
CO3	12	9	8									
Total	3	2	2									
Scaled Value	**3**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

1 – 5 → 1, 6 – 10 → 2, 11 – 15 → 30 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

XAR102 – THEORY OF ARCHITECTURE – I	3 – 0 – 0 - 3

Course Objectives:

1. To understand what is architecture
2. To understand the elements of architecture
3. To understand the objectives and scope of architecture

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO 1	To know the need for architecture and the services of architecture.	Cognitive	Understand
CO 2	Understand form, space, their relationship and evolution of new form.	Cognitive	Knowledge
CO 3	Understand elements and fundamentals of defining space.	Cognitive	Interpret
CO 4	Understand the principles of architecture	Cognitive	Knowledge

SUBCODI	SUB NAME	L	T	P	C
XAR 102	**THEORY OF ARCHITECTURE-I**	**3**	**0**	**0**	**3**
C:P:A	**3:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**

UNIT – I	WHAT IS ARCHITECTURE ?	5
	Few definitions to architecture. Objective, scope and need for architecture. Its applications.	

UNIT – II	ARCHITECTURE IS A MULTIDISCIPLINARY FIELD (OCCUPATION)	5

The functional and aesthetic components of architecture.

The relationship between architecture and technology.

The relationship between architecture and fine arts.

Design process: Intuition vs analysis and synthesis (artistic vs scientific)

UNIT – III	AESTHETIC COMPONENT	15

Form & space: Unity of opposites, Shapes, visual and emotional effects of geometric forms - The sphere, the cube, the pyramid, the cylinder and cone and their derivatives, Subtractive & additive forms – linear, radial, centralized, clustered, grid.

UNIT – IV	ARCHITECTURAL SPACE	10

Space defining elements: Vertical, horizontal and curved elements.

Spatial relationship: space within a space, interlocking spaces, adjacent spaces, spaces linked by common spaces.

Spatial organization: influencing factors and their types: centralized, linear, radial, cluster, grid with examples.

UNIT – V	PRINCIPLES OF DESIGN	10

Proportion: Need for proportion, Golden Proportion, Modular. Indian proportion and Japanese Proportions.

Scale: The need for scale, human scale and generic scale.

Ordering Principles: Balance, Rhythm, Symmetry, datum, hierarchy, pattern and axis citing

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. V.S.Pramar, Design Fundamentals in Architecture, Samaiya Publications Private Ltd., New Delhi, 1973.

REFERENCES

1. Paul Alan Johnson - The Theory of Architecture - Concepts and themes, Van Nostrand Reinhold Co., New York, 1994.
2. Francis D.K.Ching, Architecture-Form, Space and Order, Van Nostrand Reinhold Company, New York, 1979.
3. Helm Marie Evans and Caria David Dunneshil, An initiation to design, Macmillan Publishing Co. Inc., New York

Mapping of COs with Pos

	PO 1	PO 2	PO 3	PO 4	PO5	PO6	PO7	PO 8	PO 9	PO1 0	PSO1	PSO 2
CO1	3		2									1
CO2	3		2									1
CO3	2		2									1
CO4	3		2									1
Total	11		10									4
Scaled Value	3	2										1

1-5 =1, 6-10=2, 11-15=3, 0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 103 – ARCHITECTURAL MATHEMATICS 2 – 0 – 0 – 2

Course Objectives:

1. Understanding the simple and complex geometry and calculating the areas and volumes
2. Identifying practical problems to obtain solutions involving trigonometric and exponential functions.
3. Understanding the various proportioning systems and their applications.
4. Analyzing data collection and interpretation of results using statistical and computer tools

Course Outcome:	**Domain**	**Level**

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

CO1	***Find*** area and volumes of simple, complex and	Cognitive	Rememberin

	irregular geometries using various rules.		g
CO2	***Apply*** Trigonometry on architectural elements	Affective	Applying
CO3	***Demonstrate*** the appropriate role of the mathematical concepts learnt.	Cognitive	Understanding
CO4	***Analyze*** Tally charts, Tables and graphs and statistical diagrams using for various types of data.	Affective	Analyzing
CO5	***Explain*** about various architectural proportioning systems and calculating the same.	Cognitive	Understanding

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 103	**ARCHITECTURAL MATHEMATICS**	**2**	**0**	**0**	**2**
C:P:A	**3:0:0**	**L**	**T**	**P**	**H**
		2	**0**	**0**	**2**

UNIT – I	**AREAS AND VOLUMES**	**6**

Surface areas and frustum of complex geometry consisting of primitives – cuboid, cylinder, cone, pyramid, and cylinder. Practical application of calculating areas of and building element like floors, walls, staircase. Volumes of complex geometry consisting of primitives – cuboid, cylinder, cone, pyramid, and cylinder. Practical application of calculating Volumes rooms, staircases, walls, roof etc. Mid ordinate rule, Trapezoidal rule, Simpson's rule, Volume of irregular solids, Prismoidal rule.

UNIT–II	**TRIGNOMETRY AND SETTING OUT**	**6**

Trignometrically ratios for 30°, 45°, 60°, Angle of elevation and depression, sine rule and cosine rule. Practical application of Trignometry on staircases, ramps and different kinds of sloping roofs. Setting out of simple building sites, Bay window and curved brick works, Checking a building for square corners, Circular arches.

UNIT–III	**STATISTICS**	**6**

Tally charts, Tables and graphs, Types of data: Discrete, continuous, raw and group, Averages: Mean, mode and median, Statistical diagrams: Pictorial, bar chart, pie chart and line graphs. Histograms, Frequency distribution.

UNIT–IV	PROPORTIONS AND FIBONACCI NUMBERS	6
.	Golden mean ratio, algebric relations and its application in Egyptian pyramids, Fibonacci series, Fibonacci rabbit experiment, Square root proportions, Modular proportions	
UNIT–V	**COMPUTER TECHNIQUES**	**6**
	Introduction to excel, creating formulas to solve problems based on above topics. Introduction to Matlab.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	0	30

TEXT

1. I.H.Morris – Geometrical drawing for Art Students. Orient Longman – Madras 1982
2. Albert. O. Halse – Architectural Rendering Techniques McGraw-Hill Book Co. New York 1972

REFERENCES

1. Construction Mathematics, Surinder Singh Virdi and Roy T Baker, Elsevier, 2008
2. The Golden Ratio, Mario Livio, Broadway Books
3. Architecture and Mathematics in Ancient Egypt, Corinna Rossi, Cambridge University Press

e- REFERENCES

1. http://www.cs.brown.edu
2. http://www.dtcc.edu/ - document, project info – Arch.dwg.

Mapping of Cos with Pos:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1			1	2								
CO2			1	1								
CO3			1	2								
CO4			1	1								
CO5			1	1								
Total			5	7								
Scaled Value			1	2								

1 – 5 → 1, 6 – 10 → 2, 11 – 15 → 30 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

XAR 104 - ARCHITECTURAL GRAPHICS – I	1 – 0 – 2 – 4

Course Objectives:

1. To prepare students for three-dimensional visualization and representation of complex geometrical objects in the form of two and three dimensional drawings.
2. To educate students with the basics of drafting tools and their application in the process of drawing preparation.
3. To educate students with concepts and fundamentals of architectural drawings.

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO1	Understand the concepts of architectural drawings	Cognitive	Knowledge
CO2	Ability to represent complex geometrical forms in two and three dimensional drawings of varied scales.	Psychomotor	Application
CO3	Draw Orthographic projections, Axonometric and Isometric views of three-dimensional objects in varied scales.	Affective	Application

SUBCODE	SUB NAME	L	T	P	C
XAR104	**ARCHITECTURAL GRAPHICS - I**	**1**	**0**	**2**	**4**
C:P:A	**0.6:1.8:0.6**	**L**	**T**	**P**	**H**
		1	**0**	**2**	**5**

UNIT - I	INTRODUCTION TO GEOMETRICAL DRAWING	15

Introduction to fundamentals of geometrical drawing - Construction of lines, line value, line types, lettering, dimensioning, representation, format for presentation, etc. Use of scales in drawing – plain, diagonal and comparative scales

UNIT - II	PLANE GEOMETRY	20

Construction of planar surfaces - square, circle, curve, polygon etc,

Projection of points, lines and planes

UNIT - III ORTHOGRAPHIC PROJECTIONS 10

Orthographic Projection of solids – simple and complex solids, section of solids, true shape of solids – intersection and interpenetration of solids.

UNIT - IV AXONOMETRIC PROJECTIONS 10

Introduction to Axonometric projections – Isometric and Oblique projections. Construction of basic shapes and combination of shapes and solids in Isometric projections.

UNIT - IV MEASURED DRAWING 20

Fundamentals of measured drawing – draw the plan, elevation and section of simple objects - furnitures and building components using suitable scale.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	60	75

TEXT

1. I.H.Morris – Geometrical drawing for Art Students. Orient Longman – Madras 1982
2. Albert. O. Halse – Architectural Rendering Techniques McGraw-Hill Book Co. New York 1972

REFERENCES

1. George K.Stegman, Harry J.Stegman, Architectural Drafting Printed in USA by American Technical Society, 1966.
2. Francis Ching, Architectural Graphics, Van Nostrand Rein Hold Company, New York, 1964.
3. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1964.
4. Tokyo Musashino Academy of Art - Introduction to Pencil Drawing, Graphic - Shaw PublishingCo. Ltd., Japan, 1991.

WEBSITES

1. http://www.cs.brown.edu

2. http://www.dtcc.edu/ - document, project info – Arch.dwg.

Mapping of COs with Pos												
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**PSO 1**	**PSO 2**
CO1				1	1							
CO2				3	3							
CO3				3	3							
Total				7	7							
Scaled Value				2	2							

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR105 - COMMUNICATION SKILLS 1 – 0 – 1 – 3

Objectives:

- To enhance their communication skills in English by developing their listening, speaking,
  reading and writing skills.

Expected outcome		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	Knowledge on the techniques and strategies of communication.	Cognitive	Knowledge
CO2	Enhance their reading skills specifically journals, books.		Apply
CO3	Develop the speaking skills specifically conversing with peers, presenting their works.		Understand
CO4	Learn to apply different strategies in writing a paper or proposal		Apply

SUBCODE	SUB NAME	L	T	P	C
XAR 105	COMMUNICATION SKILLS	1	0	1	3
C:P:A	3:0:0	L	T	P	H
		1	0	1	3

UNIT - I	INTRODUCTION	9

Listening- short talks, interviews and discussions from various media

Speaking-negotiating meaning, convincing people- describing places

Reading- texts on architecture, Writing process descriptions -Vocabulary Development-Abbreviations and Acronyms. Grammar - Suitable tenses to write descriptions and describe.

UNIT – II	SPEAKING, READING AND WRITING	9

Listening –listen to talks for specific information.

Speaking- preparing a presentation using the computer, participating in small group discussion. Reading- lengthy articles related to architecture and construction

Writing- writing formal emails, vocabulary appropriate words to describe topics in architecture. Grammar- suitable grammar for writing a report.

UNIT– III	DESCRIPTIVE PRESENTATION	9

Listening- Descriptions of place, conversations and answering questions,

Speaking- making a power point presentation on a given topic,

Reading- architecture manuals, Writing- writing a report, writing essays- descriptive essays, Vocabulary- adjectives of comparison, Grammar - collocations.

UNIT – IV	ANALYTICAL PRESENTATION	9

Listening- TED talks, Speaking- participating in group discussions,

Reading- reading and interpreting visual information,

Writing- writing analytical essays and argumentative, Vocabulary- suitable words to be used in analytical and argumentative essays, Grammar - subject-verb agreement.

UNIT – V PROJECT PROPOSAL PRESENTATION 9

Listening- ink talks and longer talks, Speaking- talking about one's project proposal,

Reading- reading essays on construction, buildings, different schools of architecture, Writing proposals, Vocabulary- related vocabulary, Grammar- Cohesive devices.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	30	45

TEXT

1. V.R. Narayanaswamy, Strengthen Your Writing (Orient Longman)
2. Jaya Sasikumar, Champa Tickoo, Writing With A Purpose, Published by Oxford University Press | Paper Back | Language – English
3. *Freeman, Sarah*: *Study Strategies*, New Delhi: Oxford University Press, *1979*.
4. Paul Gunashekar M.L. Tickoo, Reading for Meaning, Published by S. Chand & Company Ltd.

   Sultan Chand & Company

E – REFERENCES

1. Sharon Hendenreich Springer - English for Architects and civil Engineers -, 2014 ISBN 978-3-658-030-63.

Table 1: Mapping of Cos with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	-	2	-	1	-	-	-	-	-
CO2	2	-	-	-	-	-	2	-	1	-	-	-	-	-
CO3	1	-	-	-	-	-	1	-	1	-	-	-	-	-
CO4	2	-	-	-	-	-	1	-	1	-	-	-	-	-
Total	7	-	-	-	-	-	6	-	4	-	-	-	-	-
Scaled Value	2	-	-	-	-	-	2	-	1	-	-	-	-	-

1-5= 1, 6-10 = 2, 11-15= 3,0-No Relation, 1- Low Relation, 2 – Medium Relation, 3- High Relation

XAR106 – VISUAL ARTS I **0 – 0 – 6 – 4**

Course Objectives:

1. To understand that the basic design elements and principles are the important tools for creative designing.
2. To stimulate the creative thinking process by drawing inspirations from nature
3. To understand the basics of two and three dimensional visual compositions.
4. To provide practical understanding of design principles using studio exercises.
5. To gain art appreciation skills through visual arts

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	Express the knowledge on appreciation of paintings and other art forms.	Affective	Valuing
CO2	Draw the basic geometrical shapes, components of scenes.	Affective	Drawing
CO3	Demonstrate the knowledge on components of visual composition.	Cognitive	Application
CO4	Develop and compose the natural scenes.	Psychomotor	Application
CO5	Design and develop scaled sketches	Psychomotor	Application

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 106	**VISUAL ARTS I**	**0**	**0**	**3**	**4**
C:P:A	**1:1.5:1.5**	**L**	**T**	**P**	**H**
		0	**0**	**3**	**6**

UNIT – I	**BASICS OF DRAWING**	**25**
	Introduction to History of Arts – Artists, Art movements. Introduction to drawing tools – Quality of lines and expressions – pen, pencil, charcoal, marker, etc. – Exercises to explore the various rendering techniques using various tools.	

UNIT – II	**FREE HAND DRAWING**	**30**

Seeing and drawing – Still life and natural objects – exploring the elements of art – line, shape, form, proportion, scale, texture, colour. Exercises to develop the visual perception.

UNIT –III PAINTING **35**

Exercises with themes on principles of art and to explore various colour schemes using various mediums – water colour, poster colour, acrylic, oil paint, tools & techniques – brushes, knife, lumograph pen, etc.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	90	90

TEXT

1. Maittand Graves – The Art of Colour and Design McGraw-Hill Book company Inc. 1951
2. Albert O.Halse, Architectural Rendering, 1990.
3. Ching Francis, “Drawing a Creative Process”, Van Nostrand Reinhold, New York, 1990.
4. Webb, Frank, “The Artist guide to Composition”, David & Charles, U.K., 1994.

Mapping of COs with POs

	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PSO 1	PSO 2
CO1	3				1							
CO2	3				1							
CO3	3				1							
CO4	3				1							
CO5	3				1							
Total	15				5							
Scaled Value	3				1							

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR107 - BASIC DESIGN **0 – 0 – 6 – 9**

Course Objectives:

1. To understand that the basic design elements and principles are the important tools for creative designing.
2. To stimulate the creative thinking process by drawing inspirations from nature
3. To understand the basics of two and three dimensional visual compositions.
4. To provide practical understanding of design principles using studio exercises.
5. To gain art appreciation skills through visual arts

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	Understand the basic design elements and principles	Cognitive	Understand
CO2	Identify common design principles applicable to architecture	Psychomotor	Application
CO3	Develop the skills of art appreciation and sense of aesthetics by studying, correlating the basic design principles and works of master architects.	Affective	Analyze
CO4	Involve in practical exercises to apply the learnt design principles.	Psychomotor	Application
CO5	Develop the skills of expressing the ideas visually through observation, analysis, abstractions, interpretation through models and drawings using different media.	Affective	Interpret

SUBCODE	SUB NAME	L	T	P	C
XAR 107	BASIC DESIGN	0	0	6	9
C:P:A	2:1.5:1.5	L	T	P	H
		0	0	6	12

UNIT – I	INTRODUCTION TO DESIGN	30

Definition of design - Design Thinking - Design Process - Design problems and solutions. Exercises using points and lines.

UNIT – II	PRINCIPLES OF VISUAL COMPOSITIONS	50

Principles of Design and its role in expression (architectural expression)

Introduction to principles of organization/composition

Repetition, Variety, Radiation, Rhythm, Gradation, Emphasis & Subordination, Proportion, Harmony, Balance, Focal point, Symmetry, Asymmetry, Background, Foreground, Sense of Direction – Exercises to explore the above principles - Symmetrical and asymmetrical compositions and patterns by organization of shapes, expressing themes using geometrical or organic shapes.

UNIT –III	STUDY OF COLOURS	30

Study of classification of colours with different hues, values, and shades. Exploring colour theories and applying them in visual composition – Example: Poster design

UNIT – IV	VISUAL PROPERTIES	20

Study of Visual Properties - visual textures, optical illusion etc. and apply them in visual composition – Example : Collage

UNIT –V	FORMS – GEOMETRIC / SCULPTURAL	50

Exploring the forms - Linear and Planar, fluid and plastic forms using simple material like Match stick, Mount Board, metal foil, wire string, thermocol, clay, plaster of Paris etc. Study of Solids and voids to evolve sculptural forms and spaces, Additive models using similar forms / dissimilar forms, subtractive models from a given geometric form - using various materials and mediums like

casting , moulding, etc.,

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	180	180

TEXT

1. Maittand Graves – The Art of Colour and Design McGraw-Hill Book company Inc. 1951
2. Albert O.Halse, Architectural Rendering.
3. A techniques of contemporary – presentation McGraw HillBook Company, New York, 1972.
4. Mulick Milind, Water colour, Jyotsna Prakasan, Mumbai 2002.
5. Farey; A. Cyril, Architectural Drawing perspective and Rendering – A Hand book for students and draftsmen
6. John W.Mills - The Technique of Sculpture, B.T.Batsford Limited, New York - Reinhold PublishingCorporation, London, 1966. Elda Fezei, Henny Moore, Hamlyn, London, New York, Sydney, Toronto, 1972.
7. C.Lawrence Bunchy - Acrylic for Sculpture and Design, 450, West 33rd Street, New York, N.Y.10001, 1972. Orbid Publishing Ltd., Know how the complete course in Dit and Home Improvements No.22, Bed fordbury, London, W.C.2, 1981.

REFERENCES

1. Edward D.Mills - Planning the Architects Hand Book - Bitterworth, London, 1985.
2. V.S.Pramar, Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Nelhi, 1973.
3. Francis D.K.Ching - Architecture - Form Space and Order Van Nostrand Reinhold Co., (Canaa), 1979.

WEBSITES

1. http://infinit.net – elements of design
2. http://www.okino.com - design, visualization, rendering system.
3. http://www.interface - signage.com

4. http://www.design community.com – arch rendering, 3D design

Mapping of COs with POs												
	PO1	**PO2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PSO 1**	**PSO 2**
CO1	3				1							
CO2	3				1							
CO3	3				1							
CO4	3				1							
CO5	3				1							
Total	15				5							
Scaled Value	3				1							

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR201 – HISTORY OF ARCHITECTURE – II 3 – 0 – 0 - 3

Course Objectives:

1. To understand Islamic architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
2. To gain knowledge on the development of architectural form with reference to Technology, Style and Character in the Mughal rulers.

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Understand*** the evolution of Mughal Architecture in India at different points of time.	Cognitive	Understand
CO2	***Understanding*** the architectural responses with respect to materials, technology, style and character.	Cognitive	Understand
CO3	***Gain Knowledge*** on the history related to design thinking, cultural aspiration, social needs, and the evolution of the built environment	Cognitive	Understand

SUBCODE	SUB NAME	L	T	P	C
XAR 201	**HISTORY OF ARCHITECTURE - II**	**3**	**0**	**0**	**3**
C:P:A	**3:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**

UNIT – I INTRODUCTION TO INDO ISLAMIC ARCHITECTURE 10

Advent of Islam into the Indian subcontinent and its impact - Factors Influencing Islamic Architecture- socio-cultural, political - Evolution of building types in terms of forms and functions - the Mosque, the Tomb, and Minaret, the Madarasa, the Caravanserai.

Elements and character of Islamic architecture in terms of structure, materials and methods of construction. Elements of decoration, color, geometry, light.

UNIT–II ISLAMIC ARCHITECTURE-IMPERIAL ERA 12

Evolution of architecture under the Slave kings – Khalji - Qutub mosque, Qutubminar, Tomb of Nasir - ud - din - Mohammed shah, eg.: Alai Darwaya, Tughlaq - eg. Tomb of Ghiyas - ud - din Tughlaq, Kirki mosque, Delhi., Sayyid and Lodhi Dynasties – tombs in Punjab- eg.: Mothi - Ki - Masjid.

UNIT–III ISLAMIC ARCHITECTURE - PROVINCES 10

Evolution of regional architecture and the factors influencing - geographic, cultural, political, etc., - Bengal – Adina mosque, Gujarat - earlier period – Mosque at Broach, Jami Masjid at Ahmedabad, middle period - Mosque at Champanir, Teen Darwaza, later period - Siddisayad mosque, Shah Alam Rauza,

Adalaj - step well , Rani Rupavatis Mosque, Jaunpur- Jami Masjid of Jaunpur, Malwa - royal complex at Mandu, Kashmir – Jami Masjid, Srinagar, Deccan (Gulbarga, Bidar, Golconda and Bijapur)

UNIT–IV MUGHAL ARCHITECTURE 13

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Evolution of Mughal architecture - cities and gardens under the Mugal rulers Babur - eg. Humayuns Tomb – Delhi, Akbar - Agra fort, Fate-pur-sikri - site planning, Jodhabais palace, Birbal palace, Diwan-e- khas, Salim Chisti's Tomb & Buland Darwaza; Jahangir - Akbar's mausoleum at Sikandra, Shahjahan - Red fort, Jami Masjid at Delhi, Taj - Mahal - Agra.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Percy Brown, “Indian Architecture (Islamic Period)”, Taraporevala and Sons, Bombay, 1983.
2. Satish Grover, “Islamic Architecture of India”, CBS Publishers, New Delhi, 2002.
3. Christoper Tadgell, “The History of Architecture in India from the Dawn of civilization to the End of the Raj”, Longmon Group U.K.Ltd., London, 1990.

REFERENCES

1. Christopher Tadgell, “The History of Architecture in India”, Penguin Books (India) Ltd, New Delhi, 1990.
2. R.Nath, “History of Mughal Architecture”, Vols I to III - Abhinav Publications, New Delhi, 1985.
3. Catherine Asher, “Architecture of Mughal India”, Cambridge University Press, 2001.
4. Monica Juneja, “Architecture in Medieval India: Forms, Contexts, Histories”, New Delhi, Permanent Black, 2001

Mapping of Cos with Pos:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PSO 1	PSO 2
CO1	3	1										
CO2	3	3	3									
CO3	12	9	8									
Total	3	2	2									
Scaled Value	**3**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

1 – 5 → 1, 6 – 10 → 2, 11 – 15 → 30 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

XAR202 – THEORY OF ARCHITECTURE – II 3 – 0 – 0 - 3

Course Objectives:

1. To impart knowledge about architecture, design and the various components involved in it.
2. Educate them about the fundamental principles and elements of architecture.
3. To understand the primary two dimensional and three dimensional elements in architecture.
4. Students will be equipped to design spaces and products applying the various principles of design for courses such as Architectural Design & Interior Design.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO 1	***Understand*** the factors that determine the size and shape of architectural spaces.	Cognitive	Remember Understand
CO 2	***Understand*** the role played by climate and site conditions in modifying the form of the architectural spaces.	Cognitive	Understand Knowledge
CO 3	***Understand*** the role played by the materials and structural system in architectural design.	Cognitive	Understand Knowledge
CO 4	***Understand*** the role played by socio psychological aspects in architectural design	Cognitive	Understand Knowledge

SUBCODI	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 202	**THEORY OF ARCHITECTURE - II**	**3**	**0**	**0**	**3**
C:P:A	**3:0:0**	**L**	**T**	**P**	**H**

		3	**0**	**0**	**3**

UNIT – I	**FUNCTIONAL AND AESTHETIC ASPECTS**	**10**

The relationship between form and function found in natural objects and their aesthetics. Example flowers, fruits etc.

The relationship between form and function found in man-made objects and their aesthetics. Example Knife, Chair etc.

The work of an architect: tackling functional aspect and aesthetic aspects.

Handling architectural projects: Planning, designing and execution.

UNIT – II	**ANTHROPOMETRICSAND ITS APPLICATION**	**5**

Determining size and shape of various activity spaces

UNIT – III	**CLIMATE AND SITE**	**10**

The impact of climatology on the design of spaces. Examples from the past and present.

The impact of site conditions on the design of spaces. Examples from past and present.

UNIT – IV	**BUILDING MATERIALS AND STRUCTURAL SYSTEM**	**10**

The relationship between building materials and structural systems possible by them and the resultant forms. Examples from the past and present.

UNIT – V	**SOCIO PSYCHOLOGICAL ASPECTS**	**10**

Believes, values and the aspiration of the user and its impact on architecture. Examples from past and present.

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**0**	**0**	**45**

TEXT

1. V.S.Pramar, Design Fundamentals in Architecture, Samaiya Publications Private Ltd., New Delhi, 1973.
2. Francis D.K.Ching, Architecture-Form, Space and Order, Van Nostrand Reinhold Company, New York, 1979. Samaiya Publications Private Ltd., New Delhi, 2007.

REFERENCES

1. Paul Alan Johnson - The Theory of Architecture - Concepts and themes, Van Nostrand Reinhold Co., New York, 1994.
2. Helm Marie Evans and Caria David Dunneshil, An initiation to design, Macmillan Publishing Co. Inc., New York

Mapping of COs with POs

	PO 1	PO 2	PO 3	PO 4	PO5	PO6	PO7	PO 8	PO 9	PO1 0	PSO1	PSO 2
CO1	2	1	1									1
CO2	2	1	1									1
CO3	2	1	1									1
CO4	2	1	1									1
Total	8	4	4									4
Scaled Value	2	1	1	0	0	0	0	0	0	0	0	1

1-5 =1, 6-10=2, 11-15=3, 0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 203 -MECHANICS OF STRUCTURES - I 3 – 0 – 0 – 3

Course Objectives:

1. To enable students to understand the effect of action of forces on a body and the concept of equilibrium of the body through exercises.
2. To educate the students to calculate the sectional properties (centroid, moment of inertia, section modulus and radius of gyration) for various sections by working out problems.
3. To inculcate the students to study the stress – strain behaviors of steel and concrete due to axial loads and to determine the stresses and strains developed in solids due to external action through select problems.
4. To enhance students' ability to design by requiring the solution of open-ended problems.

Course Outcome:		Domain	Level
Upon successful completion of this course, it is expected that students will be able to			
CO1	***Apply*** the concepts of action of forces on a body and equilibrium concepts.		Understand
CO2	***Analyze*** any type of determinate trusses with different end conditions.		Analyze
CO3	***Solve*** the sectional properties for any geometrical shapes.		Application
CO4	***Understand*** the concepts of stress, strain and elastic consonants		Understand

SUBCODE	SUB NAME	L	T	P	C
XAR 203	**MECHANICS OF STRUCTURES - I**	**3**	**0**	**0**	**3**
C: P: A	**3:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**

UNIT - I	**FORCES AND STRUCTURAL SYSTEMS**	**8**

Units of Measurement- Introduction to Scalar and Vector, Types of force systems - Resultant of parallel forces - law of mechanics – coplanar and non-coplanar forces - Resolution and Composition of forces

UNIT - II	**EQUILIBRIUM OF RIGID BODIES**	**7**

Principle of moments - principle of equilibrium – Free body Diagram- simple problems, types of supports and their reactions – requirements of stable equilibrium

UNIT – III	**ANALYSIS OF PLANE TRUSSES**	**10**

Introduction to Determinate and indeterminate plane trusses - Analysis of simply supported and cantilevered trusses by method of joints and method of sections.

