PERIYAR MANIAMMAI INSTITUTE OF SCIENCE & TECHNOLOGY

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

Criterion 1 – Curricular Aspects

Key Indicator	1.1	Curriculum Design and Development
Metric	1.1.3	Average percentage of courses having focus on employability/ entrepreneurship/ skill development offered by the Department of Architecture

DEPARTMENT OF ARCHITECTURE

SYLLABUS COPY OF THE COURSES HIGHLIGHTING THE FOCUS ON EMPLOYABILITY/ ENTREPRENEURSHIP/ SKILL DEVELOPMENT

1. List of courses for the programmes in order of

S. No.	Programme Name
1.	Bachelor of Architecture
2.	Master of Architecture

2. Syllabus of the courses as per the list.

Legend: Words highlighted with **Blue Color** - Entrepreneurship
Words highlighted with **Red Color** - Employability
Words highlighted with **Green Color** - Skill Development

1. LIST OF COURSES

Name of the Course	Course Code	Year of Introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
History of Architecture – I	XAR101	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Theory of Architecture – I	XAR102	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Architectural Mathematics	XAR 103	2007-08	*****
Communication skills	XAR104	2019-20	**Skill Development**- Discussion, Writing, Speaking and Test
Architectural Graphics – I	XAR105	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Visual Arts	XAR106	2007-08	**Skill Development**- Sheets, Model and Sketches
Basic Design	XAR107	2007-08	**Skill Development**- Sheets, Model and Sketches
History of Architecture - II	XAR201	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Theory of Architecture - II	XAR202	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Mechanics of Structures - I	XAR203	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Architectural Graphics - II	XAR204	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Materials and Construction -I	XAR205	2007-08	Employability - Assignments, Sketches, Site visit, Model and plates
Carpentry and Model making workshop	XAR206	2021-22	**Skill Development**- Sheets, Model and Sketches
Architectural Design - I	XAR207	2007-08	**Entrepreneurship**- Sheets, Sketches, Literature study, Case study, Models, Plan, Elevations, Sections and Views
History of Architecture - III	XAR301	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Site Surveying and Planning	XAR302	2021-22	Employability - Assignments, Sketches, Site visit, Model and Test
Mechanics of Structures - II	XAR303	2007-08	Employability - Assignments, Sketches, Site visit, Model and

			Test
Building Services - I	XAR304	2007-08	Employability - Assignments, Sketches, Site visit, Model and plates
Materials and Construction -II	XAR305	2007-08	Employability - Assignments, Sketches, Site visit, Model and plates
Computer Applications in Architecture - I	XAR306	2007-08	**Skill Development**- Sheets, Model and Sketches
Architectural Design - II	XAR307	2007-08	**Entrepreneurship**- Sheets, Sketches, Literature study, Case study, Models, Plan, Elevations, Sections and Views
History of Architecture - IV	XAR401	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Climate and Architecture	XAR402	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Design of Structures - I	XAR403	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Building Services - II	XAR404	2007-08	Employability - Assignments, Sketches, Site visit, Model and plates
Materials and Construction - III	XAR405	2007-08	Employability - Assignments, Sketches, Site visit, Model and plates
GIS for Rural Development	XARON34	2007-08	Employability - Assignments, Sketches, Site visit, Model and plates
Architectural Design - III	XAR406	2007-08	**Entrepreneurship**- Sheets, Sketches, Literature study, Case study, Models, Plan, Elevations, Sections and Views
Contemporary Architecture	XAR501	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Environmental Sciences	XAR502	2015-16	Employability - Assignments, Sketches, Site visit, Model and Test
Design of Structures - II	XAR503	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Building Services - III	XAR504	2007-08	Employability - Assignments, Sketches, Site visit, Model and plates
Materials and Construction- IV	XAR505	2007-08	Employability - Assignments, Sketches, Site visit, Model and plates

