

**DEPARTMENT OF
ARCHITECTURE**



MINUTES of BOARD OF STUDIES

CURRICULUM & SYLLABUS

(I - X Semester)

For

B.Arch

(Bachelor of Architecture)

(Based on Outcome Based Education)

REGULATION- 2016 R-I

TABLE OF CONTENTS

S.No	Contents	P.No
1.	Institute Vision and Mission	1
2.	Department Vision and Mission	2
3.	Members of Board of studies	3
4.	Department Vision and Mission Definition Process	5
5.	Programme Educational Objectives (PEO)	6
6.	PEO Process Establishment	7
7.	Mapping of Institute Mission to PEO	8
8.	Mapping of Department Mission to PEO	9
9.	Programme Outcome (PO)	10
10.	PO Process Establishment	11
11	Correlation between the POs and the PEOs	12
12	Curriculum development process	13
13.	Faculty allotted for course development	14
14	Pre-requisite Course Chart	18
15	B. Arch – Curriculum	19
16	B. Arch – Syllabus	27
17	Overall course mapping with POS	145

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 an 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.	Dr.P.Jayasudha	Dean, School of Architecture and Planning.,PMU	Chairperson
2.	Ar.V.S.Kavitha	Associate professor & Head Dept.of Architecture.,PMU	Chairperson
3.	Ar.C.V.Subramanian	Associate professor Dept. of Architecture.,PMU	Member
4.	Ar.K.Manonmani	Associate professor Dept. of Architecture.,PMU	Member
5.	Ar.M.Devadoss	Asst.Prof(SS)	Member
6.	Ar.N.RameshBabu	Asst.Prof(SS)	Member
7.	Prof.N.Joseph Fernando	Principal, Sigma College of Architecture, Moododu, Anducode Post Kanyakumari Dist Tamilnadu - 629 168	Special Invitee Member Representing academia
8.	Ar.V.Balasubramanian	Practicing Architect, LLB Associates 11/1. E-2 E-2 road, Chinnasokkikulam, Madurai -2	External Member Representing academia

The current Bachelor of Architecture (B.Arch) Curriculum is undergoing its **Eighth Board of studies on 23.05.2015** to tune the syllabus towards Outcome based Education and meet the UGC requirements and in turn the suggestions provided will be implemented in Regulations 2015-16.

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	applying them for the societal needs with environmental consciousness.
Creating an egalitarian society.	

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

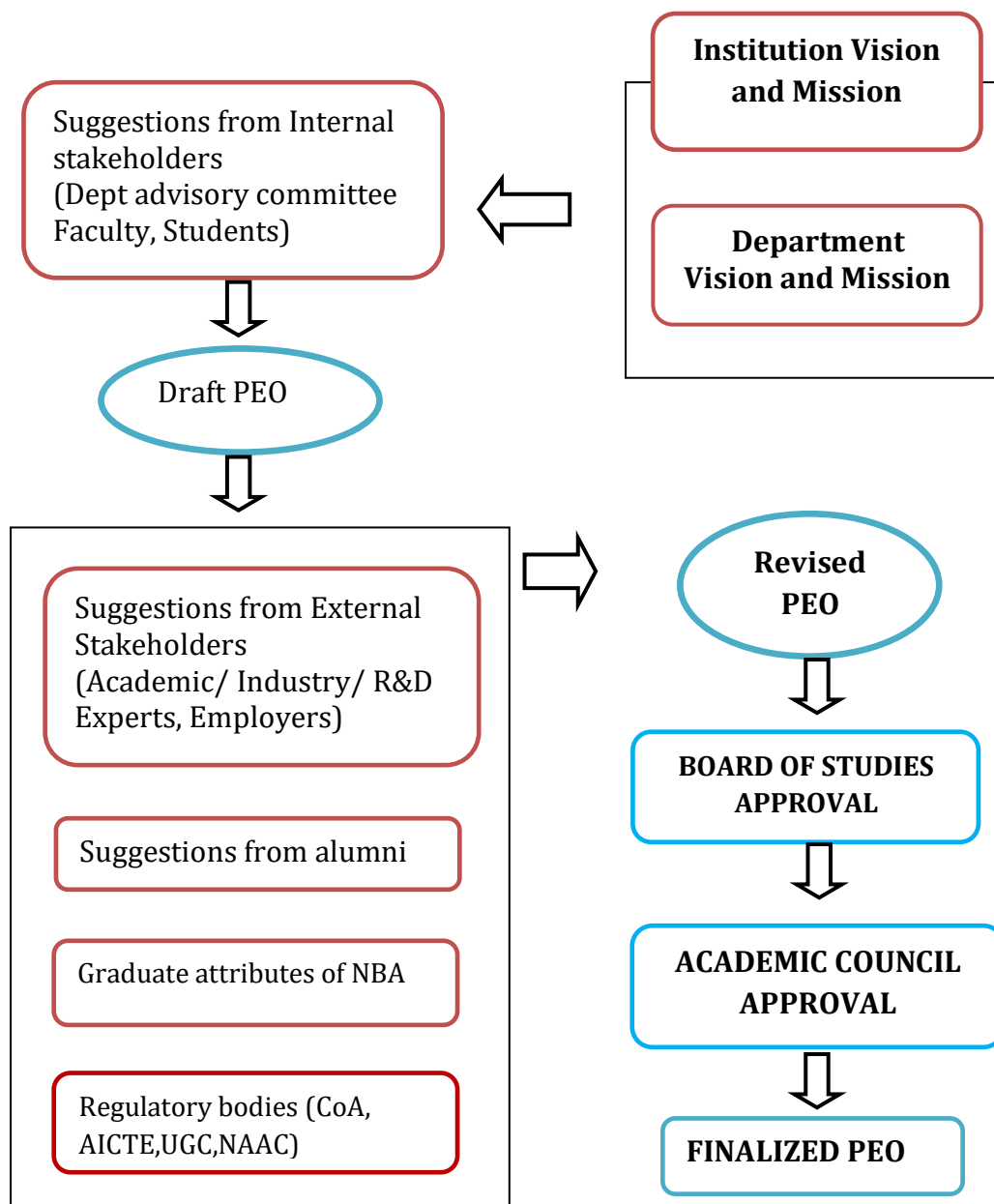
PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

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
	<i>1- Low</i>	<i>2 – Medium</i>	<i>3-High</i>	

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 BACK OBTAINED

Total number of feedback 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. Detail drawing and software skill need to be improved
3. More hands on experience with actual site problems and also the actual procedure of site work
4. Emphasize the product awareness
5. Include working drawing as one of the course
6. Arrange the exhibition and workshops by practicing architects and display of their office works for the better understanding of working drawing and details
7. The Portion of the Course XAR 205 MATERIAL AND CONSTRUCTION –II shall be reduced
8. The syllabus of the Course XAR103 Theory of Architecture -I and XAR 203 theory of architecture -II should be changed to application oriented
9. Remove the course XAR 904 CYBER SECURITY
10. Evaluation process shall be at the end of the semester for the Architectural design courses.

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)

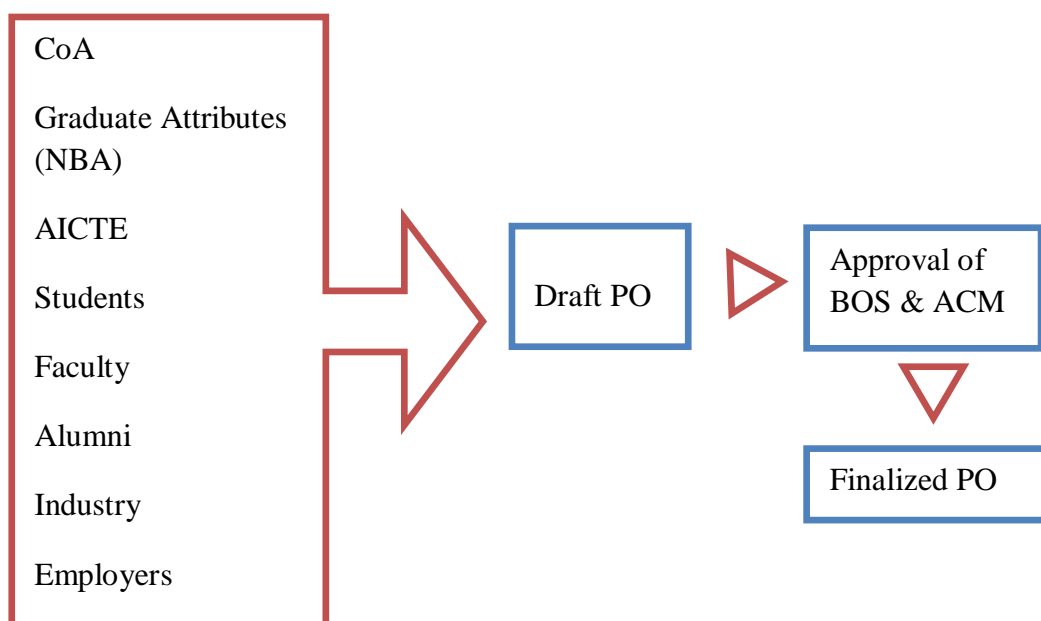
	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10
PO1	3	1	2	1	2	2	1	1	1	1
PO2	1	3	1	2	1	1	1	1	2	1
PO3	2	1	3	1	1	2	2	3	2	2
PO4	1	1	1	3	1	1	2	1	1	1
PO5	3	3	2	1	3	1	2	1	1	1
PO6	1	1	2	1	1	3	1	1	3	1
PO7	2	1	1	2	2	1	3	1	2	2
PO8	1	1	3	1	3	2	1	3	1	1
PO 9	1	2	2	1	2	1	2	1	3	1
PO10	1	2	1	1	1	3	1	1	2	3
PSO1	2	1	2	1	2	2	1	3	1	2
PSO2	1	1	1	2	3	1	2	1	2	1

1- Slightly

2 – Supportive

3 - Highly related

PO PROCESS ESTABLISHMENT



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.

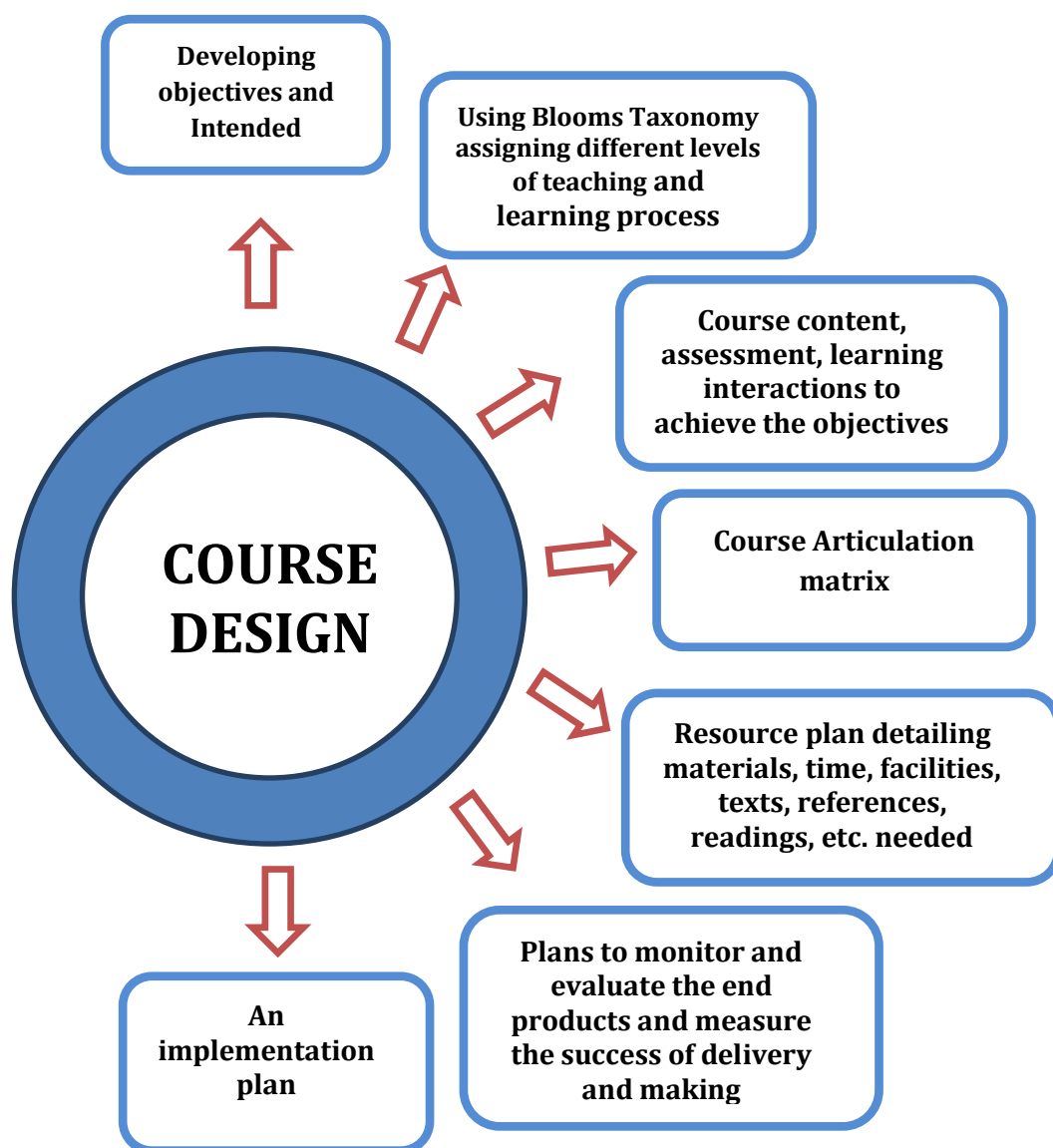
Courses and topics were designed and developed within a framework which comprises a specified curriculum, specified assessment arrangements, and clearly identified educational aims and learning outcomes.

Faculty members assigned for course development

S.No	Course Name	Staff Incharge
1.	Architectural Mathematics	Ar.Devadoss.M
2.	History of Architecture – I, II, III,	Ar.K.Jasmine Vidhya
3.	Theory of Architecture I, II	Ar.S.Pratheeba
4.	Architectural Graphics –I, II	Ar.V.S.Kavitha
5.	Materials and Construction – I, II, III, IV, V, VI	Ar.C.Sivapriya
6.	Study skills and Language lab	Ar.VijAyakumar
7.	Mechanics of Structures – I, II	Er.R.latha
8.	Basic Design & Visual Arts	Ar.V.S.Kavitha
9.	Creative Workshop & Visual Arts I, II	Ar.K.Manonmani
10.	Architectural Design – I, II, III, IV, V, VI, VII	Ar.N.Ramesh babu Ar.P.Jayasudha Ar.V.S.Kavitha Ar.K.Manonmani
11.	Climate and Architecture	Ar.C.V.Subramanian
12.	Building services I, II	Ar.N.Ramesh babu
13.	Visualization and Representation	Ar.V.S.Kavitha
14.	Design of Structures – I, II	Dr.S.Senthamil Kumar
15.	Early Modern Architecture	Ar.K.Manonmani
16.	Environmental Sciences	Ar.Devadoss.M
17.	Computer Applications In Architecture	Ar.J.Mullai
18.	Contemporary Architecture	Ar.K.Manonmani
19.	Culture and Architecture	Ar.P.Jayasudha
20.	Site planning and Surveying	Ar.K.Chithra
21.	Digital Design & Media tools	Ar.J.Mullai
22.	Human Settlement Planning	Ar.N.Ramesh babu
23.	Estimation & Costing	Ar.K.Chithra
24.	Vernacular Architecture	Ar.P.Jayasudha
25.	Energy Efficient Architecture	Ar.C.V.Subramanian
26.	Architectural Working Drawing and Specifications	Ar.K.Manonmani
27.	Practical Training	Ar.Devadoss.M
28.	Urban Economics & Sociology	Ar.J.Mullai
29.	Advanced Building Services	Ar.N.Ramesh babu
30.	Seminar	Ar.K.Manonmani
31.	Professional Practice & Ethics	Ar.C.V.Subramanian
32.	Dissertation	Ar.K.Manonmani
33.	Thesis	Ar.K.Manonmani

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 UGC and NAAC

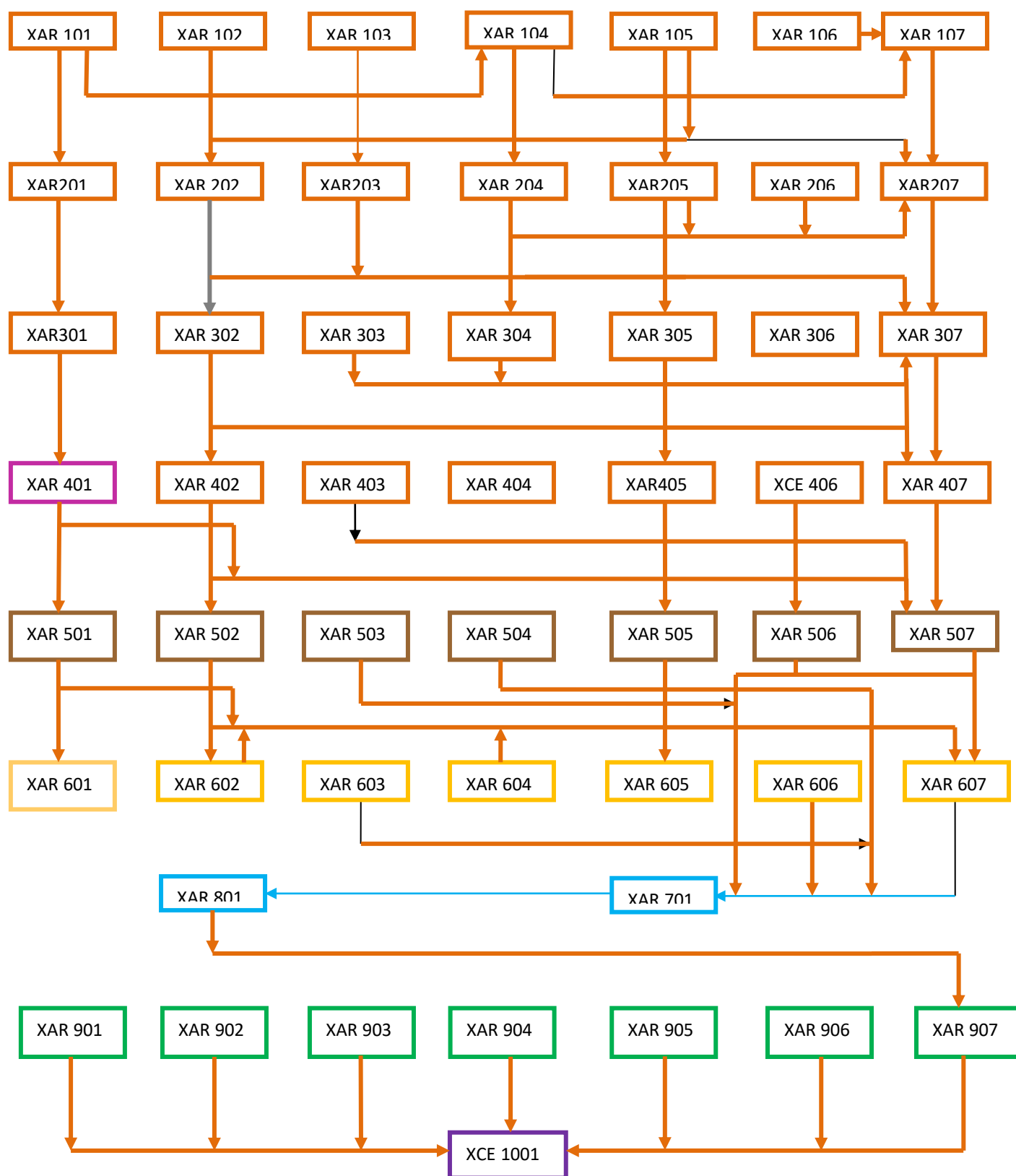
S.No	Category	Symbol
1.	Humanities including communication English, Management;	HS
2.	Basic Sciences(BS) including Mathematics	BS
3.	Engineering Sciences (ES), including Architectural drawing and graphics , Structural mechanics and theory of structures, surveying and leveling , building services and equipments, Estimation and costing.	ES
4.	Professional Subjects-Core (PC), relevant to the chosen specialization/branch;	PC
5.	Professional Subjects – Electives (PE), relevant to the chosen specialization/ branch;	PE
6.	Thesis, Seminar and/or Internship in Industry or elsewhere	PW/PI
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
HS	1										1
BS	2	3									5
ES	3	3	3	5	5	2		3			24
PC	16	16	18	14	16	19		10	13		122
PE								6	6		12
PW/PI							4	2	2	10	18
MC				2							2
Total	22	22	21	21	21	21	4	21	21	10	184