UNIT – IV	**PROPERTIES OF SECTION**	**10**

Centroid and Center of Gravity- Moment of Inertia- Polar Moment of Inertia- Product of Inertia- Introduction to Moment of Inertia of Masses with simple problems - Section modules – Radius of gyration - Theorem of perpendicular axis - Theorem of parallel axis

UNIT –V ELASTIC PROPERTIES OF SOLIDS 10

Stress strain diagram for mild steel, High tensile steel and concrete - Concept of axial and volumetric stresses and strains. Elastic constants - Relation between elastic constants - Application to problems.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. R.K.Bansal – A textbook on Engineering Mechanics. Lakshmi Publications. Delhi 1992
2. R.K.Bansal – A textbook on Strength of Materials Lakshmi Publications. Delhi 1998

REFERENCES

1. P.C.Punmia, Strength of Materials and Theory of Structures; Vol. I, Laxmi publications, Delhi 1994
2. S.Ramamrrutham, Strength of materials - Dhanpatrai& Sons, Delhi, 1990.
3. W.A.Nash, Strength of Materials - Schaums Series – McGraw-Hill Book Company, 1989.
4. R.K. Rajput - Strength of Materials, S. Chand & Company Ltd., New Delhi 1996

Table-1 Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	2	3	0	0	0	0	0	0	0	0	0	0
CO2	2	2	0	0	0	0	0	0	0	0	0	0
CO3	1	0	3	0	0	0	0	0	0	0	0	0
CO4	1	2	0	0	0	0	0	0	0	0	0	0
Total	6	7	3	3	0	0	0	0	0	0	0	0
Scaled Value	2	2	1	1	0	0	0	0	0	0	0	0

1-5 =1, 6-10=2, 11-15=3 0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 204 – ARCHITECTURAL GRAPHICS – II	1 – 0 – 2 – 3

Course Objectives:

1. To prepare students for three-dimensional visualization and representation of objects and buildings in the form of drawings.
2. To equip the students with appropriate skills, techniques and knowledge for preparing measured drawings, working drawings, design drawings in courses such as Materials and Construction and Architectural Design

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO2	Measure and prepare scaled measured drawings of various objects and existing buildings/ structures.	Psychomotor	Application
CO3	Prepare One-point &Two-point perspective views of objects, interior and exterior of buildings from given plans and elevations.		Application
CO4	Draw the shade and shadows of basic geometric shapes, forms and buildings.		Application
CO5	To apply graphic principles in preparing construction drawings for complicated buildings.	Affective	Create

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 204	**ARCHITECTURAL GRAPHICS – II**	**1**	**0**	**2**	**4**
C:P:A	**0.6:1.2:0.6**	**L**	**T**	**P**	**H**
		1	**0**	**2**	**5**

UNIT - I	**MEASURED DRAWING**	**25**

Detailed measured drawing/documentation of historic and architectural monument or building of small scale. Complete Documentation including the plan, section, elevation, details of building construction and technology.

UNIT - II	**PERSPECTIVE**	**30**

Characteristics of Perspective Drawings, Perspective systems and methods. Two point perspective of simple objects, outdoor and indoor view of a building, etc.

One point and three point perspective of interiors Perspective theory and practice using scientific methods and short cut methods. Applying rendering techniques.

UNIT - III	SCIOGRAPHY	20

Principles of shades and shadows - Shadows of geometrical shapes and solids – construction of sciography on buildings and Shadows of architectural elements, etc.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	60	75

TEXT

1. Robert. W.Gill – Advanced perspective and Sciography Thames and Hudson London 1974
2. Claude Batley – Indian Architecture Taraporevale sons & co. Bombay.

REFERENCES

1. William Kirby Lockard, Drawing as a Means to Architecture, Van Nostrand, Reinhold Company, New York.
2. George A.Dinsmore, Analytical Graphics - D.Van Nostrand, Company Inc., Canada.
3. John M.Holmes, Applied Perspective, Sir Isaac, Piotman and Sons Ltd., London 1954.
4. Robert W.Gill, Basic Perspective, Thames and Hudson, London, 1974.
5. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1964.
6. Francis Ching, Architectural Graphics, Van Nostrand and Reinhold Company, New York, 1975.
7. Ernest Norling, Perspective drawing, Walter Fostor Art Books, California, 1986.
8. Bernard Alkins - 147, Architectural Rendering, Walter Foster Art Books, 1986.

WEBSITES

1. http://www.cs.brown.edu
2. http://www.dtcc.edu/-document,projectinfo–Arch.dwg.

Table 1: Mapping of COs with Pos												
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**PSO 1**	**PSO 2**
CO1				3	2							
CO2				3	3							
CO3				3	2							
CO4				3	2							
CO5				3	3							
Total				15	12							
Scaled Value				3	3							

1-5 =1, 6-10=2, 11-15=3 0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR205 - MATERIALS AND CONSTRUCTION - I 2 – 0 – 2 – 4

Objectives:

1. To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as soil, lime, rocks and stones.
2. To inform the properties, characteristics and use of bamboo, palm, straw, etc. and methods of preservation and treatment.
3. To sensitize the students to the use of these naturally occurring materials in the context of creating a green architecture.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	Understand the basics of structures, their type and draw the section of wall showing the various building components and list their functions.	Cognitive	Understand
CO2	Know the origin, properties, process of manufacturing, treatment, preservation methods and types of various building materials like soil, stone and lime and understand their importance and uses in building construction.	Cognitive Affective Psychomotor	Knowledge Analyze Application
CO3	Draw the various types of foundation, wall, roof trusses, flooring and plastering for rural and modern structures using various materials like brick, stone.	Psychomotor	Application

SUBCODE	SUB NAME	L	T	P	C
XAR 205	MATERIALS AND CONSTRUCTION - I	2	0	2	4
C:P:A	1.5:1:0.5	L	T	P	H
		2	0	2	5

UNIT – I INTRODUCTION **15**

Functional requirements of a building and its components - foundations, plinth, superstructure (framed and load bearing), roofing. Role of soil in building construction – Formation - grain size distribution – soil classification systems.

PLATES : Section of a typical wall showing the various components of building

ASSIGNMENTS: Drawing the various types of Foundations, Types of structure – load bearing, framed

UNIT– II STONE **20**

Classification of rocks - Building stones - their uses –physical properties - brief study of tests for stone – deterioration - preservation of stone - various stone finishes - cutting and polishing of granites. Drawings of foundations - types of masonry - random rubble/Ashlar, etc. - cavity walls - flooring copings, sills, lintels, corbels, arches. **Plates & Assignments**

UNIT – II LIME **5**

Lime - fat/Hydraulic Limes - Their properties and uses – Manufacturing process - Mortar, functions – requirements - mix proportions.

UNIT – IV RURAL MATERIALS AND CONSTRUCTION **20**

Mud as a building material - Soil stabilization, soil blocks - foundations - types, S.S.Block – S.S. Cast in situ walls - flooring - roofing - plastering. Bamboo, casuarinas coconut, palm, hay, coir, jute – properties - uses - fire retardant treatment termite proofing. Types of foundations - walls - simple roof trusses floors for rural structures. **Assignments**

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. S.C.Rangwala – Engineering Materials Charotar Publishing House – Anand 1997
2. W.B.Mckay – Building Construction Vol. 1,2,3- Longmans U.K 1981.

REFERENCES

1. R.J.S.Spencke and D.J.Cook, Building Materials in Developing Countries, John Wiley andSons, 1983.
2. HUDCO - All you want to know about soil stabilized mud blocks, HUDCO Pub, New

Delhi,1989.

3. UNO - Use of bamboo and reeds in construction - UNO Publications. Rural Construction - NBO, New Delhi

WEBSITES

1. http://www.bamboo-Flooring.com
2. http://ag.avizona.edu/SWES
3. http://www/angelfite.com/in
4. http://www.idrc.ca/library/documents/104800/chapz-e.html
5. http://www/angelfite.com/inz/granite

Mapping of COs with POs

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	2					2					1	
CO-2	3	1		3		3	2				3	
CO-3	3			3		3					2	
	9	1		6		8	2				6	
Scaled value	2	1		2		2	1				2	

1-5 =1, 6-10=2, 11-15=3) 0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR206 – MODEL MAKING & VISUAL ARTS – II 0 – 0 – 6 – 9

Course Objectives:

1. To understand that the basic design elements and principles are the important tools for creative designing.
2. To stimulate the creative thinking process by drawing inspirations from nature
3. To understand the basics of two and three dimensional visual compositions.
4. To provide practical understanding of design principles using studio exercises.
5. To gain art appreciation skills through visual arts

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	Express the knowledge on appreciation of paintings and other art forms.	Affective	Valuing
CO2	Draw the basic geometrical shapes, components of scenes.	Affective	Drawing

CO3	Demonstrate the knowledge on components of visual composition.	Cognitive	Application
CO4	Develop and compose the natural scenes.	Psychomotor	Application
CO5	Design and develop scaled sketches	Psychomotor	Application

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 206	**MODEL MAKING & VISUAL ARTS – II**	**0**	**0**	**3**	**4**
C:P:A	**1:1.5:1.5**	**L**	**T**	**P**	**H**
		0	**0**	**3**	**6**

UNIT – I RENDERING TECHNIQUES **25**

Rendering techniques for architectural drawings - building perspectives, interior & exteriors in various mediums like pencil, ink, pastels, water colours - opaque and transparent.

UNIT – II MODEL MAKING - I **30**

Simple geometrical objects with simple straight or curved shapes. Exercises in preparing site models representing groups of buildings as blocks, roads and landscaped open spaces.

UNIT –III MODEL MAKING - II **35**

Spatial awareness through model making. Articulation of planes, walls and volumes. Scale model of products furniture small scale structures such bus shelter, pavilions, kiosk etc. detailed model of buildings using the set of drawings (preferably their own design project)

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
0	**0**	**90**	**90**

TEXT

1. Arundell (Jan), Exploring Sculpture, Mills and Boon, London/Charles T.Branford Company, USA 1972

2. HJKJK John W.Mills, The Technique of Sculpture, B.T.Batsford Ltd., New York Reinhold Publishing Corpn., London, 1966.

Mapping of COs with POs												
	PO1	**PO2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PSO 1**	**PSO 2**
CO1	3				1							
CO2	3				1							
CO3	3				1							
CO4	3				1							
CO5	3				1							
Total	15				5							
Scaled Value	3				1							

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR207 – ARCHITECTURAL DESIGN – I 0 – 0 – 6 – 9

Course Objectives:

1. To initiate the design thinking process by conceptualization of form, space and structure through creative thinking.

2. To involve students in a design projects that will involve simple space planning and the understanding of the functional and aesthetic aspects of good design.
3. To involve students in building case study by choosing appropriate examples to enable them to formulate and concretize their concepts.
4. To enable the presentation of concepts through various modes and techniques that will move constantly between 2D representation and 3D modeling.
5. To engage in discussion and analytical thinking by the conduct of seminars/ workshops.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	Demonstrate the knowledge on arriving spatial requirements for various human activities	Cognitive	Understand
CO2	Demonstrate the knowledge on anthropometry and ergonomics in architectural design.	Psychomotor	Knowledge Application
CO3	Interpret the case study examples to develop knowledge on architectural design.	Affective	Analyze Apply
CO4	Design of single spaces with the understanding of structural, utility, aesthetics and material considerations.	Psychomotor	Create
CO5	Develop a neat presentation drawings, scale models using various medium	Affective	Create, Manipulate Articulate

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 207	**ARCHITECTURAL DESIGN - I**	**0**	**0**	**6**	**9**
C:P:A	**2:1.5:1.5**	**L**	**T**	**P**	**H**
		0	**0**	**6**	**12**

UNIT – I	**SUBTRACTIVE UTILITY SCULPTURE**	**24**

Parameters of design, anthropometrics. Understating the relationship between the human activity, Interrelationship of architectural space to form, structure, and materials.

Design of Subtractive utility sculpture -A Play object for 4-6 years age children.

Areas of concern/ focus:

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

Methodology:

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

Presentation:

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

UNIT – II	ADDITIVE UTILITY SCULPTURE	24

Design of Additive utility sculpture – Utility object

Areas of concern/ focus:

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

Methodology:

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

Presentation:

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

UNIT –III	STUDY	36

Study of Anthropometry details with free hand sketches and the study of the relationship between form and function in a man-made objects.

Areas of concern/ focus:

- scale and proportion
- Behavioral aspects
- Anthropometry details
- Application of Forms in construction

Methodology:

Study of Anthropometric details and applications of forms in buildings.

Presentation:

Study work has to be done in outside the classroom.

UNIT – IV	DESIGN OF SPACE	36

Parameters of design, anthropometrics. Understating the relationship between the human activity and spatial, furniture requirements, Interrelationship of architectural space to form, structure, and materials.

Redesign of single space such as own room etc.

Areas of concern/ focus:

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

Methodology:

Data collection, Measure drawing of own room/case studies, analysis and

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

Presentation:

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

UNIT –V MULTIFUNCTIONAL SPACE 60

The design problem shall take into consideration of activities and their relationship with space, function, scale and proportion, climate.

The project shall be Shop, Workshop, pavilions, snack bar, cafeteria

Areas of concern/ focus:

- scale and proportion
- Behavioral aspects
- Site planning
- Appropriate materials and construction

Methodology:

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

Presentation:

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	180	180

TEXT

1. De Chiara and Callender, Time Saver Standard for Building Types, McGraw-Hill Co., 2nd Edition, 1980.
2. Edward D.Mills, Planning - The Architects Handbook - 10th Edition, British Library Cataloguing in Publication Data, 1985.
3. Andrew Alpern, Handbook of Speciality Elements in Architecture, McGraw-Hill Book Co., 1982.
4. Neufert Architect's Data, Rudolf Herg, Crosby Lockwood and Sons Ltd., 1970.

REFERENCES

1. Edward D.Mills - Planning the Architects Hand Book - Bitterworth, London, 1985.
2. Francis D.K.Ching - Architecture - Form Space and Order Van Nostrand Reinhold Co., (Canaa), 1979.

Mapping of COs with POs

	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PSO 1	PSO 2
CO1	1	-	3	2	1	3	2	1	1	1	-	-
CO2	1	2	3	-	-	-	-	-	-	-	-	-
CO3	-	-	3	3	2	-	-	2	2	2	2	-

CO4	3	3	-	2	2	2	3	3	2	2	2	-
CO5	3	3	-	2	2	2	2	3	2	2	-	-
Total	8	8	9	9	7	7	7	8	7	7	6	-
Scaled Value	3	3	3	3	3	3	3	3	3	3	3	3

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR301 – HISTORY OF ARCHITECTURE – III 3 – 0 – 0 - 3

Course Objectives:

1. To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.
2. To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
3. To gain knowledge on the development of architectural form with reference to Technology, Style and Character in the Indus valley Civilization, Vedic period and manifestation of Buddhist, Hindu and Islamic architecture in various parts of the country

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Understand*** the construction techniques used by Egyptian, Babylonian, Mesopotamian, Greek, Rome and Byzantine builders.	Cognitive	Understand
CO2	***Know*** the importance of the history, relate to design thinking, cultural aspiration, social needs, and the evolution of the built environment	Cognitive	Knowledge Understand Application
CO3	***Interpret*** the characteristics of designing of temples and tombs by Egyptian, Babylonian, and Mesopotamian, Greek, Rome and Byzantine builders.	Cognitive	Understand

SUBCODE	SUB NAME	L	T	P	C
XAR 301	HISTORY OF ARCHITECTURE - III	3	0	0	3
C:P:A	3:0:0	L	T	P	H
		3	0	0	3

UNIT – I PREHISTORIC & EGYPTIAN ARCHITECTURE **5**

Development of Shelter during prehistoric age. Factors influencing Architecture -Outline of Architectural Character of Egyptian architecture. Factors influencing Architecture

UNIT–II WEST ASIA **10**

Evolution of Sumerian, Babylonian and Persian cultures - Factors influencing architecture - Outline of architectural character - Palace of Sargon, Khorsabad - Palace at Persepolis.

UNIT–III GREECE **10**

Evolution architecture in the archaic and classic periods – Factors influencing architecture - Outline of architectural character – optical illusion in buildings, Orders in architecture - Doric Ionic and Corinthian, Parthenon, Athens;

UNIT–IV ROME **10**

. Factors influencing architecture - outline of architectural character; Colloseum Rome; Pantheon, Rome

UNIT–V EARLY CHRISTIAN AND BYZANTINE **10**

Birth and spread of Christianity - Evolution of church forms - Factors influencing architecture - Outline of Architectural character - St.Sophia, Constantinople.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Sir Banister Fletcher – A History of Architecture University of London, The Athlone Press 1986..

REFERENCES

1. Pier Liugi Nervi, General Editor - History of World Architecture - Series, Harry N.Abrams, Inc.Pub., New York, 1972.
2. S.Lloyd and H.W.Muller, History of World Architecture - Series, Faber and Faber Ltd., London, 1986.
3. Spiro Kostof - A History of Architecture - Setting and Rituals, Oxford University Press, London, 1985. Gosta, E.Samdstrp, Man the Builder, McGraw-Hill Book Company, New York, 1970.

Mapping of Cos with Pos:												
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**PSO 1**	**PSO 2**
CO1	3	1										
CO2	3	3	3									
CO3	3	3	3									
Total	9	7	6									
Scaled Value	2	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

1 – 5 → 1, 6 – 10 → 2, 11 – 15 → 3

0 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

XAR302 –SITE SURVEYING AND PLANNING 3 – 0 – 0 - 3

Course Objectives:

1. To educate the students about the importance and relevance of site and its context in architectural design.
2. To gain knowledge on the various factors that influences the building environment and the methods of analyzing the same.
3. To teach the students various techniques of surveying.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Understand*** the contextual importance of site analysis	Cognitive	Knowledge

	based on the various site factor with respect to the study area		
CO2	***Understand*** the various scientific and analytic site analysis techniques	Cognitive	Knowledge
CO3	***Able*** to read site drawings for Landscape Architecture, master plan and Urban design.	Cognitive	Create Apply

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 302	**SITE SURVEYING AND PLANNING**	**3**	**0**	**0**	**3**
C:P:A	**3:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**

UNIT – I INTRODUCTION TO SURVEY AND ITS TECHNIQUES 9

Definition of plot, site, land and region, units of measurements, reconnaissance, and need for surveying. Chain survey and compass survey - Plane Table and Theodolite, total station surveys - various equipments used – simple field surveys.

UNIT–II SITE ANALYSIS 10

Importance of site analysis - factors involved – On site and off site factors; Analysis of natural, cultural and aesthetic factors – topography, hydrology, soils, vegetation, climate, surface drainage, accessibility, size and shape, infrastructures available - sources of water supply and means of disposal system, visual aspects

UNIT–III SITE ANALYSIS TECHNIQUES 10

Preparation of site analysis diagram. Study of microclimate:- vegetation, landforms and water as modifiers of microclimate. Study of land form;- contours, slope analysis, grading process, grading criteria, functional and aesthetic considerations – Architectural and visual aspects.

UNIT–IV SITE PLANNING AND LAYOUT PRINCIPLES 10

. Context of the site. Preparation of site plan drawing – incorporation of site analysis factors, Organization of vehicular and pedestrian circulation, types of roads, hierarchy of roads, networks, road widths and parking, regulations. Turning radii & street intersections

UNIT–V ENVIRONMENTAL FACTORS 6

Man-made structures, sensuous qualities, cultural data, images and data correlation - vegetation – plant associations, types and distribution - preparation of ecological profile for an area, basic understanding of agencies related to environmental regulations.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. W.M. Marsh - Landscape Planning, John Wilay& Sons, USA 1983.
2. B.C.Punmia - Surveying Vol.I - Standard Book House, New Delhi - 1983.

REFERENCES

1. Kevin Lynch - Site planning - MIT Press, Cambridge, MA - 1967.
2. Edward. T. Q., “Site Analysis”, Architectural Media, 1983.
3. P.B.Shahani - Text of surveying Vol. I, Oxford and IBH Publishing Co - 1980
4. Joseph De.Chiarra and Lee Coppleman - Planning Design Criteria - Van Nostrand Reinhold Co.,New York - 1968.
5. Beer R, Environmental Planning for Site development, Turner, Landscape Planning and environmental impact design.

Mapping of Cos with Pos:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PSO 1	PSO 2
CO1			3	3								
CO2			3	3								2
CO3			3	3							3	
Total			9	9							3	2
Scaled Value			**2**	**2**							**1**	**1**

1– 5 → 1, 6 – 10 → 2, 11 – 15 → 30 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

XAR 303- MECHANICS OF STRCUTURES - II **3 – 0 – 3**

Course objectives:

1. To determine the stresses in beams and strength of sections by working out problems.
2. To calculate deflection of beams using methods.
3. To study the theory of columns by working out problems.
4. To understand the concept of indeterminate structure and its analysis.
5. Case studies and models wherever feasible.

Course Outcome		Domain	Level
CO1	***Identify*** various types of loading and support conditions that act on structural systems and Understand the basic principles used in the analysis of structural members.	Cognitive	Apply Understand
CO2	***Apply*** the concepts for finding the shear forces and moments for various structural members.	Affective	Apply
CO3	***Apply*** the concepts for finding the shear forces and moments for various structural members.	Psychomotor	Evaluate
CO4	***Analyze*** the long and short columns and determine the design loads.	Cognitive	Apply
CO5	***Analyze*** indeterminate beams like continuous beams and fixed beams	Cognitive	Apply
CO6	***Analyze*** and solve the problems in practical installations of the structural members	Cognitive	Apply

SUBCODE	SUB NAME	L	T	P	C
XAR 303	**MECHANICS OF STRCUTURES - II**	**3**	**0**	**0**	**3**
C:P:A	**2:0.5:0.5**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**

UNIT – I **SHEAR FORCE AND BENDING MOMENT** **9**

Concept of shearing forces and Bending Moments - shear force and bending Moment diagrams for cantilever and simply supported beams subjected to point

load, uniformly distributed loads and their combinations.

UNIT – I I STRESSES IN BEAMS **9**

Theory of simple bending -bending stresses in beams, shear stresses in beams - examples on simple sections. Stress distribution diagrams.

UNIT – III DEFLECTION OF BEAMS **9**

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

UNIT – IV THEORY OF COLUMNS **9**

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

UNIT – V INTRODUCTION TO INDETERMINATE STRUCTURES **9**

Concept in Analysis of continuous beams, fixed beams, and partial frames - Application to simple problems.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. M.M.Ratwani&V.N.Vazirani, Analysis of Structure, Vol.1, Khanna Publishers – Delhi, 1987

2. A.R.Jain and B.K.Jain, Theory and analysis of Structures,Vol. 1, Nemchand and Bros, Roorkee, 1987.

REFERENCES

1. Dr.V.S.Prasad, Basic Structural Mechanics, Galgotia Publications.

2. Timoshenko, S.P., and D.H. Young, Elements of Strength of Materials, Fifth edition, East West Press, 1993.

3. B.C.Punmia, "Strength of Materials and Theory of Structures", Vol. 1, Laxmi publications, New Delhi 1994.

4. R.K. Rajput "Strength of Materials", S.Chand& Company Ltd., New Delhi 1996

Mapping:

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2

CO-1		2		3	2							
CO-2		2		3	2							
CO-3		2		3	2							
CO-4		2		3	2							
CO-5		2		3	2							
CO-6		2		3	2							
Original		12		18	12							
Scaled to0,1,2,3 scale	**0**	**3**	**0**	**3**	**3**	**0**	**0**	**0**			**0**	**0**

1– 5 → 1, 6 – 10 → 2, 11 – 15 → 30 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

XAR304 – BUILDING SERVICES – I 2 – 0 – 1 - 3

Course Objectives:

1. To Study Water supply, treatments, distribution and plumbing system for all type of buildings.
2. To Study Waste water treatments, Sewer lines for all types of buildings.
3. To Study Drainage system for a Small Campus and a Residential neighbourhood.
4. To understand Refuse collections, disposal, composting, Landfill, Bio gas for a Town and City
5. Applications of all the above systems to a Building, Small Campus and a Residential neighbourhood.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Outline*** the sources, treatment of water, water supply and drainage systems	Cognitive	Understanding
CO2	***Assess*** the water supply requirements, storage and sewage generated.	Psychomotor	Evaluating
CO3	***Select*** the pumps, water supply and drainage pipes.	Affective	Applying
CO4	***Design*** the water supply and drainage layout of residential buildings.	Psychomotor	Creating
CO5	***Illustrate*** the solid waste management concepts and systems.	Cognitive	Understanding

SUBCODE	SUB NAME	L	T	P	C
XAR 304	BUILDING SERVICES - I	2	0	1	3
C:P:A	1:1:1	L	T	P	H
		2	0	1	4

UNIT – I **WATER QUALITY, PURIFICATION AND TREATMENT** **10**

Sources of water -Surface and ground water sources. Water quailty - nature of impurities, Water treatment methods – Aeration, sedimentation, filtration, sterilization, disinfection and softening.

Water requirements for all type of residential, commercial, industrial buildings and for town.

UNIT–II **WATER DISTRIBUTION AND STORAGE** **16**

Distribution systems in small towns - Types of pipes used - Laying, jointing, testing - prevention of water wastage and reuse of water. Plumbing-Internal water supply layout in buildings, pipe size calculations, Planning and layout of water supply distribution in residences. Types of water supply pumps and their applications - mechanical equipment. Automation systems. Water heating systems, solar water heaters. Energy efficient systems. Water requirements calculation and Water storage systems- Design and calculations of OHTs, UG Sumps and fire fighting storage.

Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT–III **STORM WATER DRAINAGE AND RAIN WATER HARVESTING** **10**

Basic principles of storm water drainage, Types of Drain pipes and pipe size calculations, storm water gutter.

Rainwater harvesting principles, rain water pipe calculation. Details of rain water disposal - roof drain, systems of sub soil drainage. Different types of pavements and details for water percolation.

UNIT–IV **SEWERAGE AND SANITATION** **14**

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Sewerage, Sewer and sewage. Sewage - Their disposal, Primary treatment, Secondary treatment. Biological treatment. Modern types of sewage treatment

plants.

Sewer -Types of sewer systems, Construction details of Sewer line, gradients, manholes, inspection chambers, septic tank, leach pits, traps for various types and its details.

Drainage and sanitation requirements for various private and public buildings. Drainage and sanitary appliance materials, fittings, pipes, sizes for toilet and kitchen fittings. Connection of lines to fittings. Choice of plumbing systems. Planning and layout of sanitary fittings in residences. Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT–V SOLID WASTE MANAGEMENT 10

Solid waste management concepts and systems, waste and resources, recycling solid waste in small and large buildings - Refuse collection, disposal, Incinerator, Composting, Vermicomposting, Sanitary Land filling, Biogas system and Modern renewable energy system., equipments for handling solid waste. Refuse chute, service core concepts.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. S.C.Rangwala, Water Supply and Sanitary Engineering, Charotar Publishing House, 1989
2. National Building Code 2016.
3. Indian Standard Code of Practice for Water Supply in Buildings, IS :2065 – 1983'.
4. Mechanical and Electrical Equipment for buildings, Benjamin Stein, John.S.Reynolds, Walter.T.Grondzik, Alison.G.Kwok, 10th edition, John Wiley and Sons, London, 2006.
5. Punmia B.C., 'Waste Water Engineering', Laxmi Publications, 2009.

REFERENCES

1. Manual on Sewerage and Sewage Treatment, CPHEEO, Ministry of Works and Housing, New Delhi, 1980.
2. Handbook for Building Engineers in Metric systems, NBC, New Delhi, 1968.

Mapping of Cos with Pos:												
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**PSO 1**	**PSO 2**
CO1				3				3			2	
CO2				3				3	2			
CO3				3				3				
CO4				3				3	2			
CO5				3				3				
Total				15				15	4			
Scaled Value				3				3	1		1	

1 – 5 → 1, 6 – 10 → 2, 11 – 15 → 30 - No Relation, 1 - Low Relation, 2- Medium Relation, 3- High Relation

XAR305 – MATERIALS AND CONSTRUCTION – II 2 – 0 – 2 – 4

Course Objectives:

1. To inform the properties and characteristics of timber, its conversion, preservation and uses.

2. To inform of the various market forms of timber, their production, properties and application in the building industry.
3. To understand both in general and in detail the methods of construction by using basic materials such as brick; clay products, natural and man-made timber for both structural and nonstructural components.