Computer Applications in Architecture – II	XAR506	2019-20	**Skill Development**- Sheets, Model and Sketches
Architectural Design – IV	XAR507	2007-08	**Entrepreneurship**- Sheets, Sketches, Literature study, Case study, Models, Plan, Elevations, Sections and Views
Vernacular Architecture	XAR601	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Culture and Architecture	XAR602A	2015-16	Employability - Assignments, Sketches, Site visit, Model and Test
Estimation, Costing & Valuation	XAR603	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Glass in Architecture	XAR604A	2020-21	Employability - Assignments, Sketches, Site visit, Model and plates
Building Automation and Management system	XAR604B	2020-21	Employability - Assignments, Sketches, Site visit, Model and plates
Advanced Building Technology	XAR604C	2015-16	Employability - Assignments, Sketches, Site visit, Model and Test
Materials and Construction - V	XAR605	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Architectural Working Drawing and Specifications	XAR606	2015-16	**Skill Development**- Sheets, Model and Sketches
Architectural Design - V	XAR607	2007-08	**Entrepreneurship**- Sheets, Sketches, Literature study, Case study, Models, Plan, Elevations, Sections and Views
Human Settlement Planning	XAR701	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Professional Practice & Ethics	XAR702	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Disaster Resistance in Architecture	XAR703A	2015-16	Employability - Assignments, Sketches, Site visit, Model and Test
Architectural Lighting and Acoustics	XAR703B	2015-16	Employability - Assignments, Sketches, Site visit, Model and Test
Behavioural Studies in Built Environment	XAR703C	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Landscape Design	XAR704	2022-23	Employability - Assignments, Sketches, Site visit, Model and Test

Materials and Construction – VI	XAR705	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Architectural Design – VI	XAR706	2007-08	**Entrepreneurship**- Sheets, Sketches, Literature study, Case study, Models, Plan, Elevations, Sections and Views
Practical Training	XAR801	2007-08	Entrepreneurship-Students work as an intern for six months in a reputed architectural firm getting involved in real time architectural design projects and their execution.
Urban Design	XAR901	2007-08	Employability - Assignments, Sketches, Site visit, Model and Test
Project Management	XAR902	2015-16	Employability - Assignments, Sketches, Site visit, Model and Test
Housing	XAR903	2015-16	Employability - Assignments, Sketches, Site visit, Model and Test
Interior Design	XAR904B	2022-23	Employability - Assignments, Sketches, Site visit, Model and Test
Energy Efficient Architecture	XAR904C	2015-16	Employability - Real time study , analysis and proposal for societal need projects
Materials & Technologies for Sustainable Architecture	XAR904D	2019-20	Employability - Real time study , analysis and proposal for societal need projects
Dissertation	XAR905	2015-16	**Entrepreneurship**- Students select individual societal need architecture topic, do literature study, case study, and real time study, do analysis and give societal need conclusion
Architectural Design – VII	XAR906	2007-08	**Entrepreneurship**- Students select a urban space for study and collect data, problems and issues give solution for the selected urban spaces.
Thesis	XAR1001	2007-08	**Entrepreneurship**- Students select individual project and design based on the study of Special study, Literature study, Case study, Site analysis, Concept development, plan, elevation, sections, views . models
Emerging Practices in Housing	YAR101	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test

Appropriate Materials and Technology for Sustainable Architecture	YAR102	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Advanced Studies in Regional and Vernacular Architecture	YAR 103	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Services in High rise Buildings	YAR104	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Architectural Design Studio –I	YAR105	2012-13	**Entrepreneurship**- Sheets, Sketches, Literature study, Case study, Models, Plan, Elevations, Sections and Views
Contemporary Theories and Trends	YAR201	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Research Methodology	YAR202	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Advanced Materials and Construction Technology	YAR203 A	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Digital Design Process in Architecture	YAR204	2012-13	**Skill Development**- Sheets, Model and Sketches
Building Management Systems	YAR205	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Architectural Design Studio II	YAR206	2012-13	**Entrepreneurship**- Sheets, Sketches, Literature study, Case study, Models, Plan, Elevations, Sections and Views
Sustainable Landscape Design	YAR301	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Heritage Conservation Planning	YAR302	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Urban Design Practices	YAR303	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Energy Simulation and Modeling	YAR304B	2012-13	Employability - Assignments, Sketches, Site visit, Model and Test
Dissertation	YAR305	2012-13	Employability - Real time study , analysis and proposal for societal need projects
Architectural design studio -III	YAR306	2012-13	**Entrepreneurship**- Sheets, Sketches, Literature study, Case study, Models, Plan, Elevations, Sections and Views

Thesis	YAR401	2012-13	**Entrepreneurship-** Students select individual project and design based on the study of Special study, Literature study, Case study, Site analysis, Concept development, plan, elevation, sections, views . models