* flexibility of +/- 20%

PRE REQUISITE



CURRICULUM AND SYLLABUS FOR
B.ARCH - BACHELOR OF ARCHITECTURE
(FIVE YEAR - FULL TIME)
REGULATION – 2016 -I

(Applicable to the students admitted from the academic year 2015 -2016)

SEMESTER – I

SL.No	Code No.	COURSE TITLE	L	T	P	H	C
1	XAR101	Architectural Mathematics	2	0	0	2	2
2	XAR102	History of Architecture – I	2	0	0	2	2
3	XAR 103	Theory of Architecture I	3	0	0	3	3
THEORY CUM STUDIO							
4	XAR104	Architectural Graphics –I	1	0	2	5	3
5	XAR105	Materials and Construction – I	2	0	1	4	3
6	XAR106	Study skills and Language lab	1	0	0	1	1
STUDIO							
7.	XAR107	Creative workshop and visual Arts-I	0	0	2	4	2
8.	XAR108	Basic Design	0	0	6	12	6
		SUB TOTAL	14	0	12	33	22

SEMESTER – II

SL.No.	Code No.	COURSE TITLE	L	T	P	H	C
1.	XAR201	Mechanics of Structures – I	3	0	0	3	3
2.	XAR202	History of Architecture – II	2	0	0	2	2
3.	XAR203	Theory of Architecture II	3	0	0	3	3
THEORY CUM STUDIO							
4.	XAR204	Architectural Graphics –II	1	0	2	5	3
5.	XAR205	Materials and Construction –II	1	0	2	5	3
STUDIO							
6.	XAR206	Creative Workshop & Visual Arts II	0	0	2	4	2
7.	XAR207	Architectural Design – I	0	0	6	12	6
		SUB TOTAL	10	0	12	34	22

SEMESTER – III

Sl. No	Code No.	COURSE TITLE	L	T	P	H	C
1.	XAR301	Mechanics of Structures – II	3	0	0	3	3
2.	XAR302	History of Architecture – III	2	0	0	2	2
3.	XAR303	Climate and Architecture	3	0	0	3	3
THEORY CUM STUDIO							
4.	XAR304	Building services I	1	0	1	3	2
5.	XAR305	Materials and Construction –III	2	0	1	4	3
STUDIO							
6.	XAR306	Visualization and Representation	0	0	2	4	2
7.	XAR307	Architectural Design – II	0	0	6	12	6
		SUB TOTAL	11	0	10	31	21

SEMESTER– IV

Sl.No	Code No.	Course title	L	T	P	H	C
1.	XAR401	Design of Structures – I	3	0	0	3	3
2.	XAR402	Early Modern Architecture	3	0	0	3	3
3.	XAR403	Environmental Science	2	0	0	2	2
THEORY CUM STUDIO							
4.	XAR404	Building Services – II	1	0	1	3	2
5.	XAR405	Materials and Construction – IV	1	0	2	5	3
STUDIO							
6.	XAR406	Computer Application in Architecture	0	0	2	4	2
7.	XAR407	Architectural Design – III	0	0	6	12	6
		SUB TOTAL	12	0	9	30	21

SEMESTER V

Sl.No	Code No.	COURSE TITLE	L	T	P	H	C
1.	XAR501	Design of Structures – II	3	0	0	3	3
2.	XAR502	Contemporary Architecture	3	0	0	3	3
3.	XAR503	Culture and Architecture	2	0	0	2	2
THEORY CUM STUDIO							
4.	XAR504	Site planning and Surveying	1	0	1	3	2
5.	XAR505	Materials and Construction- V	2	0	2	4	3
STUDIO							
6	XAR506	Digital Design & Media tools	0	0	2	4	2
7.	XAR507	Architectural Design – IV	0	0	6	12	6
		SUB TOTAL	10	0	11	32	21

SEMESTER VI

Sl.No	Code No.	COURSE TITLE	L	T	P	H	C
1.	XAR601	Human Settlement Planning	3	0	0	3	3
2.	XAR602	Vernacular Architecture	3	0	0	3	3
3.	XAR603	Estimation & Costing	2	0	0	2	2
THEORY CUM STUDIO							
4.	XAR604	Energy Efficient Architecture	1	0	1	3	2
5.	XAR605	Materials and Construction – VI	1	0	2	5	3
STUDIO							
6.	XAR606	Architectural Working Drawing and Specifications	0	0	2	4	2
7.	XAR607	Architectural Design – V	0	0	6	12	6
		SUB TOTAL	10	0	11	32	21

SEMESTER VII

Sl.No	Code No.	COURSE TITLE	L	T	P	C
1.	XAR701	Practical Training	0	0	0	4

SEMESTER VIII

Sl.No	Code No.	COURSE TITLE	L	T	P	H	C
1.	XAR801	Urban Economics & Sociology	2	0	0	2	2
2.	XAR802	Advanced Building Services	3	0	0	3	3
3.	XAR803	Elective -1	3	0	0	3	3
4.	XAR804	Elective -2	3	0	0	3	3
STUDIO							
5.	XAR805	Seminar	0	0	2	4	2
6.	XAR806	Architectural Design – VI	0	0	8	16	8
		SUB TOTAL	11	0	10	31	21

SEMESTER IX

Sl.No.	Code No.	COURSE TITLE	L	T	P	H	C
1.	XAR901	Professional Practice & Ethics	2	0	0	2	2
2.	XAR902	Housing	3	0	0	3	3
3.	XAR903	Elective – 3	3	0	0	3	3
4.	XAR904	Elective – 4	3	0	0	3	3
STUDIO							
5.	XAR905	Dissertation	0	0	2	4	2
6.	XAR906	Architectural Design – VII	0	0	8	16	8
		SUB TOTAL	11	0	10	31	21

SEMESTER X

Sl.No	Code No.	COURSE TITLE	L	T	P	C
1.	XAR1001	Thesis	0	0	0	10

LIST OF ELECTIVES FOR B.ARCH**ELECTIVE 1(Eight semester)**

Sl.No.	Code No.	Course title	L	T	P	C
1.	XAR803A	Project Management	3	0	0	3
2.	XAR803B	Advanced Building Technology	3	0	0	3
3.	XAR803C	Architecture and Structure	3	0	0	3
4.	XAR803D	Sustainable Architecture	3	0	0	3

ELECTIVE 2 (Eight Semester)

Sl.No.	Code No.	COURSE TITLE	L	T	P	C
1.	XAR804A	Interior design and detailing	3	0	0	3
2.	XAR804B	Disaster Resistance in Architecture	3	0	0	3
3.	XAR804C	Architectural lighting and acoustics	3	0	0	3
4.	XAR804D	Building automation and management system	3	0	0	3

ELECTIVE 3 (Ninth Semester)

Sl.No.	Code No.	COURSE TITLE	L	T	P	C
1.	XAR903A	Architectural Conservation	3	0	0	3
2.	XAR903B	Urban Design and Renewal	3	0	0	3
3.	XAR903C	Principles of traditional architecture	3	0	0	3
4.	XAR903D	Theory of Design	3	0	0	3

ELECTIVE 4 (Ninth Semester)

Sl.No.	Code No.	COURSE TITLE	L	T	P	C
1.	XAR904A	Cyber Security System	3	0	0	3
2.	XAR904B	Landscape Architecture	3	0	0	3
3.	XAR904C	Behavioral studies in Built Environment	3	0	0	3
4.	XAR904D	Architectural Research Skills	3	0	0	3

Total no. of credits: 184**Note:****L - Lecture****T- Tutorial****P – Practical****C-Credit**

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. Understand functions of more than one variable, along with differentiation under integral sign.
4. Understanding the various proportioning systems and their applications.
5. Analyzing data collection and interpretation of results using statistical tools.
6. Studying the computer tools applicable to mathematical calculation

Course Outcome:	Domain	Level
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On the successful completion of the course, students will be able to

CO1	<i>Find</i> area and volumes of simple, complex and irregular geometries using various rules.	Cognitive	Remembering
CO2	<i>Apply</i> Trigonometry on architectural elements	Affective	Applying
CO3	<i>Demonstrate</i> the appropriate role of the mathematical concepts learnt.	Cognitive	Understanding
CO4	<i>Analyze</i> Tally charts, Tables and graphs and statistical diagrams using for various types of data.	Affective	Analyzing
CO5	<i>Explain</i> about various architectural proportioning systems and calculating the same.	Cognitive	Understanding

SUBCODE	SUB NAME	L	T	P	C
XAR 101	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**9**

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

8

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

UNIT – III STATISTICS

8

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, algebraic relations and its application in Egyptian pyramids, Fibonacci series, Fibonacci rabbit experiment, Square root proportions, Modular proportions.

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 Viridi 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								
Total			4	6								
Scaled Value			1	2								

1 – 5 → 1, 6 – 10 → 2, 11 – 15 → 3

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

XAR102 - HISTORY OF ARCHITECTURE -I**2 – 0 – 0 – 2****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 of the development of architectural form with reference to Technology, Style and Character in the prehistoric world and in Ancient Egypt, West Asia, Greece and Rome.

Course Outcome:	Domain	Level
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On the successful completion of the course, students will be able to

CO1	Understand the origin of architecture in prehistoric age in western world.	Cognitive	Understand
CO2	<i>Identify</i> the construction techniques used by Egyptian, Babylonian, Mesopotamian, Greek, Rome and Byzantine builders	Cognitive	Understand
CO3	Know the importance of the history, relate to design thinking, cultural aspiration, social needs, and the evolution of the built environment.	Cognitive	Understand Understand

			Application
CO4	<i>Interpret</i> the characteristics of designing of temples and tombs by Egyptian, Babylonian, and Mesopotamian, Greek, Rome and Byzantine builders	Cognitive	Understand
CO5	Compare spatial and stylistic qualities associated with church architecture	Affective	Analyzing

SUBCODE	SUB NAME	L	T	P	C
XAR 102	HISTORY OF ARCHITECTURE -I	2	0	0	2
C:P:A = 3:0:0		L	T	P	H
		2	0	0	2

UNIT - I PREHISTORIC AGE EGYPTIAN ARCHITECTURE 4

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

UNIT – II WEST ASIA 4

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

UNIT – III GREECE 9

Evolution of city states - Development of Art, Sculpture, 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; Erechthion, Athens, Theatre Epidauros; Tower of Winds.

UNIT –I V ROME 7

Birth and spread of Christianity - Evolution of church forms - Factors influencing architecture - Outline of Architectural character - St.Clement, Rome St.Sophia, Constantinople; St.Marks, Venice; St.Vitale, Ravenna.

UNIT – V EARLY CHRISTIAN AND BYZANTINE 6

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	0	30

TEXT

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

REFERENCES

1. Pier Luigi 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. Sandstrp, Man the Builder, McGraw-Hill Book Company, New York, 1970.

WEBSITES:

1. <http://library.advanced.org/10098>
2. <http://www.encylopedia.com/articles/05371.html>
3. <http://www.cup.org/Titles/09/0521094526.html>

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1		3					3	2		2		
CO2							3	2		2		
CO3							3	2		2		
CO4							3	2		2		
CO5							3	2		2		
Total	0	0	0	0	0	0	15	10	0	10	0	0
Scaled Value	0	0	0	0	0	0	3	3	0	2	0	0

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

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

Preamble

This course provides a fundamental understanding about Architecture and Design.

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
<i>On the successful completion of the course, students will be able to</i>			
CO1	To know the difference between architecture and engineering.	Cognitive	Understand
CO2	Understand the primary elements and forms in architecture, their role and impact on architecture and the development of new forms by applying the same techniques.	Cognitive Psychomotor	Knowledge Application
CO3	Understand about the elements and fundamentals Techniques of space making of space making.	Cognitive	Knowledge
CO4	An exposure to the principles of architecture and applications of the same in buildings.	Cognitive & Psychomotor	Knowledge & Application

SUBCODE	SUB NAME	L	T	P	C
XAR 103	THEORY OF ARCHITECTURE-I	3	0	0	3
C:P:A =		L	T	P	H
3:0:0		3	0	0	3

UNIT – I INTRODUCTION TO ARCHITECTURE**5**

Definition of Architecture, Architectural design - An analysis, Integration of aesthetic and function.

UNIT – II	ELEMENTS OF ARCHITECTURE	10
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Elements of Architecture backed by need and followed by fulfillment of need, primary elements of architecture – point, line, plane and volume.

UNIT – III	ARCHITECTURAL FORMS	10
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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
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Form defining space – horizontal elements, vertical elements. Space defining elements, openings in space-defining elements

UNIT – V	PRINCIPLES OF DESIGN	10
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Proportion, scale. Ordering principles - balance, rhythm, symmetry, datum, hierarchy, pattern and axis with building examples.

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1			2	3								1
CO2	3		2	3								1
CO3	2		2	3								1
CO4	3		2	3								1
Total	8		10	12								4
Scaled Value	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.

XAR104 - ARCHITECTURAL GRAPHICS - I**1 – 0 – 2 – 3****Preamble:**

This course provides the skill on basic visualization of objects and represents them in the form of drawings to scale and to focus on the various technicalities of construction and construction detail using some of the basic building materials.

Course Objectives:

1. To prepare students for three dimensional visualization and representation of complex geometrical objects in the form of drawings.
2. To educate students with the basics of drafting tools and their application in the process of drawing preparation.
3. To equip the students with appropriate skills, techniques and knowledge for preparing drawings in courses such as Architectural graphics-II, Materials and Construction-I and Basic Design & Visual Arts.
4. To educate students with standard drawing conventions to be adhered in construction and design drawing preparations.

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

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

CO1	Appropriate usage of various drafting tools in the process of preparing drawings.	Cognitive	Understanding
CO2	Identify standard drawing conventions and representations in drawings.	Psychomotor	Evaluating

CO3	Construct lines, Planar and solid geometry of simple and complex objects in reduced scales.	Psychomotor	Creating
CO4	Learn about various types of projections	Cognitive	Knowledge Application
CO5	Draft Orthographic projections, Axonometric and Isometric views of three dimensional objects in reduced scales.	Psychomotor	Creating

SUBCODE	SUB NAME	L	T	P	C
XAR104	ARCHITECTURAL GRAPHICS - I	1	0	2	3
C:P:A = 0.6:1.8:0.6		L	T	P	H
		1	0	4	5
UNIT I INTRODUCTION					10
Introduction, Instruments for drawing, scale, sizes of sheets, grades of pencil, composition of sheet, dimensioning of objects-elements of dimensioning, methods of dimensioning.					
UNIT II PLANE GEOMETRY					30
Construction of planar surfaces - square, rectangle, polygon etc,					
Projection of points, lines and planes					
UNIT III ORTHOGRAPHIC PROJECTIONS					20
Introduction to orthographic projections. Construction of plan, elevation and section of 3D objects and projections in various positions.					
UNIT IV AXONOMETRIC PROJECTIONS					15
Introduction to Axonometric projections – Isometric, Dimetric, Trimetric and Oblique projections. Construction of basic shapes and combination of shapes in Isometric projections					
	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.

Table Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
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.