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Produce*** 2D technical drawings of building components and structural elements for varying conditions using bricks and clay products.	Psychomotor	Manipulation
CO2	***Select*** the timber and suggest suitable treatment process/preservation of timber.	Cognitive Affective	Understanding Justifying
CO3	***Produce*** drawings showing the details of timber applications in construction.	Affective Psychomotor	Responding Manipulation
CO4	***Understand*** the cost effective technologies and ***produce*** develop building components and drawings of the same.	Psychomotor	Create Manipulation

SUBCODE	SUB NAME	L	T	P	C
XAR 305	**MATERIALS AND CONSTRUCTION - II**	**2**	**0**	**2**	**4**
C:P:A	**0.6:2:1.4**	**L**	**T**	**P**	**H**
		2	**0**	**2**	**5**

UNIT – I	**BRICKS AND CLAY PRODUCTS**	**20**

Drawings of brick foundations - buildings in brickwork, bonds columns, corners –structural members in brickwork. Reinforced brick masonry - Arches - Lintels – Corbels - copings. Hollow clay blocks - for walls - partitions - roofs. Roofings - Flat Roofs or Terrace roofs - Sloping roofs. **Plates & assignments**

UNIT – II	**TIMBER AND ALLIED PRODUCTS**	**15**

Softwood and hardwood - Physical properties and uses - Defects, Conversion, Seasoning, decay and preservation of timber - Fire retardant treatment, anti-

termite treatment. Industrial timbers - plywood, block board, particle board, fibre boards. Manufacture and uses - current developments. **Assignments**

UNIT– III	TIMBER JOINERY	30

Introduction to timber joinery, Details of timber joinery for Windows, doors, ventilators. Timber partitions, paneling - false ceiling, fixed partitions, movable partitions. Timber staircases - Designed staircase - timber trusses - Lean-to – close couple - Kingpost - Queen post - Trusses. Timber floors - timber built-in-furniture. **Plates through case studies**

UNIT – IV	COST EFFECTIVE BUILDING TECHNOLOGY	10

Drawings of foundations – walling – Roofs – partitions – ceiling panel – doors and windows. Miscellaneous – Drawing of Brick jallies, Screen walls – pavement blocks – Ferrocement water tanks. **Assignments**

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	45	75

TEXT

1. S.C.Rangwala, Engineering Materials, Charotar Pub. House, Anand, 1997.
2. W.B.Mckay, 'Building Construction', Vol.1, 2, 3 Longmans, U.K. 1981.

REFERENCES

1. Don A.Watson, Construction Materials and Processes, McGraw Hill Co., 1972.
2. Alanwerth, Materials, The Mitchell Pub. Co. Ltd., London, 1986.
3. R.Chudleu, 'Building Construction Handbook', British Library Cataloguing in Publication Data, London, 1990.

WEBSITES

1. http://www.ibex-ibex-intl.com
2. http://www.inika.com/chitra
3. http://www.routbdge.com
4. http://www.venturaindia.com

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	-	-	-	3	-	-	-	3	-	2	-	-
CO-2	-	-	-	0	-	-	-	0	-	2	-	-
CO-3	-	-	-	2	-	-	-	2	-	2	-	-
CO-4	-	-	-	3	-	-	-	3	-	2	-	-
Total	-	-	-	8	-	-	-	8	-	8	-	-
Scaled value	-	-	-	2	-	-	-	2	-	2	-	-

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 306 – COMPUTER APPLICATIONS IN ARCHITECTURE - I	0 – 0 – 2 – 3

Course Objectives:

1. To teach students with the 3d and 3d drafting, graphical representations and rendering using software.

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO1	To ***apply*** software's in the field of Architecture to represent design ideas.	Cognitive	Applying
CO2	***Produce*** 2D technical drawings using AutoCAD	Psychomotor	Manipulation
CO3	***Develop*** the 3D model of buildings & objects using AutoCAD and Sketch Up	Psychomotor	Articulation
CO4	***Recreate*** realistic image of objects and buildings by using presentation software.	Psychomotor	Manipulation
CO5	Sheet set ***organization*** and plot/print drawing to the scale.	Affective	Organizing

SUBCODE	SUB NAME	L	T	P	C
XAR 306	COMPUTER APPLICATIONS IN ARCHITECTURE - I	0	0	2	3
C:P:A	0.5:2.0:0.5	L	T	P	H
		0	0	2	4

UNIT – I	INTRODUCTION TO BASICS OF COMPUTER	4

Introduction to personal computers – hardware / software – operating system – important DOS commands – Windows. Introduction to MS Word, Excel.

UNIT – II	BASIC OF AUTOCAD	8

Basic introduction to CAD packages. Setting up & controlling the AutoCAD drawing environment – Creating & Editing Commands.

UNIT– III	AUTOCAD 2D DRAWINGS	20

Organizing a drawing with layers – Advanced geometry editing – Creating & using Blocks, Dynamic blocks. X –Referencing files. Inquiry tools. Text annotation. Creating & Customizing Hatch patterns. Productive Dimensioning – Defining Text & Dimension Styles. Printing & plotting

UNIT – IV	AUTOCAD 3D MODELS	16

Drawing utilities – importing / exporting files. Understanding 3D coordinate system - Using View ports – 3D drawing & Editing commands

UNIT – V	RENDERING AND PRESENTATION	12

Introduction to rendering in 3D – Rendering process – Enhancing digital images from CAD application using Adobe Photoshop, & other graphic programs. Use of Sketch Up for modeling of buildings and presentation of design projects as Photo realistic images and virtual architecture.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	60	60

TEXT

1. Omura George, "Mastering AutoCAD (Release 19)", BPB Publications, New Delhi, 2018.
2. Omura George, " AutoCAD 2000", BPB Publications, New Delhi, 1997
3. George Omura, Brian C. Benton, AutoCAD 2019 and AutoCAD LT 2019, Autodesk Official Press (SYBEX)

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2

CO-1	-	-	-	3	2	-	-	-	-	3	-	-
CO-2	-	-	-	3	2	-	-	-	-	2	-	-
CO-3	-	-	-	3	3	-	-	-	-	2	-	-
CO-4	-	-	-	3	3	-	-	-	-	3	-	-
Total	-	-	-	3	2	-	-	-	-	0	-	-
Scaled value	-	-	-	15	12	-	-	-	-	10	-	-

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 307 – ARCHITECTURAL DESIGN - II **0 – 0 – 6 – 9**

Course Objectives:

1. To create an understanding of the inter relationships amongst various elements of architecture – form, function, space planning, user perception and behaviour.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Understand*** the characteristics of site and the importance of site planning which includes built form and open space.	Cognitive	Understand
CO2	***Determine*** spatial arrangements, circulation of buildings and the response of user group through case studies.	Affective	Evaluate
CO3	***Learn*** the process of design	Cognitive	Knowledge
CO4	***Able*** to Design of spaces with functional, aesthetics and material considerations by applying the knowledge gained in case studies.	Psychomotor	Create
CO5	***Enable*** to present the concepts as drawings using various media and making scale models	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 307	ARCHITECTURAL DESIGN - II	0	0	6	9
C:P:A	2.0:5.0:2.0	L	T	P	H
		0	0	6	12

UNIT – I	CONTENT	180
	Projects involving single level planning in small scale, small span, horizontal movement and simple vertical movement. **Areas of concern/ focus:** • Form-space relationships • Spatial organization • Behavioral aspects especially those relating to children • Site planning aspects • Appropriate materials and construction	
	Suggestive Typologies/ projects: Residential buildings, institutional buildings: nursery or primary schools, schools for children with specific disabilities, primary health center, banks, neighbourhood market, neighbourhood library, Gate complexes including security Kiosk and entry/ exit gates.	
	Methodology: Data collection, case studies, analysis and presentation of studies – Data collection with respect to design and detailing for physically handicapped persons – **Presentation:** Concepts and presentation of design with scaled models and rendered drawings.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	180	180

TEXT

1. Joseph De Chiara, Michael J Crosbie, “Time Saver Standards for Building Types”, McGraw Hill Professional, 2001.
2. Julius Panero, Martin Zelnik, “Human Dimension and Interior Space”, Whitney Library

of Design, 1975

3. Joseph De Chiara, Julius Panero, Martin Zelnik, “Time Saver Standards for Interior Design and Space Planning”, McGraw Hill, 2001.
4. Ernst Neuferts, “Architects Data,” Blackwell, 2002.
5. Ramsey et al, “Architectural Graphic Standards”, Wiley, 2000.

REFERENCES

1. Richard P. Dober, “Campus Planning” - Society for College and University Planning, 1996.
2. AchyutKanvinde, “Campus design in India”, American year Book, 1969
3. Kevin Lynch, “Site planning”, MIT Press, Cambridge, 1967
4. Sam F. Miller, “Design Process: A Primer for Architectural and Interior Design”, Van Nostrand Reinhold, 1995.

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	3	3	2	-	3	-	-	2	-	2	3	-
CO-2	3	3	2	-	3	-	-	2	-	2	3	-
CO-3	3	-	3	-	3	-	-	2	-	2	3	-
CO-4	3	3	-	-	-	-	-	3	-	-	3	-
CO-5	-	-	-	3	-	-	-	-	-	3	-	-
Total	12	9	7	3	9	-	-	9	-	9	12	-
Scaled value	**3**	**2**	**2**	**1**	**2**	**-**	**-**	**2**	**-**	**2**	**3**	**-**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR - 401 - HISTORY OF ARCHITECTURE - IV 3 – 0 – 0 – 3

Course objectives:

1. To understand the architectural development in Western world during medieval period.
2. To understand the factors that influence the emergence or decline of any architectural style

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO1	Analyze the continuity between each style – the factors that connect each style	Cognitive	Analyze
CO2	Explain the architectural characters of Medieval Europe through selected examples.		Knowledge
CO3	Analyze the trend or the pattern of development of architectural styles.		Analyze
CO4	Understand the contemporary architectural style and its development leading to new styles.		Understand

SUBCODE	SUB NAME	L	T	P	C
XAR 401	**HISTORY OF ARCHITECTURE - IV**	**3**	**0**	**0**	**3**
C:P:A	**3:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**

UNIT – I **ROMANESQUE** **10**

Architectural characters of Italy, France and England during Romanesque period - Examples: Pisa Complex, Italy- Abbay Aux Hommes, Caen, France - Tower of London, London, England

UNIT – II **GOTHIC** **12**

Outline of Architectural character in Italy, France and England during Gothic period - Examples: France - Notre Dame in Paris, Reims Cathedral, Beauvais Cathedral, England- Westminster Abbey, Hampton Court Palace, London, Italy - Doges Palace, Venice, Milan Cathedral. Evolution of vaulting and development of structural systems.

UNIT – III **RENAISSANCE** **11**

The idea of rebirth and revival and sociological influences in art and architecture - Emergence of merchant communities and their patronage. Different phases of Renaissance style in Italy, England and France. Typical

Renaissance structures - Palaces in Italy, Domestic Architecture in England and Chateaux of France.

UNIT – IV	RENAISSANCE ARCHITECTS	12

Study of life history, philosophy and contributions of the Renaissance architects in Europe.

Italy - Brunelleschi, Donatello, Rapheal, Michelangelo and Andrea Palladio

England - Sir Christopher Wren, Inigo Jones and John Webber

France - Pierre Lescot, Philibert de l'Orme, and Jean Bullant

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Sir Bannister Fletcher, A History of Architecture, University of London, The Antholone Press, 1986.

REFERENCES

1. Skpiro Kostof, A History of Architecture - Settings and Rituals, Oxford University Press, London, 1985.
2. S.Lloyd/H.W.Muller, History of World Architecture - Series, Faber Ltd., London, 1986.
3. Pier Luigi Nervi, History of World Architecture Series. Harry N. Abrame Inc. Publication, New York, 1972.

WEBSITES

1. http://www.clr.tornoto.edu - virtual lib.
2. http://www.lib.virginia.edu/- Renaissance and baroque
3. http://2.siis.umich.edu/ - Image browser

Mapping of COs with POs

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO 9	PO10	PSO1	PSO 2
CO1	2	-	1	-	-	-	-	-	-	1	-	-
CO2	2	-	1	-	-	-	-	-	-	1	-	-

CO3	2	-	1	-	-	-	-	-	-	1	-	-
CO4	2	-	1	-	-	-	-	-	-	1	-	-
Total	8	-	4	-	-	-	-	-	-	4	-	-
Scaled Value	2	-	1	-	-	-	-	-	-	1	-	-

1-5 =1, 6-10=2, 11-15=30 0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 – High Relation.

XAR 402 - CLIMATE AND ARCHITECTURE 3 – 0 – 0 – 3

Course Objectives:

1. To educate the fundamentals of climate and the human comfort.
2. To understand the movement of sun and its impact in building design.
3. To understand various building materials and its thermal performance.
4. To inform about air pattern around buildings and the effect of wind on design and siting of Buildings.
5. To give exposure on various design strategies adopted in different climatic zones.

Course Outcome		Domain	Level
CO1	***Understand*** climatic types and design approaches	Cognitive	Understand
CO2	***Analyze*** the movement of sun and wind and design various types of shading devices	Affective Psychomotor	Analyze Create
CO3	***Understand*** thermal performance of various building materials	Cognitive	Understand
CO4	Able to ***design*** of climatic conscious buildings	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 402	**CLIMATE AND ARCHITECTURE**	**3**	**0**	**0**	**3**
C:P:A	**0.6:1.2:1.2**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**CLIMATE AND THERMAL SENSATION**				**10**
	Factors that determine climate - Components of climate - Characteristics of climate types, Building design Approaches- Body heat balance - Effective				

	temperature - Comfort zone. Exercises on Mahoney chart, Comfort zone calculation, etc.,	
UNIT – II	**SOLAR CONTROL**	**10**
	Solar geometry - Solar chart – Sun path diagram - Sun angles and shadow angles. Design of solar shading devices.- Study projects, Shading device study models, etc.,	
UNIT – III	**HEAT FLOW THROUGH BUILDING MATERIALS**	**7**
	Basic principles of Heat Transfer, Performance and properties of different materials- calculation of 'U' value - Time lag and decrement of building elements-Study projects	
UNIT – IV	**AIR MOVEMENT**	**8**
	Wind rose - Wind shadows -The effects of topography on wind patterns - Air movement around and through buildings -The use of fans - Stack effect -Venturi effect - Thermally induced Air currents – Use of court yard.	
UNIT – V	**SHELTER DESIGN IN TROPICS**	**10**
	Design considerations for warm humid, hot dry, composite and upland climates, Heavy rainfall regions. Landscape and climatic design. Mini projects in relation with Architectural Design	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. O.H. Koenigsberger and Others, “Manual of Tropical Housing and Building” – Part I - Climate design, Orient Longman, Madras, India, 2010.
2. Bureau of Indian Standards IS 3792, “Hand book on Functional requirements of buildings other than industrial buildings”, 1987.

REFERENCES

1. Galloe, Salam and Sayigh A.M.M., “Architecture, Comfort and Energy”, Elsivier Science Ltd., Oxford, U.K., 1998.
2. M.Evans- Housing, Climate and Comfort - Architectural Press, London, 1980.
3. B.Givoni, Man, Climate and Architecture, Applied Science, Banking, Essex,198.
4. Donald Watson and Kenneth Labs., Climatic Design - McGraw Hill BookCompany-New York - 1983.
5. B. Givoni, “Passive and Low Energy Cooling of building”, Van Nortrand Reinhold New York, USA, 1994.

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1. http://www.envinst.conu.edu/~envinst/research/built.html
2. www.terin.org/

3. http://www.pge.com/pec/archives/w98 passi.html
4. http://solstice.crest.org/efficiency/index.shtml

MAPPING OF Cos and POs:

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO10	PSO1	PSO2
CO-1	-	-	-	1	-	-	-	2	-	-	-	-
CO-2	-	-	-	-	-	-	-	2	-	-	-	-
CO-3	2	-	-	2	-	2	-	2	-	-	3	-
CO-4	2	-	-	2	-	2	-	3	-	-	3	-
	4	-	-	5	-	4	-	9	-	-	6	-
Scaled to 0,1,2,3 scale	**1**	**0**	**0**	**1**	**0**	**1**	**0**	**3**	**0**	**0**	**2**	**0**

1-5 =1, 6-10=2, 11-15=3 0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 – High Relation.

XAR403 – DESIGN OF STRUCTURES - I 3 – 0 – 0 – 3

Course Objectives:

1. To understand the different techniques for analysis of **structures**.
2. To learn the behavior and design of structural steel

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Understand and Design of*** Advanced concrete structures (prestress and Prefabricated structrues)	Psychomotor	Creating
CO2	***Understand and design of*** steel connections.	Cognitive	Understand
CO3	***Analyze*** the behaviour of steel members	Affective	Analyzing
CO4	***Design*** reinforced concrete circular slabs and concrete wall	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 403	DESIGN OF STRUCTURES – I	3	0	0	3
C:P:A	0.6:1.2:1.2	L	T	P	H
		3	0	0	3

UNIT – I ADVANCED CONCRETE STRUCTURES 9

Principles of Pre stressing – Methods of Pre stressing – Materials used – Analysis and Losses of pre stressing, simple problems. Principles of Post tensioning – Methods of Post tensioning – Materials used – Analysis and Losses of Post tensioning, simple problems. Prefabrication of structures – dimension analysis.

UNIT – II STEEL SECTIONS AND RIVETED, WELDED & BOLTED JOINTS 9

Properties of rolled steel sections, riveted joints, Analysis and Design of riveted joints (Excluding eccentric Connections)

Types of welding, permissible stresses, Design of fillet welds (excluding eccentric connections) Design of Bolted connection.

UNIT –III TENSION MEMBERS 9

Introduction – Net sectional area – permissible stresses. Design of Axially loaded Tension member – Lug angle – code provision – tension splice.

UNIT –IV COMPRESSION MEMBERS 9

Introduction – various sections – built up section – Design of columns (excluding Lacing, Battening and other connections.)

UNIT –V DESIGN OF CIRCULAR SLAB AND CONCRETE WALLS 9

Design of concrete walls – Design of cantilever – Cantilever retaining walls – Shear wall. Classification of walls. Design of Simply supported and fixed Circular slabs subjected to uniformly distributed loads

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Ramachandra S., Design of Steel Structures, Standard Book House, Delhi, 1984.
2. "N. *Krishna Raju*". *Design* of Prestressed Concrete *Structures* Tata McGraw-Hi Education, 1986
3. P.Dayarathnam, Design of Reinforced Concrete Structures, Oxford and IBH Publishing Co.,1983

REFERENCES

1. National Building Code of India, 1983, Part VI, Structural Design.
2. Gurucharan Singh, Design of Steel Structures, Standard Publishers, New Delhi, 1982.
3. Negi "Design of steel Structures", Tata McGraw-Hill Book Company, New Delhi 1997.
4 S.S.Bhavikatti " Design of steel Structures", I. K. International Pvt Ltd, 2009

Mapping of COs with POs

	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO 9	PO1 0	PSO1	PSO 2
CO-1				3					3			
CO-2				3					3			
CO-3				3					3			
CO-4				3					3			
CO-5				3					3			
Total				15					15			
Scaled Value	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3 0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR404 – BUILDING SERVICES - II 2 – 0 – 1 – 3

Course Objectives:

1. To teach the fundamentals of lighting systems in buildings.
2. To give exposure about the methods of designing the electrical and wiring systems in buildings.

Course Outcome:	**Domain**	**Level**

On the successful completion of the course, students will be able to			
CO1	***Explain*** on the basics of electrical, lighting and the components	Cognitive	Understanding
CO2	***Illustrate*** the fundamentals of lighting and ***prepare*** lighting design	Cognitive Psychomotor	Understanding Creating
CO3	***Outline*** energy efficient lighting design solutions	Cognitive	Understanding
CO4	***Understand*** the basic principles of Acoustics	Cognitive	Understanding
CO5	***Analyze*** the acoustical criteria of various spaces and ***Solve*** simple Acoustical problems	Affective Psychomotor	Analyzing Creating

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 404	**BUILDING SERVICES – I I**	**2**	**0**	**1**	**3**
C:P:A	**2.1:0.6:0.3**	**L**	**T**	**P**	**H**
		2	**0**	**1**	**4**

UNIT – I ELECTRICAL SYSTEMS **10**

Basics of Electricity, Units of Electricity, Distribution, AC,DC, Single phase, three phase supply, protective devices, earthing, electrical installations, Switches, Loading calculations, Symbols and notations in drawings, power requirement for various appliances, location of installations, Typical electrical layout for residences.

UNIT – II LIGHTING AND ILLUMINATION **9**

Lighting basics, Elements of lighting, units of lighting-luminous flux, luminous intensity, illuminance and luminance, colour temperature, beam angle and field angle, Lighting level for different uses in outdoor and indoor environment. Daylighting – Daylight Considerations for designing with daylight - typology, room dimensions, openings. Daylight Factor.Artificial Lighting -concepts – lighting layers, techniques, Lighting sources-lamps and luminaries, control devices, Case study : Office lighting design.

UNIT – III ENERGY EFFICIENT LIGHTING **14**

Energy efficient technologies and design approaches –selection of luminaries, lighting controls and daylighting, glare from lamps, Reducing electric loads, installation and maintenance – LEED certification & energy efficient lighting, energy audit for lighting performance. Solar energy systems for lighting –

Photovoltaic systems for Residential/Commercial buildings. Case studies and exercises involving in the above.

UNIT – IV	FUNDAMENTALS OF ACOUSTICS	9

Fundamentals – sound waves, wave length ,frequency, intensity, Octave, , measure of sound, decibel scale, speech and music frequencies, NC curves. Indoor Accoustics -Material property - absorption, reflection, scattering, diffusion, transmission. Absorption co-efficient, NRC. Sound Transmission – Air borne, Structure borne, Sound Transmission Class (STC), Impact Insulation Class (IIC). Understanding acoustic properties of materials, types of acoustic absorbers.

UNIT –V	INDOOR AND ENVIRONMENTAL ACOUSTICS	12

Acoustical criteria for various spaces – conference rooms, lecture halls, recording studios, Open air theatres and auditoriums. Importance of shape volume, treatment for interior surfaces, etc. Indoor Acoustics - Reverberation time, optimum reverberation time, echo, early decay time. Environmental Acoustics –Types of noise and its control at site level -and urban level-geometrical changes, noise barriers. Structure borne and air borne noise control. Site selection. Simple problems based on reverberation time and absorption coefficients. Acoustic design for simple and small projects including planning.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. M.K.Halpeth, T.Senthil kumar, G.Harikumar “Light Right”, TERI publications,2004
2. Jason Livingston, “Designing with light”,Wiley,2014
3. Philips, “Lighting in Architectural Design”, McGraw Hill. New York, 1964

REFERENCES

1. Handbook of building Engineers in metric systems, NBO(India), 1968
2. National Building Code of India, 2016 (NBC 2016)
3. Mechanical and Electrical Equipment for buildings, Benjamin Stein, John.S.Reynolds, Walter.T.Grondzik, Alison.G.Kwok, 10th edition, John Wiley and Sons, London, 2006.
4. 'The Lighting Handbook', IES, 2011.
5. R. G. Hopkenson & J. D. Kay, “The lighting of Buildings”, Faber & Faber, London, 1969.

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO10	PSO1	PSO2

									9			
CO1				3								
CO2				3								
CO3				3			3					
CO4				3			3					
CO5				3							1	
Total				15								
Scaled Value				3			4				1	

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR405 – MATERIALS AND CONSTRUCTION – III	**2 – 0 – 2 – 4**

Course Objectives:

1. To provide knowledge about the principles, methods of construction and applications of metals for structural and non-structural building components.
2. To enable design and detail the various components of buildings using metals and glass.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Identify*** the appropriate Ferrous and Non-Ferrous materials in construction.	Cognitive	Apply
CO2	***Identify*** appropriate construction techniques using Ferrous and Non-Ferrous materials in construction	Cognitive	Apply
CO3	***Ability*** to design and detail drawings of structural and non structural building components using Ferrous and Non Ferrous and Glass	Psychomotor	Create
CO4	***Ability*** to use metals and glass innovatively in buildings.	Affective	Evaluate

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 405	**MATERIALS AND CONSTRUCTION – III**	**2**	**0**	**2**	**4**
C:P:A	**1.2:1.2:0.6**	**L**	**T**	**P**	**H**
		2	**0**	**2**	**5**
UNIT – I	**FERROUS METALS**				**6**
	Introduction to Ferrous metals, Types of Ferrous metals, its properties and applications, Manufacturing process by blast furnace, oxygen furnace and production of structural shapes, cast steel, hot rolled, cold rolled steel, Heat treatment of steel, Coated steel.				
UNIT – II	**STEEL CONSTRUCTION**				**3 0**

Joining of Steel members, Details of steel framing, Stabilization of steel frames structures, Metal Doors and windows assembly, Steel staircases, Lattice Truss, Beam, Portal Frame and Flat roof Structures, Fire proofing of steel framings. Design and construction parameters developed by INSDAG. Typical Plates: Metal windows, Metal doors, Steel Staircase, Lattice steel roof truss, Tubular Steel roof truss, Steel space frame for flat roof.

UNIT – III	NON FERROUS METALS	5

Introduction to Aluminum, Physical properties, Manufacture of extruded sections and flat products, Finishes for Aluminum, Fabrication process and connections, Introduction to Copper, Manufacture, Grades and Sizes of Copper, Patina and corrosion, protective coatings, Copper alloys: Bronze, Brass. Titanium – Manufacture, Properties and uses, Titanium alloys.

UNIT –IV	CONSTRUCTION USING NON-FERROUS METALS	28

Aluminum doors and windows, Ironmongery, Aluminum glass framing systems, Curtain walls and structural glazing, Exterior wall claddings, Skylights, Interior dry wall partition, False ceiling. Application of gaskets, caulking and sealants.
Typical Plates:Aluminium windows, doors, shop front curtain walls, structural glazing systems and aluminium composite panel cladding

UNIT –V	GLASS	6

Introduction to glass, Composition and forming process, Extruded section and cast glass blocks, Types of glass, Strength of glass, Fire resistant glass, Insulation glass, Energy conservation and solar control glass, Acoustic properties of glass.
Typical Plates: Showroom glass wall systems, Glass staircase, Balustrade and glass partition systems, installation details of glass.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	60	75

TEXT

1. S.C.Rangwala, Engineering Materials, Charotar Publishing House, India,1997.
2. W.B.Mckay Building Construction, Longmans, U.K. 1981.
3. Fundamentals ofBuilding Construction, John Wiley & Sons Inc, 2009.
4. Materials for Architects and Builders, Elsevier, 2010

REFERENCES

1. B.C.Punmia, Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 1993.
2. Arthur Lyons - Materials for Architects and Builders - An Introduction - Arnold, London,1997.
3. Harold B.Olin, Construction Principles Materials and Methods, The Institute of Financial
   Education, Chicago, 1980.
4. Time Saver Standards for Architectural Design Data, Calendar JH, McGraw-Hill,

1974.
5. Don A. Watson, Construction Materials and processes, McGraw Hill Co., 1972.

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1. http://www.britmetfed.org.uk/frmedu.html
2. http://www.indiabussinessonline.com
3. http://www.nrwas.com
4. http://www.arcadiaproducts.com
5. http://www.sail.com.in

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3	2	-	-	1		1					
CO2	2	2			1		2					
CO3	3	2		2	1	3	1					
CO4					2						2	1
CO5					2	3					3	1
Total	8	6	0	2	7	6	4	0			5	2
Scaled Value	**2**	**2**	**0**	**1**	**2**	**2**	**1**	**0**			**1**	**1**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR406 – OPEN ELECTIVE 0 – 0 – 2 – 2

To be attended in other department.

XAR407 – ARCHITECTURAL DESIGN – III 0 – 0 – 6 – 9

Course Objectives:

1. To develop skills for designing functional and aesthetical spaces
2. To develop skills to study, analyze and provide design solutions
3. To apply the basic design principles in medium scale built forms.
4. To develop skills such as presentation drawings, rendering, visualize and express ideas **t**hrough scale models.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Understand*** the space and furniture's required for various human activities and their influences in arriving with the circulation patterns	Cognitive	Knowledge
CO2	***Design*** of medium scale public buildings with structural, utility, aesthetics and material considerations by applying the knowledge gained in case studies.	Psychomotor	Create
CO3	***Ability*** to Study & Analyze the existing rural settlements and identify the need and demand and give solutions.	Cognitive Affective	Analyze & Apply
CO4	***Ability*** to represent design ideologies as 2 and 3 dimensional drawings, views and models in appropriate scale.	Psychomotor Affective	Application Create

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 407	**ARCHITECTURAL DESIGN – III**	**0**	**0**	**6**	**9**
C:P:A	**2:4:3**	**L**	**T**	**P**	**H**
		0	**0**	**6**	**12**

UNIT – I DESIGN STUDIO 70

Problem related to multi room, single use, small span - multiple story, Horizontal and vertical movement, Active cum passive energy, conventional and frame type buildings.