2.SYLLABUS

SUBCODE	SUB NAME	L	T	P	C
XAR 101	HISTORY OF ARCHITECTURE – IV	3	0	0	3
C:P:A	3:0:0	L	T	P	H
		3	0	0	3

UNIT – I ROMANESQUE **10**

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

UNIT – II GOTHIC **12**

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

UNIT – III RENAISSANCE **11**

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

UNIT – IV RENAISSANCE ARCHITECTS **12**

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

Italy - Brunelleschi, Donatello, Rapheal, Michelangelo and Andrea Palladio
England - Sir Christopher Wren, Inigo Jones and John Webber
France - Pierre Lescot, Philibert de l'Orme, and Jean Bullant

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

WEBSITES

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

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2
CO1	2	-	1	-	-	-	-	-	-	1	-	-

CO2	2	-	1	-	-	-	-	-	-	1	-	-
CO3	2	-	1	-	-	-	-	-	-	1	-	-
CO4	2	-	1	-	-	-	-	-	-	1	-	-
Total	8	-	4	-	-	-	-	-	-	4	-	-
Scaled Value	2	-	1	-	-	-	-	-	-	1	-	-

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

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

UNIT – I WHAT IS ARCHITECTURE ? 5

Few definitions to architecture.
Objective, scope and need for architecture. Its applications.

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

The functional and aesthetic components of architecture.
The relationship between architecture and technology.
The relationship between architecture and fine arts.
Design process: Intuition vs analysis and synthesis (artistic vs scientific)

UNIT – III AESTHETIC COMPONENT 15

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

UNIT – IV ARCHITECTURAL SPACE 10

Space defining elements: Vertical, horizontal and curved elements.
Spatial relationship: space within a space, interlocking spaces, adjacent spaces, spaces linked by common spaces.
Spatial organization: influencing factors and their types: centralized, linear, radial, cluster, grid with examples.

UNIT – V PRINCIPLES OF DESIGN 10

Proportion: Need for proportion, Golden Proportion, Modular. Indian proportion and Japanese Proportions.
Scale: The need for scale, human scale and generic scale.
Ordering Principles: Balance, Rhythm, Symmetry, datum, hierarchy, pattern and axis citing

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 104	COMMUNICATION SKILLS	1	0	1	3
C:P:A	3:0:0	L	T	P	H
		1	0	1	3

UNIT - I INTRODUCTION **9**

Listening- short talks, interviews and discussions from various media
Speaking-negotiating meaning, convincing people- describing places
Reading- texts on architecture, Writing process descriptions -Vocabulary Development-Abbreviations and Acronyms. Grammar - Suitable tenses to write descriptions and describe.

UNIT– II SPEAKING, READING AND WRITING **9**

Listening–listen to talks for specific information.
Speaking- preparing a presentation using the computer, participating in small group discussion. Reading- lengthy articles related to architecture and construction
Writing- writing formal emails, vocabulary appropriate words to describe topics in architecture. Grammar- suitable grammar for writing a report.

UNIT– III DESCRIPTIVE PRESENTATION **9**

Listening- Descriptions of place, conversations and answering questions,
Speaking- making a power point presentation on a given topic,
Reading- architecture manuals, Writing- writing a report, writing essays-descriptive essays, Vocabulary- adjectives of comparison, Grammar - collocations.

UNIT – IV ANALYTICAL PRESENTATION **9**

Listening- TED talks, Speaking- participating in group discussions,
Reading- reading and interpreting visual information,
Writing- writing analytical essays and argumentative, Vocabulary- suitable words to be used in analytical and argumentative essays, Grammar - subject-verb agreement.

UNIT – V PROJECT PROPOSAL PRESENTATION 9

Listening- ink talks and longer talks, Speaking- talking about one's project proposal,
Reading- reading essays on construction, buildings, different schools of architecture, Writing proposals, Vocabulary- related vocabulary, Grammar- Cohesive devices.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	30	45

TEXT

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

E – REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR105	ARCHITECTURAL GRAPHICS - I	1	0	2	4
C:P:A	0.6:1.8:0.6	L	T	P	H
		1	0	2	5

UNIT - I **INTRODUCTION TO GEOMETRICAL DRAWING** **15**

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

UNIT - II **PLANE GEOMETRY** **20**

Construction of planar surfaces - square, circle, curve, polygon etc,
Projection of points, lines and planes