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 OUTCOMES

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
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 formation of soil, their classification, understand the importance of soil in building construction and list the various types of grain sizes and their uses.	Cognitive	Knowledge
CO3	Describe the properties, characteristics, method of preservation, treatment and methods of construction ,tests and uses of stone and other ecological materials.	Cognitive	Knowledge
CO4	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
CO5	Classify the rocks and recognize the building stones and their uses and sketch the various stone finishes and explain the methods of cutting and polishing of granites.	Affective	Analyze
CO6	Classify the various types of lime, properties manufacturing process ,mix proportions and application in building construction.	Cognitive	Application

SUBCODE	SUB NAME	L	T	P	C
XAR 105	MATERIALS AND CONSTRUCTION - I	2	0	1	3
C:P:A = 1.5:1:0.5		L	T	P	H
		2	0	2	4
UNIT – I INTRODUCTION					8
Functional requirements of a building and its components - drawings of foundations, plinth, superstructure, roofing. Types of structure – load bearing, framed Soils – Formation - grain size distribution – soil classification systems - Role of soil in building construction. PLATES Section of a typical wall showing the various components of building MODELS Small building models showing the various components of a building					
UNIT – II LIME					5
Lime - fat/Hydraulic Limes - Their properties and uses – Manufacturing process - Mortar, functions – requirements - mix proportions.					
UNIT – III RURAL - MATERIALS AND CONSTRUCTION					20
Mud as a building material - Detailing of walls, roofs, flooring, plastering and foundations using soils (rammed earth, compressed blocks). Bamboo, casuarinas coconut, palm, hay, coir, jute – properties - uses - fire retardant treatment termite proofing. Detailing of simple roof trusses and floors. Design and Construction Techniques using bamboo for building components for small scale buildings including detailing of doors and windows, arches, barrel walls, weave structures. Assignments, Plates & models Case studies and making models of simple structures					
UNIT – IV 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. - detailing of arches, corbels, coping, sills, lintels, corbels, arches, flooring and cladding in buildings. Plates & Assignments Case studies					
UNIT – V INTRODUCTION OF BRICKS AND CLAY PRODUCTS					7
Bricks - brief study on manufacture of bricks - properties – uses - suitability - types of bricks - uses in buildings, structural tiles, ceramics, terracotta - uses. Assignments & Site visit					
	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 and Sons, 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/granit>

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											
CO-2		1		2		3					3	
CO-3	3			2		3						
CO-4	2			2		2					3	
CO-5	2					3						
Scaled value	9	1		6		11	2				6	

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

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

Objectives:

- To introduce the basic concepts of Study Skills
- To familiarize the need for and importance of study skills
- To classify the various types of study strategies
- To illustrate the underlying scientific factors behind the study skills
- To differentiate between study skills and intelligence

Expected outcome		Domain	Level
CO1	Knowledge on the techniques and strategies of studies	Cognitive	Understand
CO2	Ability to make use of them in every day studies.	Cognitive	Understand
CO3	Understand the effectiveness of study skills in learning	Cognitive	Understand
CO4	Learn to apply different strategies in learning a subject/s	Cognitive	Understand
CO5	Start using the physical study skills based on body orientation	Affective	Analyze

SUBCODE	SUB NAME	L	T	P	C
XAR 106	STUDY SKILLS	1	0	1	3
C:P:A =3:0:0		L	T	P	H
		1	0	2	3

UNIT - I**9**

Introduction to study skills; Learning Skills and Strategies of Learning; Cognitive Study skills and physical study skills; Library skills (How to use Library), familiarization of library facilities by the librarian; familiarization of basic cataloguing techniques, how to ransack the library etc

UNIT – II**9**

Reference Skills, how to use the library facilities for research and to write assignments; how to find out reference books, articles, journals and other e- learning materials; how to use a dictionary and thesaurus

UNIT – III**9**

Reading related study skills, Process of reading, various types of reading materials and varied reading techniques; familiarization to materials written by various authors; features of scientific writing and familiarization to scientific writing by renowned authors; note making skills

UNIT – IV**9**

Writing related study skills; process of writing, characteristics of writing, discourse analysis, use of visual aids, and note making and note taking skills

Writing related study skills; process of writing, characteristics of writing, discourse analysis, use of visual aids, and note making and note taking skills

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	10	5	45

TEXT

1. Strengthen Your Writing by V.R. Narayanaswamy (Orient Longman)
2. **A course in written English: by Ghosh, R N; Inthira, S R [Author]; Moody, K [Author].1978**
3. Writing With A Purpose, Jaya Sasikumar, Champa Tickoo,
Published by Oxford University Press / Paper Back / Language - English
Freeman, Sarah: Study Strategies. New Delhi: Oxford University Press, 1979. 13.
4. Reading for Meaning, Paul Gunashekar M.L. Tickoo, Published by S. Chand & Company Ltd. Sultan Chand & Company

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	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO2	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO3	1	0	0	0	0	0	1	0	1	0	0	0	0	0
CO4	2	0	0	0	0	0	1	0	1	0	0	0	0	0
CO5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7	0	0	0	0	0	6	0	4	0	0	0	0	0
Scale d Valu e	2	0	0	0	0	0	2	0	1	0	0	0	0	0
	1	0	0	0	0	0	1	0	1	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

Course Objectives:

1. To educate the students to handle basic design elements and principles in design.
2. To educate students the universal design principles used in many design fields like product design, fashion technology, graphic design etc. and identify and apply the principles that will be used in architecture.
3. To provide practical understanding of design principles using studio exercises.
4. To gain art appreciation skills through visual arts

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	Understand the basic design elements and principles	Cognitive	Understand
CO2	Exposure to Gestalt principles	Cognitive	Knowledge
CO3	Study of universal design principles used in various fields	Cognitive	Knowledge
CO4	Identify common design principles applicable to architecture	Cognitive	Application
CO5	Develop the skills of art appreciation and sense of aesthetics by studying, correlating the basic design principles and works of master architects.	Affective	Analyze
CO6	Involve in practical exercises to apply the learnt design principles.	Cognitive	Application
CO7	Developing the skills of expressing the ideas visually through sketching, renderings using different media.	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 107	BASIC DESIGN AND VISUAL ARTS	0	0	7	7
C:P:A =2:1.5:1.5		L	T	P	H
		0	0	14	14

UNIT – I HISTORY OF ARTS**5**

Brief historical review of development of fine arts (visual and performing arts and Interdependency of visual arts, architecture, painting and sculpture

UNIT – II	INTRODUCTION TO DESIGN	40
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Definition of design - Design Thinking - Design Process - Design problems and solutions. Introduction to basic elements of design—point, line, plane, form

UNIT – III	PRINCIPLES OF VISUAL COMPOSITIONS	40
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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

UNIT –I	VVISUAL PROPERTIES OF FORM	35
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Study of Visual Properties of 2-Dimensional forms both geometrical and non-geometrical surfaces and visual textures, optical illusion etc.

UNIT – V	FREE HAND DRAWING	40
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Free hand line sketching and drawing of natural and manmade. Study of shades and shadows. Sketching of Historic or new built up structures of Architectural importance using different mediums.

UNIT – VI	STUDY OF COLOURS	20
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Study of classification of colours with different hues, values, and shades. Colour wheel and colour composition, properties of colour

UNIT –VII	ARCHITECTURAL RENDERING	30
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Rendering techniques for architectural drawings; building perspectives – interiors and exteriors, building plans and site plans articulating features such as landscape, furniture human figures etc., Various mediums in Black and white ; pencils, sketch pens, charcoal, pen and ink colour, colour pencils, sketch pens, pastels, water colour, poster colour, oils.

Sessional Work -plates, Sketches and Models to understand basic design principles, elements and their expressive qualities. Creative Exercises of 2d to 3d composition, Exercise related to positive and negative spaces, Product design.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	210	210

TEXT

1. Maitland Graves – The Art of Colour and Design McGraw-Hill Book company Inc. 1951
Albert O.Halse, Architectural Rendering.
2. A techniques of contemporary – presentation McGraw HillBook Company, New York, 1972.
3. Mulick Milind, Water colour, Jyotsna Prakasan, Mumbai 2002.
4. Farey; A. Cyril, Architectural Drawing perspective and Rendering – A Hand book for students

and draftsmen

5. John W.Mills - The Technique of Sculpture, B.T.Batsford Limited, New York - Reinhold Publishing Corporation, London, 1966. Elda Fezei, Henny Moore, Hamlyn, London, New York, Sydney, Toronto, 1972.
6. 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, Bedfordbury, 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://infinet.net> – elements of design
2. <http://www.okino.com> - design, visualization, rendering system
3. <http://www.interface-signage.com>
4. <http://www.designcommunity.com> – arch rendering, 3D design

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
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
Relation.

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

Course Objectives:

1. To make the students to practice in applying their knowledge of mathematics, science, and engineering and to expand this knowledge in to the vast area of Applied Mechanics.
2. To enable students to understand the effect of action of forces on a body and the concept of equilibrium of the body through exercises.
3. 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.
4. 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.
5. 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	Work comfortably with basic engineering mechanics concepts required for analyzing static structures. To calculate resultant of parallel forces	Cognitive	Understand
CO2	Apply the basic principles of structural mechanics in analysis of simple structural members and concepts of action of forces on a body	Cognitive	Application
CO3	Practice the problems Free body Diagram & principle of equilibrium	Affective	Analyze
CO4	Identify and model 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	Knowledge Understand
CO5	Analyze any type of determinate trusses with different end conditions. Solve the problems by method of joints and method of sections	Cognitive	Application
CO6	Understanding radius of gyration - Theorem of perpendicular axis - Theorem of parallel axis and derive the relation between	Affective	Analyze

	elastic constants		Knowledge
CO7	Express the concept of section modules and drive the relations for centroid and Center of Gravity and generate an ability to apply the knowledge of stress state in the design of structural elements.	Cognitive	Understand Skill development

SUBCODE	SUB NAME	L	T	P	C
XAR 201	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
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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
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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
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Introduction to Determinate plane trusses - Analysis of simply supported and cantilevered trusses by method of joints and method of sections.

UNIT – IV	PROPERTIES OF SECTION	10
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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
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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.Ramamrutham, 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
CO5	2	0	0	3	0	0	0	0	0	0	0	0
Total	8	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.

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

SUBCODE	SUB NAME	L	T	P	C
XAR 202	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					4
The medieval ages – Monastic establishments and learning in the monasteries - evolution of the guilds, Factors influencing new architectural styles. Architecture of Pre-Romanesque period in Europe					
UNIT – II ROMANESQUE					8
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 – III GOTHIC					8
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 – IV RENAISSANCE				8
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 – V RENAISSANCE ARCHITECTS				11
Study of life history, philosophy and contributions of the Renaissance architects in Europe.				
<p>Italy - Brunelleschi, Donatello, Raphael, Michelangelo and Andrea Palladio</p> <p>England - Sir Christopher Wren, Inigo Jones and John Webber</p> <p>France - Pierre Lescot, Philibert de l'Orme, and Jean Bullant</p>				
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	30	0	0	30
TEXT				
Sir Bannister Fletcher, A History of Architecture, University of London, The Antholone Press, 1986.				
REFERENCES				
<ol style="list-style-type: none"> 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				
<p>http://www.clr.toronto.edu - virtual lib.</p> <p>http://www.lib.virginia.edu/ - Renaissance and baroque</p> <p>http://2.siis.umich.edu/ - Image browser</p>				

Table-1 Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	2	0	1	0	0	0	0	0	0	1	0	0
CO2	2	0	1	0	0	0	0	0	0	1	0	0
CO3	2	0	1	0	0	0	0	0	0	1	0	0
CO4	2	0	1	0	0	0	0	0	0	1	0	0
Total	8	0	4	0	0	0	0	0	0	4	0	0
Scaled Value	2	0	1	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- 203 - THEORY OF ARCHITECTURE II**3 – 0 – 0 – 3****Preamble**

This course provides basic knowledge on spatial organization of built environment and enhances the skill set to be creative towards Architectural Design.

Course Objectives:

1. Students will be able to understand the spatial organization which is fundamental to any architectural design
2. To understand the various parameters involved in the design of forms and spaces.
3. Learn the elements of two dimensional and three dimensional compositions.
4. Equip the students to design a space considering the functional and emotional requirements.
5. Prepare the students to handle the design of built environment with the simple and complex spatial configurations.

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	Understanding the spatial relationship & organization through examples from master architects work.	Cognitive	Understand
CO2	Understanding the various types of articulation of forms through case study examples.	Cognitive	Understand
CO3	Students will be able to Understand the role of approach and circulation in design through case study examples. and	Cognitive	Understand

identify the different approaches and able to apply the same in their design.

CO4	Understand the Various techniques for Composition of forms and spaces.	Cognitive	Understand
CO5	Understanding the visual and emotional impact of color at spatial level and human level.	Cognitive	Understand

SUBCODE	SUB NAME	L	T	P	C
XAR 203	THEORY OF ARCHITECTURE II	3	0	0	3
C:P:A =3:0:0		L	T	P	H
		3	0	0	3
UNIT – I ORGANISATION OF FORMS & SPACES					10
a)Spatial Relationships: i) Space within space, ii) Interlocking spaces,iii) Adjacent spaces, iv) Space linked by a common space. b)Spatial Organization: influencing factors and their types i) Centralized, ii)Linear, iii) Radial, iv) Clustered, v) GridWorks of contemporary architects and their ideologies and philosophies using the forms and space – F.L.Wright, Le Corbusier					
UNIT – II ARTICULATION					8
Articulation of Form. Types: i) Edges and corners, ii) Surfaces articulation Works of contemporary architects and their ideologies and philosophies using the forms and space – Louis Sullivan, Philip Johnson					
UNIT – III CIRCULATION					10
Function of building circulation components of building circulation - The building approach, The building entrance, configuration of the path, path space relationship, form of circulation space with examples. Simple circulation diagram for buildings. Examples - Circulation as a component in the works of modern and post modern architects – Louis Khan, Charles Correa, and Michael Graves					
UNIT – IV PRINCIPLES OF COMPOSITION					10
Unity, harmony and specific qualities of design to include dominance, punctuating effect, dramatic effect, fluidity, climax, accentuation and contrast with building examples					
UNIT – V APPLICATION OF COLOUR IN ARCHITECTURE					7

Effect of colour in Architecture - Colour symbolism				
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	45	0	0	45
TEXT				
1. Paul Alan Johnson - The Theory of Architecture - Concepts and Themes - Van Vostrand Reinhold Co -1994.				
2. Francis D.K.Ching, Architecture - Form, Space and Order, Van Nostrand Publications, New York, 1979.				
3.V.S. Pramar, Design Fundamental in Architecture - Somaiya Publications Pvt. Ltd. New Delhi, 1973.				
REFERENCES				
Ernest Burden - Elements of Architectural Design - A visual resource, VanNostrand Reinhold, 1994.				
2. Sir Bannister Fletcher - A History of Architecture, Butterworths, London, 1987				

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	2	1			1							
CO2	2	1			1							
CO3	2	1			1							
CO4	2	1			1							
CO5	1	1			1							
Total	9	5			5							
Scaled Value	2	1			1							

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

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

Preamble:

This course provides the skill on basic visualization of complex objects, buildings and represent them in the form of drawings to scale.

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

CO1	Identify standard drawing conventions and representations in construction drawings.	Cognitive	Understand
CO2	Appropriate usage of various drafting tools in the process of preparing construction drawings.	Cognitive	Knowledge
CO3	Measure and prepare scaled measured drawings of various objects and existing buildings/ structures.	Cognitive	Application
CO4	Identify the different types of perspectives in practice.	Cognitive	Understand
CO5	Prepare Two-point perspective views of objects, interior and exterior of buildings from given plans and elevations.	Psychomotor	Application
CO6	Prepare One-point perspective views of objects and interior of buildings from given plan and elevations.	Psychomotor	Application
CO7	Study the formation of shade and shadows of basic geometric shapes, forms and buildings.	Affective	Analyze
CO8	Draft the shade and shadows of basic geometric shapes, forms and buildings.	Psychomotor	Application
CO9	To apply graphic principles in preparing construction drawings for complicated buildings.	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 204	ARCHITECTURAL GRAPHICS – II	1	0	2	3
C:P:A = 0.6:1.2:0.6		L	T	P	H
		1	0	4	5
UNIT - I MEASURED DRAWING					20
Principle of basic architectural drafting - line value lettering basic, multi view projections and sections - presentation formats. Measured drawing of simple objects (like furniture, entrance gates, etc.) and building components (like columns, cornice, door, window, etc.)Detailed measured drawing/documentation of historic and architectural monument or building.					
UNIT - II PERSPECTIVE					25
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					
UNIT - III SCIOGRAPHY					15
Principles of shades and shadows - Shadows of lines and circles - Shadows of architectural elements, etc. - Shadows of circular solids - Shadows on buildings, etc.					
	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
	15	0	45	60	
TEXT					
1. Robert. W.Gill – Advanced perspective and Sciography Thames and Hudson London 1974					
2. Claude Batley – Indian Architecture Taraporevale sons & co. Bombay.					
REFERENCES					
I. Measured Drawing					
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.					
II. Perspective					
1. John M.Holmes, Applied Perspective, Sir Isaac, Piotman and Sons Ltd., London 1954.					
2. Robert W.Gill, Basic Perspective, Thames and Hudson, London, 1974. Interiors: Perspective in Architectural Design Graphic - SMA Publishing Co. Ltd., Japan, 1967.					

II. Sciography

1. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1964.
2. Francis Ching, Architectural Graphics, Van Nostrand and Reinhold Company, New York, 1975.
3. Ernest Norling, Perspective drawing, Walter Foster Art Books, California, 1986.
4. Bernard Alkins - 147, Architectural Rendering, Walter Foster Art Books, 1986.
5. Rober W.Gill, Advanced Perspective, Thames and Hudson, London, 1974.

WEBSITES:

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

Table 1: Mapping of COs with Pos

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	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.

Preamble:

This course is devised to make students understand some basic materials of construction such as brick, clay products and timber and its various market forms.

Course Objectives:

1. To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as brick and other clay products.
2. To inform the properties and characteristics of timber, its conversion, preservation and uses.
3. To inform of the various market forms of timber, their production, properties and application in the building industry.
4. To understand both in general and in detail the methods of construction by using basic materials such as brick; clay products and natural timber for both structural and nonstructural components.
5. To understand both in general and in detail the methods of construction by using man-made timber products such as ply wood.

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	Understand the basic ingredients of brick, tiles, terracotta, their manufacturing process, properties and methods of construction, tests and identify the suitability, types, shapes and the uses of bricks.	Cognitive	Understand Knowledge
CO2	Draw the bonding, building components and structural elements for varying conditions using bricks and clay products.	Psychomotor	Application
CO3	Describe the properties, methods of conversion, seasoning, treatment, causes of decay and preservation of timber,	Cognitive	Knowledge
CO4	Differentiate the various types of timber and identify the defects and explain the manufacturing process and uses of industrial timbers.	Cognitive	Knowledge
CO5	Understanding the basics of timber and draw the details of timber or various elements of building including the partitions, staircases, roof trusses, furniture, etc.	Cognitive	Understand /Application
CO6	Need and methods of cost effective building technologies and drafting the construction techniques.	Cognitive	Understand /Application

SUBCODE	SUB NAME	L	T	P	C
XAR 205	MATERIALS AND CONSTRUCTION - II	2	0	3	4
C:P:A=0.6:2:1.4		L	T	P	H
		2	0	3	5
UNIT – I INTRODUCTION TO BRICKS AND CLAY PRODUCTS					5
Bricks - brief study on manufacture of bricks - properties – uses - suitability - types of bricks - uses in buildings, structural tiles, ceramics, terracotta - uses. Assignments					
UNIT – II BRICKS AND CLAY PRODUCTS					15
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 – III 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 – IV 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 & Assignments					
	LECTURE	TUTORIAL		PRACTICAL	TOTAL
	15	0		60	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 inPublication 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.

OBJECTIVES:

1. To educate students with the importance of Model making for better spatial and volumetric visualisation.
2. To improve student's skills on working with three dimensional forms and enhancing their creativity.
3. To educate the students on process and techniques, appropriate media and materials of model making for various applications like interior, exterior built forms and site models.
4. To equip the students with presentation techniques used in courses such as Architectural design and in practical training, Thesis projects.

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	Understanding various building materials and their tools used for cutting, joining and extension. Handling materials like wood, marble, steel, MS, plywood, POP, Aluminum etc.	Cognitive	Understand
CO2	Apply key qualities of space and design tools within the design project through designing, sketching, model-making and graphic composition	Cognitive	Application
CO3	Know and apply formal systems of two-dimensional composition, using the basic principles and elements of design.	Cognitive	Application
CO4	Understanding 3 - dimensional perception of spaces and making models using various materials	Affective	Analyze
CO5	Design and model making like bus stop, match stick model, wire models	Psychomotor	Application
CO6	Understanding components of buildings (interior of a room, landscape elements etc.) and making models	Psychomotor	Application
CO7	Identify the process of site planning and making block model for small campuses and countered site.	Cognitive	Understand

STAGE I**30**

Techniques and principles of model making and sculpturing for effective 3 dimensional perception and communication, using various materials. Study models/ conceptual models; perception and demonstration of form, depth, texture, and organization using clay, terracotta, thermacol, plaster-of-paris, papers, boards, metal wire, soft wood. acrylic.