Examples: Department store, Library, higher secondary school, campus students' centre, etc. The projects will consciously provide for movement and use by the physically handicapped and elderly.

UNIT – II DESIGN STUDIO - RURAL PROJECT 110

Problems related to Rural Housing - Visits to selected village - surveys on socio- economic, physical, housing and surveys, etc. to study existing conditions - analysis of survey data - preparation of report and presentation in a seminar – identifying the need and demand of the society - preparation of design solutions for housing and community facilities.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	180	180

TEXT

1. Quentin Pickard RIBA - The Architects' Hand Book - Bladewell Science Ltd. - 2002

REFERENCES

1. De Chiara and Callender, Time Saver Standard for Building Types, McGraw-Hill Co., 2nd Edition, 1980.
2. P&D Act 1995.
3. Edward D.Mills, Planning - The Architects Handbook - 10th Edition, British Library Cataloguing in Publication Data, 1985.
4. AndrewAlpern, Handbook of Speciality Elements in Architecture, McGraw-Hill Book Co., 1982.
6. Neufert Architect's Data, Rudolf Herg, Crosby Lockwood and Sons Ltd., 1970.

Mapping of COs with Pos

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PSO 1	PSO 2
CO1	3	2	2	-	-	-	-	-	-	-	3	1
CO2	3	3	2	2	2	2	2	3	2	3	3	1
CO3	1	1	3	2	2	1	2	2	1	-	3	2
CO4	3	2	-	3	3	2	2	3	1	3	3	1
CO5	-	-	-	3	3	-	2	2	2	-	3	3
Total	10	8	7	10	10	5	8	10	6	6	15	8
Scale	**2**	**2**	**2**	**2**	**2**	**1**	**2**	**2**	**2**	**2**	**3**	**2**

d Value												

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR - 501 - CONTEMPORARY ARCHITECTURE 3 – 0 – 0 – 3

Course objectives:

1. To understand the evolution of important style and their chronological order
2. To understand the factors that helped cause the various styles
3. To understand the origin of modern architecture
4. To understand the application of various design philosophies.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Differentiate*** the chronological development of architectural style in relation with the material development and cultural change.	Cognitive	Analyze
CO2	***Interpret*** the spatial configuration and three dimensional articulation of master architects works.	Cognitive	Apply
CO3	***Examine*** the contextual design solution, Spatial organization and spatial qualities of different typologies of buildings.	Cognitive	Analyze
CO4	***Develop*** the knowledge towards logical design development.	Cognitive	Create

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 501	**CONTEMPORARY ARCHITECTURE**	**3**	**0**	**0**	**3**
C:P:A	**3:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**

UNIT – I NEO CLASSICAL ARCHITECTURE 5

Chronological order of developments that led to Neo – Classical Architecture. The works of Boulle: Cenotaph of Isaac Newton, The works of Ledoux: Theatre at Beseneon.

UNIT – II INDUSTRIAL REVELOUTION AND ITS IMPACT 13

Industrial revolution: Definition, factors caused it, its impact on building industry and city. Discovery of new materials: Cast iron (later Steel) sheet glass

and cement and their impact on building industries, discovery of new Services: Lift, Telephone, Room heating, Waste disposal etc. and their impact.

Crystal palace, London by Joseph Paxton, Arts and craft movement: Principle and factors caused it.

Art- Noveau movement: Principles and factors caused it, Chicago school of Architects: their principles and work, Example: Louis Sullivan and his skyscrapers, Principles of Gaudi and works: Casa Balto

Principles of Mackintosh and works: Glasco School of Arts

UNIT – III	**DEVELOPMENT UPTO 1920**	**9**

Early principles and work of FL Wright (Winslow house, Robi House, Le Corbusier (Ron Champ) principles of Adolf Loos with one example. Design philosophies: manifested of Futurist Architecture By Antonio Sant' Eliya, Cubish, Destijl, constructivism (with an example each) expressionism (Ex Mendelson's , Einstein's tower) Peter Beherens and his contributions to Werkbund with examples (Turbinen Fabric Building Berlin) Walter Gropius and his contribution to Bauhaus institute and his works(ex. Bauhaus Building at Dessau)

The contribution made by Bauhaus institute to modern architecture

UNIT – IV	**DEVELOPMENT UPTO 1950**	**12**

Later works of F.L.Wright and Le Corbusier(Ex. Museum of modern Art, New York, Villa Savoy, united habitat, Marsails)

Evolution of International Style: works of Mies Vander Rohn and Eero Saarinen

Alternative theories: Louis Khan, Alvar alto and Paul Rudolph with one example each.

UNIT– V	**INTERNATIONAL STYLE AND ALTERNATIVES**	**6**

International Style – General Characteristics and trends of Team-X and its Manifesto. Its influence: the works of Aldo Van Eyck, Ralph Erskin and Lousien Kroll with on e example each. Alternative theories.

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**0**	**0**	**45**

TEXT

1. Willam J.Curtis, Modern Architecture Since 1900.
2. Bill Risebero, Modern Architecture and Design.
3. Kenneth Frampton, Modern Architecture: A Critical History, Tahmes and Hudson,

London, 1994.

REFERENCES

1. Thomas Metcalf, An Imperial Vision, Faber and Faber, London, 1989.
2. Manfredo Taferi / Francesco dal co., Modern Architecture, Faber and Faber/Electa,198(
3. Sigfried Giedion, Space Time and Architecture: The Growth of a New Tradition, Harva University Press, 1978.

Mapping of COs with POs

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO 9	PO10	PSO1	PSO 2
CO1	3	1		-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
Total	12	9	8	-	-	-	-	-	-	-	-	-
Scaled Value	3	2	2	-	-	-	-	-	-	-	-	-

1-5 =1, 6-10=2, 11-15=30

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR - 502 –ENVIRONMENTAL SCIENCES 3 – 0 – 0 – 3

Course objectives:

1. To understand the evolution of important style and their chronological order

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Understand*** the environment and its interrelationship with the living organisms.	Cognitive	Analyze
CO2	***Understand*** the importance of human activity, built environment and its impact on environment	Cognitive	Apply
CO3	***Know*** about the scientific, technical, economic and political solutions to environment	Cognitive	Analyze

SUBCODE	SUB NAME	L	T	P	C
XAR 502	**ENVIRONMENTAL SCIENCES**	**3**	**0**	**0**	**3**

C:P:A	3:0:0	L	T	P	H
		3	0	0	3

UNIT – I	IINTRODUCTION TO ENVIRONMENTAL STUDIES AND ENERGY	12

Definition, scope and importance – Need for public awareness – 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, flood, 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.

UNIT – II	ECOSYSTEMS AND BIODIVERSITY	7

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 ecosystem (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III	ENVIRONMENTAL POLLUTION	10

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 – Solid waste management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: flood, earthquake, cyclone and landslide.

UNIT – IV	SOCIAL ISSUES AND THE ENVIRONMENT	10

Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, 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 – Issues involved in enforcement of environmental legislation – 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 programme– Role of Information Technology in Environment and human health – Case studies.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co, USA, 2000.
2. Townsend C., Harper J and Michael Begon, Essentials of Ecology, Blackwell Scienc UK, 2003
3. Trivedi R.K and P.K.Goel, Introduction to Air pollution, Techno Science Publicatior India, 2003.
4. Disaster mitigation, Preparedness, Recovery and Response, SBS Publishers & Distributors Pvt. Ltd, New Delhi, 2006.
5. Introduction to International disaster management, Butterworth Heinemann, 2006.
6. Gilbert M.Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second Edition, New Delhi, 2004.

REFERENCES

1. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media, India, 2009.
2. Cunningham, W.P.Cooper, T.H.Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001.
3. S.K.Dhameja, Environmental Engineering and Management, S.K.Kataria and Sons, New Delhi, 2012.
4. Sahni, Disaster Risk Reduction in South Asia, PHI Learning, New Delhi, 2003.
5. Sundar, Disaster Management, Sarup& Sons, New Delhi, 2007.
7. G.K.Ghosh, Disaster Management, A.P.H.Publishers, New Delhi, 2006.

e- REFERENCES

1. http://www.e-booksdirectory.com/details.php?ebook=10526
2. https://www.free-ebooks.net/ebook/Introduction-to-Environmental-Science
3. https://www.free-ebooks.net/ebook/What-is-Biodiversity
4. https://www.learner.org/courses/envsci/unit/unit_vis.php?unit=4
5. http://bookboon.com/en/pollution-prevention-and-control-ebook
6. http://www.e-booksdirectory.com/details.php?ebook=8557
7. http://www.e-booksdirectory.com/details.php?ebook=6804
8. http://bookboon.com/en/atmospheric-pollution-ebook
9. http://www.e-booksdirectory.com/details.php?ebook=3749
10. http://www.e-booksdirectory.com/details.php?ebook=2604
11. http://www.e-booksdirectory.com/details.php?ebook=2116
12. http://www.e-booksdirectory.com/details.php?ebook=1026
13. http://www.faadooengineers.com/threads/7894-Environmental-Science

Mapping of COs with POs

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO 9	PO10	PSO1	PSO 2
CO1				3								
CO2				3			2					
CO3				3			2				3	
Total				12			4				3	
Scaled Value	**0**	**0**	**0**	**3**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**

1-5 =1, 6-10=2, 11-15=30

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation

XAR503 – DESIGN OF STRUCTURES - I I 3 – 0 – 0 – 3

Course Objectives:

3. To teach the fundamentals of reinforced concrete design with emphasis on the design of RCC structural elements through working stress and limit state methods.
4. Analyze and design reinforced concrete structural members under bending, shear, and/or axial loads according to IS code provisions

COUSE CODE	XAR 503	L	T	P	C
COUSE NAME	DESIGN OF STRUCTURES - I	3	0	0	3
PREREQUISITES	NIL	L	T	P	H
C:P:A	C:P:A = 3:0:0	3	0	0	3

COURSE OUTCOMES		DOMAIN	LEVEL
CO1	***Understand*** the concepts of working stress method of design	Cognitive	Understand
CO2	***Design*** reinforced concrete slabs	Cognitive	Creative
CO3	***Design*** rectangular and flanged beam as per LSM	Cognitive	Creative
CO4	***Design*** column and staircase	Cognitive	Creative
CO5	***Design*** shallow foundation	Cognitive	Creative

UNIT – I PROPERTIES OF CONCRETE & WORKING STRESS METHOD OF DESIGN **9**

Structural properties of concrete – Grades and Strength of concrete – Durability – Reinforcing steel – Code Provisions of concrete and steel – Introduction to working stress method – Design of rectangular beams for bending and shear.

UNIT – II LIMIT STATE DESIGN – INTRODUCTION & DESIGN OF SLAB **9**

Introduction to the Limit state method – partial safety factor - Limit state design of slab – Design of one way slab – Two way slab using IS Code for various edge conditions - Design of Flat slabs

UNIT – III LIMIT STATE DESIGN OF BEAM **9**

Limit state design of beam - Design of rectangular and Flanged beams for bending and shear

UNIT – IV DESIGN OF COLUMN AND STAIRCASE **9**

Limit state design of column - Design of axially loaded short and long columns – Eccentric loaded column - Staircase and its types - Design of dog legged staircase.

UNIT – V DESIGN OF FOUNDATIONS **9**

Foundation and its types – Design of Isolated Footing – Combined rectangular footing

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	45	0	0	45

TEXT

1. Dayarathnam, Design of Reinforced Concrete Structures, Oxford and IBH Publishing Co., 1983.

2. N.C.Sinha and S.K.Roy, Fundamentals of Reinforced Concrete, S.Chand & co., New Delhi, 1983.

REFERENCES

1. S.N. Sinha, Reinforced Concrete Design Tata McGraw-Hill, New Delhi 1998.
2. Dr. B.C. Punmiya, Reinforced Concrete Structures, standard Laxmi publication,Delhi,1994
3. P.C.Varghese ,Limit State Design of Reinforced Concrete, Printice Hall of India-1999

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO 1	PSO 2
CO-1				03								
CO-2		03		03								
CO-3				03						03		
CO-4				03						03		
CO-5				03						03		
Total				15						09		
Scaled Value	**0**	**01**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR504 – BUILDING SERVICES - III 2 – 0 – 1 – 3

Course Objectives:

1. To teach the fundamentals of HVAC systems in buildings.
2. To give exposure about the methods of providing the safety and security systems in buildings.

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO 1	***Illustrate*** the basics of Refrigeration, components and installations and ***prepare*** electrical layout.	Cognitive	Understanding
CO 2	***Compare*** the various systems of HVAC and their applications.	Cognitive	Understanding
CO 3	***Classify*** the various vertical circulation components and ***design*** them.	Cognitive Psychomotor	Understanding Creating

CO 4	***Understand*** the fire safety requirements of buildings	Cognitive	Understanding
CO 5	***Identify*** fire detection and fire fighting systems for buildings and ***prepare*** fire escape plans.	Cognitive Psychomotor	Understanding Creating

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 504	**BUILDING SERVICES – III**	**2**	**0**	**1**	**3**
C:P:A	**2.4:0.6:0**	**L**	**T**	**P**	**H**
		2	**0**	**1**	**4**

UNIT – I **REFRIGERATION PRINCIPLES AND COMPONENTS** **10**

Thermodynamics. Transfer of heat. Refrigeration cycle components. Vapor compression cycle. Refrigerant, Compressor, condenser, evaporator, refrigerant control devices, electric motors, air handling units, fan coil unit, chillers, chiller pumps, cooling towers.

UNIT – II **HVAC SYSTEMS** **14**

Local and Central Air conditioning systems and their applications- window type, split system, package unit, direct expansion system, VRF, chilled water system, district cooling systems. Energy efficient systems, environmental aspects and latest innovations.

Understanding of HVAC Ducting and piping layout drawings.

UNIT – III **VERTICAL CIRCULATION SYSTEMS** **14**

Elevators and escalators – types, applications and components. 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 catalogues/ field visits. Design exercise on the above through choice, calculations, layout and drawings.

UNIT – IV **FIRE SAFETY - GENERAL PROVISIONS** **12**

Fire, causes of fire and spread of fire. Fire protection, standards - safety regulations - NBC - Planning considerations in buildings like Non-combustible materials, staircases and lift lobbies, general guidelines for egress design, Fire drills , refuge areas.

UNIT –V **FIRE DETECTION AND FIRE FIGHTING** **10**

Detectors and Alarms - Types of detectors and usage Heat detectors, smoke detectors, photoelectric detectors, Control panel, buzzer etc.,

Extinguishing Systems - Fire fighting: various types of Extinguishers, Pumps, Fire tank (static capacity) Dry and wet risers, Automatic sprinklers. Preparation of Means of Egress layouts.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. National Building Code of India, 2016 (NBC 2016)
2. 'ISHRAE Handbook for Refrigeration', 2015.
3. William H. Severns and Julian R Fellows, 'Air conditioning and Refrigeration', John Wiley and Sons, London, 1988.
4. George R. Strakosch (Editor), Robert S. Caporale, 'The Vertical Transportation Handbook' 4th Edition, Wiley and Sons, 2010.

REFERENCES

1. Mechanical and Electrical Equipment for buildings, Benjamin Stein, John.S.Reynolds, Walter.T.Grondzik, Alison.G.Kwok, 10th edition, John Wiley and Sons, London, 2006.
2. Andrew H Buchanan; 'Structural Design for Fire Safety', Wiley, 2001.
3. Swenson S. Don, 'Heating, Ventilating and Air Conditioning', American Technical Publishers, 1995.
4. CIBSE Guide D, 'Transportation Systems in Buildings',2010.
5. A.K.Mittal, 'Electrical and Mechanical Services in High Rise Building: Design and Estimation
6. Manual', CBS, 2009.

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1				3								
CO2				3								
CO3				3			2					
CO4				3			2					
CO5				3							3	
Total				15								
Scaled Value				**3**			**4**				**1**	

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 505 – MATERIALS AND CONSTRUCTION - IV 2 – 0 – 2 – 4

Course Objectives:

1. To have an understanding of the properties, characteristics, strength, manufacture, processing and application of cement and cement concrete.
2. To understand the specific application of concrete in various building components.
3. To Design and detail various concrete staircases.

Course Outcome:		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Explain*** the composition, properties, and tests for cement	Cognitive	Understand
CO2	***Summarize*** the ingredients, properties ,quality control of concrete and its construction process	Cognitive	Understand
CO3	***Ability*** to provide specific details of components in concrete wherever its application is possible in buildings	Psychomotor	Create
CO4	***Create*** detailed drawings of footing, lintels, beams and slabs	Psychomotor	Create
CO5	***Ability*** to use concrete at different applications	Affective	Evaluate

SUBCODE	SUB NAME	L	T	P	C
XAR 505	**MATERIALS AND CONSTRUCTION - IV**	**2**	**0**	**2**	**4**
C:P:A	**1.5:1.5:1.0**	**L**	**T**	**P**	**H**
		2	**0**	**2**	**5**

UNIT – I CEMENT & CONCRETE - INGREDIENTS AND PROPERTIES 12

Varieties of cement, composition, properties and uses - tests for cement - mortar for various works.

Ingredients - suitability requirements for aggregates, grading of aggregates – water mix in concrete - reinforcement - admixtures - properties of concrete. Concreting process - mix proportioning - batching, mixing, transporting, placing, compaction, curing, formwork - quality control - tests for concrete - joints in concrete - concrete finishes. Types of concrete. Ferro cement, FRP,

FRC and its applications.

UNIT – II	CONCRETE CONSTRUCTION - I	18

Introduction to framed structures. Concrete in foundations - types of footings - isolated, combined, continuous, strap Concrete floors (PCC), walls and partitions. Concrete lintels, sunshades. Concrete beams and columns and slabs – one-way and two-way slabs.

UNIT –III	CONCRETE CONSTRUCTION - II	15

Pre cast concrete wall, cast in situ wall, pre cast building elements, pre stressed concrete and its applications. Post & Pre tension concrete.

UNIT –IV	CONCRETE STAIRCASES	20

Factors involving staircase design - types of staircases like straight flight, doglegged, quarter turn, bifurcated, spiral helical, etc. - different support conditions like inclined slab, cranked slab, continuous, cantilever – foundations, finishes for staircases - detailing out of handrails and balusters. Designing and detailing for physically handicapped.

UNIT –V	FORMWORKS & SCAFFOLDING	10

Fundamentals of formworks and scaffolding. Different types and its applications. Case studies and examples.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	45	75

TEXT

1. Dr.B.C.Punmia, Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 1993.
2. Francis D.K.Ching, Building Construction Illustrated VNR, 1985.

REFERENCES

1. S.C.Rangwala, Engineering Materials, Charotar Publishing House, India, 1997.
2. Alan Banc, Stairs, Steps and Ramps, Butter worth Heinemann Ltd., 1996
3. M.S.Shetty, Concrete Technology, S.Chand & Co. Ltd., New Delhi, 1986.
4. W.B.Mckay Building Construction, Longmans, UK, 1981.

Mapping of COs with POs

	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO 9	PO1 0	PSO1	PSO2

CO1				3	1					3	1	
CO2				3	1					3	1	
CO3				3	1					3	1	
CO4				3	1					3	1	
CO5				3	1					3	1	
Total				**15**	**5**					**15**	**5**	
Scaled Value				**3**	**1**					**3**	**1**	

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 506 – COMPUTER APPLICATIONS IN ARCHTECTURE - II 2 – 0 – 2 – 4

Course Objectives:

1. To develop the skill & knowledge in 3D Modelling & Animation.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Ability*** to use 3d modeling in representing the ideas of design	Psychomotor	Manipulation
CO2	***Ability*** to produce 3d animated videos/walkthroughs of buildings	Psychomotor	Articulation
CO3	***Recreate*** realistic image of objects and buildings by using presentation software.	Psychomotor	Manipulation

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 506	**COMPUTER APPLICATIONS IN ARCHITECTURE - II**	**0**	**0**	**2**	**3**
C:P:A	**0.5:2.0:0.5**	**L**	**T**	**P**	**H**
		0	**0**	**2**	**4**
UNIT – I	**INTRODUCTION**				**4**

	Definition of Computer-based Animation, Basic Types of Animation: Real Time,Non-real-time, Definition of Modelling, Creation of 3D objects. Exploring the Max Interface, Controlling & Configuring the Viewports, Customizing the Max Interface & Setting Preferences, Working with Files, Setting Object Properties & Duplicating Objects, Creating & Editing Standard Primitive & extended Primitives objects, Transforming objects, etc.	
UNIT – II	**2D SPLINES & SHAPES & COMPOUND OBJECT**	**8**
	Understanding 2D Splines & shape, Extrude & Bevel 2D object to 3D, Understanding Loft & terrain, Modeling simple 4 objects with splines, Understanding morph, scatter, conform, connect compound objects, blobmesh, Boolean ,Proboolean&procutter compound object.	
UNIT– III	**3DMODELLING**	**20**
	Modeling with Polygons, using the graphite, working with XRefs, Building simple scenes, Building complex scenes with XRefs, using assets tracking, deforming surfaces & using the mesh modifiers, modeling with patches & NURBS	
UNIT – IV	**KEYFRAME ANIMATION**	**8**
	Creating Keyframes, Auto Keyframes, Move & Scale Keyframe on the timeline, Animating with constraints & simple controllers, animation Modifiers & complex controllers, function curves in the track view, motion mixer etc.	
UNIT – V	**SIMULATION & EFFECTS**	**12**
	Bind to Space Warp object, Gravity, wind, displace force object, deflectors, FFD space warp, wave, ripple, bomb, Creating particle system through p-array, understanding particle flow user interface, how to particle flow works, hair & fur modifier, cloth & garment maker modifiers etc.	
UNIT – VI	**LIGHTING& CAMERA**	**8**
	Configuring & Aiming Cameras, camera motion blur, camera depth of field, camera tracking, using basic lights & lighting Techniques, working with advanced lighting, Light Tracing, Radiosity, video post, mental ray lighting etc.	
UNIT– VII	**TEXTURING WITH MAX**	**8**
	Using the material editor & the material explorer, creating & applying standard materials, adding material details with maps, creating compound materials & material modifiers, unwrapping UVs & mapping texture, using atmospheric & render effects etc.	
UNIT – V	**RENDERING WITH V-RAY**	**8**

	V-ray light setup, V-ray rendering settings, HDRI Illumination, Fine-tuning shadows, Final render setting etc.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	**0**	**60**	**60**

TEXT

1. TedBoardman, 3dsmax7 Fundamentals, Techmedia
2. Michael E. Mortenson, 3D Modelling, Animation, and Rendering, Createspace

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	-	-	-	3	2	-	-	-	-	3	-	-
CO-2	-	-	-	3	2	-	-	-	-	2	-	-
CO-3	-	-	-	3	3	-	-	-	-	2	-	-
CO-4	-	-	-	3	3	-	-	-	-	3	-	-
Total	-	-	-	3	2	-	-	-	-	0	-	-
Scaled value	-	-	-	**15**	**12**	-	-	-	-	**10**	-	-

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 507 –ARCHTECTURAL DESIGN – IV 0 – 0 – 7 – 14

Course Objectives:

1. To address the socio- cultural & economic needs of contemporary urban society in the process of building design.
2. To emphasize the importance of spatial planning by considering the Development Regulations in force for urban areas.
3. To emphasis on the importance of understanding the relationship between open space and built form, built form to built form and site planning principles involving landscaping circulation network and parking.

Course Outcome:			
On the successful completion of the course, students will be able to		**Domain**	**Level**
CO1	***Understand*** the impact of social-cultural & economy in the built environment.	Cognitive	understanding
CO2	***Analyze*** the impact of spatial configuration at building	Affective	Analyzing

	level and at site level on passive design.		
CO3	***Analyze*** and interpret different case buildings.	Affective	Analyzing
CO4	***Develop*** working drawings and model	Psychomotor	Creating

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 507	**ARCHITECTURAL DESIGN - IV**	**0**	**0**	**6**	**10**
C:P:A	**3.0:4.0:3.0**				
		L	**T**	**P**	**H**
		0	**0**	**7**	**14**
UNIT – I	**DESIGN STUDIO**				**210**

Scale and Complexity: Buildings and small complexes that address the social and cultural needs of contemporary urban life (residential. commercial, institutional); multi bayed, multiple storeys, circulation intensive; passive and active energy

Areas of concern/ focus

- Socio-cultural and economic aspects
- Designing for the differently abled
- Building byelaws and rules
- Appropriate materials and construction techniques, detailing

Design Examples:

The building project shall be of housing typologies – detached, attached, group housing and so on.

Shopping centers (Commercial) Home for aged, apartments (residential) Health centers, Nursing homes (institutional) etc.

Introduction to three-dimensional modeling of spaces using Computer. Construction and manipulation of three-dimensional building databases, Rendering 3D images and Presentation techniques.

	LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
	0	**0**	**210**	**210**

TEXT

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.

2. Ernst Neuferts Architects Data, Blackwell 2002.

REFERENCES

1. Edward D.Mills, Planning, 4 volumes, Newnes, Butterworths, London, 1976.
2. P&D Act 1995.
3. E and O.E. Planning. Liffee Books Ltd., London, 1973.
4. National Building Code and Bureau of Indian standard publications.

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	3	2	2	-	-	-	-	-	-	-	3	1
CO-2	3	3	2	2	2	2	2	3	2	3	3	1
CO-3	1	1	3	2	2	1	2	2	1	-	3	2
CO-4	3	2	-	3	3	2	2	3	1	3	3	1
Total	**-**	**-**	**-**	**3**	**3**	**-**	**2**	**2**	**2**	**-**	**3**	**3**
Scaled value	**10**	**8**	**7**	**10**	**10**	**5**	**8**	**10**	**6**	**6**	**15**	**8**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 601 - VERNACULAR ARCHITECTURE 3 – 0 – 0 – 3

Course Objectives:

1. To provide an overview of the various approaches and concepts to the study of vernacular architecture.
2. To study the various vernacular architecture forms in the various regions of the country.

Course Outcome		Domain	Level
CO1	***Understand*** various approaches and concepts of vernacular architecture	Cognitive	Understand

CO2	***Understand*** the impact of colonial rule on vernacular architecture in India	Cognitive	Knowledge
CO3	***Exposure*** to various vernacular architectural forms in various regions	Psychomotor	Application

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR601	**VERNACULAR ARCHITECTURE**	**3**	**0**	**0**	**3**
C:P:A	**2.5:0.5:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**INTRODUCTION**				**7**
	Definition and classification of Vernacular architecture – Vernacular architecture as a process – Survey and study of vernacular architecture: methodology- Cultural and contextual responsiveness of vernacular architecture: an overview				
UNIT – II	**APPROACHES AND CONCEPTS**				**10**
	Different approaches and concepts to the study of vernacular architecture: an over view – Aesthetic, Architectural and anthropological studies in detail				
UNIT – III	**VERNACULAR ARCHITECTURE OF THE WESTERN AND NORTHERN REGIONS OF INDIA**				**12**
	Forms spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction technique of the vernacular architecture of the following: - Deserts of Kutch and Rajasthan; Havelis of Rajasthan - Rural and urban Gujarat; wooden mansions (havelis); Havelis of the Bohra Muslims - Geographical regions of Kashmir; house boats.				
UNIT – IV	**VERNACULAR ARCHITECTURE OF SOUTH INDIA**				**10**
	Forms, spatial planning, cultural aspects, symbolism, art, colour, materials of construction and construction technique, proportioning systems, religious beliefs and practices in the vernacular architecture of the following: - Kerala: Houses of the Nair &Namboothri community; Koothambalam, Padmanabhapuram palace. - Tamil Nadu: Houses and palaces of the Chettinad region; Agraharams				
UNIT – V	**WESTERN INFLUENCES ON VERNACULAR ARCHITECTURE OF INDIA**				**6**
	Colonial influences on the Tradition Goan house - Evolution of the Bungalow from the traditional bangla, Victoria Villas – Planning principles and materials and methods of construction. Settlement pattern and house typologies in Pondicherry and Cochin.				

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**0**	**0**	**45**

TEXT

1. Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997.
2. Amos Rapoport, House, Form & Culture, Prentice Hall Inc. 1969.