UNIT - III **ORTHOGRAPHIC PROJECTIONS** **10**

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

UNIT - IV **AXONOMETRIC PROJECTIONS** **10**

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

UNIT - IV **MEASURED DRAWING** **20**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	60	75

TEXT

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

REFERENCES

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

WEBSITES

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

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

UNIT – I **BASICS OF DRAWING** **25**

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

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

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

UNIT –III **PAINTING** **35**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	90	90

TEXT

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

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

UNIT – I **INTRODUCTION TO DESIGN** **30**

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

UNIT – II **PRINCIPLES OF VISUAL COMPOSITIONS** **50**

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

Introduction to principles of organization/composition

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

UNIT –III **STUDY OF COLOURS** **30**

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

UNIT – IV **VISUAL PROPERTIES** **20**

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

UNIT –V **FORMS – GEOMETRIC / SCULPTURAL** **50**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	180	180

TEXT

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

REFERENCES

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

WEBSITES

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

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

UNIT – I	**INTRODUCTION TO INDO ISLAMIC ARCHITECTURE**	**10**

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

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

UNIT–II	**ISLAMIC ARCHITECTURE-IMPERIAL ERA**	**12**

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

UNIT–III	**ISLAMIC ARCHITECTURE - PROVINCES**	**10**

Evolution of regional architecture and the factors influencing - geographic, cultural, political, etc., - Bengal – Adina mosque, Gujarat - earlier period – Mosque at Broach, Jami Masjid at Ahmedabad, middle period - Mosque at Champanir, Teen Darwaza, later period - Siddisayad mosque, Shah Alam Rauza, Adalaj - step well , Rani Rupavatis Mosque, Jaunpur- Jami Masjid of Jaunpur, Malwa - royal complex at Mandu, Kashmir – Jami Masjid, Srinagar, Deccan (Gulbarga, Bidar, Golconda and Bijapur)

UNIT–IV	**MUGHAL ARCHITECTURE**	**13**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

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

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

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

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

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

Handling architectural projects: Planning, designing and execution.

UNIT – II ANTHROPOMETRICSAND ITS APPLICATION **5**

Determining size and shape of various activity spaces

UNIT– III CLIMATE AND SITE **10**

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

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

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

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

UNIT – V SOCIO PSYCHOLOGICAL ASPECTS **10**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

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

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

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

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

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

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

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

UNIT – IV PROPERTIES OF SECTION **10**

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

UNIT –V ELASTIC PROPERTIES OF SOLIDS **10**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

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

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

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

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

Characteristics of Perspective Drawings, Perspective systems and methods. Two point perspective of simple objects, outdoor and indoor view of a building, etc. One point and three point perspective of interiors Perspective theory and practice using scientific methods and short cut methods. Applying rendering techniques.

UNIT - III **SCIOGRAPHY** **20**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	60	75

TEXT

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

REFERENCES

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

WEBSITES

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

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

UNIT – I **INTRODUCTION** **15**

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

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

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

UNIT– II **STONE** **20**

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

UNIT – II LIME 5

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

UNIT – IV RURAL MATERIALS AND CONSTRUCTION 20

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

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

REFERENCES

1. R.J.S.Spencke and D.J.Cook, Building Materials in Developing Countries, John Wiley andSons, 1983.
2. HUDCO - All you want to know about soil stabilized mud blocks, HUDCO Pub, New Delhi,1989.
3. UNO - Use of bamboo and reeds in construction - UNO Publications. Rural Construction - NBO, New Delhi

WEBSITES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 206	CARPENTARY AND MODEL MAKING WORKSHOP	0	0	3	3
C:P:A	0:3:0	L	T	P	H
		0	0	3	6
UNIT – I	INTRODUCTION TO MODEL MAKING				15
	Need for architectural models, Role of scale-models in design; General practices in model making; Types of models: block, detailed, construction & interior models. Introduction to concepts of model making and various materials used for model making.				
UNIT – II	BASE AND BLOCK MODELLING				15
	Preparation of base for models using wood or boards, Introduction to block models of objects (3D Compositions) and buildings involving the usage of various materials like Thermocole, Soap/Wax, Boards, Clay, etc.				
UNIT –III	DETAIL MODELLING				20