Exercises:

- Sculptural form using planes and explore various structural supports

- Design and model making like bus stop, match stick model, wire models and so on.
- Design and model furniture.

STAGE II

30

- Contour model
- Interior of a room
- Detailed model of a small building like branch bank, small residences.
- Multistory building
- Block models of small campuses using wood, thermacol, mount board, soap, cork board, etc. including landscape details.
- Elementary models which are functional and useful in day to day life

REFERENCES:

TOTAL: 60

1. Arundell (Jan), Exploring Sculpture, Mills and Boon, London/Charles T.Branford Company, USA, 1972.
2. John W.Mills, The Technique of Sculpture, B.T.Batsford Ltd., New YorkReinhold Publishing Corpn., London, 1966.

WEBSITES:

1. www.designbasics.com/-(on house type – Americans)
2. <http://www.geosystems.gatech.edu/> - (on detail design method)
3. <http://www.c.s.berkeley.edu/> - (on bubble diagram builder with interaction)
4. <http://www.plannet.com/resources.htm> - (on resource info)

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3				1							
CO2	3				1							
CO3	3				1							
CO4	3				1							
CO5	3				1							
Total	15				05							
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.

Preamble

This course provides a fundamental design knowledge for Architectural design for entire course duration and beyond.

Course Objectives:

1. To educate the students about basic anthropometrics and ergonomics involved in various human activities.
2. To educate students about spatial requirements for activities as well as furniture's in individual spaces like living room, bedroom, kitchen etc.
3. To apply the basic design principles in small scale built forms.
4. To develop skills such as presentation drawings, rendering, visualize and express ideas through scale models.

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	Understand the space required for various human activities	Cognitive	Understand
CO2	Understand the furniture required for various spaces and activities	Cognitive	Knowledge
CO3	Case study of individual spaces for analyzing arrangement of furniture and types of circulation.	Affective	Analyze
CO4	Design spaces like living room, bedroom and kitchen for applying the knowledge gained in case studies.	Cognitive	Application
CO5	Involve in design of small built forms with structural, utility, aesthetics and material considerations.	Cognitive	Application
CO6	Involve in producing neat presentation drawings using various media like pencil color, water and poster colours, crayons etc.	Psychomotor	Application
CO7	Prepare scale models of studio exercises using sheets, boards, wood etc.	Psychomotor	Application

STAGE I**195**

In this term sessional work should be related to preparation of actual measured drawings at selected locations rural in nature and further elaborated with notes on form, functions utility, method of construction etc. This exercise shall be followed by a design problem by studying the anthropometric details and to understand the function of a single space unit such as

1. Living area, bed room, stalls, booths, bus-stops etc.
2. Shop, Workshop, pavilions, snack bar, cafeteria.

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

TEXT BOOKS:

TOTAL: 195

1. De. Chiara and Callender, Time-saver Standards for Building Types, McGraw-Hill Co., New York, 1973.

REFERENCES:

1. E and O.E. Planning, Liffle Books Ltd., London, 1973.
2. Leach, Techniques of Interior Design Rendering and presentation, McGraw-Hill Co., New York, 1973.

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	1	-	3	2	1	3	2	1	1	1	-	-
CO-2	1	2	3	-	-	-	-	-	-	-	-	-
CO-3	-	-	3	3	2	-	-	2	2	2	2	-
CO-4	3	3	-	2	2	2	3	3	2	2	2	-
CO-5	3	3	-	2	2	2	2	3	2	2	-	-
Total	8	8	9	9	7	7	7	8	7	7	6	-
Scaled to 0,1,2,3 scale	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.

Course objectives: The students will be able to understand the basic concepts of shear force and bending moment acting on beams subjected to various loading conditions through exercises.

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 inter determinate structure and its analysis.
5. Case studies and models wherever feasible.

Course Outcome		Domain	Level
CO1	<i>Identify</i> 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	<i>Apply</i> the concepts for finding the shear forces and moments for various structural members.	Affective	Apply
CO3	<i>Apply</i> the concepts for finding the shear forces and moments for various structural members.	Psychomotor	Evaluate
CO4	<i>Analyze</i> the long and short columns and determine the design loads.	Cognitive	Apply
CO5	<i>Analyze</i> indeterminate beams like continuous beams and fixed beams	Cognitive	Apply
CO6	<i>Analyze</i> and solve the problems in practical installations of the structural members	Cognitive	Apply

SUBCODE	SUB NAME	L	T	P	C
XAR 301	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 – II 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				

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	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 to 0,1,2,3 scale	0	3	0	3	3	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 302- HISTORY OF ARCHITECTURE-III

2 – 0 – 0 – 2

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
CO1	<i>Understand</i> the origin of various civilization and Architecture in India at different points of time.	Cognitive	Understand
CO2	<i>Understanding</i> the architectural responses with respect to materials, technology, style and character in the Buddhist, Hindu and Dravidian Architecture	Cognitive	Understand

CO3	Understand the emergence of Islamic Architecture, form and function of different structures and the underlying geometry and concepts of decoration and color.	Cognitive	Understand
CO4	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 302	HISTORY OF ARCHITECTURE-III	2	0	0	2
C:P:A =2:0:0		L	T	P	H
		2	0	0	2
UNIT – I ANCIENT INDIA AND BUDDHIST ARCHITECTURE					5
Indus Valley Civilization - Culture and pattern of settlement. Aryan culture -Vedic village and the rudimentary forms of bamboo and Wooden construction under the Mauryan rule. Buddhist Architecture: Hinayana and Mahayana Buddhism - Architectural Production during Ashoka's rule - Ashokan Pillar. Salient features of a Chaitya hall and Vihara- Karli , Rani gumba					
UNIT – II HINDU ARCHITECTURE					5
Hindu Architecture - Evolution of Hindu temple - Early shrines of the Gupta and Chalukyan periods – Tigawa temple, Lath Khori, Aihole, Papanatha and Virupaksha temples, Pattadakal.					
UNIT – III DRAVIDIAN ARCHITECTURE AND INDO ARYAN STYLE					7
Dravidian Architecture -Rock cut productions under Pallavas –Shore temple, Mahabalipuram - Dravidian Order – Brihadeeswara Temple, Tanjore - Meenakshi temple, Madurai. Indo Aryan- Salient features of an Indo Aryan temple - Lingaraja Temple- Bhuvaneshwar , Sun temple-Konark. Kunds and Vavs – vav - Adalaj - Surya kund, Modhera.					
UNIT – IV INTRODUCTION TO INDO ISLAMIC ARCHITECTURE					5
Indo Islamic Architecture- Advent of Islam into the Indian subcontinent and its impact - Factors Influencing Islamic Architecture - Evolution of building types in terms of forms and functions - the Mosque, the Tomb, and Minaret, the Madrasa, the Caravanserai. Elements and character of Islamic architecture in terms of structure, materials and methods of construction. Elements of decoration, color, geometry, light.					
UNIT – V STYLES OF ISLAMIC ARCHITECTURE					8
Imperial style - Development of Imperial style, Examples– Qutb Minar, Alai Darwaza, square and					

octagonal tombs of sayyid and Lodi dynasty

Provincial styles - Development of the provincial styles Examples: Jaunpur- Atala masjid, Bengal- Adina masjid, Ahmedabad - Tin darwaza. Bijapur – Gol Gumbaz,

Mughal style - Development of the Mughal style, Examples- Humayun tomb, Agra fort, Fatehpur sikri, Delhi fort, Jami Masjid Delhi, Taj Mahal and Development of the Mughal gardens.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	30	0	0	30

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. Christopher Tadgell, “The History of Architecture in India from the Dawn of civilization to the End of the Raj”, Longman 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.

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				2	3	3
CO-2			3	3		3						
CO-3			3	3		3						
CO-4	2			3		3						
	4		6	12		12				2	3	3

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
Original	4	0	6	12	0	12	0	0	0	0	3	3
Scaled to 0,1,2,3 scale	1	0	2	3	0	3	0	0	0	0	1	1

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

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

Course Objectives:

1. Students will be able to understand the fundamentals of climate and types of parameters.
2. To understand the various parameters involved in the design of shading elements.
3. To understand various building materials and its thermal performance.
4. To inform about the air pattern around buildings and the effect of wind on design and sitting of Buildings.
5. Prepare the students to handle the design of built environment with climate conscious approach.

Course Outcome		Domain	Level
CO1	<i>Understand</i> climatic types and design approaches	Cognitive	Understand
CO2	<i>Analyze</i> design types of shading devices	Affective	Analyze
CO3	<i>Understand</i> thermal performance of various building materials	Affective	Understand
CO4	Able to <i>design</i> of buildings with good ventilation	Psychomotor	Create
CO5	Able to <i>design</i> of climatic conscious buildings	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 303	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 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”, Elsevier 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.

E REFERENCES

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>

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	PSO1	PSO2
CO-1				1				2				
CO-2								2				
CO-3								2			3	
CO-4	2			2		2		3			3	
CO-5	2			2		2		3			3	
	4			5		4		12			9	
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.

XAR 304- BUILDING SERVICES -I

1 – 0 – 1 – 2

Preamble:

This course is devised to make students understand in detail the Water supply, drainage, sanitation and solid waste management systems in buildings.

COURSE OUTCOMES

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	<i>Outline</i> the sources and treatment of ground water	Cognitive	Understanding
CO2	<i>Explain</i> the various water supply and drainage systems	Psychomotor	Evaluating
CO3	<i>Assess</i> the water supply requirements and sewerage generated.	Psychomotor	Evaluating
CO4	<i>Select</i> the pumps, water supply and drainage pipes.	Affective	Applying
CO5	<i>Design</i> the water supply and drainage layout of residential buildings.	Psychomotor	Creating

CO6	<i>Illustrate</i> the solid waste management concepts and systems.	Cognitive	Understanding
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SUBCODE	SUB NAME	L	T	P	C
XAR 304	BUILDING SERVICES -I	1	0	1	2
C:P:A = 0.7:1:0.3		L	T	P	H
		1	0	2	3
UNIT – I WATER QUALITY, PURIFICATION AND TREATMENT					9
Sources-Surface and ground water sources -quality/quantity - nature of impurities - treatments - water supply systems - sedimentation - water supply project. Sand filtration - sand filters - rapid sand filters - pressure filters - sterilization and disinfection.					
UNIT – II WATER DISTRIBUTION AND STORAGE					12
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. Water requirements calculation and Water storage systems, Municipal byelaws and regulations.					
UNIT – III STORM WATER DRAINAGE AND RAIN WATER HARVESTING					12
Basic principles of storm water drainage – storm water gutter – rainwater harvesting principles, rain water pipe calculation.					
Details of rain water disposal and roof drain, systems of sub soil drainage. Construction details of Sewers, inspection chambers, types of pipes and pipe size calculations.					
UNIT – IV DRAINAGE AND SANITATION					6
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.					
Waste water drainage-traps for various types and its details, trap chambers and Septic tanks.					
UNIT – V SOLID WASTE MANAGEMENT					6
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
	15	0	30	45
TEXT				
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.				
REFERENCES				
1.G.M.Fair, J.C.Geyer and D.Okun, Water and Waste Water Engineering, Vol.II, John Wiley & Sons, Inc., New York, 1968.				
2.Manual of Water supply and Treatment, Second Edition, CPHEEO, Ministry of Works and Housing, New Delhi, 1977.				
3. National Building Code 2005.				
4. Manual on Sewerage and Sewage Treatment, CPHEEO, Ministry of Works and Housing, New Delhi, 1980.				
5.S.C.Rangwala, Water Supply and Sanitary Engineering, Charotar Publishing House, Anand 388 601, 1989.				
6. Handbook for Building Engineers in Metric systems, NBC, New Delhi, 1968.				

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				
CO-3				3				3	2			
CO-4				3				3				
CO-5				3				3	2			
CO-6				3				3			2	
				18				18	6		2	
Scaled to 0,1,2,3 scale	0	0	0	3	0	0	0	3	0	0	1	0

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

Objectives:

This course is aimed at developing the students to understand the properties and construction techniques of ferrous and non ferrous building materials.

Course Outcome		Domain	Level			
CO1	<i>Identify</i> the appropriate Ferrous and Non-Ferrous materials in construction.	Cognitive	Apply			
CO2	<i>Identify</i> appropriate construction techniques using Ferrous and Non-Ferrous materials in construction	Cognitive	Apply			
CO3	<i>Assess</i> the suitable steel roof truss for different spans of industrial buildings.	Affective	Evaluate			
CO4	detailed drawings of Ferrous and Non Ferrous, Glass based building components	Psychomotor	Create			
CO5	<i>Apply</i> the property of glass towards “Energy conservation	Cognitive	Apply			
SUBCODE	SUB NAME	L	T	P	C	
XAR 305	MATERIALS AND CONSTRUCTION - III	2	0	1	3	
C:P:A = 1.2:1.2:0.6		L	T	P	H	
		2	0	2	4	
UNIT – I FERROUS METALS						5
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						20
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				25
<p>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.</p> <p>Typical Plates: Aluminium windows, doors, shop front curtain walls, structural glazing systems and aluminium composite panel cladding</p>				
UNIT – V GLASS				5
<p>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.</p> <p>Typical Plates: Showroom glass wall systems, Glass staircase, Balustrade and glass partition systems, installation details of glass.</p>				
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	15	0	45	60
TEXT				
<p>1.S.C.Rangwala, Engineering Materials, Charotar Publishing House, India,1997.</p> <p>2.W.B.Mckay Building Construction, Longmans, U.K. 1981.</p> <p>3. Fundamentals of Building Construction, John Wiley & Sons Inc, 2009.</p> <p>4. Materials for Architects and Builders, Elsevier, 2010</p>				
REFERENCES				
<p>1.B.C.Punmia, Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 1993.</p> <p>2.Arthur Lyons - Materials for Architects and Builders - An Introduction-Arnold, London,1997.</p> <p>3. Harold B.Olin, Construction Principles Materials and Methods, The Institute of Financial Education, Chicago, 1980.</p> <p>4. Time Saver Standards for Architectural Design Data, Calendar JH, McGraw-Hill, 1974.</p> <p>5.Don A. Watson, Construction Materials and processes, McGraw Hill Co., 1972.</p>				
E REFERENCES				
<p>1. http://www.britmetfed.org.uk/frmedu.html</p> <p>2. http://www.indiabussinessonline.com</p> <p>3. http://www.nrwasc.com</p> <p>4. http://www.arcadiaproducts.com</p> <p>5. http://www.sail.com.in</p>				

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	-	-	1		1					
CO-2	2	2			1		2					
CO-3	3	2		2	1	3	1					
CO-4					2						2	1
CO-5					2	3					3	1
	8	6	0	2	7	6	4	0			5	2
Scaled to 0,1,2,3 scale	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.

Objectives:

To develop presentation skills, visual expression and representation, imaginative thinking and creativity through a hands on working with various mediums and materials.

1. To familiarize the students with the various mediums and techniques of art through which artistic expression can be achieved
2. To familiarize students with the grammar of art by involving them in a series of free hand exercises both indoor and outdoor to understand form, proportion, scale, etc
3. Involving them in a series of exercises which will help them experiment with form and volume.

Course Outcome		Domain	Level
CO1	Able to <i>handle</i> the colours for the presentation sheets.	Cognitive	Apply
CO2	<i>Mastery</i> in sketching and expression through forms.	Affective	Produce
CO3	Able to <i>express</i> their ideas through models	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 306	VISULIZATION AND REPRESENTATION	0	0	2	2
C:P:A =0.6:0.7:0.7		L	T	P	H
		0	0	4	4
UNIT – I ARCHITECTURAL RENDERING					10
Rendering with pen and ink. Presentation using Color, using different medium.					
UNIT – II FREEHAND SKETCHING					10
Observational sketching: Exercise involving Indoor and outdoor sketching – Spot sketching - Drawing from imagination – Study of 3 D effects through light and shade from nature – Tools and materials – Illustration – Study of human being and mobiles. Sketching details on site, street view, elevation, section etc. Sketching the ideas: Sketching of plans, thumbnail views, sectional views etc.					
UNIT – III MODEL MAKING					20
Conceptual model making: Exercise on solids & voids, projections of solids, etc., Small scale building model: kiosk, exhibition structure etc.					

UNIT – IV SCULPTURE				20
Introduction of sculpture –Sculpture using various materials such as clay, plaster of Paris, paper mache, metal, ceramics and wire.				
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	0	0	60	60
TEXT				
<div>1. Webb, Frank, “The Artist guide to Composition”, David & Charles, U.K., 1994.</div> <div>2. Ching Francis, “Drawing a Creative Process”, Van Nostrand Reinhold, New York, 1990.</div> <div>3. Alan Swann, “Graphic Design School”, Harper Collins, 1991.</div>				
REFERENCES				
<div>1. Moivahuntly, “The artist drawing book”, David & Charles, U.K., 1994.</div> <div>2. Arundell (Jan) Exploring sculpture, Mills and Boon, London/Charles, T. Brand Ford Company, U.S.A.</div> <div>3. The art of drawing trees, heads, colours, mixing, drawing, landscape and painting, water colour, oil colour, etc. – The Grumbacher Library Books, New York, 1996.</div> <div>4. Caldwell peter, “Pen and Ink Sketching”, B.T. Bats ford Ltd., London, 1995.</div>				

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		
				9	9					6		
Scaled to 0,1,2,3 scale				2	2					2		

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

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

Objectives:

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

1. To understand the relationship between form and spaces and the importance of aesthetics.
2. To develop skills to study, analyse and design solutions
3. To develop skills such as presentation drawings, rendering, visualize and express ideas through scale models.

Course Outcome:		Domain	Level
CO1	To 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	Design of spaces with functional, aesthetics and material considerations by applying the knowledge gained in case studies.	Psychomotor	Create
CO5	Producing neat presentation 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	6
C:P:A = 2.8:2.8:1.4		L	T	P	H
		0	0	12	12
CONTENT					210
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	210	210

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. Achyut Kanvinde, "Campus design in India", American year Book, 1969
4. Kevin Lynch, "Site planning", MIT Press, Cambridge, 1967
5. Sam F. Miller, "Design Process: A Primer for Architectural and Interior Design", Van Nostrand Reinhold, 1995.
6. Neufert Architect's Data, Rudolph Herg, Crosby Lockwood and Sons Ltd., 1970.