3. R W Brunskill: Illustrated Handbook on Vernacular Architecture, 1987.

REFERENCES

1. V.S. Pramar, Haveli – Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
2. Kulbushanshan Jain and Minakshi Jain – Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad 1992. 63
3. G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.
4. Carmen Kagal, VISTARA – TheArchitecture of India, Pub: The Festival of India, 1986.
5. S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 2000

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	2	-	2	1	-	2	-	2	-	2	3	3
CO-2	1	-	2	1	-	2	-	2	-	2	3	3
CO-3	3	-	2	1	-	2	-	2	-	2	3	3
CO-4	2	-	2	1	-	1	-	1	-	2	3	3
Total	8	-	8	4	-	7	-	7	-	8	12	12
Scaled value	**2**	**0**	**2**	**1**	**0**	**2**	**0**	**2**	**0**	**2**	**3**	**3**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 603 – ESTIMATION, COSTING AND VALUATION 2 – 0 – 0 – 2

Course Objectives:

1. To know the various methods of quantity surveying, rate analysis of building and valuation for different materials used.
2. To explore the techniques of estimating and costing related to building construction
3. To emphasis the importance of specification in the building activities and method of drafting specification with importance to the correct order and sequence, avoid duplication and ambiguity, specification by negation and affirmation.
4. Use of Indian standard specification and PWD handbook, for reference only specifications affecting cost.

Course Outcome		Domain	Level
CO1	***Understand*** the unit measurement of materials.	Cognitive	Understand
CO2	***Understand*** the techniques of estimating and costing related to building construction.	Cognitive	Understand
CO3	***Apply and understand*** the various methods of quantity surveying, rate analysis of building and valuation for different materials used. Calculate material cost of given component/product.	Cognitive Affective	Understand Apply
CO4	***Know*** about Specification for basic building material and apply the same for another example	Cognitive Psychomotor	Understand Create
CO5	***Understand and apply*** the concepts of project planning and basics of financial management	Cognitive Affective	Understand Apply

SUBCODE	SUB NAME	L	T	P	C
XAR 603	**ESTIMATION, COSTING AND VALUATION**	**2**	**0**	**0**	**2**
C:P:A =	**1.875:0.375:0.75**	**L**	**T**	**P**	**H**
		2	**0**	**0**	**2**
UNIT – I	**INTRODUCTION TO ESTIMATION**				**3**
	Definition, Aim and object, Scope and importance of subject. Types of Estimates - Approximate and detailed. Units of measurement for different items.				
UNIT – II	**METHODS OF ESTIMATION**				**6**
	Preparation of data and analysis of Rates for Civil Work items – as per Municipal or P. W. D. Schedule Rates and Current market rates, Units for rates. Taking of Quantities for Civil Work of Load Bearing Wall structure and preparation of abstract. Taking of Quantities of Civil Works of R. C. C. Frame Building, and preparation of abstract.				

UNIT – III	**COST ESTIMATION**	**8**
	Preparation of data and analysis of Rates for Civil Work items – as per Municipal or P. W. D. Schedule Rates and Current market rates, Units for rates. Taking of Quantities for Civil Work of Load Bearing Wall structure and preparation of abstract. Taking of Quantities of Civil Works of R. C. C. Frame Building, and preparation of abstract.	
UNIT – IV	**RATE ANALYSIS**	**8**
	Analysis of rates – using standard data and schedule of rates for conventional items – principles of pricing for new items.	
UNIT – V	**VALUATION**	**5**
	Necessity – basics of valuation – capitalized value – depreciation – escalation – value of property – calculation of Standard rent – Report preparation.	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
30	**0**	**0**	**30**

TEXT

1. S.C. Rangwala, Elements of Estimating and Costing, Charoter Publishing House, India.

REFERENCES

1. Dutta, Estimating and Costing, S.Dutta and Co., Lucknow
2. W.H.King and D.M.R.Esson, Specification and Quantities for Civil Engineers, The English University Press Ltd.
3. T.N.Building Practice, Vol.1, Civil, Govt. Publication.
4. P.W.D. Standard specifications, Govt. Publication.

e- REFERENCES

MAPPING of COs with POs:

	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1			2	2					2			
CO-2			2	3					2			
CO-3			2	3			3		3			
CO-4			2	3					2			
CO-5			2	3			3		2			

Total			10	14			6		11			
Scaled to 0,1,2,3 scale	**0**	**0**	**2**	**3**	**0**	**0**	**2**	**0**	**3**	**0**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 605– MATERIALS AND CONSTRUCTION - V 1 – 0 – 2 – 3

Course Objectives:

1. Expose the students to various Research Organization, which involving them in material and technology research.
2. Students know about various deep foundations.
3. To make the student to understand vertical circulation elements

Course Outcome		Domain	Level
CO1	***Understand*** the activities carried out by research organizations.	Cognitive	Understand
CO2	***Understand*** the various methods and types of deep foundation.	Cognitive	Understand
CO3	***Exposed*** to the vertical movement equipment in buildings.	Cognitive	Knowledge
CO4	Understand the types and working principle of Escalator and Elevator.	Cognitive	Understand
CO5	***Gain*** Knowledge of the various advanced building structure.	Affective	Illustrate

SUBCODE	SUB NAME	L	T	P	C
XAR 605	**MATERIALS AND CONSTRUCTION - V**	**1**	**0**	**2**	**3**
C:P:A =	**2.4:0:0.6**	**L**	**T**	**P**	**H**
		1	**0**	**2**	**5**
UNIT – I	**CONSTRUCTION SYSTEMS DEVELOPED BY RESEARCH ORGANISATION**				**6**
	Study of construction system innovated through research organizations like CBRI, NBO, SERC, etc. Floor, wall and roofing systems. Ferrocement its				

	properties, uses and application in building construction including the techniques of preparation, casting, curing, etc.	
UNIT – II	**FOUNDATIONS**	**30**
	Pile foundation, different types of piles, precast and cast insitu with reinforcement details for different types of grids, details of pile capping, jointing of precast piles and columns.	
UNIT – III	**VERTICAL MOVEMENT EQUIPMENTS IN BUILDINGS**	**5**
	Elevators - Historical development of elevators or lifts. Elevators - size, capacity, speed, mechanical safety method, positioning of core under planning grid. Types of elevators - Electric, hydraulic - passenger, hospital, capsule, freight, etc. Dumb waiters, details of lift shaft and other mechanism. Detailing and fitting for physically handicapped. Regenerative drives – speed converters. Fire lift tower – Solae	
UNIT – IV	**ESCALATORS AND CONVEYORS**	**28**
	Escalator types - Parallel and criss cross escalators, horizontal belt conveyors, horizontal moving walkways - concern for physically handicapped mechanical safety systems and automatic control. Speed convernors – cables – sky lobby. Elevator Research	
UNIT – V	**MISCELLANEOUS STRUCTURES**	**6**
	Shell structures, domes, space frame, shell barrel vault, folded plate structures, tensile structures, pneumatic structures, and etc	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
15	**0**	**60**	**75**

TEXT

1. J.H. Callender, Time Saver Standard for Architectural Design Data, McGraw- Hill, 1994.
2. James Ambrose, Building Construction, Service Systems, Van No strand Reinhold, New York, 1992.

REFERENCES

1. H.A Thiruvananthapuram – Hand Book on Elevators – Printing and Publishing co – 1997.
2. United Technologies –OTIS – Tell me About Escalators – Printed in USA – 1990.
3. Pamphets supplied and other literatures from N.B.O., SERC, CBRI, 1970 onwards.
4. R..Chudley, Construction Technology, Richard Clay (Chaucer Press) Ltd., Suffolk, 1978.

MAPPING of COs with POs:												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1			2	2					2			
CO-2			2	3					2			
CO-3			2	3			3		3			
CO-4			2	3					2			
CO-5			2	3			3		2			
Total			10	14			6		11			
Scaled to 0,1,2,3 scale	**0**	**0**	**2**	**3**	**0**	**0**	**2**	**0**	**3**	**0**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 606– ARCHITECTURAL WORKING DRAWING AND SPECIFICATIONS 0 -0-2-2

Course Objectives:

1. To get familiarized in the drafting (either manual or computer) of working drawings that are required for the construction of buildings

Course Outcome		Domain	Level
CO1	***Demonstrate*** an understanding of construction drawings of allied disciplines.	Cognitive	Understand
CO2	***Demonstrate*** an understanding of the relation of working drawing with specifications and Bill of quantities.	Cognitive	Understand
CO3	***Apply*** the standard conventions in a working drawing.	Affective	Apply
CO4	***Develop*** a set of Working drawing for a project.	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR606	ARCHITECTURAL WORKING DRAWING AND SPECIFICATIONS	0	0	2	2
C:P:A =	1:0.5:0.5	L	T	P	H
		0	0	4	4

UNIT – I	ARCHITECTURAL WORKING DRAWING	45

RIBA stages of work, Tender documentation, Structure of Information, Primary structuring and secondary structuring of Working drawing, drawing numbering systems. Construction drawings of allied discipline – structural, Mechanical, electrical and Plumbing.

Preparation of Working drawing for a residential, commercial project - Foundation plans, Centre line plans, all floor plans, Elevations and Sections, Door window schedules, Part Wall Sections, Blown up details, Staircase details, Kitchen details, Toilet and Bath details, approval drawing.

UNIT – II	SPECIFICATION WRITING	15

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.

Detailed specification for earthwork excavation, plain cement concrete, Reinforced concrete, first class and second class brickwork, Damp proof course, ceramic tiles/marble flooring and dadoo, woodwork for doors, windows frames and shutters, cement plastering, painting & weathering course in terrace.

Specification writing of simple residential building & commercial building.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	60	60

TEXT

1. The Professional Practice Of Architectural Working Drawings, Osamu A. Wakita; Richard M. Linde, Wiley 2002.

REFERENCES

1. .Working Drawing Handbook, Keith Styles, Architectural Press 1995

Table:1 Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	-	-	-	3	-	-	3	-	-	-	-	-
CO-2	-	-	-	3	-	-	3	-	-	-	-	-
CO-3	-	-	-	3	-	-	3	-	-	-	-	-
CO-4	-	-	-	3	-	-	3	-	-	3	-	-
Total	-	-	-	12	-	-	12	-	-	-	-	-
Scaled value	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**0**	**0**	**1**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 607 – ARCHITECTURAL DESIGN - V 0 – 0 – 7 – 10

Course Objectives:

1. To understand the design and form of building typologies that are the result of pressure on urban lands with a thrust on issues like urban land economics, technology and ecology
2. To inculcate the importance of services integration and construction in spatial planning in the context of design of High-rise buildings and service intensive buildings.

Course Outcome		Domain	Level
CO1	***Understand*** issues in buildings with respect to density, services and energy consumption as well as make the right choices in design situations involving these issues.	Cognitive	Understand
CO2	***Understand*** Green Building concepts and basic principles of sustainable built environment.	Affective	Evaluate
CO3	***Integrating*** the services in the design	Affective	Apply
CO4	***Produce*** computer aided presentation drawings and making scale models	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR607	ARCHITECTURAL DESIGN - V	0	0	7	10
C:P:A =	1.5:1.5:3	L	T	P	H
		0	0	7	14

UNIT – I	DESIGN STUDIO	180

Design of large structures - Multiuse, multispan, multilevel - building types involving technology and services – Concentrating in the interior designing - Design and detailing for movement and use by physically challenged people within and around building. Design of green and sustainable buildings.

Areas of concern/focus:

Exploring the relationship between building, space, landscape and movement in a context involving diverse user groups.

Examples: College, office buildings (Institutional) Large Commercial Complex (Commercial) Resorts

(Recreational) - Mixed Residential Developments (Residential) etc.

Working drawings for any one design Using Computer for presentation Skills.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	210	210

TEXT

1. Quentin Pickard RIBA - The Architects' Hand Book - Bladewell Science Ltd. - 2002
2. De Chiara Callender, Time Saver Standard for Building Types, McGraw-Hills Co., 1973.

REFERENCES

1. Edward D.Mills, Planning, 4 volumes, Newnes, Butterworths, London, 1976.
2. P&D Act 1995.
3. E and O.E. Planning. Lliffee Books Ltd., London, 1973.
4. National Building Code and Bureau of Indian standard publications

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	3	3	2	2	3	2	-	-	-	2	-	2
CO-2	3	2	1	3	2	1	-	-	-	2	3	-

CO-3	2	3	2	2	3	1	-	-	-	3	-	2
CO-4	2	2	1	1	1	3	-	-	-	3	-	3
Total	10	10	6	8	9	7	-	-	-	10	3	7
Scaled value	**2**	**2**	**2**	**2**	**2**	**2**	**0**	**0**	**0**	**2**	**1**	**2**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 701 – HUMAN SETTLEMENT PLANNING 3 – 0 – 0 – 3

Course Objectives:

1. To give an introduction to the discipline of Urban and Regional planning.
2. To understand the factors that determined the form and structure of human settlements in the modern age.

Course Outcome		Domain	Level
CO1	***Understand*** the origin, evolution and growth of settlements.	Cognitive	Understand
CO2	***Learn*** about planning theories by prominent planners.	Affective	Evaluate
CO3	***Understand*** about the dynamics of Urban Form and various Human Settlements pattern	Cognitive	Understand
CO4	***Understand*** Planning process and techniques adopted at various levels.	Cognitive	Understand
CO5	***Study*** the planning concepts in planned cities.	Cognitive	Understand

SUBCODE	SUB NAME	L	T	P	C
XAR 701	**HUMAN SETTLEMENT PLANNING**	**3**	**0**	**0**	**3**
C:P:A =	**2.4:0:0.6**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**INTRODUCTION TO HUMAN SETTLEMENTS**				**8**
	Elements of human settlement. Forms of human settlement, Growth factors of human settlement – functions, linkages, networks. Anatomy & classification of				

	human settlements. Characteristics of human settlement at various phases of its growth stage.	
UNIT – II	**INTRODUCTION TO PLANNING AND PLANNING CONCEPTS**	**10**
	Evolution of planning profession, role and scope of a planner, planning in history – town planning in ancient India, Greek, roman and medieval. Urban forms and pattern. Planning concepts proposed by Ebenezer Howard, Patric Geddes, Lewis Mumford, CA Perry, le Corbusier. Writings of Jane Jacobs	
UNIT – III	**COMPONENTS OF PLANNING**	**12**
	Various aspects of planning - Land use planning, transportation planning, environmental planning, infrastructure planning. The fundamentals of the land use planning, Zoning principles and basis for formation of zoning laws. Growth management system, infrastructure (Infrastructure, Road, Water supply, Sanitation, Solid Waste Disposal) development and maintenance - Forecasting infrastructure needs of the town based on set of parameters such as population and size of the city, growth trend.Development Control Regulations and bye-laws, standards, CZR in India. Critical analysis of standards. ICT in city management.	
UNIT – IV	**URBAN PLANNING AND URBAN RENEWAL**	**10**
	Tools and techniques utilized at the local, regional, and state level –master plan, structure plan, and zonal plan. Local Governance and Administration: Objectives, Functions, Responsibilities and Organizational structure of: (i) Village Panchayats (ii) Municipalities (iii) Corporations and (iv) Urban Development Authorities.Urban Renewal Plan – Meaning, Redevelopment, Rehabilitation and Conservation – Govt. schemes – case studies.	
UNIT – V	**CITIES -PARADIGM OF SOCIO POLITICAL EXPRESSION**	**5**
	Self sustained communities – SEZ – transit development – integrated townships – case studies.Cities as symbolic expressions of power – Chandigarh, Delhi, Bhubaneshwar, Brasilia, Regulations and standards in India. Critical analysis of standards.	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**0**	**0**	**45**

TEXT

1. Gallion Arthur B &Eisna Simon, The Urban Pattern: City Planning and Housing.
2. UDPFI guidelines
3. ***Town and Country Planning Act 1971with amendments***
   John Radcliffe, An Introduction to Town and Country Planning.

REFERENCES

1. C.L.Doxiadis, Ekistics, “An Introduction to the Science of Human Settlements”, Hutchinson, London, 1968.

2. Government of India, "Report of the National Commission on Urbanisation", 1988.
3. AndroD.Thomas, "'Housing and Urban Renewal", George Allen and Unwin, Sydney, 1986.
4. Rodwin, Lloyd, ed., 1987. Shelter, Settlements and Development (Hemel Hempstead, United Kingdom, Unwin Hyman Ltd.)
5. Town and country planning Act 1971 with amendments

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	-	-	3	-	-	3	-	-	-	-	-	2
CO-2	-	-	3	-	-	3	-	-	-	-	-	2
CO-3	-	-	3	-	-	3	-	-	-	-	-	2
CO-4	-	-	3	-	-		-	-	-	2	-	2
CO-5	-	-	3	-	-	2	-	-	-	-	-	2
Total	**0**	**0**	15	**0**	**0**	11	**0**	**0**	**0**	**2**	**0**	10
Scaled value	**0**	**0**	**3**	**0**	**0**	**3**	**0**	**0**	**0**	**1**	**0**	**2**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 702–PROFESSIONAL PRACTICE AND ETHICS 3 – 0 – 0 – 3

Course Objectives:

1. To give an introduction to the students about the architectural profession and the role of professional bodies and statutory bodies.
2. To sensitize the students about the importance of code of conduct and ethics in professional practice and the mandatory provisions as per Architects Act 1972.
3. To expose the students some of the important legal aspects and legislations which have a bearing on the practice of architectural profession.
4. To enable the students to grasp the advanced issues concerning professional practice such as tendering, contracting including alternative practices in project execution and project management.
5. To facilitate practical exposure to students about Approval Process, Team work with consultants, Project management, certifications etc.

Course Outcome		Domain	Level
CO1	***Knowledge*** Of The Role of professional and	Cognitive	Understand

	statutory bodies		
CO2	***Understanding*** of the Architects services, scale of fee, and competition in Architects Act 1972	Cognitive Affective	Application
CO3	***Understanding*** of code of conduct	Cognitive	Understand
CO4	***Understanding*** on role of Architects in project execution	Cognitive Affective	Application

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 702	**PROFESSIONAL PRACTICE AND ETHICS**	**3**	**0**	**0**	**3**
C:P:A =	**1.3:1:.06:01**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**INTRODUCTION TO ARCHITECTURAL PROFESSION CODE OF CONDUCT AND ETHICS**				**9**
	Importance of Architectural Profession and Role of Architects in Society – Registration of Architects – Architect's office and its management –, organizational structure - Infrastructure requirement, skills required, elementary accounts – Tax liabilities- Setting up Architectural Practice. 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. - A visit to Architectural Practice in City - A joint discussion with IIA Chapter/Centre.				
UNIT – II	**ARCHITECT'S SERVICES, SCALE OF FEES & COMPETITIONS**				**9**
	Mode of engaging an architect – Comprehensive services, partial services and specialized 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 & 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 - its necessity – Contents (Articles of Agreement, Terms and Conditions, Bills of Quantities and specifications, Appendix) – Certification of Contractors Bills at various stages. New trends in project formulation and different types of execution (BOT, DBOT, BOLT, BOO, etc.) - Role of Architect in Project execution stage (A visit to major project site and interaction with Project managers).	
UNIT – IV	**LEGAL ASPECTS**	**6**
	Arbitration (Definition, Advantages of arbitration, 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 evolving from master plan of a city – case study 2nd master plan CMDA- Development Regulations in Second Master Plan for CMA- Building Rules emerging from National Building Code- case study Chennai Corporation Building Rules 1972 – (A visit to CMDA and a visit Chennai Corporation) Factories Act – Persons with Disabilities Act – Barrier Free Environment – Costal 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 specializations in the field of Architecture – Architect as construction / Project manager – Architectural journalism – Architectural photography	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**0**	**0**	**45**

TEXT

1. Architects Act 1972.
2. Publications of Council of Architecture-Architects (Professional conduct) Regulations 1989, Architectural Competition guidelines.

3. Roshan Namavati, Professional practice, Lakhani Book Depot, Mumbai 1984.
4. Ar. V.S. Apte, Architectural Practice and Procedure, Mrs. Padmaja Bhide, 2008.
5. Madhav Deobhakta, Architectural Practice in India, CoA; 2007

REFERENCES

1. J.J.Scott, Architect's Practice, Butterworth, London 1985.
2. Development Regulations of Second Master Plan for Chennai Metropolitan Area - 2026. (Second Master plan of CMA).
3. Chennai City Corporation Building Rules 1972.
4. T.N.D.M. Buildings rules, 1972.
5. Consumer Protection Act, 1986.
6. Arbitration Act, 1996.
7. Factories Act, 1948.

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	-	-	-	-	-	3	2	-	3	-	-	-
CO-2	-	-	-	-	-	3	2	-	3	-	-	-
CO-3	-	-	-	-	-	3	2	-	3	-	-	-
CO-4	-	-	-	-	-	3	2	-	3	-	-	-
Total	**0**	**0**	**0**	**0**	**0**	12	8	**0**	12	**0**	**0**	**0**
Scaled value	**0**	**0**	**0**	**0**	**0**	**3**	**2**	**0**	**3**	**0**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 704–LANDSCAPE DESIGN 2 – 0 –1 – 3

Course Objectives:

1. To familiarize students with the various elements, principle of landscape architecture and develop competency in dealing with the analytic, artistic and technical aspects of landscape design

Course Outcome		Domain	Level
CO1	***Demonstrate*** the knowledge on Landscape and scope of landscape architecture.	Cognitive	Knowledge
CO2	***Understand*** the landscape elements	Cognitive	Knowledge
CO3	***Develop*** a landscape proposal for small and medium scale projects.	Psychomotor	Create
CO4	***Develop*** a detailed drawing and use digital tools to present landscape proposal	Psychomotor	Create
CO5	***Take part***. In a team with the Landscape professionals in a project	Psychomotor	Evaluate

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR704	**LANDSCAPE DESIGN**	**2**	**0**	**1**	**3**
C:P:A	**1.2:1.8:0**	**L**	**T**	**P**	**H**
		2	**0**	**1**	**4**
UNIT – I	**INTRODUCTION**				**10**
	Introduction to Landscape, Categories and Materials in Landscape, Objective and Professional Scope of Landscape. 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 – II	**ELEMENTS IN LANDSCAPE DESIGN**				**13**
	Introduction to hard and soft landscape elements. Different types of hard landscape elements. Plant materials, Plants as design elements- classification structural characteristic of plants – visual characteristics of plant viz. line, form, texture, colour, etc. – basic data for plant selection. water and landform - classification, characteristics, use and application in landscape design.				
UNIT – III	**GARDENS**				**10**
	Catagories of garden, Indian, Japan, Spanish, Chinese, English French, Italian, Mugal Garden (TajMahal) Japanese gardens: Italian Renaissance gardens, Outline of landscape and garden design in Indian history. Gardens depicted in Sanskrit literature, Nandavanams and residential gardens of South India.				

	Mughul gardens. Public parks and residential gardens of the colonial period. Contemporary public landscape projects. Study of notable examples. Spatial development in landscape design.	
UNIT – IV	**PLANTING DESIGN**	**15**
	Behavioral principles, landform design, Landscape character – Landscape Composition – Plant Association– Landscape effects-Organisation of spaces-circulation, built form and open spaces- exercises on planning for neighbourhood parks and campus developments..	
UNIT – V	**LANDSCAPE DESIGN OF FUNCTIONAL AREAS / /PUBLIC OPEN SPACES**	**12**
	Urban open spaces and principle of urban landscape. Street landscaping, landscape design for waterfront areas and functional areas in urban centres like squares, plazas . Green infrastructure including green roofs and walls Landscaping for residential layout – ecreational facilities, like parks, play fields- water front areas – hill areas , Consideration and key factors to landscaping of above context. **Design Assignment**: landscape proposal and Drawing preparation for assigned projects.	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
40	**0**	**20**	**60**

TEXT

1. Landscape Architecture – John Omsbeesimonds .
2. Planting Design – Theodore D Walker.
3. Motloch, J.L., 'An Introduction to Landscape Design', US: John Wiley and Sons, 2001.
4. Michael Laurie, 'Introduction to Landscape Architecture', Elsevier, 1986.
5. Sauter D; 'Landscape Construction', Delmar Publishers; 2000.
6. Geoffrey And Susan Jellico, 'The Landscape of Man', Thames And Hudson, 1987

REFERENCES

1. Introduction to landscape design – John L.Motloch.
2. Planting design Handbook – Nick Robinson.
3. Site planning Standards – Joseph dechiara Lee E. Koppelman.
4. Hand Book of Urban Landscape, The Architectural Press, London, 1973, Cliff Tandy.
5. T S S for Landscape Architecture, McGraw Hill, Inc, 1995
6. Landscape planning and Environmental Impact Design , Turner
7. Landscape detailing , Little woods
8. Landscape design , Park C.

Table:1 Mapping of COs with Pos

	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	2	3	3	-	-	-	-	-	-	-	-	-
CO-2	-	-	-	-	-	-	-	3	-	-	-	-
CO-3	-	-	-	-	-	-	-	-	3	3	3	3

CO-4	-	-	-	3	2	1	-	-	-	-	-	-
CO-5	-	-	-	-	-	-	3	-	-	-	1	2
Total	2	3	3	3	2	1	3	3	3	3	4	5
Scaled value	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR705 MATERIALS AND CONSTRUCTION - VI 1- 0 – 2 – 3

Course Objectives

1. To teach the various types of treatment methods and finishes to achieve the required comfort.

Course outcomes		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Identify*** the various water proofing materials, thermal insulation and their application	Affective	Applying
CO2	***Explain*** the properties and types of acoustic insulation	Cognitive	Understanding
CO3	***Select*** the floor, wall covering and decorative coats based on their applications	Psychomotor	Evaluating

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 705	**MATERIALS AND CONSTRUCTION - VI**	**2**	**0**	**2**	**3**
C:P:A	**1:1:1**	**L**	**T**	**P**	**H**
		1	**0**	**2**	**5**
UNIT – I	**DAMP AND WATER PROOFING**				**15**

	Damp proofing materials - Asphalt, Bentonite clays, butyl rubber, silicones, vinyls, Epoxy resins and metallic sheets - properties, uses. Water proofing materials - rug, asbestos, glass, felt - plastic and synthetic rubber -vinyls, butyl rubber, neoprene polyvinyl chloride (PVC) - prefabricated membranes - sheet lead, asphalt - properties and uses, Expanded polystyrene roof insulation and extruded polystyrene foam insulation. Application of the above under various situations - basement floors, swimming pools, terraces, etc – plates and assignments	
UNIT - II	**THERMAL INSULATION**	**15**
	Heat transfer – Heat gain and heat loss by materials – Types of insulation materials - vapour barriers and rigid insulation. Blanket, poured and reflective insulation - properties and uses of fibre glass, foamed glass, cork, vegetable fibres, mineral fibres, foamed plastics and vermiculite. Gypsum - manufacture, properties and uses, plaster of paris and anhydride gypsum. Foam based insulation. Internal wall insulation and EFIS – External façade insulation	

	system. Construction details of the material application of floors, walls and roofs – Cold storages- Detailing for physically handicapped.	
UNIT - III	**ACOUSTIC INSULATION**	**15**
	Porous, Baffle and perforated materials such as plastic, acoustic tiles, wood, particle board, fibre board, cork, quilts and mats - Brief study on properties and uses of the above - current developments.	
UNIT- IV	**FLOOR AND WALL COVERINGS**	**15**
	Floor coverings - flooring - softwood, hardwood - Resilient flooring -Linolium, Asphalt tile, vinyl, rubber, cork tiles - terrazzo - properties, uses and laying. Wall coverings - cement fiber board's Porcelain, enameled metal, wood veneer, Vinyl, plastic surfaced paneling - properties, uses and laying. Wall and floor tiles - Ceramic glazed, mosaic, quarry and cement tiles - properties, uses and laying. Timber flooring. Details of wet and Dry wall cladding system. Detailing for physically handicapped. Calculation of materials for selected wall and floor coverings.	

UNIT - V	PROTECTIVE AND DECORATIVE COATINGS	15
	Preparation of wall for painting, Putty,Paints- Enamels, distempers, plastic emulsions, cement based paints - properties, uses and applications - Painting on different surfaces - defects in painting. Clear coatings and strains - Varnishes, Lacquer, , Wax Polish and Strains - Properties, uses and applications.Special purpose paints - Bituminous, Luminous, fire retardant and resisting paints - properties, uses and applications. Calculation of quantity of paints for selected projects	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	60	75

TEXT

1. S.C.Rangwala, Building Construction (Sixteenth Edition) Charotar Publishing House, Anand, India, 1997.
2. Arthur R.Llons, Materials for architects and builders - An introduction, Holder Headline group, Great Britain, 1997.
3. Jack M.Launders, Construction Materials, Methods, careers pub., J.Holland, Illinois Wileox Co., Inc. 1983.
4. W.B. Mckay, Building construction, Longman, U.K. 1921
5. Don.A.Watson, Construction Materials and Processes, McGraw Hill Book Co., 1972

REFERENCES

1. Kevin Lynch - Site planning - MIT Press, Cambridge, MA - 1967.
2. Edward. T. Q., “Site Analysis”, Architectural Media, 1983.
3. P.B.Shahani - Text of surveying Vol. I, Oxford and IBH Publishing Co - 1980

4. Joseph De.Chiarra and Lee Coppleman - Planning Design Criteria - Van Nostrand Reinhold Co.,New York - 1968.
5. Beer R, Environmental Planning for Site development, Turner, Landscape Planning and environmental impact design.