	Making detailed models which includes the representation of various building elements like Walls, Columns, Steps, Windows/glazing, Sunshades, Handrails using materials like Mountboard, Snow-white board, acrylic sheets; Representing various surface finishes like brick/stone representation, stucco finish etc; Various site elements – Contour representation, Roads/Pavements, Trees/Shrubs, Lawn, Water bodies, Street furniture, Fencing etc,	
UNIT– IV	**JOINERY AND STRUCTURAL SYSTEMS MODEL**	**20**
	JOINERY Simple exercises in cutting, finishing and joinery with simple blocks; Use of carpentry tools and making joints such as Dovetail joint, Mortise and Tenon joint, Lap joint, Butt joint, etc. to be used for making furniture. MODELS OF STRUCTURAL SYSTEMS Makingmodels of the various structural systems used in buildings like; Space frames – using Match sticks, wires; Different forms of shell roofs using POP, Clay, Soap; Tensile structures using fabric	
UNIT – V	**INNOVATIVE IDEAS, MATERIAL AND TECHNIQUES**	**20**
	Flexible for the teacher to decide assignments for representing innovative ideas, and by using new materials and techniques.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	90	90

TEXT BOOKS

1. Models.3rd Ed. Hoboken : John Wiley & Sons.
2. Kieran, S. and Timberlake, J. (2008). LobollyHouse : Elements of a New Architecture. New York : Princeton Architectural Press.
3. Morgan, C. L. and Nouvel, J. (2002). The Elements of Architecture. London : Thames &Hudson.
4. Werner, M. (2011). Model Making. New York : Princeton Architectural Press
5. Elements of Workshop Technology, Vol. I", HajraChoudhury, HazraChoudhary and Nirjhar Roy, Media promoters and Publishers Pvt. Ltd., 2007.
6. "Workshop Technology", W. A. J. Chapman,1st South Asian Edition, Viva Book Pvt Ltd., 1998.
7. "Manufacturing Technology, Vol.1, 3rd Ed.", P.N. Rao,Tata McGraw Hill Publishing Company, 2009
8. Mills, Criss B., "Designing with Models",John Wiley & Sons, New Jersey,.
9. Knoll, Wolfgang & Hechinger, Martin, "Architectural Models", J.Ross Publishing,2006.
10. Watson, Don A., "Construction Materials and Processes", McGraw Hill Co., University of Michigan,1972.
11. Mckay, W.B., "Building Construction", Vol.1, 2, 3 Longmans, U.K.1981.
12. Alanwerth, "Materials", The Mitchell Pub.Co.Ltd., London, 1986.
13. Chudley, R., "Building Construction Handbook", British Library Cataloguing in Publication Data, London, 1990.
14. Rangwala, S.C., "Engineering Materials", Charotar Pub. House, Gujarat, 1997.

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

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

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

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

Areas of concern/ focus:

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

Methodology:

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

Presentation:

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

UNIT – II **ADDITIVE UTILITY SCULPTURE** **24**

Design of Additive utility sculpture – Utility object

Areas of concern/ focus:

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

Methodology:

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

Presentation:

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

UNIT –III **STUDY** **36**

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

Areas of concern/ focus:

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

Methodology:

Study of Anthropometric details and applications of forms in buildings.

Presentation:

Study work has to be done in outside the classroom.

UNIT – V **DESIGN OF SPACE** **36**

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

Redesign of single space such as own room etc.

Areas of concern/ focus:

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

Methodology:

Data collection, Measure drawing of own room/case studies, analysis and presentation of studies – Data collection with respect to design and detailing for the users

Presentation:

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

UNIT –V **MULTIFUNCTIONAL SPACE** **60**

The design problem shall take into consideration of activities and their relationship with space, function, scale and proportion, climate.
The project shall be Shop, Workshop, pavilions, snack bar, cafeteria

Areas of concern/ focus:

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

Methodology:

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

Presentation:

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	180	180

TEXT

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

REFERENCES

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

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

UNIT – I	**ANCIENT INDIA**	**7**
	Indus Valley Civilization - Culture and pattern of settlement. **Aryan civilization** - Evolution of early Aryan architectural forms - origins of early Hinduism - Vedic culture Vedic village and the rudimentary forms of bamboo and Wooden construction under the Mauryan rule - origins of Buddhism and Jainism.	
UNIT–II	**BUDDIST ARCHITECTURE**	**10**
	Hinayana and Mahayana Buddhism - Architectural Production during Ashoka's rule - Ashokan Pillar. Salient features of a Chaitya hall and Vihara- Karli , Rani Gumpha	
UNIT–III	**HINDU ARCHITECTURE**	**8**
	Evolution of Hindu temple - Early shrines of the Gupta and Chalukyan periods – Tigawa temple, Ladh Khan Aihole, Papanatha and Virupaksha temples, Pattadakal. A comparative study of the Buddhist and Hindu styles	