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		
	12	9	7	3	9			9		9	12	
Scaled to 0,1,2,3 scale	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- DESIGN OF STRUCTURES -I

3 – 0 – 0 – 3

OBJECTIVES:

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

Course Outcome:		Domain	Level
CO1	<i>Illustrate</i> masonry walls for axial loads and RCC walls.	Cognitive	Understand
CO2	<i>Apply</i> relevant IS Code provisions to ensure safety and serviceability of structural elements	Affective	Apply
CO3	<i>Identify</i> and compute the main mechanical properties of concrete and steel and structural behavior of RCC members	Affective	Apply

CO4	Design different types of foundations for axially short and long columns	Psychomotor	Create
CO5	Design reinforced concrete slabs and beams by WSM and LSM for flexure	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR401	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 CONCRETE WALLS & COLUMNS					9
Design of concrete walls – Design of cantilever – Cantilever retaining walls – Shear wall. Classification of walls, Effective height of walls and Columns, effective length of walls, Design Loads, Load dispersion, Permissible stresses – Design of axially loaded brick walls and columns.					
UNIT – II PROPERTIES OF CONCRETE & WORKING STRESS DESIGN METHOD					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 – III LIMIT STATE DESIGN – INTRODUCTION & DESIGN OF BEAMS					9
Introduction to the Limit state method – partial safety factor – Design of rectangular and Flanged beams for bending and shear					
UNIT – IV LIMIT STATE DESIGN OF SLAB					9
Limit state design of slab – Design of one way slab – Two way slab using IS Code coefficients for various edge conditions.					
Design of continuous slab and beam by limit state method using IS code coefficients – Design of Flat slabs, Coffer slab, circular slab – simply supported and fixed with uniformly distributed load.Design Dog legged staircase.					
UNIT – V DESIGN OF COLUMNS & FOUNDATIONS					9
Design of axially short and long columns for different types of foundations.					
	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
	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, Preufice 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	PSO1	PSO2
CO-1		3					3	2		2		
CO-2							3	2		2		
CO-3							3	2		2		
CO-4							3	2		2		
CO-5							3	2		2		
		3					15	10		10		
Scaled to 0,1,2,3 scale	0	1	0	0	0	0	3	2	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.

Course Objectives:

To understand the spatial organization and architectural design aspects of master architects works.

COURSE CODE	XAR402	L	T	P	C
COURSE NAME	EARLY MODERN ARCHITECTURE	3	0	0	3
PREREQUISITES	NIL	L	T	P	H
C:P:A	3: 0:0	3	0	0	3
Course Outcome		Domain	Level		
On the successful completion of the course, students will be able to					
CO1	<i>Differentiate</i> the chronological development of architectural style in relation with the material development and cultural change.	Cognitive	Analyzing		
CO2	<i>Interpret</i> the spatial configuration and three dimensional articulation of master architects works.	Cognitive	Applying		
CO3	<i>Examine</i> the contextual design solution, Spatial organization and spatial qualities of different typologies of buildings.	Cognitive	Analyzing		
CO4	<i>Develop</i> the knowledge towards logical design development.	Cognitive	Creating		
UNIT – I LEADING TO A NEW ARCHITECTURE					5
Chronological Development leading to the Neoclassicism. Introduction to Neo-Classicism works of Enlightenment Architects: Boulle and Ledoux.					
UNIT – II BEGINING OF A NEW ERA					13
Industrial Revolution and its impact - Materials and Technologies: History of Steel, Concrete, and Glass -Architecture and Industrial Exhibitions. Important buildings made out of glass, steel and concrete and their architectural significance. Chicago school of art. Arts and Crafts Movement in Europe and America - Art Nouveau and the works of Gaudi, Horta, Macintosh- Early works of F.L.Wright., le Corbusier					
UNIT – III DEVELOPMENT OF MODERN ARCHITECTURE					9
Adolf Loos and the Arguments on Ornamentation - Futurists Movement Manifestos and the works of Sant'Elia - Expressionism and the works of Mendelson, Taut, Polzeig - Cubism and Constructivism					

and its influence on Architecture - Destijl: Ideas and works. Werkbund and Bahaus.

UNIT – IV LATER DEVELOPMENT OF MODERN ARCHITECTURE

12

Growth of International Style Ideas and works of Behrens Gropius, Le Corbusier, Wright, works of Alvar Aalto, Mies, Later works of Corbusier: Brasilia, Unite- Works of later modernists: Louis Kahn, Paul Rudolph, Eero Saarinen

UNIT – V INTERNATIONAL STYLE AND MODERN ARCHITECTURE

6

International Style - CIAM Congresses and Declarations.

Works and ideas of Louis Barragan, Richard Neutra. Proliferation of modern architecture in third world countries and globally

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	45	0	0	45

TEXT BOOKS

1. Bill Risebero, Modern Architecture and Design.
2. 2. 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, 1980.
3. 3. Sigfried Giedion, Space Time and Architecture: The Growth of a New Tradition, Harvard University Press, 1978.

Table-1 Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3	1										
CO2	3	3	3									
CO3	3	2	2									
CO4	3	3	3									
Total	12	9	8									
Scaled Value	3	2	2									
Scaled to 0,1,2,3 scale	3	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

OBJECTIVE

To understand the ecosystem and the impact of human activities on the same.

COURSE CODE	COURSE NAME	L	T	P	C
XAR403	ENVIRONMENTAL SCIENCE	2	0	0	2
PREREQUISITE	Nil	L	T	P	H
C:P:A	2.5: 0 : 0.5	2	0	0	2
UNIT - 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 - IIECOSYSTEMS 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 – IIIENVIRONMENTAL 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 –IVSOCIAL 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	TOTAL
	45	0	45

TEXT BOOKS

1. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co, USA, 2000.
2. Townsend C., Harper J and Michael Begon, Essentials of Ecology, Blackwell Science, UK, 2003
3. Trivedi R.K and P.K.Goel, Introduction to Air pollution, Techno Science Publications, 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.

REFERENCE BOOKS

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.
6. G.K.Ghosh, Disaster Management, A.P.H.Publishers, New Delhi, 2006.

E RESOURCES

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>

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								
CO-2				3								
CO-3				3			2					
CO-4				3			2					
CO-5				3							3	
				15			4				3	
Scaled to 0,1,2,3 scale	0	0	0	3	0	0	1	0	0	0	1	0

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

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

Course Objectives:

1. This course is devised to make students understand in detail the Electrical systems and selection of lighting fixtures,

COUSE CODE	XAR 404	L	T	P	C
COUSE NAME	BUILDING SERVICES -II	1	0	1	2
PREREQUISITES	NIL	L	T	P	H
C:P:A	C:P:A = 1.2:0.8:0	1	0	2	3
COURSE OUTCOMES		DOMAIN		LEVEL	
CO1	<i>Illustrate</i> the basics of electricity and wiring system	Cognitive		Understanding	
CO2	<i>Outline</i> the fundamentals of lighting and lighting design	Cognitive		Understanding	
CO3	<i>Determine</i> the lighting level for various building types	Psychomotor		Evaluating	
CO4	<i>Decide</i> the lighting types based on their application	Psychomotor		Evaluating	
CO5	<i>Outline</i> energy efficient lighting design solutions	Cognitive		Understanding	
UNIT – I ELECTRICAL AND ELECTRONIC SYSTEMS: ELECTRICAL WIRING SYSTEMS					9
Laws of electrical circuits: Ohms and Kichoffs Laws Basics of electricity – Single/Three phase supply. Earthing for safety – types of earthing - ISI specifications Electrical wiring systems in domestic and commercial buildings. Conduits, Types of wiring Diagram for connection. Bus way, Bus Bars, lighting track and conduits (Aluminum metallic, non metallic) arrangements. Power handling, equipment, switch board, panel boards. Lighting conductors: Purpose, materials, fixing, earthing arrangements Electronic and Communication systems. Communication and data systems- communication spaces, pathways, cabling systems, voice and data, communication, Electronic security systems, computer labs/server, Rooms etc. Electrical Installations in Buildings. Main and distribution boards – transformers – switch gears– substations – space requirement and Layout of the same in building types.					
UNIT – II FUNDAMENTALS OF LIGHTING					6

Principles of light – Electromagnetic radiation, waves, nature of vision, measurement of lighting.				
Principles of illumination: definitions, Visual tasks, Factors affecting visual tasks Units of light, definitions of flux, solid angle, luminous intensity –utilization factor – depreciation factor- MSCP –MHCP, brightness, glare.				
UNIT – III ILLUMINATION AND LIGHTING				12
Electric light sources: brief description, characteristics and application of different types of lamps, methods of mounting and lighting control Luminaries classification/ - Lumen method for design – Room reflectance/ Glare – manufacturer’s data on luminaries / luminaries cost.				
UNIT – IV LIGHTING DESIGN: INSTALLATION AND APPLICATION IN BUILDINGS				12
Artificial light sources, spectral energy distribution, Luminous efficiency- color temperature – color rendering, Additive, subtractive color and their application areas and outdoor lighting Lighting for Office, Schools, Libraries, Residential, Hospital, Parking, Outdoor. Elementary ideas of special features required and minimum level of illumination for the physically handicapped and elderly in building types.				
Natural lighting-fundamentals, geometry of fenestration.				
UNIT – V ENERGY EFFICIENT LIGHTING				6
Solar energy systems for lighting – Photovoltaic systems for Residential/Commercial buildings. Reducing electric loads, installation and maintenance – LEED certification & energy efficient lighting, Lighting controls, Solar systems – Case studies and exercises involving in the above.				
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	15	0	30	45
TEXT				
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.E.P. Ambrose, “Electric Heating”, John Wiley & Sons Inc., New York, 1968.3. National Building Code 2005.				
3.Philips, “Lighting in Architectural Design”, McGraw Hill. New York, 1964.				
4. R. G. Hopkenson & J. D. Kay, “The lighting of Buildings”, Faber & Faber, London, 1969.				
REFERENCES				
1. Handbook of building Engineers in metric systems, NBO(India), 1968				
2. National Building Code of India, 2005 (NBC 2005)				

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								
CO-2				3								
CO-3				3			2					
CO-4				3			2					
CO-5				3							3	
				15			4				3	
Scaled to 0,1,2,3 scale	0	0	0	3	0	0	1	0	0	0	1	0

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

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

XAR 405 - MATERIALS AND CONSTRUCTION - IV

1 – 0 - 2 - 3

Preamble:

This course is devised to make students understand concrete and its extensive application in buildings.

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 OUTCOMES

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	<i>Explain</i> the composition, properties, and tests for	Cognitive	Understanding

	cement		
CO2	<i>Summarize</i> the ingredients, properties ,quality control of concrete and its construction process	Cognitive	Understanding
CO3	<i>Summarize</i> the various application of concrete in construction	Cognitive	Understanding
CO4	<i>Create</i> detailed drawings of footing, lintels, beams and slabs	Psychomotor	Creating
CO5	<i>Create</i> detailed drawings of concrete staircases.	Psychomotor	Creating

SUBCODE	SUB NAME	L	T	P	C
XAR 405	MATERIALS AND CONSTRUCTION - IV	1	0	2	3
C:P:A = 1.8:1.2:0		L	T	P	H
		1	0	4	5
UNIT – I CEMENT & CONCRETE - INGREDIENTS AND PROPERTIES					8
<p>Varieties of cement, composition, properties and uses - tests for cement - mortar for various works.</p> <p>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</p>					
UNIT – II CONCRETE CONSTRUCTION - I					18
<p>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.</p>					
UNIT – III CONCRETE CONSTRUCTION - II					8
<p>Pre cast concrete wall, cast in situ wall, pre cast building elements, pre stressed concrete and its applications. Post & Pre tension concrete.</p>					
UNIT – IV CONCRETE STAIRCASES					20
<p>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.</p>					

UNIT – V FORMWORKS & SCAFFOLDING					6
Fundamentals of formworks and scaffolding. Different types and its applications. Case studies and examples.					
	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
	30	0	30	60	
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.					

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					3	1	
CO-2				3	1					3	1	
CO-3				3	1					3	1	
CO-4				3	1					3	1	
CO-5				3	1					3	1	
				15	5					15	5	
Scaled to 0,1,2,3 scale	0	0	0	3	1	0	0	0	0	3	1	0

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

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

OBJECTIVES:

To have an understanding and application of software for design, drafting and presentations,

SUBCODE		SUB NAME	L	T	P	C
XAR 406		COMPUTER APPLICATIONS IN ARCHITECTURE	0	0	2	2
C:P:A = 0.4:1.2:0.4			L	T	P	H
			0	0	4	2
COURSE OUTCOMES			DOMAIN		LEVEL	
CO1	To <i>apply</i> software’s in the field of Architecture to represent design ideas.		Cognitive		Applying	
CO2	<i>Produce</i> 2D technical drawings using AutoCAD		Psychomotor		Manipulation	
CO3	<i>Develop</i> the 3D model of buildings & objects using AutoCAD and Sketch Up		Psychomotor		Articulation	
CO4	<i>Recreate</i> realistic image of objects and buildings by using presentation software.		Psychomotor		Manipulation	
CO5	Sheet set <i>organization</i> and plot/print drawing to the scale.		Affective		Organizing	
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 14)", BPB Publications, New Delhi, 1997. 2. Omura George, " AutoCAD 2000", BPB Publications, New Delhi, 1997 3. AutoCAD 2016 and AutoCAD LT 2016 No Experience Required: Autodesk Official Press (SYBEX) Paperback – 17 Dec 2015 by George Omura (Author), Brian C. Benton (Author)				
REFERENCES				
1. Mastering AutoCAD 2016 and AutoCAD LT 2016: Autodesk Official Press Paperback				

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	0	0	0	3	2	0	0	0	0	3	0	0
CO-2	0	0	0	3	2	0	0	0	0	2	0	0
CO-3	0	0	0	3	3	0	0	0	0	2	0	0
CO-4	0	0	0	3	3	0	0	0	0	3	0	0
CO-5	0	0	0	3	2	0	0	0	0	0	0	0
Original	0	0	0	15	12	0	0	0	0	10	0	0
Scaled value	0	0	0	3	3	1	1	0	1	2	1	1

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

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

Preamble

This course provides an Architectural design knowledge of small public buildings, study and analysis of rural settlements.

Course Objectives:

1. To develop skills to design functional and aesthetical spaces
2. To develop skills to study, analyse and 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 Through scale models.

Course Outcome:		Domain	Level
CO1	<i>Understand</i> the space and furniture's required for various human activities.	Cognitive	Knowledge
CO2	<i>Interpretation</i> of buildings for spatial arrangements and circulation.	Cognitive	understanding
CO3	<i>Design</i> of medium scale public buildings with structural, utility, aesthetics and material considerations by applying the knowledge gained in case studies.	Psychomotor	Creating
CO4	Learn the procedure of studying and analysis of rural housing and settlements and preparing design solutions.	Cognitive	Analyze & Application
CO5	<i>Involve</i> in producing neat presentation drawings using various media like pencil color, water and poster colors, crayons etc.	Psychomotor	Application
CO6	<i>Prepare</i> scale models of studio exercises using sheets, boards, wood etc.	Affective	Creating

SUBCODE	SUB NAME	L	T	P	C
XAR 407	ARCHITECTURAL DESIGN - III	0	0	6	6
C:P:A = 3:2:1		L	T	P	H
		0	0	12	12
UNIT – I 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 - preparation of design brief solutions for housing and community					

facilities.

UNIT – II DESIGN STUDIO

100

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 center, etc. The projects will consciously provide for movement and use by the physically handicapped and elderly.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	0	0	12	180

TEXT

1. .By.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. 2.P&D Act 1995.
3. Edward D.Mills, Planning - The Architects Handbook - 10th Edition, British Library Cataloguing in Publication Data, 1985.
4. ndrew Alpern, Handbook of Speciality Elements in Architecture, McGraw-Hill Book Co., 1982.
5. Neufert Architect's Data, Rudolf Herg, Crosby Lockwood and Sons Ltd., 1970.

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
	10	8	7	10	10	5	8	10	6	6	15	8
Scaled to 0,1,2,3 scale	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.

COURSE OUTCOMES

		Domain	Level
On the successful completion of the course, students will be able to			
CO1	<i>Design</i> the Pre stressed members	Psychomotor	Creating
CO2	<i>Explain</i> the design concepts of Shells and folded plates	Cognitive	Understanding
CO3	<i>Analyze</i> the behavior of steel and R.C.C structural members	Affective	Analyzing
CO4	<i>Design</i> the steel connections.	Psychomotor	Creating
CO5	<i>Design</i> the R.C.C structural members	Psychomotor	Creating

SUBCODE	SUB NAME	L	T	P	C
XAR 501	DESIGN OF STRUCTURES – II	3	0	0	3
C:P:A =	0.6:1.8:0.6	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 SHELLS & FOLDED PLATES					7
Introduction of shells and folded plates – Classification of shells – Structural action of shells and Folded plates – space frames – Design concept only.					
UNIT – III STEEL SECTIONS AND RIVETED, WELDED & BOLTED JOINTS					8
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 – IV STEEL BEAMS AND COLUMNS					11

Steel beams: Allowable stresses, General specifications, Design of laterally supported beams.

Steel Columns: Allowable stresses, various shapes, built-up sections, Design of columns (excluding built – up columns lacing, battening and other connections).

UNIT – V STRUCTURAL DESIGN

10

Analysis and design of structural members for residential or commercial buildings.

TOTAL 45

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	45	0	0	45

TEXT

1. Ramachandra S., Design of Steel Structures, Standard Book House, Delhi, 1984.
2. A.S.Arya, Structural Design in Steel, Masonry and Timber, Nemchand and Bros, Roorkee, 1971.
3. P.Dayarathnam, Design of Reinforced Concrete Structures, Oxford and IBH Publishing Co.,1984.
4. N.C.Sinha and S.K.Roy, Fundamentals of Reinforced Concrete, S.Chand & co., New Delhi, 1984.

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.

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			
CO-5				3					3			
				15					15			

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

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

Objectives:

1. To inform about the development of architecture during and after the industrialization.
2. To understand impact of new materials on architectural design
3. To gain knowledge of the spatial organization and articulation in the works of master architects.
4. To learn the conceptualization of architectural design with respect to program, context etc.
5. To learn the contemporary design process.

Course Outcome:		Domain	Level			
CO1	<i>Understand</i> the impact of literature in architecture on philosophical development of design.	Cognitive	Understand			
CO2	<i>Understand</i> the alternative architectural methods available.	Affective	Evaluate			
CO3	<i>Exposed</i> to the master architects works and trace the development of evolution of their style.	Affective	Analyze			
CO4	Understand the spatial organization and spatial qualities of different typologies of buildings.	Cognitive	Understand			
CO5	Knowledge of the contemporary design process and apply the same in the architectural design.	Cognitive	Understand			
		Affective	Apply			
SUBCODE	SUB NAME	L	T	P	C	
XAR502	CONTEMPORARY ARCHITECTURE	3	0	0	3	
C:P:A	1.5:0:1.5	L	T	P	H	
		3	0	0	3	
UNIT I CRITIQUING MODERNISM						6
Writings of Robert Venturi, Christopher Alexander. Jane Jacob						
UNIT IIAFTER MODERNISM						7
Conditions of Post-Modernity - Canonization of Post-Modernist Architecture. Ideas and works of Soleri, Archigram and Metabolism- Neo Rationalism.						
UNIT III AFTER MODERNISM II						15
High Tech architecture: Works of Stirling, Rogers and Piano - Deconstructive Theory and Practice & their limitations.Works of Peter Eisenman, Bernard Schumi, Daniel Libeskind, Zaha Hadid, Rem Koolhaas						

UNIT IV ALTERNATIVE PRACTICES				8
Critical Regionalism Ideas and selected Works of - Fathy - Baker - Ando - - Bawa.				
UNIT V. POST-INDEPENDENT ARCHITECTURE IN INDIA				9
Early modernist architecture in india, Architecture of Kanvinde, Raje, Doshi, Correa, Nari Gandhi, Raj Rewal— new directions after 1960s				
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	45	0	0	45
TEXT				
1. Bill Risebero, Modern Architecture and Design.				
2. Kenneth Frampton, Modern Architecture: A Critical History, Tahmes and Hudson, London, 1994.				
3. Leonardo Benevolo, “History of Modern Architecture”, 2 Vols., reprint, MIT Press, 1977.				
REFERENCES				
1. Thomas Metcalf, An Imperial Vision, Faber and Faber, London, 1989.				
2. Manfredo Taferi / Franceso dal co., Modern Architecture, Faber and Faber/Electa,1980.				
3. Sigfried Giedion, Space Time and Architecture: The Growth of a New Tradition, Havard University Press, 1978.				