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	-	-	-	3	1	-	-	2	-	3	2	-
CO-2	-	-	-	3	1	-	-	2	-	3	2	-
CO-3	-	-	-	3	1	-	-	2	-	3	2	-
Total	-	-	-	9	3	-	-	6	-	9	6	-
Scaled value	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**2**	**0**	**2**	**2**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 706 – ARCHITECTURAL DESIGN - VI 0– 0 – 8 – 12

Course Objectives:

1. The course is design to expose the students to the design of energy efficient and green building technologies at the large scale projects.

Course Outcome		Domain	Level
CO1	***Understand*** the concept of energy efficient design & green building technologies.	Cognitive	Understand
CO2	***Understand*** the impact of spatial configuration at building level and at site level on energy consumption	Cognitive	Understand
CO3	***Analyze*** and interpret different case buildings.	Affective	Analysis
CO4	***Design*** and development energy efficient buildings.	Psychomotor	Create
CO5	***Develop*** working drawings and model displaying energy efficient and green building technologies.	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 706	**ARCHITECTURAL DESIGN -VI**	**0**	**0**	**8**	**12**
C:P:A =	**3.2:6.2:2.6**	**L**	**T**	**P**	**H**

		0	**0**	**8**	**16**

UNIT – I	**DESIGN STUDIO**
	Areas of concern/focus: Relationship between building, space, landscape and movement in a context involving diverse user groups. Appropriate architecture and exploration of architectural form towards a desired ideal for a given context of time and place. **Examples:** Five star hotel, airports, cultural centers, museum and exhibition complex, neighborhood design, housing projects, etc

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
0	**0**	**240**	**240**

TEXT

1. D. Gosling and Maitland - Urban Design - St. Martins Press 1984.
2. Campus Architecture: Building in the groves of academe, Richard P. Dober, McGraw Hill, 1996.

REFERENCES

1. Kevin Lynch, Site Planning, MIT Press, Cambridge, 1967.
2. Edward D Mills planning 4 volumes Newnes - Butterworths, London 1976.

Gordon Cullen - the concise Townscape - The Architectural press

Table:1 Mapping of COs with Pos

	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	3	2	2	-	-	-	-	-	-	-	3	1
CO-2	3	3	2	2	2	2	2	3	2	3	3	1
CO-3	1	1	3	2	2	1	2	2	1	-	3	2
CO-4	3	2	-	3	3	2	2	3	1	3	3	1
CO-5	-	-	-	3	3	-	2	2	2	-	3	3
Total	10	8	7	10	10	5	8	10	6	6	15	8
Scaled value	**2**	**2**	**2**	**2**	**2**	**1**	**2**	**2**	**2**	**2**	**3**	**2**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 801 - PRACTICAL TRAINING **0 – 0 – 0 - 12**

OBJECTIVE: The aim of the training semester is to provide structured work based learning in industry in order to enhance learning and employability skills and Assimilation and application of theoretical knowledge in the practical world.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Demonstrate*** an understanding of the design philosophy, or vision of the architectural office and its implementation in the project/s	Cognitive	Illustrate
CO2	***Interpret*** the architectural design process evolves when structural and service issues are integrated to create the final product.	Cognitive	Infer
CO3	***Demonstrate*** the Knowledge on how the Drawings are used at site and an insight into the relationship between the site and drawing.	Cognitive	Analysis.
CO4	***Develop*** a office and run the office successfully	Psychomotor	Apply / Build

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 801	**PRACTICAL TRAINING**	**0**	**0**	**0**	**12**
C:P:A	**2:5:5**	**L**	**T**	**P**	**H**
		0	**0**	**0**	**100 days**

CONTENT

The Practical Training would be done in offices / firms in India empanelled by the Institution in which the principal architect is registered with the Council of Architecture if the firm is in India or in an internationally reputed firm established abroad.

The progress of practical training shall be assessed internally through submission of log books supported by visual documents maintained by students every month along with the progress report from the employer/s of trainees.

The students would be evaluated based on the following criteria:

1. Adherence to time schedule, Discipline.
2. Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings.
3. Ability to work as part of a team in an office.
4. Ability to participate in client meetings and discussions
5. Involvement in supervision at project site.

At the end of the Practical Training a portfolio of work done during the period of internship along with certification from the offices are to be submitted for evaluation by a viva voce examination. This will evaluate the understanding of the students about the drawings, detailing, materials, construction method and service integration and the knowledge gained during client meetings, consultant meetings and site visits.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
		0	**0**	**100 days**

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	1	-	3	2	1	3	2	1	1	1	1	3
CO-2	1	2	3	-	-	-	-	-	-	-	2	3
CO-3	-	-	3	3	2	-	-	2	2	2	2	3
CO-4	3	3	-	2	2	2	3	3	2	2	2	3
CO-5	3	3	-	2	2	2	2	3	2	2	2	3
Total	8	8	9	9	7	7	7	8	7	7	9	15
Scaled value	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**3**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 901– URBAN DESIGN 3 – 0 – 0 – 3

Course Objectives:

1. To understand the scope and nature of urban design as a discipline.
2. To introduce the components of a city and their interdependent roles.
3. To understand the evolution of historic urban form.
4. To learn to interpret the city in different ways and layers.

5. To create awareness of contemporary urban issues as well as learn about possible ways to address them.

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Demonstrate*** the knowledge of Urban design as a discipline, and its role in understanding and interpreting a city	Cognitive	knowledge
CO2	***Illustrate*** the role of imagebility in urban areas.	Cognitive	Understand
CO3	***Analyze*** the Contemporary Issues related to Urban Area	Cognitive	Analyze
CO4	***Prepare*** the sketches and design based on the above study	Psychomotor	Analysis & perception
CO5	***Ability*** to study about contemporary issues and design the buildings	Cognitive	Apply

SUBCODE	**URBAN DESIGN**	**L**	**T**	**P**	**C**
XAR 901	**URBAN DESIGN**	**3**	**0**	**0**	**3**
C:P:A =	**2.4:0.6:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**INTRODUCTION TO URBAN DESIGN**				**06**
	Introduction to cities, Components of urban space such as blocks, density, neighborhood, streets etc and their interdependencies - outline of issues/ aspects of urban space and articulation of need for urban design- scope and objectives of urban design as a discipline.				
UNIT – II	**HISTORIC URBAN FORM**				**10**
	Overview of rise and fall of various river civilizations**.** Detailed study of urban development throughout the globe.**Western:** Morphology of early cities - Greek agora - Roman forum - Medieval towns-Renaissance place making - ideal cities – Industrialization and city growth - the eighteenth century city builders Garnier's industrial city - the American grid planning- anti urbanism and the picturesque- cite industrielle- citte nuovo-radiant city. **Indian:** Evolution of urbanism in India- Temple towns - Mughal city form-				

	medieval cities - colonial urbanism- urban spaces in modernist cities: Chandigarh, Bhuvaneshwar and Gandhi Nagar subsequent directions – case studies.	
UNIT – III	**THEORIES AND ILLUSTRATIONS OF URBAN DESIGN**	**9**
	To understand urban design thru reading and illustrations. Ideas of Image ability and townscape: Cullen, Lynch- place and genius loci - collective memory historic reading of the city and its artifacts: Rossi- social aspects of urban space: life on streets and between buildings, life style, gender and class, Jane Jacobs, William Whyte. Contemporary theories in Urbanism, New Urbanism concepts.	
UNIT – IV	**URBAN DESIGN AND URBAN ANALYSIS**	**10**
	Understanding various tools thru which an urban setting could be perceived - maps, sketches, photo documentations, reading, data collections, transects etc. Students to have a broad knowledge of various techniques to read a city. The various aspects of urban growth esp. in Asian cities, city limits/boundaries, urban structure, urban architecture, typologies as well as infrastructural planning, parcellation, public space and design guidelines will be introduced. The critical role that transportation plays in structuring the city will also be examined.	
UNIT – V	**SUSTAINABLE URBAN DESIGN AND DEVELOPMEMNT**	**10**
	Overview of urban ecology. Contemporary issues of urban ecology in Asian context and its articulation towards urban design. Urban sustainability focuses on forms and flows of urban, industrial and natural systems. Two main categories of spatial typologies and ecological flows to be studied thru case studies from western as well as eastern parts of the globe. The sessions conclude with the discussion of urban and environmental design that is essential to the professional practices of ecologically sound urban and environmental design	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**0**	**0**	**45**

TEXT

1. A.E.J. Morris, “History of Urban Form before the Industrial Revolution”, Prentice Hall, 1996.

2. Edmund Bacon , “Design of Cities”, Penguin, 1976.
3. Gordon Cullen, “The Concise Townscape”, The Architectural Press, 1978.
4. Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999.
5. “Time Saver Standards for Urban Design”, Donald Natson, McGraw Hill, 2003.
6. Kevin Lynch, “The Image of the City”, MIT Press, 1960.
7. Rithchie. A, “Sustainable Urban Design: An Environmental Approach”, Taylor & Francis, 2000.

REFERENCES

1. Jonathan Barnett, “An Introduction to Urban Design”, Harper Row, 1982.
2. Lawrence Halprin, “Cities”, Reinhold Publishing Corporation, New York, 1964.
3. Gosling and Maitland, “Urban Design”, St. Martin’s Press, 1984.
4. Malcolm Moor, “Urban Design Futures”, Routledge, 2006.
5. Geoffrey Broadbent, “Emerging Concepts in Urban Space Design”, Taylor & Francis, 2003

Table:1 Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	2	3	3	-	-	1	-	2	-	3	-	3
CO-2	2	2	3	-	-	2	-	3	2	1	-	3
CO-3	-	-	3	2	2	3	-	3	3	3	3	3
CO-4	2	2	2	1	-	3	2	2	3	-	2	3
CO-5	3	2	2	3	3	3	3	3	3	2	2	3
Total	9	9	13	6	5	12	5	13	11	9	7	15
Scaled value	**2**	**2**	**3**	**2**	**1**	**3**	**2**	**3**	**3**	**2**	**2**	**3**

1-5 =1, 6-10=2, 11-15=3 0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 902 – PROJECT MANAGEMENT 3 – 0 – 0 – 3

Course Objectives:

1. The course is designed to enable the students to learn different management techniques suitable for planning and constructional Projects in terms of cost and time.

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Demonstrate*** the knowledge of traditional and contemporary project management techniques	Cognitive	Knowledge
CO2	***Demonstrate*** the understanding of the management system for accomplishing the task efficiently in terms of time and cost.	Cognitive	comprehension
CO3	***Apply*** the techniques of project management in solving the constructional problems efficiently	Affective	Knowledge Application
CO4	***Work*** with interdisciplinary design team in accordance with the project management schedule	Affective	Application
CO5	***Use*** the related software for project management	Affective	Application

SUBCODE	SUB NAME	L	T	P	C
XAR 902	**PROJECT MANAGEMENT**	**3**	**0**	**0**	**3**
C:P:A =	**2:0:3**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**INTRODUCTION TO PROJECT MANAGEMENT**				**5**
	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 chat, Merits and Demerits.				
UNIT – II	**PROJECT PROGRAMMING AND ANALYSIS**				**15**
	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. Concepts: 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. Cost model-Project cost, direct cost, indirect cost, slope curve, Total project cost, optimum duration contracting the network for cost optimization. Steps in cost optimization, updating, resource allocation-resource smoothing, resource leveling.				
UNIT – III	**PROGRAMMING EVALUATION REVIEW TECHNIQUE**				**10**

	PERT network, introduction to the theory of probability and statistics. Probabilistic time estimation for the activities for the activities of PERT Network.	
UNIT – IV	**COMPUTERIZED PROJECT MANAGEMENT**	**10**
	Introduction: Creating a New project, building task. Creating resources and assessing costs, Refining your project. Project Tracking-Understanding tracking, recording actual. Reporting on progress. Analyzing financial progress	
UNIT – V	**TOTAL QUALITY MANAGEMENT**	**5**
	Introduction to TQM principles, TQM tools, SPC tools and quality systems - Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, TS16949, ISO 14000 – Concepts, Requirements and Benefits	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	**0**	**0**	**45**

TEXT

1. S.C.Rangwala, Elements of Estimating and Costing, Charoter Publishing House, India

REFERENCES

1. Dutta, Estimating and Costing, S.Dutta and Co., Lucknow
2. W.H.King and D.M.R.Esson, Specification and Quantities for Civil Engineers, The English University Press Ltd.
3. T.N.Building Practice, Vol.1, Civil, Govt. Publication.
4. P.W.D. Standard specifications, Govt. Publication

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	-	-	-	-	-	-	-	-	-	3	-	-
CO-2	-	-	-	-	-	-	-	-	-	3	-	-
CO-3	-	-	3	3	-	-	3	3	-	3	-	-
CO-4	-	-	3	3	-	3	-	-	-	3	-	-
CO-5	-	-	-	-	3	-	3	-	-	3	-	-
Total	-	-	6	6	3	3	6	3	-	15	-	-
Scaled	**0**	**0**	**2**	**2**	**1**	**1**	**2**	**1**	**0**	**3**	**0**	**0**

value												

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 903–HOUSING
3 – 0 – 0 – 3

Course Objectives:

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

Course Outcome		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	**Knowledge** of various issues concerning housing & housing development in Indian & global context covering a cross section of income groups.	Cognitive	Analyzing
CO2	***Ability*** to appreciate socio-economic aspects in housing	Cognitive	Applying
CO3	***Understanding*** of housing standards, site planning principles, housing concepts and types.	Cognitive	Understanding
CO4	***Understanding*** of key issues in housing today.	Cognitive	Understanding

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 903	**HOUSING**	**3**	**0**	**0**	**3**
C:P:A =	**3:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
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.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	**0**	**0**	**45**

TEXT

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

REFERENCES

1. Richard Kintermann and Robert Small, 'Site Planning for Cluster Housing', Van Nostrand Reinhold Company, London/New York, 1977.
2. Joseph de Chiara et al, 'Time Saver Standards for Housing and Residential Development', McGraw Hill Co, New York, 1995.

Table:1 Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	-	-		2	-	-	-	-	1	3	-	-
CO-2	-	-		3	-	-	-	-	-	3	-	-
CO-3	-	-	3	3	-	-	3	-	3	-	-	-
CO-4	-	-		3	-	-		-	3	-	-	-
Total	**0**	**0**	3	11	**0**	**0**	3	**0**	7	6	**0**	**0**
Scaled value	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 905–DISSERTATION 0 – 0 –3 – 4

Course Objectives:

1. To motivate students to involve in individual research and methodology

Course Outcome		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Undertake*** the research systematically in a chosen topic.	Cognitive	Knowledge
CO2	***Illustrate*** the various methods available for the collection of information.	Cognitive	Infer
CO3	***Analyses*** and interpret the information obtained from the study.	Cognitive	Analysis
CO4	***Organize*** the collected information graphically	Cognitive	Application
CO5	***Develop*** a report of the analyzed information with the logical reasoning and conclusion.	Psychomotor	Evaluate

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR905	**DISSERTATION**	**0**	**0**	**3**	**4**
C:P:A =	**3.2:1.8:0**	**L**	**T**	**P**	**H**
		0	**0**	**3**	**6**
UNIT – I	**TOPICS OF STUDY**				

	The main areas of study and research can include advanced architectural design, including contemporary design processes, urban design, environmental design, conservation and heritage precincts, housing etc. However, the specific thrust should be architectural design of built environment. Preparation of presentation drawings and reports are part of the requirements for submission. **METHOD OF SUBMISSION** The Dissertation shall be submitted in the form of drawings, project report, CDs and reports.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	**0**	**60**	**60**

Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	3	1	-	-	-	-	-	1	1	2	1	2
CO-2	-	-	3	-	-	-	-	-	-	2	2	2
CO-3	3	3	3	-	-	3	-	2	-	-	2	2
CO-4	-	-	-	3	3	-	-	-	-	-	1	3
CO-5	-	-	-	3	-	-	3	-	-	-	2	3
Total	6	4	6	6	3	3	3	3	1	4	8	12
Scaled to 0,1,2,3 scale	**3**	**2**	**3**	**3**	**2**	**2**	**2**	**2**	**1**	**2**	**3**	**3**

1-5 =1, 6-10=2, 11-15=3 **0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.**

XAR906 – ARCHITECTURAL DESIGN – VII 0 – 0 – 8 – 12

Course Objectives:

1. To understand the city under study, read the issues in a given area after a methodical analysis and propose housing /urban design/ campus design solutions.

Course Outcome		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Undertake*** a study to identify existing issues related urban design in built environment.	Cognitive	Illustrate
CO2	***Identify*** various factors that are responsible urban conditions.	Cognitive	Infer
CO3	***Gather***, ***correlate*** and ***interpret*** the data that are required for design proposal at historic cities.	Affective	Analyze

CO4	***Develop*** an urban renewal proposal for a city.	Psychomotor	Create
CO5	***Develop*** a design proposal for the urban issues relating to the built environment	Psychomotor	Create

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR906	**ARCHITECTURAL DESIGN – VII**	**0**	**0**	**8**	**12**
C:P:A	**3.2:4.2:4.6**	**L**	**T**	**P**	**H**
		0	**0**	**8**	**16**

UNIT – I **STUDIO**

Projects pertaining to Urban Design including Urban Renewal and Redevelopment -Involving intensive study of visual and other sensory relationship between people and their environment, problems concerning both preservation and development based on correlation of socio-economic and physical state and problems pertaining to traffic – Design and detailing for differently-abled at the city/street/building scale.

Examples: Any part of a city exploring specific urban design typologies and alternatives for revitalization. The studio exercise could involve the design of a group of buildings in the urban context. This could be a green field/ brown field development, redevelopment or revitalization project in the context of the city under study, Conservation and Re-development, revitalization of historic core, etc. Emphasis shall be on the design with relation to the contextual environment, heritage, traffic, planning controls and impact analysis. An understanding of the architectural implications of such development scheme should lead to insights in the formulation of urban design controls and urban planning policy

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
0	0	240	240

TEXT

1. D. Gosling and Maitland - Urban Design - St. Martins Press 1984.
2. Ian Bentley - Responsive Environment - A manual for Designer - Architecture Press, London - 1985.

REFERENCES

1. E and OE planning 11iffe Books Ltd, London 1973.
2. P&D Act 1995.
3. Edward D Mills planning 4 volumes Newnes - Butterworths, London 1976.
4. Gordon Cullen - the concise Townscape - The Architectural press

Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	1	-	3	2	1	3	2	1	1	1	1	3
CO-2	1	2	3	-	-	-	-	-	-	-	2	3
CO-3	-	-	3	3	2	-	-	2	2	2	2	3
CO-4	3	3	-	2	2	2	3	3	2	2	2	3
CO-5	3	3	-	2	2	2	2	3	2	2	2	3
Total	8	8	9	9	7	7	7	8	7	7	9	15
Scaled to 0,1,2,3 scale	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**3**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 1001 – THESIS 0 – 0 – 0 – 18

Course Objectives:

1. To demonstrate the students' capability of synthesizing architecture, engineering systems, social sciences and humanities through a capstone project which showcases

creative and critical thinking abilities and skills developed through the course and come out with comprehensive design proposals/ findings

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Formulate*** design project independently by identifying the issues at individual building level and urban level.	*Cognitive*	illustrate
CO2	***Determine*** the requirements and other relevant information for chosen projects.	*Cognitive*	*Infer*
CO3	***Plan*** Undertake a study, analyze and identify the issues in chosen area of interest	*Cognitive*	Analyze
CO4	***Demonstrate*** design skills and expertise through imaginative approach in designing built environment	*Psychomotor*	Create
CO5	Effectively ***communicate*** design ideas through set of detail technical drawings, models and oral presentations	*Psychomotor*	Create

SUBCODE	SUB NAME	L	T	P	C
XAR1001	**THESIS**	**0**	**0**	**17**	**18**
C:P:A =	**6:4:0**	**L**	**T**	**P**	**H**
		0	**0**	**17**	**35**
UNIT – I	**TOPICS OF STUDY**				
	The main areas of study and research shall be Architecture, Urban design, Urban renewal, urban and rural Housing and settlements, Environmental Design, Conservation, Landscape Design, etc. However, the specific thrust shall be on architectural design and environment context with full understanding. **PRESENTATION REQUIREMENTS** The Thesis Project shall be submitted in the form of drawings, project report, models, Slides, C.D's and reports, as required for the project				

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	**0**	**17**	**525**

TEXT

As per requirement of Topic and as suggested by the supervisor of Thesis
REFERENCES
As per requirement of Topic and as suggested by the supervisor of Thesis

Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	2	2	3	-	-	-	-	2	2	2	3	3
CO-2	2	3	-	-	2	1	1	2	1	2	3	3
CO-3	-	-	3	-	2	1	-	3	2	2	3	3
CO-4	3	3	-	2	2	2	2	3	3	2	3	3
CO-5	2	-	-	3	3	-	-	3	2	1	3	3
Total	9	8	6	5	9	4	3	13	10	9	15	15
Scaled to 0,1,2,3 scale	**2**	**2**	**2**	**1**	**2**	**1**	**1**	**2**	**2**	**2**	**3**	**3**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 602A – CULTURE AND ARCHITECTURE 3 – 0 – 0 – 3

Course Objectives:

1. To provide an overview of the relationship between culture and the built environment.
2. To expose the components of culture and the factors influencing culture.
3. To study the evolution of built forms in different regions.
4. To know about the factors that influence architecture of a particular region.
5. To understand Architecture, as expression of Culture

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Understand*** the significance of Anthropology in Architecture.	Cognitive	Understanding
CO2	***Assess*** the role of different components of culture in deciding and shaping the architecture of a particular region.	Cognitive	Evaluate
CO3	***Analyze*** the stages of evolution of built forms in different regions as a continuous process	Cognitive	Analyzing
CO4	***Outline*** the factors that influence architecture of a particular region during different periods till today.	Cognitive	Understanding
CO5	***Identify*** the impact of Culture on Architecture as a whole.	Cognitive	Applying

SUBCODE	SUB NAME	L	T	P	C
XAR602A	CULTURE AND ARCHITECTURE	3	0	0	3
C:P:A =	3:0:0	L	T	P	H
		3	0	0	3
UNIT – I	**INTRODUCTION**				**10**
	History of civilizations - Evolution of first societies - Relationship between man, nature and built forms - Built forms as expressions of culture.				
UNIT – II	**RELATIONSHIP BETWEEN MAN, NATURE AND SOCIETY**				**7**
	Introduction to Sociology, an overview of Social Institutions Underlying values of relationships between Man, Nature and Society. Role of Family structure, privacy, religion and occupation, status of women etc. Settlements and its locations- river banks, valleys, fertile soils.				

UNIT – III	**ROLE OF CULTURE IN ARCHITECTURE**	**8**
	Introduction to culture and architecture. Relationship between culture and climate. Effect of socio – cultural factors in architecture. Impact of tangible and non-tangible elements on spatial design.	
UNIT – IV	**ANTHROPOLOGY OF TRADITIONAL ARCHITECTURE**	**10**
	Architecture as a Process – kinship and house societies – perceptions of built form – conceptions of space – symbolism and technology – study of the above through case study of traditional architecture in India	
UNIT – V	**ALTERNATE THEORIES OF HOUSE FORM**	**10**
	Evolution of built forms - influencing factors. Constraining and determining factors – Climate, material resources, construction and technology, site, defense, economics, religion, symbols and meanings.	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**0**	**0**	**45**

TEXT

1. Amos Rapoport, " House Form and Culture", 1969.
2. Amos Rapoport, "Culture, Architecture and Design", 2005

REFERENCES

1. Amos Rapoport, "The meaning of the Built Environment", 1982.
2. Paul Oliver, Encyclopedia of Vernacular Architecture of the world, Cambridge University Press, 1997.
3. Paul Oliver's "Built to meet needs - Cultural Issues in Vernacular Architecture", 2006

Mapping of COs with Pos

	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	2	2	-	-	-	1	-	1	-	-	-	1
CO-2	2	1	-	-	-	1	-	1	-	-	-	1
CO-3	1	2	-	-	-	1	-	3	-	-	-	1
CO-4	2	2	-	-	-	2	-	2	-	-	-	1
CO-5	2	1	-	-	-	1	-	1	-	-	-	1

Total	9	8	-	-	-	6	-	8	-	-	-	5
Scaled to 0,1,2,3 scale	**2**	**2**	**0**	**0**	**2**	**2**	**0**	**2**	**0**	**0**	**0**	**3**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 602B – DIGITAL DESIGN PROCESSES IN ARCHITECTURE 3 – 0 – 0 – 3

Course Objectives:

1. To introduce theories of media and its influence on perception of space.

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Understand*** the digital design process and theories and their relation to computation.	Cognitive	Understanding
CO2	***Understand*** the specific aspects of contemporary processes appropriate to a design situation.	Cognitive	Evaluate

SUBCODE	SUB NAME	L	T	P	C
XAR602B	**DIGITAL DESIGN PROCESSES IN ARCHITECTURE**	**3**	**0**	**0**	**3**
C:P:A =	**3:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**INTRODUCTION**				**7**
	Investigation of contemporary theories of media and their influence on the perception of space and architecture. Digital technology and architecture.				
UNIT – II	**ASPECT OF DIGITAL ARCHITECTURE**				**9**
	Design and computation. Difference between digital design processes and non-digital processes. Architecture and cyber spaces. Qualitites of new space.Increased utomation and its influence.				
UNIT – III	**CONTEMPORARY PROCESSES**				**9**

	Emerging phenomena such as increasing formal and functional abstractions. Diagrams and diagramatic reasoning. Diagrams and design processes. Animation and design.	
UNIT – IV	**GEOMETRIES AND SURFACES**	**10**
	Fractal geometry. Shape grammar. Hyper surface. Liquid architecture. Responsive architecture.	
UNIT – V	**CONTEMPORARY PROCESS**	**10**
	Ideas and works of Architects – Greg Lynn, Reiser , Umemetto, Lars Spuybroek, NOX Architects, UN studio, Diller Scofidio, Dominic Perrault, Decoi, Marcos Novak, Asymptote, Herzog and De Meuron, Neil Denari, Serie Architects, BIG Architects.	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**0**	**0**	**45**

TEXT

1. Walter Benjamin, "The Work of Art in the age of Mechanical Reproduction", in Illuminations Schocken Books, New York, 1969.
2. Ali Rahim, "Contemporary processes in Architecture", John Wiley & sons,2000

REFERENCES

1. Gillian Hunt, "Architecture in the Cyber space II", John Wiley & sons,2001.

Mapping of COs with Pos

	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	2	2	-	-	-	1	-	1	-	-	-	1
CO-2	2	1	-	-	-	1	-	1	-	-	-	1
CO-3	1	2	-	-	-	1	-	3	-	-	-	1
CO-4	2	2	-	-	-	2	-	2	-	-	-	1
CO-5	2	1	-	-	-	1	-	1	-	-	-	1
Total	9	8	-	-	-	6	-	8	-	-	-	5
Scaled to 0,1,2,3 scale	**2**	**2**	**0**	**0**	**2**	**2**	**0**	**2**	**0**	**0**	**0**	**3**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 602C – ARCHITECTURE AND STRUCTURE 3 – 0 – 0 – 3

Course Objectives:

1. To study evolution of structural systems through history.
2. To familiarise the students with concepts of structural design through works of architects/
   engineers.
3. To study architectural expression through its structure.
4. To analyze and understand the relationship between form & structure through seminars.