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						2
CO-2	2					2						3
CO-3	2				1	1						2
CO-4	2				2			1				2
CO-5	2				1			1				2
	10				4	5		2				10
Scaled to 0,1,2,3 scale		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.

OBJECTIVES

- To provide an overview of the relationship between culture and the built environment.
- To expose the components of culture and the factors influencing culture.
- To study the evolution of built forms in different regions.
- To know about the factors that influence architecture of a particular region.
- To understand Architecture, as expression of Culture.

COURSE OUTCOMES

Course Outcome:		Domain	Level				
On the successful completion of the course, students will be able to							
CO1	<i>Understand</i> the significance of Anthropology in Architecture.	Cognitive	Understanding				
CO2	<i>Assess</i> the role of different components of culture in deciding and shaping the architecture of a particular region.	Cognitive	Evaluate				
CO3	<i>Analyze</i> the stages of evolution of built forms in different regions as a continuous process	Cognitive	Analyzing				
CO4	<i>Outline</i> the factors that influence architecture of a particular region during different periods till today.	Cognitive	Understanding				
CO5	<i>Identify</i> the impact of Culture on Architecture as a whole.	Cognitive	Applying				
SUBCODE		SUB NAME		L	T	P	C
XAR 503		CULTURE AND ARCHITECTURE		2	0	0	2
C:P:A		2:0:0					
				L	T	P	H
				2	0	0	2
UNIT – I INTRODUCTION							4
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							5
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

6

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

7

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

8

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
	30	0	0	30

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

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		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
	9	8				6		8				5
Scaled to 0,1,2,3 scale	2	2	0	0	0	2	0	2	0	0	0	1

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

COURSE OUTCOMES

Course Ourcomes		Domain	Level
On the successful completion of the course, students will be able to			
CO1	<i>Illustrate</i> the application of various types of surveys in buildings	Cognitive	Understanding
CO2	<i>Survey</i> a site or building	Affective	Analyzing
CO3	<i>Analyze</i> a site with respect to various aspects	Affective	Analyzing
CO4	<i>Design</i> and <i>Develop</i> a site plan	Psychomotor	Creating
CO5	<i>Outline</i> the Environmental factors related to site planning	Cognitive	Understanding

SUBCODE	SUB NAME	L	T	P	C
XAR 504	SITE PLANNING AND SURVEYING	1	0	1	2
C:P:A	0.8:0.4:0.8	L	T	P	H
		1	0	2	3
UNIT – I INTRODUCTION TO SURVEY AND SURVEYING 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 PRICIPLES					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
	15	0	30	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.				

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							3	
CO-4			3	3								2
CO-5			3	3								
			15	15							3	2
Scaled to 0,1,2,3 scale	0	0	3	3	0	0	0	0	0	0	1	1

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

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

COURSE OUTCOMES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 505	MATERIALS AND CONSTRUCTION - V	2	0	3	3
C:P:A	1:1:1	L	T	P	H
		2	0	3	5
UNIT – I DAMP AND WATER PROOFING					15
<p>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.</p> <p>Application of the above under various situations - basement floors, swimming pools, terraces, etc – plates and assignments</p>					
UNIT II THERMAL INSULATION					15
<p>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.</p> <p>Construction details of the material application of floors, walls and roofs – Cold storages- Detailing for physically handicapped.</p>					

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
	30		30	60
TEXT				
<ol style="list-style-type: none"> 1. S.C.Rangwala, Building Construction (Sixteenth Edition) Charotar Publishing House, Anand, India, 1997. 2. Jack M.Launders, Construction Materials, Methods, careers pub., J.Holland, Illinois Wileox Co., Inc. 1983. 3. W.B. McKay, Building construction, Longman, U.K. 1921 				
REFERENCES				
<ol style="list-style-type: none"> 1. Arthur R.Llons, Materials for architects and builders An introduction, Holder Headline group, Great Britain, 1997. 2. Don.A.Watson, Construction Materials and Processes, McGraw Hill Book Co., 1972 				

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	
				9	3			6		9	6	
Scaled to 0,1,2,3 scale	0	0	0	2	1	0	0	2	0	2	2	0

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

XAR506 - DIGITAL DESIGN AND MEDIA TOOLS
0-0-2-2
COURSE OUTCOMES

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	<i>Design</i> graphics using computer tools	Psychomotor	Creating
CO2	<i>Experiment with</i> the software tools for visualisation	Affective	Applying
CO3	<i>Create</i> 3D models of buildings and render them	Psychomotor	Creating

SUBCODE	SUB NAME	L	T	P	C
XAR 506	DIGITAL DESIGN AND MEDIA TOOLS	0	0	2	2
C:P:A	1:1:1				
		L	T	P	H
		0	0	4	4

UNIT –I INTRODUCTION TO COMPUTER AND IMAGE EDITING
10

Windows Digital Art, poster designing, book cover design, card designing exercise. Basic Tools for Editing and Creating Graphics. Basics of photography to understand the documentation of buildings through digital media. Image doctoring and manipulation using computer software for graphics and

animation (Photoshop and Flash)				
UNIT II BASICS OF BUILDING MODELLING				20
Creating a basic floor plan, About Temporary Dimensions, Adding and Modifying Walls, Working with Compound Walls, Using Editing Tools, Adding and Modifying Doors, Adding and Modifying, Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, and text, are dimensioning. Transparent overlays, hatching utilities, line type, line weight and color. Multiline, Polyline, etc. Styles, blocks and symbol library.				
UNIT III INTRODUCTION TO 3D MODELLING				15
Project: Create 3D sculpture using 3D primitives (cubes, spheres etc.) Tools: Slide facilities script attributes, V-port, editing session. Introduction to 3D-modelling technique and construction planes, drawing objects, 3D surfaces setting up elevation thickness and use of dynamic projections. Solid modeling with primitive command and Boolean operation. Photoshop for architectural rendering of plans, elevation, section.views. Sketching in photoshop, sketch pad.				
UNIT IV 3D RENDERING AND SETTING				15
Project: Visualize a building. Explore the potential of lights and camera and use the same in the model created for the final submission. Tools: Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filling. Exercise to identify and visualize a building using the above said utilities. 3D modelling softwares like sketch up, Autocad rivet, etc Typography & Calligraphy. Photoshop and flash for conceptual presentation technique. Basic movie camera shooting, traditional analog and digital methods, conversion of analog to digital, memory manipulation and software compatibility exercises.				
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	0	0	60	60

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				2	3					3		
CO-3				2	3					3		
				6	9					9		
Scaled to 0,1,2,3 scale	0	0	0	2	2	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.

COURSE OUTCOMES

Course Outcome:			
<i>On the successful completion of the course, students will be able to</i>		Domain	Level
CO1	<i>Demonstrate</i> the concept of passive design in built environment.	Cognitive	understanding
CO2	<i>Analyze</i> the impact of spatial configuration at building level and at site level on passive design.	Affective	Analyzing
CO3	<i>Analyze</i> and interpret different case buildings.	Affective	Analyzing
CO4	<i>Design</i> and development energy efficient buildings.	Psychomotor	Creating
CO5	<i>Develop</i> working drawings and model displaying energy efficient and green building technologies.	Psychomotor	Creating

SUBCODE	SUB NAME	L	T	P	C
XAR 507	ARCHITECTURAL DESIGN - IV	0	0	6	6
C:P:A	1.2:2.4:2.4				
		L	T	P	H
		0	0	12	12
UNIT – I DESIGN STUDIO					180
Solar Passive Design Small complexes - involving building technology - Design and detailing for movement of physically handicapped and elderly persons within and around buildings. Examples: The building project should be of low services complexity largely relying on passive design strategies and natural systems of lighting and ventilation. 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	180	180
TEXT				
1. Ed.By.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. Liffie Books Ltd., London, 1973. 4. National Building Code and Bureau of Indian standard publications.				
E REFERENCES				

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
	10	8	7	10	10	5	8	10	6	6	15	8
Scaled to 0,1,2,3 scale	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.

Objectives:

The objective of the course is to give an introduction to the discipline of Urban and Regional planning

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

SUBCODE	SUB NAME	L	T	P	C
XAR601	HUMAN SETTLEMENTS 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 BOOKS:				
1. Gallion Arthur B & Eisner Simon, The Urban Pattern: City Planning and Housing. 2. UDPFI guidelines 3. <i>Town and Country Planning Act 1971 with amendments</i> 4. 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. Andro D. 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
			15			11			2			10
Scaled to 0,1,2,3 scale	0	0	3	0	0	3	0	0	1	0	0	2

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

XAR602 VERNACULAR ARCHITECTURE
3 – 0 – 0 – 3
OBJECTIVES:

To study the various vernacular architecture forms in the various regions of the country.

Course Outcome:		Domain	Level
CO1	Exposed to an overview of the various approaches and concepts to the study of vernacular architecture.	Cognitive	Understand
CO2	Aware of vernacular architecture as a process and not a product.	Cognitive	Knowledge
CO3	Understand the impact of colonial rule on vernacular architecture in India	Cognitive	Knowledge
CO4	Exposure to various vernacular architectural forms in various regions	Psychomotor	Application
CO5	Understanding on the study of Indian vernacular architecture as a process and also to provide an overview of various approaches and concepts	Cognitive	Knowledge
CO6	To look at the impact of Colonial rule on the vernacular architecture of India	Cognitive	Knowledge

SUBCODE	SUB NAME	L	T	P	C
XAR 602	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					6
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					9
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					8
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					10
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	
	30	0	15	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. Prammar, 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 – The Architecture 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		2		2		2	3	3
CO-5	2		2	1		2		2		2	3	3
CO-6	1		2	1		2		2		2	3	3
	11		12	6		12		12		12	18	18
Scaled to 0,1,2,3 scale	3	0	3	2	0	3	0	3	0	3	3	3

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

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

Objectives:

1. The course deals with various methods of quantity surveying, rate analysis of building and valuation for different materials used
2. Techniques of estimating and costing related to building construction
3. Importance of specification in the building activities 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	<i>Understand</i> the unit measurement of materials.	Cognitive	Understand
CO2	<i>Understand</i> the techniques of estimating and costing related to building construction.	Cognitive	Understand
CO3	<i>Apply and understand</i> 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	<i>Know</i> about Specification for basic building material and apply the same for another example	Cognitive Psychomotor	Understand Create
CO5	<i>Understand and apply</i> the concepts of project planning and basics of financial management	Cognitive Affective	Understand Apply

SUBCODE	SUB NAME	L	T	P	C
XAR603	ESTIMATION AND COSTING	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
Methods of Approximate Estimating - Built up or Carpet Area Method, Cubic Contents, Method and Numbers System, Current rates in industry for Approximate Estimating. Detailed Estimate on item rate basis - Quantities and Abstract of Estimate, Bill of Quantities of a Tender, Contingencies				
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				
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.				

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					2			
CO-2			2	3					2			
CO-3			2	3			3		3			
CO-4			2	3					2			
CO-5			2	3			3		2			
			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 604-

ENERGY EFFICIENT ARCHITECTURE

1- 0 -1- 2

OBJECTIVES:

To make the students aware of the future trends in creating sustainable built environment

Course Outcome:		Domain	Level
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	Understands 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 604	ENERGY EFFICIENT ARCHITECTURE	1	0	1	2
C:P:A	1.33:0.66:0	L	T	P	H
		1	0	2	3
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					10
Evaporative Cooling - Nocturnal Radiation cooling - Passive Desiccant Cooling – Induced Ventilation - Earth Sheltering - Wind Tower - Earth Air Tunnels					
UNIT – IV DAY LIGHTING AND NATURAL VENTILATION					8
Daylight Factor - Daylight Analysis - Daylight and Shading Devices - Types of Ventilation - Ventilation and Building Design.					
UNIT – V CONTEMPORARY AND FUTURE TRENDS					7
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.					
30	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
	15	0	15	30	
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

Table-1 Mapping of COs with POs:

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO1	PSO2
CO-1	2								3	
CO-2		1							3	
CO-3	3								3	
CO-4	2								3	
CO-5	2					2			3	
	9	1				2			15	
Scaled to 0,1,2,3 scale	2	1				2			3	

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 CONTRUCTION - VI

1 – 0 – 2 – 3

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	<i>Understand</i> the activities carried out by research organizations.	Cognitive	Understand
CO2	<i>Understand</i> the various methods and types of deep foundation.	Cognitive	Understand
CO3	<i>Exposed</i> to the vertical movement equipment in buildings.	Cognitive	Knowledge
CO4	Understand the types and working principle of Escalator and Elevator.	Cognitive	Understand
CO5	<i>Gain</i> Knowledge of the various advanced building structure.	Affective	Illustrate

SUBCODE	SUB NAME	L	T	P	C
XAR605	MATERIALS AND CONTRUCTION - VI	1	0	2	3
C:P:A	2.4:0:0.6				
		L	T	P	H
		1	0	4	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 convertors. Fire lift tower – solea					
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 converters – 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. Pamphlets supplied and other literatures from N.B.O., SERC, CBRI, 1970 onwards.
4. R.Chudley, Construction Technology, Richard Clay (Chaucer Press) Ltd., Suffolk, 1978.

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						1		1
CO-2		3		1						1		1
CO-3		3		2						1		1
CO-4		2		2						1		1
CO-5		1		3						3		2
		12		9						7		6
Scaled to 0,1,2,3 scale	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.

Objectives:

The objective of the course is 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
<i>On the successful completion of the course, students will be able to</i>			
CO1	<i>Demonstrate</i> an understanding of construction drawings of allied disciplines.	Cognitive	Understanding
CO2	<i>Demonstrate</i> an understanding of the relation of working drawing with specifications and Bill of quantities.	Cognitive	Understanding
CO3	<i>Apply</i> the standard conventions in a working drawing.	Affective	Applying
CO4	<i>Develop</i> a set of Working drawing for a project.	Psychomotor	Creating

SUBCODE	SUB NAME	L	T	P	C
XAR 606	ARCHITECTURAL WORKING DRAWING	0	0	2	2
C:P:A	1:0.5:0.5				
		L	T	P	H
		0	0	2	4
ARCHITECTURAL WORKING DRAWING					45
<p>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.</p> <p>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.</p>					
SPECIFICATION WRITING					15
<p>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.</p> <p>Detailed specification for earthwork excavation, plain cement concrete, Reinforced concrete, first</p>					

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 Syles, 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		
CO-5				3			3					
				15			15			3		
Scaled to 0,1,2,3 scale	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.

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 create an awareness with regard to the design of green buildings and sustainable architecture.
3. 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.
4. To highlight on the importance of High rise buildings as elements of identity in urban areas and urban design principles that govern their design.
5. To explore computer aided presentation techniques involving 2D and 3D drawings, walk through and models as required.
- 6.

Course Outcome:		Domain	Level
CO1	<i>Understand</i> 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	Design and Produce computer aided presentation drawings and making scale models	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR607	ARCHITECTURAL DESIGN - V	0	0	12	6
C:P:A	1.5:1.5:3				
		L	T	P	H
		0	0	12	12
UNIT – I DESIGN STUDIO					180
Design of large structures - Multiuse, multispans, 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.

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	180	180

TEXT

1. Ed.By.Quentin Pickard RIBA - The Architects' Hand Book - Bladewell Science Ltd. - 2002
- 2.DeChiara 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. Liffie 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
	10	10	6	8	9	7				10	3	7
Scaled to 0,1,2,3 scale	2	2	1	1	1	1	0	0	0	2	1	1

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

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

Objectives:

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:			
<i>On the successful completion of the course, students will be able to</i>		DOMAIN	LEVEL
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 701	PRACTICAL TRAINING	0	0	0	4
C:P:A	3:1:0				
		L	T	P	H
		0	0	0	100 days
<p>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.</p> <p>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</p> <p>The students would be evaluated based on the following criteria:</p> <ol style="list-style-type: none"> 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	PSO-1	PSO-2
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
	8	8	9	9	7	7	7	8	7	7	9	15
Scaled to 0,1,2,3 scale	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.

Course Objectives:

The objective of the course is to give an introduction to the discipline of Urban and Regional

Course Outcome:			
<i>On the successful completion of the course, students will be able to</i>		DOMAIN	LEVEL
CO1	<i>Interpret</i> the relation of economics & sociology with buildings	Cognitive	Understand
CO2	<i>Experiment with</i> urban land value and market demand	Affective	Apply
CO3	<i>Analyze</i> the urban issues and urban problems	Affective	Understand
CO4	<i>Compare</i> the concepts of sociology & social structure	Affective	Analyze
CO5	<i>Improve</i> Ecological process & societal development	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 801	URBAN ECONOMICS & SOCIOLOGY	2	0	0	2
C:P:A	1:1:3	L	T	P	H
		2	0	0	2
UNIT – I ROLE OF URBAN ECONOMICS & SOCIOLOGY					5
Subject matter of Economics and Sociology as related to built environment.					
UNIT – II URBAN ECONOMICS					6
Principles of consumption, production and distribution and their relevance's; market demand and supply and price changes, laws of returns and urban land values, built environment and municipal taxes.					
UNIT–III BUILDING ECONOMICS, URBAN RENEWAL AND URBANIZATION					8
Construction labour market, economic evaluation of urban renewal, building and housing, urbanization and urban problems.					
UNIT – IV SOCIOLOGICAL CONCEPTS AND SOCIAL CHANGES					6
Concepts of Society, community, group, culture, Institutions, role of status, social norms, social structure and changes.					
UNIT – V ECOLOGICAL PROCESSES AND DEVELOPMENT IMPACTS					5

Ecological processes and land use structures of cities, impact of urbanization and developmental programmes on social development.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	30	0	0	30
TEXT				
1. Hirsch W.Z., Urban Economics, Macmillan, New York, 1984. 2. Gopal Bhargava (ed) Urban Problems and policy perspectives, Abhinav Publications, New Delhi, 1981				
REFERENCES				
1. Desai A.R., Rural Sociology, Popular Prakasham, Bombay, 1984. 2. Gopal Bhargava (ed) Urban Problems and policy perspectives, Abhinav Publications, New Delhi, 1981. 3. Hirsch W.Z., Urban Economics, MacMillan, New York, 1984. 4. Muttalib, A.A., Public Housing, Sterling Publishers, New Delhi, 1986. 5. Rao, ULSP, Urbanisations in India, Concept Publishing Co., New Delhi 6. Subramanian, K.K. et.al. Construction Labour Market: A study in Ahmedabad, Concept Publishing Co., New Delhi, 1982.				

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			2			
CO-2	2					3			2			
CO-3	2					3			2			
CO-4	2					3			2			
CO-5	2					3			2			
	10					15			10			
Scaled to 0,1,2,3	3	0	0	0	0	3	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.

COURSE OUTCOMES

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	<i>Illustrate</i> the basics of building management systems, scope and its importance.	Cognitive	Understanding
CO2	<i>Outline</i> the basics of BIM and Controllers.	Cognitive	Understanding
CO3	<i>Categorize</i> all the aspects of BMS and its role in advanced building services.	Affective	Analyzing
CO4	<i>Assess</i> the components of BMS and its application in buildings	Affective	Evaluating
CO5	<i>Summarize</i> the various technological advancements, current trends in BMS	Cognitive	Understanding

SUBCODE	SUB NAME	L	T	P	C
XAR 802	ADVANCED BUILDING SERVICES	3	0	0	3
C:P:A	1.8:0:1.2				
		L	T	P	H
		3	0	0	3
UNIT – I INTRODUCTION					5
Introduction to Advanced Building Services. 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 CONTROLLERS					10
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					12
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.

UNIT – IV SAFETY AND SECURITY SYSTEMS

12

Access control systems, Closed circuit television, Intruder Alarm, Perimeter protection, Safety system integration with BMS.

UNIT – V ADVANCEMENTS IN BUILDING MANAGEMENT SYSTEM

6

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
	45	0	0	45

TEXT

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.

REFERENCES

1. Smart Buildings Systems for Architects, Owners and Builders -By James M Sinopoli.
2. Intelligent Buildings and Building Automation - By Shengwei Wang.
3. Introduction to Building Management - By D. Coles, G. Bailey, R E Calvert.
4. Building Energy Management Systems: Application to Low-Energy Hvac and Natural Ventilation Control- By G. J. Levermore.
5. Smart grid home- By Quentin Wells.

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	
CO-2				1				1		1	2	
CO-3				1				1		1	2	
CO-4				1				1		1	2	
CO-5				1				1		3		
Original				6				5		7	7	
Scaled value	0	0	0	2	0	0	1	1	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.

COURSE OUTCOMES

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
CO1	Understand the process of evolution happens in the varied aspects of Architecture	Cognitive	understand
CO2	Documentation of various methods of design evolution in Architecture	Psychomotor	Create
CO3	Manipulate the communication ability of students in the field of Architecture	Psychomotor	Create

SUBCODE	SUB NAME	L	T	P	C
XAR 805	SEMINAR	0	0	1	2
C:P:A	1.8:0:1.2				
		L	T	P	H
		0	0	1	2
UNIT – I					5
Independent study and documentation of architectural and allied subjects by Individual student. Submission of report along with oral and visual presentation.					
UNIT – I I					
UNIT – I I I					
	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
	30	0	0	30	

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	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
Original	8	8	9	9	7	7	7	8	7	7	9	15
Scaled to 0,1,2,3 scale	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.

XAR 806 ARCHITECTURAL DESIGN – VI

0 – 0 – 8 – 8

OBJECTIVES:

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:			
<i>On the successful completion of the course, students will be able to</i>		Domain	Level
CO1	Understand the concept of energy efficient design & green building technologies.	<i>Cognitive</i>	understand
CO2	Understand the impact of spatial configuration at building level and at site level on energy consumption	<i>Cognitive</i>	understand
CO3	Analyze and interpret different case buildings.	<i>Affective</i>	<i>Analysis</i>
CO4	Design and development energy efficient buildings.	<i>Psychomotor</i>	Design
CO5	Develop working drawings and model displaying energy efficient and green building technologies.	<i>Psychomotor</i>	Design

SUBCODE	SUB NAME	L	T	P	C
XAR 806	ARCHITECTURAL DESIGN – VI	0	0	8	8
C:P:A	3.2:3.2:1.6	L	T	P	H
		0	0	16	16
DESIGN STUDIO					210
Design of large scale projects involving energy efficient and green building design.					
Examples: Five star hotel, airports, cultural centers, museum and exhibition complex, neighborhood design, housing projects, etc					
		LECTURE	TUTORIAL	PRACTICAL	TOTAL
		0	0	210	210
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					

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	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
Original	10	8	7	10	10	5	8	10	6	6	15	8
Scaled to 0,1,2,3 scale	3	3	3	3	3	3	3	3	3	3	3	3

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

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
<i>On the successful completion of the course, students will be able to</i>			
CO1	Relate the responsibility of architect towards the society.	Cognitive	Infer.
CO2	Illustrate the building rules and regulations essentials for practice.	Cognitive	Illustrate
CO3	Know the ethics to be followed while practicing the profession	Cognitive	Interpret
CO4	Develop tenders and contract documents.	Cognitive	Apply
CO4	Develop the office, work with allied professionals as a team in accordance with the architect's act 1972	Cognitive	Apply

SUBCODE	SUB NAME`	L	T	P	C
XAR 901	PROFESSIONAL PRACTICE AND ETHICS	2	0	0	2
C:P:A	2:0:0	L	T	P	H
		2	0	0	2
UNIT – I ARCHITECT AND PROFESSION					6
<p>Role of architect in society - role of IIA and COA– Salient features of Architects' Act 1972 - code of conduct, Partial/ Comprehensive Architectural service, Conditions of engagement of an architect - normal additional, special and partial services. Architect's Registration Act. importance of ethics in professional practice (Council of Architecture guide lines) - Code of Professional Conduct for architects as prescribed by Council of Architecture, punitive action for professional misconduct of an architect.</p> <p>Office set up and administration, Filling and recording of letters and drawings. Nature of partnership,</p>					

registration of firm and dissolution. Practice Procedure and conduct, membership of professional organization. Entrepreneurship aspects of architectural profession. Work order agreement. (Council of Architecture norms) - Mode of payment - Terms and conditions of engagement.

- relationship with client and contractor – management of an architect's office - elementary accountancy. Tax liabilities. Copy-rights of drawings

UNIT – II ARCHITECTURAL COMPETITIONS	5
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Types of competitions - appointment of assessors - duties of assessors - instructions to participants - rejection of entries - award of premium - guidelines prescribed by COA & IIA for promotion and conduct of competitions. Code relation to Architectural Competition.

UNIT – III TENDER and CONTRACT	6
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Tenders. Types of tenders and tenders document, tender draft notices and invitation of tenders. Procedure for opening and selection of tenders. Analysis and report to owner.

Work order.-Contract.

Type of contracts and contract documents, detailed knowledge about various conditions of contract as published by the Indian Institute of Architects and specially about :

Earnest Money. Security Deposit, Retention Money. Mobilization Fund. Bank Guarantee.

Architect's Instructions. Clerk of works. Variation and extras. Defects after completion.

Certificates and payments. Insurance and fire Insurance. Liquidate damage. Termination of the contract

UNIT – IV ARBITRATION & EASEMENTS	6
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Arbitration clause. Arbitration, Conciliation and Mediation. Arbitration proceedings and Awards. Duties and liabilities in profession. Legal responsibility of architect to Employer.

Easements -Definition - types of easement – acquisition extinction and protection of easements - Arbitration in disputes - arbitration agreement - sole arbitration - umpire - accepted matters and – award.

UNIT – V BUILDING RULES and LEGISLATION	7
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The Building Rules and By laws - Panchayat , Municipal Corporation, Role of Local Authorities and Local Planning Authorities- Development Control Rules – Chennai Metropolitan Development Authority. Environmental Acts and Laws, Fire Safety Rules – Role of EIA Committee Need for special rules on architectural control and development -Special Rules governing Hill Area Development - coastal area development - Heritage Act of India - Role of urban Arts Commission, Tamil Nadu Factory Rules. Consumer Protection Act 1986.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	30	0	0	30

TEXT

1. Publications of COA IIA Hand book on Professional Practice, The Architects publishing Corporation of India, and Bombay 1987
2. Roshan Namavathi, Professional Practice, Lakshmi Book Depot, Mumbai, 1984.
3. Vasant S. Apte., Architectural Practice and Procedure, Padmaja bhide publisher, Pune 2008.

REFERENCES

1. J.J. Scott, Architect's Practice, Butterworth, London 1985
- 2 D.C. Rules for Chennai Metropolitan Area 1990
3. T.N.D.M. Building Rules, 1972
4. T.N.P. Building Rules 1942
5. Chennai City Corporation Building Rules 1972
6. Derek Sharp, The Business of Architectural Practice William Collins Sons &Co. Ltd., Erafton St., London W1 1986
7. The Tamil Nadu Hill Areas Special Building Rules - 1981
8. Environmental Laws of India - by Kishore Vanguri, C.P.R. Environmental Education Centre, Chennai

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.

Course Objectives:

1. To introduce the fundamental aspects involved in housing and sensitize the students about the housing issues

Course Outcome:			
<i>On the successful completion of the course, students will be able to</i>		DOMAIN	LEVEL
CO1	Understand the magnitude of housing issues	Cognitive	Knowledge
CO2	Understand the various methods and schemes available for housing development.	Cognitive	comprehension
CO3	Understand the various standards and regulations involved in housing development.	Affective	Knowledge Application
CO4	Understand the role of real estate in housing issues.	Affective	Application
CO5	Prepare the feasibility and financial report for the project.	Affective	Application

SUBCODE	SUB NAME`	L	T	P	C
XAR 902	HOUSING	3	0	0	3
C:P:A	3:0:0	L	T	P	H
		3	0	0	3
UNIT – I HOUSING ISSUES - INDIAN CONTEXT					8
Need and Demand - National Housing and Habitat Policy - Housing Agencies and their role in housing development. Social factors influencing Housing Design, affordability, economic factors and Housing concepts – Slum Up-gradation and Sites and Services					
UNIT – II HOUSING STANDARDS IN INDIA					8
Standards and Regulations - DCR relevant to housing - Methodology of formulating standards - Performance standards. Traditional patterns - Row Housing and Cluster Housing - Layout concepts - Use of open spaces – Utilities and common facilities - Case studies - High Rise Housing					
UNIT – III HOUSING DESIGN PROCESS					8
Various stages and tasks in Project Development - Housing Management - Community participation - Environmental aspects - Technology. housing finances, financial institutions,					
UNIT – IV REAL ESTATE DEVELOPMENT					14
Property Development Process: The property development process from inception to completion					

; parties involved; legislative and planning requirements including the Housing Developers (Control & Licensing) Act and Rules. Conception of Development Project: Conception of development; pro forma

analysis; site identification investigation and options; preliminary drawings. Feasibility Study: Market analysis, including timing of development and real estate cycles. Cash flow analysis. Project Financing: Various financing arrangements including partnerships and joint ventures; project accounts; construction finance. Project Construction: Contract negotiation; types of construction contracts; tendering procedures; project/development management. Real Estate Marketing: Marketing plan, evaluation and control of marketing process. Project Completion: Handling over and management of completed project

UNIT – V CURRENT TRENDS IN REAL ESTATE IN INDIA

7

Role of various players in the Real Estate Sector – Land and Land transactions. taxes involved in land transactions.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	45	0	0	45

TEXT

1. Joseph de chiara & others - Time Saver Standards for Housing and Residential development, McGraw-Hill Co., New York, 1995.
2. .Karnataka state Housing Board - MANE - Publication - 1980.

REFERENCES

1. Richard Untermanu & Robert Small, Site Planning for Cluster Housing, Van Nostrand Reinhold Company, London/New York, 1977.
2. Forbes Davidson and Geoff Payne, Urban Projects Manual, Liverpool University Press, Liverpool, 1983.
3. Christopher Alexander, A Pattern Language, Oxford University Press, New York -1977.
4. 4. HUDCO Publications - Housing for the Low income, Sector Model.

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 – 2 - 2

OBJECTIVES:

To motivate students to involve in individual research and methodology.

Course Outcome: <i>On the successful completion of the course, students will be able to</i>		Domain	Level
CO1	<i>Undertake</i> 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	<i>Develop</i> a report of the analyzed information with the logical reasoning and conclusion.	Psychomotor	Evaluate

SUBCODE	SUB NAME	L	T	P	C
XAR 905	DISSERTATION	0	0	2	2
C:P:A	3.2:1.8:0	L	T	P	H
		0	0	4	4
TOPICS OF STUDY					60
<p>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.</p> <p>METHOD OF SUBMISSION</p> <p>The Dissertation shall be submitted in the form of drawings, project report, CDs and reports.</p>					
		LECTURE	TUTORIAL	PRACTICAL	TOTAL
		0	0	60	60

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	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
Original	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.

OBJECTIVE: 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			
<i>On the successful completion of the course, students will be able to</i>						
CO1	Plan / 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		Analysis.	
CO4	Develop an urban renewal proposal for a city.		Psychomotor		Design	
CO5	Develop a design proposal for the urban issues relating to the built environment		Psychomotor		Design	
SUBCODE		SUB NAME	L	T	P	C
XAR 906		ARCHITECTURAL DESIGN – VII	0	0	8	8
C:P:A		3.2:3.2:1.6				
			L	T	P	H
			0	0	16	16
DESIGN 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

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	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
Original	8	8	9	9	7	7	7	8	7	7	9	15
Scaled to 0,1,2,3 scale	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.

OBJECTIVE:

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
<i>On the successful completion of the course, students will be able to</i>			
CO1	Formulate design project independently by identifying the issues at individual building level and urban level.	<i>Cognitive</i>	illustrate
CO2	Determine the requirements and other relevant information for chosen projects.	<i>Cognitive</i>	<i>Infer</i>
CO3	Plan Undertake a study, analyze and identify the issues in chosen area of interest	<i>Cognitive</i>	Analyze
CO4	Demonstrate design skills and expertise through imaginative approach in designing built environment	<i>Psychomotor</i>	Design
CO5	Effectively communicate design ideas through set of detail technical drawings, models and oral presentations	<i>Psychomotor</i>	Design

SUBCODE	SUB NAME	L	T	P	C
XAR 1001	THESIS	0	0	0	10
C:P:A	6:4:0				
		L	T	P	H
		0	0	900	450
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	900	450

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.

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	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
	9	8	6	5	9	4	3	13	10	9	15	15
Scaled to 0,1,2,3 scale	3	3	3	2	3	2	1	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.

ELECTIVES

XAR 803A PROJECT MANAGEMENT & TQM

3 - 0 - 0 - 3

COURSE OUTCOMES

- 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
<i>On the successful completion of the course, students will be able to</i>			
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	To 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 803A	PROJECT MANAGEMENT & TQM	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

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	-	-
CO-2										3	-	-
CO-3			3	3			3	3		3	-	-
CO-4			3	3		3				3	-	-
CO-5					3		3			3	-	-
Original	-	-	6	6	3	3	6	3	-	15	-	-
Scaled value	0	0	1	1	1	0	1	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.

XAR803 B

ADVANCED BUILDING TECHNOLOGY

3 - 0 - 0 - 3

OBJECTIVES:

The course is designed to enable the students to learn advanced building technology available for construction.

S.NO	COURSE OUTCOME	Domain	Level
1	Expose to the latest construction materials and global trends in construction methods	Cognitive	Knowledge
2	Identify a suitable construction methods	Cognitive	Knowledge
3	Identify the suitable construction techniques to be employed for a given situation	Affective	Application
4	Understand various aspects involved in demolition of buildings and safety aspects.	Affective	Application

SUBCODE	SUB NAME	L	T	P	C
XAR803B	ADVANCED BUILDING TECHNOLOGY	3	0	0	3
C:P:A = 2:0:3					
		L	T	P	H
		3	0	0	3
UNIT – I MODERN MATERIALS					5
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					10
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 PREFABRICATION 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					5
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
	45	0	0	45
TEXT				
1. 1. Peurifoy, R.L., Ledbette. W.B., Construction Planning, Equipment and Methods, McGraw Hill Co., 2000. 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. John Fernandez, Material Architecture, Architectural Press, UK.				

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	PS O-1	PS O-2
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	-	-
	-	-	-	9	-	-	7	7	7	12		-
Scaled to 0,1,2,3 scale	0	0	1	3	0	0	2	2	2	2	0	0

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

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

OBJECTIVES:

To evaluate the understanding of the relationship between form& structure through a seminar.

Course Outcome:		Domain	Level
CO1	Understand the evolution of structural systems through history	Cognitive	Understand
CO2	Expose to the concepts of structural design through works of architects/ engineers	Cognitive	Knowledge
CO3	Analyze the concepts of structural design and its impact on the architectural design of the historic and contemporary buildings.	Cognitive	Knowledge
CO4	Interpret the architectural expression, its relation between form and structure through relevant case studies.	Psychomotor	Application

SUBCODE	SUB NAME	L	T	P	C
XAR 803C	ARCHITECTURE AND STRUCTURE	3	0	0	3
C:P:A = 3:1:0					
		L	T	P	H
		3	0	0	3
UNIT – I HISTORY OF STRUCTURAL DESIGN IN THE PRE INDUSTRIAL ERA					6
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 PERIOD					7
Post Industrial modular construction of large span and suspension structures in steel and concrete- projects of Pier Luigi Nervi, Maillart, Candella, Buckminster Fuller and Eero Saarinen.					

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				15
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				7
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
	45	0	0	45
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 ; Boston : Architectural Press, 2003				
REFERENCES				
1. Martorell, Bohigas& Mackay, Pavilion of the Future, Expo 92, Seville (MBM),1992.				
2. P. COX, Daring Harbour Expo Center, Sydney Australia				
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				

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		
CO-2					2	2	2	3		3		
CO-3					2	2	2	3		3		
CO-4					3			3		3		
	-	-	-	-	7	4	4	9		12	-	-
Scaled to 0,1,2,3 scale	0	0	0	0	2	1	1	2	0	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 803 (D) - SUSTAINABLE ARCHITECTURE

3 – 0 – 0 – 3

OBJECTIVES:

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.

S.NO	COURSE OUTCOME	Domain	Level
1.	Understand the various aspects of sustainability	Cognitive	Knowledge
2.	Demonstrate the knowledge on material properties and the impact on construction.	Cognitive	comprehension
3.	Work with various building codes, regulations related to sustainable construction	Affective	Knowledge Application
4.	Select the suitable construction methods to achieve sustainable design.	Affective	Application
5.	Analyze the given condition and arrive a appropriate sustainable construction solution	Affective	Application

SUBCODE	SUB NAME	L	T	P	C
XAR 803 D	SUSTAINABLE ARCHITECTURE	3	0	0	3
C:P:A = 2:0:3					
		L	T	P	H
		3	0	0	3
UNIT – I INTRODUCTION					6
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					12
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					12
Design issues relating to sustainable developmentincluding 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					8
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					7
. Ranging from small dwellings to large commercial buildings, drawn from a range of countries to demonstrate best current practice					
	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
	45	0	0	45	
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

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				2					1	3	-	-
CO-2				3						3	-	-
CO-3			3	3			3		3		-	-
CO-4				3					3		-	-
CO-5				1	3		3		3		-	-
			3	12	3		6		10	6		-
Scaled to 0,1,2,3 scale	0	0	1	3	1	0	2	0	3	2	0	0

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

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

OBJECTIVES:

To introduce the vocabulary of interior design with an overview of interior and furniture design and other components

S.NO	COURSE OUTCOME	Domain	Levels
1	Relate various theories and factors that are to be considered in interior design	Cognitive	Comprehension
2	Demonstrate knowledge on the relationship between the ergonomics, function, psychological aspects of aesthetics.	Cognitive	Comprehension
3	Able to propose the theme oriented interior design.	Psychomotor	Design
4	Able to develop a specification and estimation report for an interior project.	Cognitive	Analysis
5	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
XAR 804	INTERIOR DESIGN AND DETAILING	1	0	1	3
C:P:A = 4:1:0					
		L	T	P	H
		1	0	2	3
UNIT – I INTRODUCTION TO INTERIOR DESIGN					9
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					9
Concept & theme Development: Enclosures & envelopes 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	9
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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	9
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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	9
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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 m² to 600 m².