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Understand*** and get acquainted with the concepts of structural design and its influence on the functional and aesthetic domains of architectural design relating to historic and contemporary periods	Cognitive	Understand
CO2	***Familiar*** with the architectural expression, its relation between form and structure through relevant case studies.	Cognitive	Analyze

SUBCODE	SUB NAME	L	T	P	C
XAR 602C	**ARCHITECTURE AND STRUCTURE**	**3**	**0**	**0**	**3**
C:P:A =	**1.5:.75:.75**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**HISTORY OF STRUCTURAL DESIGN IN THE PRE INDUSTRIAL ERA**				**8**
	Development of monolithic and rock cut structures - trabeated construction - arcuate construction vaults and flying buttresses - tents and masted structures and bridges through ancient and medieval history				
UNIT – II	**HISTORY OF STRUCTURAL DESIGN IN THE POST INDUSTRIAL 08 PERIOD**				**8**
	Post Industrial modular construction of large span and suspension structures in steel and Concrete - projects of Pier Nuigi Nervi, Maillart, Candella, Buckminster Fuller and Eero Saarinen. Structure in Deconstructivism –				

	Structure and aesthetics	
UNIT – III	**CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – I**	**10**
	The select case studies could include KCR Terminal at Hung Hom, Hong Kong, B3 Offices in Stockley Park , Sainsbury Centre for Visual Art, Renault Centre and Swindon UK by Normal Foster and Standsted Airport Terminal, London, UK by Fosters/Arup British Pavilion EXPO 1992, Seville, Spain and Waterloo International Terminal by Nicholas Grimshaw	
UNIT – IV	**CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – II**	**10**
	The select case studies could include Inmos Microchip Factory, Centre Commercial St. Herbtain, PA Technology, Princeton and Fleetguard, Quimper UK by Richard Rogers Athens Olympic Stadium and Village, Bridges and Public Bus Stop in St. Gallen , Railway Station, Lyon, France and Stadelhofen Railway station, Zurich Schweiz by Santiago Calatrava Kansai International Airport, UNESCO Workshop, the Jean-Marie Tjibaou Cultural Center, Menil Museum, Thomson Optronics Factory, IBM Traveling Exhibition Pavilion, Columbus International Exposition, Genoa Italy and Lowara Officers, Montecchio Maggiore Italia by Reno Piano Building Workshop.	
UNIT – V	**SEMINAR**	**9**
	Seminar to present a study of architectural form and structural expression through select cases which will aid understanding of structural philosophy and analysis, building envelope and services and construction sequence.	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**

TEXT

1. Shigeru Ban, McQuaid, Matilda, Engineering and Architecture: Building the Japan Pavilion, Phaidon Press Ltd, UK, 2008.
2. Cox Architects, The images publishing group, Australia, 2000.
3. Masted structures in architecture, James B Harris, architect: Kevin Pui-K Li, Oxford ;
4. Boston : Architectural Press, 2003

REFERENCES

1. Martorell, Bohigas& Mackay, Pavilion of the Future, Expo 92, Seville (MBM),1992.
2. COX Architects Millennium; Images; 2000.
3. EnricMiralle& Carme Pinos, Olympic Archery Building, 857072 COH.
4. Prada Aoyama Tokyo Herzog & De Meuron. Milan,IT: Progetto Prada ArteSrl, 2003.
5. Christopher Beorkrem, Material Strategies in Digital Fabrication, Routledge, Taylor & Francis Group, 2013.
6. Angus J. Macdonald, Structure and Architecture, Architectural Press, 2001 (available online).

Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	1	3	-	-	-	2	-	-	-	-	-	-
CO-2	1	3	-	-	-	2	-	-	-	-	-	-
Total	2	6	-	-	-	4	-	-	-	-	-	-
Scaled to 0,1,2,3 scale	**1**	**2**	**0**	**0**	**0**	**1**	**0**	-	**0**	**0**	**0**	-

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR602D – ARCHITECTURE OF SOUTH EAST ASIA 3 – 0 – 0– 3

Course Objectives:

6. To understand the Socio Political, Economic, Geography, Geology of the Southeast Asian Countries.
7. To Understand The Style, Character, Technology Of The Southeast Asian Country Architectural Structures.

Course Outcome:		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	Understand the evolution of the south east Asian countries	Cognitive	Understand
CO2	Understand the architecture style, technology, character of China & Japanish	Cognitive	Understand Analyze
CO3	Understand the architecture style, technology, character of Indonesia & Malaysia	Cognitive	Understand Analyze
CO4	Understand the architecture style, technology, character of Thailand & Cambodia	Cognitive	Understand Analyze
CO5	Understand the architecture style, technology, character of Burma & Sri Lanka	Cognitive	Understand Analyze

SUBCODE	SUB NAME	L	T	P	C
XAR602D	ARCHITECTURE OF SOUTH EAST ASIA	3	0	0	3
C:P:A	3:0:0	L	T	P	H
		3	0	0	3

UNIT – I INTRODUCTION **5**

Origin and evolution of the south east Asian countries. Study about geography, geology, politics, social, economic value of that countries

UNIT – II HISTORY OF CHINA & JAPAN

History of china and Japan in the context of cultural including aspects of politics, society, religion, climate; geography and geology and Development of architectural form with reference to Technology, Style and Character illustrated with examples.

China: the forbidden city Beijing(1406-), Tiananmen, the main gate of the imperial city, Meridian gate, Hall of Tahedian (1406-20AD), The Summer Palace Beijing(1750,1888, 1903 AD), Typical Temple :Kaiyuan Temple Pagoda Quanzhou

Japan –Temple : Toshodaiji, Kiyomizudeva Honda, Residence:Yoshijima house Takayama city.

UNIT –III HISTORY OF INDONESIA & MALAYSIA

History of Indonesia and Malaysia in the context of cultural including aspects of politics, society, religion, climate; geography and geology and Development of architectural form with reference to Technology, Style and Character illustrated with examples.

UNIT –IV HISTORY OF THAILAND AND CAMBODIA

History of Thailand and Cambodia in the context of cultural including aspects of politics, society, religion, climate; geography and geology and Development of architectural form with reference to Technology, Style and Character illustrated with examples-Angkor Wat, The City And The Temple Mountain

UNIT –V HISTORY OF MYANMAR and SRI LANKA

History of Srilanka in the context of cultural including aspects of politics, society, religion, climate; geography and geology and Development of architectural form with reference to Technology, Style and Character illustrated with examples- Burma:

Shive dagon , pagoda (stupa) Rangoon (500-600AD), Ananda Temple, Pagan (1100AD) Srilanka: Stupa: Ruwanwelisaya stupa, Anuradhapura, Srilanka 2nd century B.C, Temple and Stupa: Vata dage, Polonnaruwa, Srilanka(1100 Ad)

LECTURE TUTORIAL PRACTICAL TOTAL

45	**0**	**0**	**45**

TEXT

1. A history of South East Asia by Arthur Cotterell
2. A History Of Architecture Sir Banister Of Fletcher's
3. A History Of Southeast Asia, Anthony reid

REFERENCES

1. THE TORANA In Indian And Southeast Asian Architecture Parul Pandiya Dhar
2. Chinese houses of Southeast Asia. Ronald G.Knapp

Mapping of COs with POs

	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PSO 1	PSO 2
CO1	3		3									
CO2	3		3									
CO3	3		3									
CO4	3		3									
CO5	3		3									
Total	15		15									
Scaled Value	3		2									

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 604A – GLASS IN ARCHITECTURE **2 – 0 – 1 – 3**

Course Objectives:

1. The course is designed to enable the students to learn advanced building technology available for construction.

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Understand*** glass and its potential application in contemporary Achitecture	Cognitive	Understanding
CO2	***Outline*** the appropriate usage of glass.	Cognitive	Understanding

CO3	***Assess*** the role of glass in green architecture	Affective	Evaluating
CO4	***Understanding*** of tools and software currently in practice with respect to the use of glass in buildings.	Cognitive	Understanding
CO4	***Summarize*** the various technological advancements, current trends in Glass	Cognitive	Understanding

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 604A	**GLASS IN ARCHITECTURE**	**2**	**0**	**1**	**3**
C:P:A =	**2:0:1**	**L**	**T**	**P**	**H**
		1	**0**	**1**	**4**
UNIT – I	**INTRODUCTION**				**10**
	Evolution & importance of glass in modern architecture. Applications of glass in buildings (façade/interior applications). Understanding the production & properties of glass. Value additions including coating technology (importance & necessity) and processing (tempering, heat strengthening, DGU, laminated, ceramic fritting). Types of Glass- mirror, lacquered, fire resistant. Modern glass with different applications. Glass for hospitals, green homes, airports, offices, other buildings. Glass and human safety compliances. Role of glass in fire safety considerations - Class E, EI & EW. Role of glass in acoustics. International standards & codal provisions.				
UNIT – II	**GLASS AND GREEN ARCHITECTURE**				**10**
	Building Physics. Theory of electromagnetic radiation. Understanding of internal and external reflections. Day-lighting in Buildings - introduction and basic concepts (VLT). Solar Control and thermal insulation (SF, UV, SHGC). Need for green Buildings. Energy efficient buildings. Achieving energy efficiency using glass. Factors of energy efficient material selection. Performance parameters. Energy codes and Green ratings - ECBC, IGBC, GRIHA. Approaches of energy efficiency - prescriptive method, trade off method. Accommodating passive architecture. Whole Building Simulation.				
UNIT – III	**CASE STUDY**				**10**
	Case study of green building designed predominantly with energy efficient materials. Calculations involving basic factors in glass design. Optimization of Glass - for wastage reduction and standardisation of Design. Construction site/ green building visit report.				
UNIT – IV	**DESIGN WORKSHOP 1**				**15**

	Analysing and creating building using interactive modelling. Analysing of sun path, solar exposure building orientation, daylight, acoustics, site shadow analysis.	
UNIT – V	**DESIGN WORKSHOP 2**	**15**
	Analysis of thickness for safety, consideration of aesthetics, economy, optimisation and wastage, airconditioning load calculations and payback analysis.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. Christian Schittich, 'Glass Construction Manual', Birkhauser Basel, 2007.
2. Architectural Glass Guide', Federation of Safety Glass, 2013.

REFERENCES

1. 'LEED 2011 For India - Green Building Rating System', Indian Green Building Council, 2011
2. 2Energy Conservation Building Code. User Guide', Bureau of Energy Efficiency, 2009.
3. 'IS 875 (Part -3) Reaffirmed 1997. Code of Practice for Design loads', Bureau of Indian Standards,1998.
4. 'IS 7883. Code of Practice for the Use of Glass in Buildings', Bureau of Indian Standards, 2013.

E-REFERENCES

1. Training Manuals & E- Learning, Glass Academy.

Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	-	-	-	2	-	-	1	1	1	3	-	-
CO-2	-	-	-	3	-	-	2	2	-	3	-	-
CO-3	-	-	-	3	-	-	2	3	3	3	-	-
CO-4	-	-	-	1	-	-	2	-	3	3	-	-
Total	-	-	-	9	-	-	7	7	7	12	-	-
Scaled to 0,1,2,3 scale	**1**	**0**	**0**	**2**	**0**	**0**	**2**	2	**2**	**3**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 604C – ADVANCED BUILDING TECHNOLOGY 2 – 0 – 1– 3

Course Objectives:

1. The course is designed to enable the students to learn advanced building technology available for construction.

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Expose*** to the latest construction materials and global trends in construction methods	Cognitive	Knowledge
CO2	***Identify*** a suitable construction methods	Cognitive	Knowledge
CO3	***Identify*** the suitable construction techniques to be employed for a given situation	Affective	Application
CO4	***Understand*** various aspects involved in demolition of buildings and safety aspects.	Affective	Application

SUBCODE	SUB NAME	L	T	P	C
XAR 604C	**ADVANCED BUILDING TECHNOLOGY**	**2**	**0**	**1**	**3**
C:P:A =	**2:0:3**	**L**	**T**	**P**	**H**
		2	**0**	**1**	**4**
UNIT – I	**MODERN MATERIALS**				**10**
	Dry wall construction, Special Use of waste products and industrial by-products in concrete making- smart materials– Geo-textiles and geo-synthetics – nano materials.				
UNIT – II	**MODERN CONSTRUCTION METHODS**				**15**
	Tall buildings structural systems – Rigid frames – Braced frames – Shear wall – Buildings – Wall frame buildings – Tubular buildings – Tube-in tube buildings – Outrigger braced system – Types – single, double &multilayered grids – two way & three way space grids, connectors, Grids – Domes - various forms. examples of tensile membrane structures – types of pneumatic structures. Biomimetics - Definition, Replicating natural manufacturing methods as in the production of chemical compounds by plants and animals; Mimicking mechanisms found in nature, Imitating organizational principles from social behavior of organisms; Examples: Spider-silk as a substitute for steel, Lotus effect in self-cleansing glass, Dinosaur spine in bridge design, Lily pad structure, termite mound cooling system, swarm theory, aerodynamic structures etc.				
UNIT – III	**PREFABR1CATION AND CONSTRUCTION TECHNIQUES**				**15**

	Modular co-ordination, standardization and tolerances-system of prefabrication. Pre-cast concrete manufacturing techniques, Moulds –construction design, maintenance and repairPre-casting techniques - Planning, analysis and design considerations -. Joints -Curing techniques including accelerated curing such as steam curing, hot air blowing etc., -Test on precast elements - skeletal and large panel constructions - Industrial structures. Pre-cast and pre-fabricating technology for low cost and mass housingschemes. Small pre-cast products like door frames, shutters, Ferro-cement in housing - Water tank service core unit. Quality control - Repairs and economical aspects on prefabrication	
UNIT – IV	**DEMOLITION**	**10**
	Advanced techniques and sequence in demolition and dismantling of buildings.	
UNIT – V	**SAFETY ASPECTS INVOLVED IN CONSTRUCTION**	**10**
	Construction accidents - Construction Safety Management: - Environmental issues in construction - occupational and safety hazard assessment. Safety Programmes - Job-site assessment - Safety in hand tools- Safety in grinding- Hoisting apparatus and conveyors- Safety in the use of mobile cranes-Manual handling- Asbestos cement roofs-Safety in demolition work- Trusses, girders and beams- First- aid- Fire hazards and preventing methods- fire accidents - earthquake resistant design of buildings.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	50

TEXT

1. Peurifoy, R.L., Ledbette. W.B., Construction Planning, Equipment and Methods, McGraw Hill Co., 2000.
2. Jimmy W. Hinze, Construction Safety, Prentice Hall Inc., 1997.

REFERENCES

1. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, Construction Safety and Health Management, Prentice Hall Inc., 2001.
2. Hand Book on Construction Safety Practices, SP 70, BIS 2001.
3. N.D. Kaushika, Energy, Ecology and Environment, Capital Publishing Company, New Delhi.
4. John Fernandez, Material Architecture, Architectural Press, UK.

Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	-	-	-	2	-	-	1	1	1	3	-	-
CO-2	-	-	-	3	-	-	2	2	-	3	-	-
CO-3	-	-	-	3	-	-	2	3	3	3	-	-

CO-4	-	-	-	1	-	-	2	-	3	3	-	-
Total	-	-	-	9	-	-	7	7	7	12	-	-
Scaled to 0,1,2,3 scale	**1**	**0**	**0**	**2**	**0**	**0**	**2**	2	**2**	**3**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 604D – BUILDING AUTOMATION AND MANAGEMENT 2 – 0 – 1 – 3

Course Objectives:

1. This course enables the students to attain a comprehensive knowledge of Building Automation and Management systems in Buildings in line with the technological growth and innovations in this Industry.

Course Outcome		**Domain**	**Level**
On the successful completion of the course, students will be able to			
CO1	***Learn*** the basics of building management systems, scope of BMS and its importance.	Cognitive	Understand
CO2	***Understand*** the basics of BIM and Controllers.	Cognitive	Understand
CO3	***Understand*** all the aspects of BMS and its application in buildings.	Affective	Knowledge
CO4	***Identify*** the components of BMS and its application in buildings with respect to energy conservation and safety	Affective	Knowledge
CO5	***Enable*** the students explore the various technological advancements, current trends in BMS	Affective	Knowledge

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR604D	**BUILDING AUTOMATION AND MANAGEMENT**	**2**	**0**	**1**	**3**
C:P:A =	**0.6:0.9:0.6:0.9**	**L**	**T**	**P**	**H**

		2	**0**	**1**	**4**
UNIT – I	**INTRODUCTION**				**5**
	Introduction to Basics of Building Management Systems (BMS), Integrated Building Management Systems (IBMS), Building Information Modeling (BIM) and Building Automation System (BAS). Scope and Importance of Building Management Systems				
UNIT – II	**BUILDING INFORMATION MODELLING AND CONTROLERS**				**15**
	Importance of Building Information Modeling (BIM), Tools used in BIM, facility operation using BIM. Controllers -Types and functions, Occupancy, Integration using Internet protocol.				
UNIT – III	**ASPECTS OF BUILDING MANAGEMENT SYSTEM**				**15**
	HVAC management – Central plant, Chillers, Cooling towers, VAV, AHU, Exhaust systems, Lighting management, Electrical systems management, Plumbing and Fire fighting systems management - detectors and alarm system integration with BMS. Energy management systems. Case study examples. Designing and drawing of a small building by applying the HVAC systems				
UNIT – IV	**SAFETY AND SECURITY SYSTEMS**				**10**
	Access control systems, Closed circuit television, Intruder Alarm, Perimeter protection, Safety system integration with BMS.				
UNIT – V	**ADVANCEMENTS IN BUILDING MANAGEMENT SYSTEM**				**15**
	Advancements in the field of Building Management System. Intelligent buildings, Role of BMS in energy efficiency and maintenance cost. Case study examples.				

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
30	**0**	**30**	**60**

TEXT

REFERENCES

1. James M Sinopoli, Smart Buildings Systems for Architects, Owners and Builders -.
2. Shengwei Wang, Intelligent Buildings and Building Automation -.
3. D. Coles, G. Bailey, R E Calvert**,** Introduction to Building Management **-.**
4. G. J. Levermore, Building Energy Management Systems: Application to Low-Energy Hvac and Natural Ventilation Control-.
5. Quentin Wells, Smart grid home-.

Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	-	-	-	3	-	-	1	-	-	3	2	-
CO-2	-	-	-	1	-		1	-	-	3	2	-
CO-3	-	-	-	1	-		3	-	-	3	2	-
CO-4	-	-	-	-	2	-	3	3	2	3	3	-
CO-5	-	-	-	1	-	-	3	3	2	3	3	-
Total	-	-	-	6	2	-	11	6	4	15	12	-
Scaled to 0,1,2,3 scale	**0**	**0**	**0**	**2**	**1**	**0**	**3**	**2**	**1**	**3**	**3**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 703A – DISASTER RESISTANCE ARCHITECTURE 3 – 0 – 0 – 3

Course Objectives:

1. To understand the fundamentals of Earthquake and the basic terminology
2. To provide basic knowledge of earthquake resistant design concepts.
3. To inform the performance of ground and buildings.
4. To familiarize the students with design codes and building configuration
5. To understand the various types of construction details to be adopted in a disaster prone area.

Course Outcome		Domain	Level
CO1	***Identify*** the natural and manmade disaster.	Affective	Understand

			Knowledge
CO2	***Understand and apply*** the disaster resistant design	Psychomotor	Apply Knowledge
CO3	***Understand and apply*** the Earthquake resistant resistant design	Psychomotor	Apply Knowledge
CO4	***Understand*** the formation and causes of Earthquakes and factors to be considered in the Design of buildings and services to resist Earthquakes	Affective	Knowledge
CO5	***Apply*** the knowledge gained in an architectural design assignment	Cognitive	Apply

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR703A	**DISASTER RESISTANCE ARCHITECTURE**	**3**	**0**	**0**	**3**
C:P:A =	**2:0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**NATURAL HAZARDS AND MAN MADE HAZARDS**				**5**
	Introduction to Disaster Management – Contemporary, Natural and Man-made Disasters- Natural Hazards – Fundamentals of Disasters, Causal Factors of Disasters, Poverty, Population Growth, Rapid Urbanization, Transitions in Cultural Practices, Environmental Degradation, War and Civil Strife - brief description on cause and formation of flood, cyclone, earthquake, Tsunami and Landslides. Zoning and classification by center/ state government organizations. Geologic Hazards and Natural disasters – how to recongnize and avoid them – hazards of faulting – hazards of geologic foundations. Man made hazards – fire, gas and chemical leakages, pollution and health hazards, manmade disasters – vulnerability analysis and risk assessment				
UNIT – II	**CONCEPTS FOR DISASTER RESISTANT DESIGN**				**5**
	Vernacular and historical experiences – case studies. Site selection and site development – building forms – Effects of cyclone, tsunami, hurricanes and seismic forces related to building configuration – spatial aspects – contemporary/ international approaches for low rise, mid-rise and high rise buildings. Innovations and selection of appropriate materials – IS code provisions for buildings – disaster resistant construction details.				
UNIT – III	**FUNDAMENTALS OF EARTHQUAKE AND BUILDING**				**5**

	CONFIGURATION	
	Fundamentals of earthquakes - Earths 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. Site planning, performance of ground and buildings - Historical experience, site selection and development - Earthquake effects on ground, soil rupture, liquefaction, landslides- Behaviour of various types of building structures, equipments, lifelines, collapse patterns - Behaviour of non-structural elements like services, fixtures in earthquake - prone zones Seismic design codes and building configuration - Seismic design code provisions – Introduction to Indian codes- Building configuration- scale of building, size and horizontal and vertical plane, building proportions, symmetry of building- torsion, re-entrant corners, irregularities in buildings- like short stories, short columns etc	
UNIT – IV	**EARTHQUAKE RESISTANT DESIGN**	**10**
	Various types of construction details a) Seismic design and detailing of non-engineered construction- masonry structures, wood structures, earthen structures. b) Seismic design and detailing of RC and steel buildings c) Design of non-structural elements- Architectural elements, water supply, drainage, electrical and mechanical components	
UNIT – V	**POST OPERATIVE MEASURES FOR DISASTER MANAGEMANT**	**5**
	Methods to minimize damage to utilities – plaster / wall boards / furnishings/ swimming pools / antennas / free standing retaining masonry walls other remedies and post operative measures – cyclone and earthquake insurance – training for before and after natural hazards and ways to protect family, property and oneself from natural calamities. Role of international, national and state bodies – CBRI, NBO and NGOs in disaster mitigation and community participation	

LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
45	**0**	**0**	**45**

TEXT

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

REFERENCES

1. . Ian Davis, “Safe shelter within unsafe cities: Disaster vulnerability and rapid urbanization”, Open House International, UK, 1987

2. Socio-economic developmental record- Vol.12, No.1, 2005
3. 3. Mary C. Comerio, Luigia Binda, "Learning from Practice- A review of Architectural design and construction experience after recent earthquakes" - Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto, Italy.

Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	-	2	1	-	-	2	-	1	-	2	-	2
CO-2	-	2	1	-	-	2	-	1	-	2	-	2
CO-3	-	2	2	-	-	2	-	1	-	2	-	2
CO-4	-	2	2	-	-	2	-	1	-	2	-	2
CO-5	-	2	3	-	-	3	-	-	-	-	-	2
Total	**-**	**10**	**9**	**-**	**-**	**11**	**-**	**4**	**-**	**8**	**-**	**10**
Scaled to 0,1,2,3 scale	**0**	**2**	**2**	**0**	**0**	**3**	**0**	**1**	**0**	**2**	**0**	**2**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 703B – ARCHITECURAL LIGHTING AND ACOUSTICS 3 – 0 – 0 – 3

Course Objectives:

1. To enable the student to understand the development of Architectural Lighting Design, its evolution and the Principles of Application in Practice by perceiving the various physical factors of Lighting and Light sources.

Course Outcome		Domain	Level
CO1	***Understand and Apply*** the basics of Acoustics	Cognitive	Apply Understand
CO2	***Understand*** the evolution of architectural lighting design and current practice of the same.	Psychomotor	Apply
CO3	***Understand*** the inter-relationship between Light and Human factors	Affective	Knowledge
CO4	***Understanding*** of the Basic Physics involved in Architectural Lighting Design	Affective	Knowledge
CO5	***Evaluate*** the various lighting sources both natural and artificial, with their application principles.	Cognitive	Evaluate
CO6	***Propose and Design*** the various Lighting concepts and Lighting layouts in Practice.	Psychomotor	Apply Understand

SUBCODE	SUB NAME	L	T	P	C
XAR703B	**ARCHITECURAL LIGHTING AND ACOUSTICS**	**3**	**0**	**0**	**3**
C:P:A =	**2:2:2**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**ACOUSTICS**				**10**
	Fundamentals – Sound waves, frequency, intensity, wave length, measure of sound, decibel scale, speech and music frequencies, and Reverberation time. Acoustics and building design-site selection, shape volume, treatment for interior surfaces, basic principles in designing open air theatres, cinemas, broadcasting studios, concert halls, class rooms, lecture halls, schools, residences, office buildings including constructional measures and sound reinforcement systems for building types – case studies				
UNIT – II	**INTRODUCTION TO LIGHTING**				**10**

	An overview of the history of architectural lighting design - Impact of Lighting design over the composition of Architectural & Interior spaces – Quality of light, brightness, colour and glare - Impact of finishes and Materials - The psychology of light and space - The impact of light on health and human behavior.	
UNIT – III	**LIGHT CONTROL SYSTEMS**	**7**
	Optical systems - Principles of controlling light (reflection/refraction) reflectors & lenses - Types of luminaires - Luminaire evaluation, components, features and accessories - Electronic Controls - Basic dimming/control logic and equipment – Specifications - The lighting specification process, various specification formats and written specifications.	
UNIT – IV	**DESIGN APPLICATIONS**	**10**
	Lighting Principles - Concepts and guidelines for general lighting, wallwashing, floodlighting, orientation lighting and beam angle studies for accent lighting - Design Concepts - Geographic context and client program requirements; visualization, communication techniques (hand sketch, computer modelling and/or rendering), lighting simulations, mock-up and lighting design narrative - Layout and documentation - Basics of architectural drawings, lighting drawings, reflected ceiling plans, luminaire schedule, specifications and typical lighting details.	
UNIT – V	**ENERGY EFFICIENT LIGHTING DESIGN**	**8**
	Understanding of Sustainable design issues related to energy usage in lighting - Energy Codes & requirements – Light level guidelines & standards of practice – CFL - LED lighting technology.	

	LECTURE	**TUTORIAL**	**PRACTICAL**	**TOTAL**
	45	**0**	**0**	**45**

TEXT

1. Work of Architecture in the Age of Mechanical Reproduction, Differences MIT press, 1997.
2. Peter Eisenman, Vision Unfolding, Architecture in the Age of Electronic Media, 1992.
3. William J Mitchell, the Logic of Architecture: Design, Computation and Cognition.

MIT Press, Cambridge, 1995

4. Ali Rahim, "Contemporary Process in Architecture", John Wiley & Sons, 2000
5. Contemporary Techniques in Architecture", Halsted Press, 2002

REFERENCES

1. Gillian Hunt, "Architecture in the Cybernetic Age", Architectural Design Profile no.136,1998
2. Sarah Chaplin, "Cyberspace Lingering on the Threshold", (architecture, postmodernism and difference, Architectural Design Profile No. 118: Architects in Cyberspace, 32-35, London: Academy Edition, 1995
3. Rob Shields (ed.), " Cultures of the internet: Virtual Spaces, Real Histories, Living bodies", Sage, London, 1996
4. John Beckman, The Virtual Dimension, Architecture, Representation and Crash Culture, Princeton Architecture Press, 1998.
5. William J Mitchell, "City of bits: Space, Place and the Infobahn". MIT Press, Cambridge, 1995

Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1				3								
CO-2				2								
CO-3				2								
CO-4				2			3	2	1			
CO-5				3			3	3	1			
CO-6							3	3	2			
Total	**-**	**-**	**-**	**12**	**-**	**-**	**9**	**8**	**5**	**-**	**-**	**-**
Scaled to 0,1,2,3 scale	-	-	0	3	-	-	3	2	1	-	-	-

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 703 C – BEHAVIORAL STUDIES IN BUILT ENVIRONMENT 3 – 0 – 0 – 3

Course Objectives:

1. To make the students to understand concepts and concerns of perception.
2. To create awareness about built - environment and perception.

Course Outcome		Domain	Level
CO1	***Identify*** concepts and concerns of perception.	Cognitive	Apply Understand
CO2	***Identify*** and develop the sensivity to the needs of users and clients	Affective	Apply
CO3	**Understanding** the designing and planning for urban quality	Affective	Evaluate
CO4	**Identify** and *apply* the micro and macro built environment and behavioral aspects	Psychomotor	Apply
CO5	**Analyze** the relationship between built - environment and perception	Cognitive	Apply

SUBCODE	SUB NAME	L	T	P	C
703 C	**BEHAVIORAL STUDIES IN BUILT ENVIRONMENT**	**3**	**0**	**0**	**3**
C:P:A =	**1.2:1.2:0.6**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**CONCEPTS AND CONCERNS OF PERCEPTION**				**5**
	Definition - Visual perception - perceptual constancy, objective and spatial vision, attention and awareness, methods of vision perception and science				
UNIT – II	**DEVELOPING SENSIVITY TO THE NEEDS OF USERS AND CLIENTS**				**5**
	Architectural assumptions and Environmental Designs, Designs and social practices, involvement of clients and user in Designs and built environment, realities of clients and public their impact projects and designs				
UNIT – III	**DESIGNING AND PLANNING FOR URBAN QUALITY**				**10**
	Quality of urban environment and living - past, present and futuretrends, role of urban design in urban environment, planning for quality living in urban				

	areas	
UNIT – IV	**MICRO AND MACRO BUILT ENVIRONMENT AND BEHAVIORALASPECTS**	**5**
	Relationship of built environment to society, spatial relationship within built - environment, influence of physical environment on human behavior, influences of built environment on human behaviour	
UNIT – V	**BUILT - ENVIRONMENT AND PERCEPTION**	**9**
	Case studies of tall buildings, low raise neighborhoods, interior and exterior elegance of built environment, local and regional level landscape.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	**0**	**0**	**45**

TEXT

1. Parfeet M and Power G, Planning for urban quality, Rent ledge, London 1977.
2. JohathanBatnett - Urban Design as public polody - Haxper and row Publications New York,1983

REFERENCES

1. Yantis .S (2001), Visual perception, Psychology Press, Philadelphia.
2. Nicol D and Pilling S (2000), changing Architectural education - Towards new propersimalism, Spon Press, London.
3. Frey H, (1999), Eand FN Spon, London.
4. 4. Dovey K, (1999) Framing Places, meditiating power in built form, Rent ledge, London.

e- REFERENCES

Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	2	2	1	-	-	-	-	2	-	-	-	-
CO-2	2	2	1	-	-	-	-	2	-	-	-	-
CO-3	2	1	2	-	-	2	-	2	-	-	-	-
CO-4	2	1	2	-	-	1	-	2	-	-	-	-
CO-5	2	1	3	-	-	2	-	3	-	-	-	-
Total	10	7	9	-	-	5	-	11	-	-	-	-

Scaled to 0,1,2,3 scale	**2**	**2**	**2**	**0**	**0**	**1**	**0**	**3**	**0**	**0**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 703 D – STEEL IN ARCHITECTURE 3 – 0 – 0 – 3

Course Objectives:

1. To make the students aware of the recent trends in built environment using Steel as structural and non structural and decorative material.

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Understand*** the history of development of steel in Architecture.	Cognitive	Understanding
CO2	***Understand*** the potential usage of steel in contemporary Architecture.	Cognitive	Understanding
CO3	***Knowledge*** on technical details of AESS	Cognitive	Understanding
CO4	***Knowledge*** on technical details of steel in curtain walls and advanced framing systems	Cognitive	Understanding
CO5	***Outline*** the fabrication and erection of steel members	Cognitive	Understanding

SUBCODE	SUB NAME	L	T	P	C
XAR 703 D	**STEEL IN ARCHITECTURE**	**3**	**0**	**0**	**3**
C:P:A	**2.0:1.0:0**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**
UNIT – I	**INTRODUCTION**				**8**
	Materiality of steel, structural properties of steel, advantages of steel in construction. History of metal in construction – Iron to Steel. Steel and tension. Industrialization and mass fabrication of steel. Casting of steel in historic and				

	contemporary examples. Invention of hollow structural sections. Hot rolled steel shapes, various hollow structural sections.	
UNIT – II	**STEEL IN HIGH TECH MOVEMENT, CONTEMPORARY ARCHITECTURE**	**10**
	Introduction to High Tech movement. Understanding of various typologies of high tech movement – Extruded, Grid/Bay, Diagrids, arched/ curved structures, tensile. Advantages of diagrids over standard frames. Curved steel –creating curves in steel buildings, limitations in curving steel. Evolution of AESS (architecturally exposed structural steel) through High Tech movement.	
UNIT – III	**STRUCTURAL EXPRESSION OF STEEL**	**10**
	Introduction to AESS (architecturally exposed structural steel), standard structural steel versus AESS. Factors that define AESS. Characteristics and categories of AESS. Connection types for AESS – bolted, welded and cast connections. Member types for AESS – Tubular and standard sections. Various steel frame design, basic connection strategies, basic understanding of steel floor systems, truss systems and braced systems	
UNIT – IV	**SUSTAINABILITY, STEEL AND OTHER MATERIALS**	**9**
	Introduction to steel as a sustainable material. Recycled, reuse and adaptive reuse of steel. Steel and glazing systems, support systems for glazing. Technical aspects of combining steel with glass. Various steel and glass envelope systems - curtain wall system, wind braced support systems, cable net walls, spider steel connections with structural glass, simple and complex cable systems. Handling curves and lattice shell construction. Advanced framing system – Steel and Timber. Low carbon design strategies.	
UNIT – V	**FABRICATIONS, ERECTION AND IMPLICATIONS ON DESIGN**	**8**
	Study on transformation of architectural design into fabricated elements. Study of process profile through case studies. Role of physical and digital models in fabrication. Steel in temporary/ exhibit buildings. Need for corrosion and fire protection. Various finishes and coating systems of steel. Detailed study on corrosion protection and fire protection systems. Transportation, site issues and erection on site. Erection of beams and columns. Effects of climate and weather on erections. Other issues relating to practical implication of design on site.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. Terrimeyer Buake, 'Architectural Design in Steel', SPON, 2004.
2. Peter Silver et al, 'Structural Engineering for Architects', Laurence King, 2013.

REFERENCES

3. Victoria Ballard Bell & Patrick J Rand; 'Materials for Architectural Design',

Lawrence King, 2006

4. Ettinger J. Van et all(Editors), 'Modern Steel Construction in Europe', Elsevier,1963.
5. Leonardo Benevolo, 'History of Modern Architecture Vol 1 & 2', Reprint, MIT Press, 1977.
6. 'Handbook of Steel Construction', Canadian Institute of Steel Construction, 2010.
7. John Leckie, 'Steel and Other Materials', Canadian Institute of Steel Construction, 2007.
8. INSDAG Publications and Brochures.

Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	2	--	-	-	-	-	-	-	-	-	3	-
CO-2	-	1	-	-	-	-	-	-	-	-	3	-
CO-3	3	-	-	-	-	-	-	-	-	-	3	-
CO-4	2	-	-	-	-	-	-	-	-	-	3	-
CO-5	2	-	-	-	-	2	-	-	-	-	3	-
Total	9	1	-	-	-	2	-	-	-	-	15	-
Scaled to 0,1,2,3 scale	**2**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**3**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 904A – ARCHITECTURAL CONSERVATION 2 – 0 – 1 – 3

Course Objectives:

1. To inform the students about the character and issues in our heritage towns through case studies

Course Outcome		Domain	Level
CO1	***Understand*** the various issues and practices of Conservation	Cognitive	Understand
CO2	***Expose*** the status of conservation in India and the various agencies involved in the field of conservation worldwide and their policies	Cognitive	Knowledge
CO3	***Understand*** the various acts, rules and guidelines for the preservation, conservation and restoration of buildings	Cognitive	Knowledge
CO4	***Understand*** the importance of heritage, issues and practices of conservation through case	Psychomotor	Application

	studies.		
CO5	***Understanding*** on historic materials and their properties various technologies for investigating masonry, foundation and also traditional and modern repair methods.	Cognitive	Knowledge

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR 904A	**ARCHITECTURAL CONSERVATION**	**2**	**0**	**1**	**3**
C:P:A =	**0.6:1.2:1.2**	**L**	**T**	**P**	**H**
		2	**0**	**1**	**4**
UNIT – I	**INTRODUCTION TO CONSERVATION**				**10**
	Understanding Heritage. Types of Heritage. Heritage conservation- Need, Debate and purpose. Defining Conservation, Preservation and Adaptive reuse. Distinction between Architectural and Urban Conservation. International agencies like ICCROM, UNESCO and their role in Conservation				
UNIT – II	**CONSERVATION IN INDIA**				**10**
	Museum conservation – monument conservation and the role of Archeological Survey of India – role of INTACH – Central and state government policies and legislations – inventories and projects- select case studies of sites such as Hampi, Golconda, Mahabalipuram - craft Issues of conservation				
UNIT – III	**CONSERVATION PRACTICE**				**10**
	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, Chettinad and Swamimalai dwellings, seismic retrofit and disabled access/ services additions to historic buildings-heritage site management				
UNIT – IV	**URBAN CONSERVATION**				**20**
	Over view of urban history of India and Tamil Nadu- understanding the character and issues of historic cities – select case studies of towns like Srirangaram, Kumbakonam and Kanchipuramhistoric districts and heritage precincts. Exercise on Documentation & conservation proposals for a heritage / historic / monumental building.				
UNIT – V	**CONSERVATION PLANNING**				**10**
	Conservation as a planning tool.- financial incentives and planning tools such as Transferable Development Right(TDR)-urban conservation and heritage tourism-case studies of sites like for Cochin, Pondichery French town.- conservation project managemen				

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	30	0	30	60

TEXT

1. Donald Appleyard, "The Conservation of European Cities", M.I.T. Press, Massachusetts, 1979.
2. James M. Fitch, " Historic Preservation: Curatorial Management of the Built World" University Press of Virginia; Reprint edition, 1990
3. Robert E. Stipe, A Richer Heritage: Historic Preservation in the Twenty-First Century" , Univ. of North Caroling press, 2003.
4. **Conservation Manual , Bernard Fielden; INTACH Publication, 1989.**

REFERENCES

1. B.K. Singh, "State and Culture", Oxford, New Delhi
2. A.G. K. Menon ed. "Conservation of Immovable Sites", INTACH Publication, N.Delhi., 1988
3. Seminar Issue on Urban Conservation

Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	2	-	3	-	-	3	-	2	-	-	2	-
CO-2	-	1	3	-	-	3	-	2	-	-	2	-
CO-3	3	-	3	-	-	3	-	2	3	-	2	-
CO-4	2	-	3	-	-	3	-	2	3	-	2	-
CO-5	2	-	3	-	-	3	-	2	3	-	2	-
Total	9	1	15	-	-	15	-	10	9	-	10	-
Scaled to 0,1,2,3 scale	**2**	**1**	**3**	**0**	**0**	**3**	**0**	**2**	**2**	**0**	**2**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 904B– INTERIOR DESIGN 2 – 0 – 1 – 3

Course Objectives:

1. To introduce the vocabulary of interior design with an overview of interior and furniture design and other components.

Course Outcome	Domain	Level

CO1	Relate various theories and factors that are to be considered in interior design	Cognitive	Comprehension
CO2	Demonstrate knowledge on the relationship between the ergonomics, function, psychological aspects of aesthetics.	Cognitive	Comprehension
CO3	Able to propose the theme oriented interior design.	Psychomotor	Design
CO4	Able to develop a specification and estimation report for an interior project.	Cognitive	Analysis
CO5	Able to develop a set of required working drawings & visuals for an interior design project using traditional and digital rendering techniques.	Cognitive	Synthesis

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR904B	**INTERIOR DESIGN**	**2**	**0**	**1**	**3**
C:P:A =	**2.0:0.0:1**	**L**	**T**	**P**	**H**
		2	**0**	**2**	**4**
UNIT – I	**INTRODUCTION TO INTERIOR DESIGN**				**10**
	Definition of interior design - Interior design process - Vocabulary of design in terms of principles and elements - Introduction to the design of interior spaces as related to typologies and functions, themes and concepts - Study and design. Influence of historical styles, folk arts in interior design				
UNIT – II	**ELEMENTS OF INTERIOR DESIGN - ENCLOSING ELEMENTS**				**15**
	Concept & theme Development: Enclosures & envelops to formulate the volumes, response to functional spaces; Functionality: Spatial organization & Planning; different treatment methods for walls, floor, ceilings, services. Derivation of quantitative aspect of spaces based on User - Activity Analysis, furniture / equipment, Anthropometry, Ergonomics, Layout, Circulation, etc.; qualitative aspects based on ambience				
UNIT – III	**ELEMENTS OF INTERIOR DESIGN– LIGHTING ACCESSORIES & INTERIOR LANDSCAPING**				**15**
	Technical decisions -Constructional details &Material specification - Exploration & selection responding to functionality & aesthetics; Decisions for aesthetics: Color, textures, patterns, surface finishes, ornamentation, furnishings, accessories, lighting, interior Landscaping, etc. with reference to visual comfort & ambience in the interiors.				
UNIT – IV	**ELEMENTS OF INTERIOR DESIGN – FURNITURE DESIGN & SPACE PLANNING**				**10**

	Study of the relationship between furniture and spaces - human movements & furniture design as related to human comfort - Function, materials and methods of construction - - Study on furniture for specific types of interiors like office furniture, children's furniture, residential furniture, display systems, etc. – Design Projects on Residential, Commercial and Office Interiors.
UNIT – V	**INTERIOR DESIGN PROJECTS** **10**
	Develop a working drawing for interior design detailing for office spaces, hotel lobbies etc. Residential/ commercial / Retails / Offices / Institutional / Hospitality / Recreational / Sports / Healthcare / Others. Site extent: Ranges from 200 m^2 to 600 m^2.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	**0**	**30**	**60**

TEXT

1. Francis .D.K. Ching, *Interior Design Illus*trated, V.N.R. Pub., NY 1987.
2. Julius Penero and Martin Zelnik, *Human Dimensions and Interior space Whitney Library of Design*, NY 1979

REFERENCES

1. Steport - De Van Kness, Logan and Szebely, *Introduction to Interior Design* Macmillan Publishing Co., NY 1980.
2. *Inca / Interior Design* Register, Inca Publications, Chennai, 1989.
3. Kathryn .B. Hiesinger and George H.Marcus, *Landmarks of twentieth Century Design*; Abbey Ville Press, 1993.
4. Syanne Slesin and Stafford Ceiff - *Indian Style*, Clarkson N. Potter, Newyork, 1990.
5. History of Interior design & furnitures , Blakemore.R
6. T.S.S. for Interior design & spaces, Chiara joseph
7. Interior Design Illustrated, Ching D.K.
8. Interior Design and Decoration, Premavathy seetharaman

Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	3	2	3								3	
CO-2	3	3	3								3	
CO-3	3	3	3			3		3	3	3	3	3
CO-4		2	2	3	2		2		2	2	2	
CO-5		1	1	3	3		2		1	1	2	
Total	9	11	12	6	5	3	4	3	6	6	16	3
Scaled to 0,1,2,3 scale	**3**	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**2**	**2**	**3**	**1**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 904C – ENERGY EFFICIENT ARCHITECTURE 2 – 0 – 1 – 3

Course Objectives:

1. To make the students aware of the future trends in creating sustainable built environment

Course Outcome		Domain	Level
On the successful completion of the course, students will be able to			
CO1	***Know*** about the need to use alternative sources of energy in view of the depleting resources and climate change.	Cognitive	Understand
CO2	***Exposed*** to simple and passive design considerations	Cognitive	Knowledge
CO3	***Exposed*** to alternative sources of energy and are exposed to passive design	Cognitive	Knowledge
CO4	***Understand*** the day lighting and natural ventilation in design in addition to the future	Cognitive Psychomotor	Understand & Application
CO5	***Exposed*** recent trends in creating sustainable built environment	Psychomotor	Application

SUBCODE	SUB NAME	L	T	P	C
XAR 904C	**ENERGY EFFICIENT ARCHITECTURE**	**2**	**0**	**1**	**3**
C:P:A	**2.0:1.0:0**	**L**	**T**	**P**	**H**
		2	**0**	**1**	**4**

UNIT – I	**PASSIVE DESIGN**	**10**
	Significance of Energy Efficiency in the contemporary context, Simple passive design considerations involving Site Conditions, Building Orientation, Plan form and Building Envelope - Heat transfer and Thermal Performance of Walls and Roofs.	
UNIT – II	**ADVANCED PASSIVE ARCHITECTURE- PASSIVE HEATING**	**10**
	Direct Gain Thermal Storage of Wall and Roof - Roof Radiation Trap - Solarium - Isolated Gain.	
UNIT – III	**PASSIVE COOLING**	**15**
	Evaporative Cooling - Nocturnal Radiation cooling - Passive Desiccant Cooling – Induced Ventilation - Earth Sheltering - Wind Tower - Earth Air Tunnels. Exercise: design a building with passive cooling techniques	

UNIT – IV	**DAY LIGHTING AND NATURAL VENTILATION**	**15**
	Daylight Factor - Daylight Analysis - Daylight and Shading Devices - Types of Ventilation - Ventilation and Building Design. Exercises : Design a small building to achieve natural ventilation	
UNIT – V	**CONTEMPORARY AND FUTURE TRENDS**	**10**
	Areas for innovation in improving energy efficiency such as Photo Voltaic Cells, Battery Technology, Thermal Energy Storage, Recycled and Reusable Building materials, Nanotechnology, smart materials and the future of built environment, Energy Conservation Building code.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	**0**	**30**	**60**

TEXT

1. Manual on Solar Passive Architecture, IIT Mumbai and Mines New Delhi, 1999
2. Arvind Krishnan & Others, " Climate Responsive Architecture", A Design Handbook for Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2001
3. Majumdar M, "Energy-efficient Building in India", TERI Press, 2000.
4. Givoni .B, "Passive and Low Energy Cooling of Buildings", Van Nostrand Reinhold, New York, 1994

REFERENCES

1. Fuller Moore, "Environmental Control Systems", McGraw Hill INC, New Delhi - 1993
2. Sophia and Stefan Behling, Solpower, "The Evolution of Solar Architecture", Prestel, New York, 1996
3. Patrick Waterfield, "The Energy Efficient Home: A Complete Guide", Crowood press ltd, 2011.
4. Dean Hawkes, "Energy Efficient Buildings: Architecture, Engineering and Environment", W.W. Norton & Company, 2002 5. David Johnson, Scott Gibson, "Green from the Ground Up: Sustainable, Healthy and Energy efficient home construction", Taunton Press, 2008

Mapping of COs with Pos

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO1	PSO2
CO-1	2	--	-	-	-	-	-	-	-	-	3	-
CO-2	-	1	-	-	-	-	-	-	-	-	3	-
CO-3	3	-	-	-	-	-	-	-	-	-	3	-

CO-4	2	-	-	-	-	-	-	-	-	-	3	-
CO-5	2	-	-	-	-	2	-	-	-	-	3	-
Total	9	1	-	-	-	2	-	-	-	-	15	-
Scaled to 0,1,2,3 scale	**2**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**3**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

XAR 904D – MATERIAL AND TECHNOLOGIES FOR SUSTAINABLE ARCHITECTURE 2 – 0 – 1 – 3

Course Objectives:

2. The course is designed to enable the students to learn different management techniques suitable for planning and constructional Projects in terms of cost and time.

Course Outcome		Domain	Level
CO1	***Understand*** the various aspects of sustainability	Cognitive	Knowledge
CO2	***Demonstrate*** the knowledge on material properties and the impact on construction.	Cognitive	comprehension
CO3	***Work*** with various building codes, regulations related to sustainable construction	Affective	Knowledge Application
CO4	***Select*** the suitable construction methods to achieve sustainable design.	Affective	Application
CO5	***Analyze*** the given condition and arrive a appropriate sustainable construction solution	Affective	Application

SUBCODE	SUB NAME	L	T	P	C
XAR904D	**MATERIAL AND TECHNOLOGIES FOR SUSTAINABLE ARCHITECTURE**	**2**	**0**	**1**	**3**

C:P:A =	2.0:0.0:1	L	T	P	H
		2	0	1	4

UNIT – I	**INTRODUCTION**	**10**
	Architecture and the survival of the planet- Assessing patterns of consumption and their alternatives- Profit and politics- Natural building movement – new context for codes and regulations	
UNIT – II	**DESIGN PRINCIPLES**	**15**
	Principle 1: Conserving energy; Principle 2: Working with Climate; Principle 3: minimizing new resources; Principle 4: respect for users; Principle 5: respect for site; Principle 6: holism- Illustrated with examples	
UNIT – III	**SUSTAINABLE CONSTRUCTION**	**15**
	Design issues relating to sustainable development including site and ecology, community and culture, health, materials, energy, and water- Domestic and Community buildings using self help techniques of construction; adaptation, repair and management.-.portable architecture	
UNIT – IV	**SYSTEMS MATERIALS AND APPLICATIONS**	**10**
	Adobe- Cob- Rammed Earth- Modular contained earth- light clay- Straw bale- bamboo- earthen finishes, etc.- their sustainability; adaptability to climate; engineering considerations, and construction methods; Waste as a resource Portable architecture to Applications through specific case studies	
UNIT – V	**CASE STUDIES FROM THE CONTEMPORARY SCENARIO**	**10**
	Ranging from small dwellings to large commercial buildings, drawn from a range of countries to demonstrate best current practice	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. S.C.Rangwala, Elements of Estimating and Costing, Charoter Publishing House, India.

REFERENCES

1. Brenda and Robert Vale; Green Architecture: Design for a sustainable future; Thames and Hudsson;1996
2. Lynne Elizabeth and Cassandra Adams; Alternative Construction: Contemporary Natural Building Methods
3. Victor Papanek; The Green Imperative; Thames and Hudson; 1995
4. Steven Harris and Deborah Berke; Architecture of the Everyday; Princeton

Architectural Press; 1997

5. Pilar Echavarria; Portable Architecture- and unpredictable surroundings; Page One Publishing Pvt. Ltd.; 2005

Mapping of COs with Pos												
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PSO1**	**PSO2**
CO-1	-	-	-	2	-	-	-	-	1	3	-	-
CO-2	-	-	-	3	-	-	-	-	-	3	-	-
CO-3	-	-	3	3	-	-	3	-	3	-	-	-
CO-4	-	-	-	3	-	-	-	-	3	-	-	-
CO-5	-	-	-	1	3	-	3	-	3	-	-	-
Total	-	-	3	12	3	-	6	-	10	6	-	-
Scaled to 0,1,2,3 scale	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

1-5 =1, 6-10=2, 11-15=3

0-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

	C	P	A	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	L:T:P:C
XAR101	√					1	2									**3:0:0:3**
XAR102	√								2		3				3	**3:0:0:3**
XAR103	√			3	1											**3:0:0:3**
XAR104	√	√	√				3	3								**1:0:2:3**
XAR105	√	√	√	2	1		2		3	1				2		**2:0:2:4**
XAR106	√			2						2		1				**2:1:1:3**
XAR107	√	√	√	3				1								**0:0:7:7**
XAR201	√			2	2	1	1									**3:0:0:3**
XAR202	√			2		1							1		1	**3:0:0:3**
XAR203	√			2	1			1								**3:0:0:3**
XAR204	√	√	√				3	3								**1:0:2:3**
XAR205	√	√	√				2				2		2			**2:0:2:4**
XAR206		√		3				1								**0:0:2:2**
XAR207		√	√	2	2	2	2	2	2	2	2	2	2	2		**0:0:7:7**
XAR301	√	√	√		3		3	3						2		**3:0:0:3**
XAR302	√			1		2	3		3					1	1	**2:0:0:2**
XAR303	√	√	√	1			1		1		3			2		**3:0:0:3**
XAR304	√	√	√				3				3	1		1		**1:0:1:2**
XAR305	√	√	√	2	2		1	2	2	1				1	1	**2:0:1:3**
XAR306	√	√	√				2	2					2			**0:0:2:2**
XAR307	√	√	√	3	2	2	1	2			2		2	3		**0:0:6:6**
XAR401	√	√	√		1					3	2		2			**3:0:0:3**
XAR402	√			3	2	2										**3:0:0:3**
XAR403	√		√				3			1				1		**2:0:0:2**
XAR404	√	√					3			1				1		**1:0:1:2**
XAR405	√	√					3	1					3	1		**1:0:2:3**

XAR406	√	√	√				3	3	1	1		1	2	1	1	**0:0:2:2**
XAR407	√	√	√	2	2	2	2	2	1	2	2	2	2	3	2	**0:0:6:6**
XAR501	√	√	√				3					3				**3:0:0:3**
XAR502	√		√	2				1	1		1				2	**3:0:0:3**
XAR503	√			2	2				2		2				1	**2:0:0:2**
XAR504	√	√	√			3	3							1	1	**1:0:1:2**
XAR505	√	√	√				2	1			2		2	2		**2:0:2:3**
XAR506		√	√				2	2					2			**0:0:2:2**
XAR507	√	√	√	2	2	2	2	2	1	2	2	2	2	3	2	**0:0:6:6**
XAR601	√		√			3			3			1			2	**3:0:0:3**
XAR602	√	√		3		3	2		3		3		3	3	3	**3:0:0:3**
XAR603	√	√	√			2	3			2		3				**2:0:0:2**
XAR604	√	√		2	1				2					3		**1:0:1:2**
XAR605	√	√			3		2						2		2	**1:0:2:3**
XAR606	√	√	√				3			3			1			**0:0:2:2**
XAR607	√	√	√	2	2	1	1	1	1				2	1	1	**0:0:6:6**
XAR701		√		2	2	2	2	2	2	2	2	2	2	2	3	**0:0:0:4**
XAR801	√						1		1	1		1		1	1	**2:0:0:2**
XAR802	√		√				2				1		2	2		**3:0:0:3**
XAR803	√		√			2	2	1		2			3			**3:0:0:3**
XAR804	√	√		1	1		1									**3:0:0:3**
XAR805		√	√	2	2	2	2	2	2	2	2	2	2	2	3	**0:0:2:2**
XAR806	√	√	√	2	2	2	2	2	1	2	2	2	2	3	2	**0:0:8:8**
XAR901	√						1		1	1		1		1	1	**2:0:0:2**
XAR902	√	√			2		3	2						3		**3:0:0:3**
XAR903	√				1	2					1		2		3	**3:0:0:3**
XAR904	√			2					2	3						**3:0:0:3**

XAR905	√	√		2	1	2	2	1	1	1	1	1	1	2	3	**0:0:2:2**
XAR906	√	√	√	2	2	2	2	2	2	2	2	2	2	2	3	**0:0:8:8**
XAR1001		√	√	2	2	2	1	2	1	1	3	2	2	3	3	**0:0:0:10**
				61	44	43	87	47	41	38	43	29	50	55	45	

Guidelines for B.Arch Curriculum 2019-20

Curriculum Structure for B.Arch. Degree Programme offered by PMIST

S. No.	Category	AICTE Recommendation %	PMU adoption %	PMU credits	Deviation %	Number of courses
1.	Humanities including communication English, Management;	5%	2 %	3	3%	1
2.	Basic Sciences(BS) including Mathematics	5%	4 %	6	1%	2
3.	Engineering Sciences (ES), including Architectural drawing and graphics, Structural mechanics and theory of structures, surveying and leveling , building services and equipments, Estimation and costing.	20%	20 %	24	0%	11
4.	Professional Subjects-Core (PC), relevant to the chosen specialization/branch;	40%	60%	126	-20%	34
5.	Professional Subjects – Electives (PE), relevant to the chosen specialization/ branch;	10%	8 %	12	2%	4
6.	Thesis, Seminar and/or Internship in Industry or elsewhere	10 %	5%	18	5%	3
7.	Mandatory Courses (UGC Mandatory)	10 %	2 %	2	8%	1
8.	Non-credit Course	-	-	-	-	-
9.	NCC/NSS/YRC/RRC/Sports	-	-	-	-	-
			100%	**191**		**56**

Summary of the credits and hours

Semester	Total Credits	Total Hours / Week	No. of courses
I	28	34	7
II	29	35	8
III	27	34	7
IV	28	34	8
V	29	36	7
VI	26	35	8
VII	28	34	7
VIII	12	100 days	1
IX	28	35	6
X	18	35	1
I - X	**253Credits**	-	60

The salient features of this curriculum are as follows.

1. For B.Arch. programme 191 credits are considered and mandatory credits are not mentioned in CoA.
2. The average load per semester is about 32 credits.
3. The Practical training is in the 7th Semester with 4 credits and 10 credits for Thesis in the 10th Semester.
4. The credit distribution is followed as per the guidelines given by CoA/AICTE/UGC

Course type	Credits				Contact Hours			
	L	T	P	Total	L	T	P	Total
Theory course	3	0	0	3	3	0	0	3
Theory + Studiocourse	1	0	2	3	1	0	3	4
	1	0	1	2	1	0	2	3
	2	0	2	4	2	0	3	5
Studio course	0	0	6	6	0	0	6	12
	0	0	7	7	0	0	7	14

Note: Evaluation and Assessment must be done for all non credit courses.

1. Apart from academic workload, the following academic sessions must be included in the time table to maintain 35 hours / week.
   Counseling – 1 hour, Academic mentor – 1 hour, Library – 1 hour.

3. The course teacher should maintain records for Models, Sheet submissions