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	15	0	30	45

TEXT

1.1. Francis .D.K. Ching, *Interior Design Illustrated*, 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. SyanneSlesin and Stafford Ceiff - *Indian Style*, Clarkson N. Potter, Newyork, 1990.

6.	History of Interior design &furnitures ,Blakemore.R
7.	T.S.S. for Interior design & spaces, Chiara joseph
8.	Interior Design Illustrated, Ching D.K.
9.	Interior Design and Decoration, Premavathyseetharaman

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	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	
	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.

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	<i>Identify</i> the natural and manmade disaster.	Affective	Understand Knowledge
CO2	<i>Understand and apply</i> the disaster resistant design	Psychomotor	Apply Knowledge
CO3	<i>Understand and apply</i> the Earthquake resistant design	Psychomotor	Apply Knowledge
CO4	<i>Understand</i> the formation and causes of Earthquakes and factors to be considered in the Design of buildings and services to resist Earthquakes	Affective	Knowledge
CO5	<i>Apply</i> the knowledge gained in an architectural design assignment	Cognitive	Apply

SUBCODE	SUB NAME	L	T	P	C
XAR 804 B	DISASTER RESISTANCE AND ARCHITECTURE	3	0	0	3
C:P:A = 0.6:0.8:0.8					
		L	T	P	H
		3	0	0	3
UNIT I NATURAL HAZARDS AND MAN MADE HAZARDS					9
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 recognize 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				9
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 CONFIGURATION				9
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				8
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				10
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. 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.

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
CO-1		2	1			2		1		2
CO-2		2	1			2		1		2
CO-3		2	2			2		1		2
CO-4		2	2			2		1		2
CO-5		2	3			3				
Scaled to 0,1,2,3 scale	0	2	2	0	0	3	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.

Course objectives:

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	<i>Understand and Apply</i> the basics of Acoustics	Cognitive	Apply Understand
CO2	<i>Understand</i> the evolution of architectural lighting design and current practice of the same.	Psychomotor	Apply
CO3	<i>Understand</i> the inter-relationship between Light and Human factors	Affective	Knowledge
CO4	<i>Understanding</i> of the Basic Physics involved in Architectural Lighting Design	Affective	Knowledge
CO5	<i>Evaluate</i> the various lighting sources both natural and artificial, with their application principles.	Cognitive	Evaluate
CO6	<i>Propose and Design</i> the various Lighting concepts and Lighting layouts in Practice.	Psychomotor	Apply Understand

SUBCODE	SUB NAME	L	T	P	C
XAR804C	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				7
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				8
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				10
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				13
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				7
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				
<ol style="list-style-type: none"> 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 Linger 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

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	PS O1	PSO 2
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			
	-	-	-	12	-	-	9	8	5	-		
Scale d to 0,1,2, 3 scale	0	1	0	3	0	0	0	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.

OBJECTIVES :

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
<i>On the successful completion of the course, students will be able to</i>			
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.	Cognitive	Knowledge
CO4	Identify the components of BMS and its application in buildings with respect to energy conservation and safety	Cognitive	Knowledge
CO5	To enable the students explore the various technological advancements, current trends in BMS	Cognitive	Knowledge

SUBCODE	SUB NAME	L	T	P	C
XAR 804 D	BUILDING AUTOMATION AND MANAGEMENT SYSTEMS	3	0	0	3
C:P:A = 2:2:2					
		L	T	P	H
		3	0	0	3
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 CONTROLLERS					10

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	14
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. 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.

UNIT – IV SAFETY AND SECURITY SYSTEMS	10
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Access control systems, Closed circuit television, Intruder Alarm, Perimeter protection, Safety system integration with BMS

UNIT – V ADVANCEMENTS IN BUILDING MANAGEMENT SYSTEM	6
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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
	45	0	0	45

TEXT

1.

REFERENCES

1. Smart Buildings Systems for Architects, Owners and Builders -By James M Sinopoli.
2. Intelligent Buildings and Building Automation - By Shengwei Wang.
3. Introduction to Building Management - **By D. Coles, G. Bailey, R E Calvert.**
4. Building Energy Management Systems: Application to Low-Energy Hvac and Natural Ventilation Control- By G. J. Levermore.
5. Smart grid home- By Quentin Wells.

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				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	
	-	-	-	6	2	-	11	6	4	15	12	-
Scale d to 0,1,2, 3 scale	0	0	0	2	1	0	3	2	1	3	3	1

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

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

XAR903A ARCHITECTURAL CONSERVATION

3 - 0 – 0 - 3

OBJECTIVES:

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 studies.	Psychomotor	Application
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 903A	ARCHITECTURAL CONSERVATION	3	0	0	3
C:P:A	4:0:0				
		L	T	P	H
		3	0	0	3
UNIT – I INTRODUCTION TO CONSERVATION					9
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					9
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					9
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					9
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 Kanchipuram historic districts and heritage precincts.					
UNIT – V CONSERVATION PLANNING					9
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 management.					
	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
	45	0	0	45	
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

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		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	
	9	1	15			15		10	9		10	
Scale d to 0,1,2, 3 scale	2	1	3	0	0	3	0	2	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.

OBJECTIVES:

To understand the scope and nature of urban design as a discipline and create awareness of contemporary urban issues as well as learn about possible ways to address them

Course Outcome:		Domain	Level
<i>On the successful completion of the course, students will be able to</i>			
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 imageability in urban areas.	Cognitive	Understand
CO3	Analyze the Contemporary Issues Related To Urban Area	Cognitive	Analyze
CO4	Choose the suitable urban renewal methods for the chosen study area	Cognitive	Application
CO5	Examine the study area and develop a proposal	Psychomotor	Analysis & perception

SUBCODE	SUB NAME	L	T	P	C
XAR 903B	URBAN DESIGN AND URBAN RENEWAL	2	0	1	3
C:P:A = 2.4:0.6:0					
		L	T	P	H
		2	0	2	4
UNIT – I INTRODUCTION TO URBAN DESIGN					8
Components of urban space 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					12
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- cittenuovo-radiant city .

UNIT – III THEORISING AND READING URBAN SPACE	8
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Ideas of Imageability and townscape: Cullen, Lynch- place and genius loci- collective memory historic reading of the city and its artefacts: Rossi- social aspects of urban space: life on streets and between buildings, gender and class, Jane Jacobs, William Whyte

UNIT – IV URBAN RENEWAL	20
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Understanding and interpreting of urban problems/ issues sprawl, generic form, incoherence, privatized public realm- effects/ role of real estate, transportation, zoning, globalisation - ideas of sustainability, heritage, conservation and renewal contemporary approaches : idea of urban catalyst, transit metropolis, community participation – studio exercise involving the above.

UNIT – V BEST PRACTICE IN URBAN DESIGN	12
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Contemporary case studies from developing and developed economies that offer design

Guidelines and solutions to address various issues/ aspects of urban space – case studies.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	30	0	30	60

TEXT BOOKS:

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:AnEnvironmentalApproach”, Taylor & Francis, 2000.54

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. Molcolm 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	PSO-1	PSO-2
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
	9	9	13	6	5	12	5	13	11	9	7	15
Scaled to 0,1,2,3 scale	3	3	3	2	2	3	2	3	3	3	2	3

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

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

XAR 903C - PRINCIPLES TRADITIONAL INDIAN ARCHITECTURE

3 – 0 – 0 – 3

OBJECTIVES:

To introduce the principles and theories involved in the traditional architectural design.

S.NO	COURSE OUTCOME	Domain	Levels
1	To respect and sensitive enough to the historical resources	Cognitive	Comprehension
2	Understand the different measurement system employed in the traditional construction.	Cognitive	Comprehension
	Understand the theories behind the spatial organization techniques employed in traditional architecture.	Cognitive	Design
4	Understand the relationship between the cosmic and the built environment	Cognitive	Analysis
5	Know the impact of scale, materials and construction techniques on aesthetics.	Affective	Synthesis

SUBCODE	SUB NAME	L	T	P	C
XAR 903C	PRINCIPLES TRADITIONAL INDIAN ARCHITECTURE	3	0	0	3
C:P:A = 1.6:.4:0					
		L	T	P	H
		3	0	0	3
UNIT – I INTRODUCTION					6
Traditional definition and meaning of Vastu – its classification – achievements in India in terms of literature and monuments					
UNIT – II SPACE THEORY					6
Features of good building site – good building shapes – macro, micro, enclosed and material spaces – relationship between living organism and built space, earth and universe – impact of built space on human psyche.					
UNIT – III VIBRATION, TIME , RHYTHM INTERFACE &MEASUREMENT AND BUILT SPACE					10
Theory of vibration - vibration as time, equation of time and space - Time space relationship and measurement of the same. Units of measurement - Tala system and Hasta system of measures - Musical measurements compared to space measurements - resultant ambience in built space.					
UNIT – IV SITE PLANNING AND COSMOGRAM					8
The celestial grid or Mandala and its types -orientation of the building, Site. Layout and settlement- positive and negative energies – importance of cardinal and ordinal directions.					
UNIT – V ARCHITECTURAL APPLICATIONS					15
Application of traditional principles in contemporary built forms – site, orientation and building components –plants and water bodies – case studies					
	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
	45	0	0	45	
TEXT					
1. K.S.SubramanyaSastri – Maya Matam – Thanjavur Maharaja SarjojiSaraswathi Mahal Library – Thanjavur – 1966.					
2. Dr.V.GanapatiSthapati- Sthapathyaveda - Vastu Vedic Research Foundation, Chennai – 1996.					

3. The Penguin Guide to Vaastu- Sashikala Ananth, Penguin Books, New delhi, 1998.

REFERENCES

1. T.GanapathiSastri – SilpaRatnam – Maharaja of Travancore, Govt of Travancore, 922.
2. Dr.Prasanna Kumar Acharya -Manasara- Oxford University Press - 1927 (English version)
3. Stella Kramresh – the Hindu Temple Vol.I& II MotilalBanarsidars Publishers Pvt.Ltd., Delhi,1994.

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	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	
	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.

OBJECTIVES:

To introduce the vocabulary of interior design with an overview of theory of design and other components

S.NO	COURSE OUTCOME	Domain	Levels
1	Understand the advanced theories involved in design process.	Cognitive	Comprehension
2	Know the stages and techniques involved in systematic design thinking.	Cognitive	Comprehension
3	Know the process of developing a design	Cognitive	Design
4	Know the inter relation between the design and philosophy	Cognitive	Analysis
5	Identify the design process for the given design context	Affective	Synthesis

SUBCODE	SUB NAME	L	T	P	C
XAR 903 D	THEORY OF DESIGN	3	0	0	3
C:P:A = 2.4:0.6:0					
		L	T	P	H
		3	0	0	3
UNIT – I DESIGN					8
Definition of design, understanding of design, purpose of design, nature of good design and evaluation of design, types of design classifications, role of designer, design in history.					
UNIT – II DESIGN THINKING					12
Understanding the terms creativity, imagination, etc. Theories on thinking, convergent and divergent thinking, lateral and vertical thinking, creative techniques like checklists, brainstorming, syntactic, etc. design puzzles and traps, blocks in creative thinking.					
UNIT – III DESIGN PROCESS					8
Context for architectural design problems, design process, stages in the design process from different considerations, different ideas of design methodology.					
UNIT – IV DESIGN PROBLEMS AND SOLUTIONS					7

Different approaches to design, problem solving or intuitive, formulation of problems, nature of creative design problems, goals in design.

UNIT – V DESIGN CONCEPTS, PHILOSOPHIES AND STRATEGIES 10

Various approaches to generate ideas for architectural design - types of concepts, personal philosophies and strategies of individual designers, channels to creativity in architecture.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	15	0	30	45

TEXT

1. Geoffrey Broadbent - Design in Architecture - Architecture and the human sciences - John Wiley & Sons, New York, 1981.
2. Nigel Cross - Developments in Design Methodology, John Wiley & Sons, 1984.
3. James C.Snyder, Anthony J.Catareux - Introduction to Architecture, McGraw-Hill Inc., 1979. Universal Design Principles

REFERENCES

1. Bryan Lauson - How Designers Think, Architectural Press Ltd., London, 1980.
2. Tom Heath - Method in Architecture, John Wiley & Sons, New York, 1984.
4. Allen Mave Evans & Caula David Dumes Nil, An Invitation to Design, Macmillan Publishing Co., New York, 1982.
5. Edward De Bone, Lateral Thinking
6. Christopher Alexander, Pattern Language, Oxford University 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	PSO-1	PSO-2
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	
	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=30-No relation, 1 –Low Relation, 2 –Medium Relation, 3 –High Relation.

As it is a common elective subject. The syllabus is prepared by computer science department.

XAR 904B LANDSCAPE ARCHITECTURE**3 – 0 – 0 – 3****OBJECTIVES:**

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 elements and scope of landscape architecture.	Cognitive	Knowledge
CO2	Interpret the impact of human activities on the environment and the role of architect in mitigating it	Cognitive	Knowledge
CO3	Design and develop a landscape proposal for small and medium scale projects.	Psychomotor	Analyse, Design
CO4	Develop a detailed drawing and use digital tools to present landscape proposal	Psychomotor	Analyse, Design
CO5	<i>Take part.</i> In a team with the Landscape professionals in a project	Psychomotor	Evaluate

SUBCODE	SUB NAME	L	T	P	C
XAR 904B	LANDSCAPE ARCHITECTURE	3	0	0	3
C:P:A = 1.2:1.8:0					
		L	T	P	H
		3	0	0	3
UNIT – I INTRODUCTION					6
Introduction to ecology, ecosystem, biosphere – components and working mechanism of ecosystem – types and courses of disturbance in ecosystem – man-made and natural e.g. Dereliction of land – reclamation, conservation and landscaping of derelict land.					

UNIT – II PLANTING DESIGN				9
Plants as design elements- classification – structural characteristic of plants – visual characteristics of plant viz. line, form, texture, colour, etc. – basic data for plant selection.				
UNIT – III ELEMENTS IN LANDSCAPE DESIGN				10
Elements of Landscape 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. Design Assignment: Plant selection and composition for given situation.				
UNIT – IV HISTORY OF GARDEN DESIGN				10
Study of principles and design – historic styles – Mughal gardens of India: Shalimar Bagh and Taj Mahal, Japanese gardens: Saihoji, Ryozanji&Katsura imperial palace, Italian Renaissance gardens: Villa Lante at Bagania				
UNIT – V LANDSCAPE DESIGN OF FUNCTIONAL AREAS / /PUBLIC OPEN SPACES				10
Landscaping for residential layout – recreational facilities, like parks, play fields- water front areas – hill areas – urban centers like squares, plazas , Consideration and key factors to landscaping of above context. Design Assignment: landscape proposal and Drawing preparation for assigned projects.				
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	45	0	0	45
TEXT				
1. Landscape Architecture – John Omsbeesimonds . 2. Planting Design – Theodore D Walker.				
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, Mc Graw 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	PSO-1	PSO-2
CO-1	2	3	3									
CO-2								3				
CO-3									3	3	3	3
CO-4				3	2	1						
CO-5							3				1	2
	2	1	1	3	2	1	3	3	3	3	4	5
Scale d to 0,1,2, 3 scale	1	1	1	2	1	1	2	2	2	2	2	2

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

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

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	<i>Identify</i> concepts and concerns of perception.	Cognitive	Apply Understand
CO2	Identify and develop the sensitivity to the needs of users and clients	Affective	Apply
CO3	<i>Understanding</i> the designing and planning for urban quality	Affective	Evaluate
CO4	<i>Identify</i> and <i>apply</i> the micro and macro built environment and behavioral aspects	Psychomotor	Apply
CO5	<i>Analyze</i> the relationship between built - environment and perception	Cognitive	Apply

SUBCODE	SUB NAME	L	T	P	C
XAR 904C	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					7
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					8
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 future trends, 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

5

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. Dovey K, (1999) Framing Places, meditiating power in built form, Rent ledge, London.

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				
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				
	10	7	9	-	-	5	-	11	-	-		
Scaled to 0,1,2,3 scale	2	2	2	0	0	1	0	3	0	0	0	1

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

Objective :

- To evolve a critical thought process, to equip students with fundamental research skills and communication.
- To develop a systematic process of abstraction, with a rigor of scientific and qualitative analysis.
- To recognise inter-disciplinary research methods and develop a foundation for thesis and future research.

SUBCODE	SUB NAME	L	T	P	C
XAR 904D	ARCHITECTURAL RESEARCH SKILL;	3	0	0	3
C:P:A =2:0:0		L	T	P	H
		3	0	0	3
UNIT – I ANALYTICAL EXERCISE					8
Exercises in analysis with case studies. Selection of project					
UNIT – II DOCUMENTATION AND ANALYSIS					8
Exercises in drawings and documentation and evolve critical framework					
UNIT – III ANALYSIS THROUGH MODEL					8
Exercises in models and drawings - to critically analyse case studies and test framework. etc.					
UNIT – IV REPORT PREPARATION					8
Group work project - Inferences and final models/ drawings with short report					
UNIT – V SEMINAR					13
External Architect jury and interactions – along with presentations on emerging trends.					
	LECTURE	TUTORIAL	PRACTICAL	TOTAL	
	45	0	0	45	
TEXT					
Noberg Shulz, Intentions in Architecture - MIT Press, Reprint - 2010					
Linda Groat, Architecture Research Methods, Wiley, 2015					

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				2	3	3
CO-2			3	3		3						
CO-3			3	3		3						
CO-4	2			3		3						
	4		6	12		12				2	3	3
Scaled to 0,1,2,3 scale	1	0	2	3	0	3	0	0	0	0	1	1

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 2015-16

Curriculum Structure for B.Arch. Degree Programmes offered by PMU

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	26	36	7
II	25	36	7
III	21	32	7
IV	21	32	7
V	21	31	7
VI	21	32	7
VII	4	-	1
VIII	21	31	6
IX	21	31	6
X	10	-	1
I - X	191 Credits	-	56

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 + Studio course	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
	0	0	8	8	0	0	8	16

Note:

1. Evaluation and Assessment must be done for all non credit courses.
2. 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.