UNIT–IV	DRAVIDIAN ARCHITECTURE	10
.	Rock cut productions under Pallavas –Shore temple, Mahaballipuram - Kailasanathar temple &Vaikunthaperumal temple, Kanchipuram, Dravidian Order – Evolution of Gopuram, city planning, Brihadeeswara Temple, Tanjore - Meenakshi temple, Madurai - Srirangam temple. **Case study**: Shore temple, Mahaballipuram - Kailasanathar temple &Vaikunthaperumal temple, Brihadeeswara Temple	
UNIT–V	**INDO ARYAN STYLE**	**10**
	Salient features of an Indo Aryan temple - Lingaraja Temple- Bhuvaneswar, Sun temple- Konarak. Kunds and Vavs – vav - Adalaj - Surya kund, Modhera – Khandharia Mahadev temple, Khajuraho - Dhilwara temple, Mt. Abu. A comparative study of the Dravidian and Indo-Aryan styles.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 302	SITE SURVEYING AND PLANNING	3	0	0	3

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

UNIT – I	INTRODUCTION TO SURVEY AND ITS TECHNIQUES	9

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

UNIT–II	SITE ANALYSIS	10

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

UNIT–III	SITE ANALYSIS TECHNIQUES	10

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

UNIT–IV	SITE PLANNING AND LAYOUT PRINCIPLES	10

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

UNIT–V	ENVIRONMENTAL FACTORS	6

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 303	MECHANICS OF STRCUTURES - II	3	0	0	3

C:P:A	2:0.5:0.5	L	T	P	H
		3	0	0	3

UNIT – I	SHEAR FORCE AND BENDING MOMENT	9

Concept of shearing forces and Bending Moments - shear force and bending Moment diagrams for cantilever and simply supported beams subjected to point load, uniformly distributed loads and their combinations.

UNIT – I I STRESSES IN BEAMS	9

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

UNIT – III	DEFLECTION OF BEAMS	9

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

UNIT – IV	THEORY OF COLUMNS	9

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

UNIT – V	INTRODUCTION TO INDETERMINATE STRUCTURES	9

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. M.M.Ratwani&V.N.Vazirani, Analysis of Structure, Vol.1, Khanna Publishers – Delhi, 1987
2. A.R.Jain and B.K.Jain, Theory and analysis of Structures,Vol. 1, Nemchand and Bros, Roorkee, 1987.

REFERENCES

1. Dr.V.S.Prasad, Basic Structural Mechanics, Galgotia Publications.
2. Timoshenko, S.P., and D.H. Young, Elements of Strength of Materials, Fifth edition, East West Press, 1993.
3. B.C.Punmia, "Strength of Materials and Theory of Structures", Vol. 1, Laxmi publications, New Delhi 1994.
4. R.K. Rajput "Strength of Materials", S.Chand& Company Ltd., New Delhi 1996

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

UNIT – I	WATER QUALITY, PURIFICATION AND TREATMENT	10

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

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

UNIT–II	WATER DISTRIBUTION AND STORAGE	16

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

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

UNIT–III	STORM WATER DRAINAGE AND RAIN WATER HARVESTING	10

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

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

UNIT–IV	SEWERAGE AND SANITATION	14

.	Sewerage, Sewer and sewage. Sewage - Their disposal, Primary treatment, Secondary treatment. Biological treatment. Modern types of sewage treatment plants. Sewer -Types of sewer systems, Construction details of Sewer line, gradients, manholes, inspection chambers, septic tank, leach pits, traps for various types and its details. Drainage and sanitation requirements for various private and public buildings. Drainage and sanitary appliance materials, fittings, pipes, sizes for toilet and kitchen fittings. Connection of lines to fittings. Choice of plumbing systems. Planning and layout of sanitary fittings in residences. Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings/ photos.	
UNIT–V	**SOLID WASTE MANAGEMENT**	**10**
	Solid waste management concepts and systems, waste and resources, recycling solid waste in small and large buildings - Refuse collection, disposal, Incinerator, Composting, Vermicomposting, Sanitary Land filling, Biogas system and Modern renewable energy system., equipments for handling solid waste. Refuse chute, service core concepts.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

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

REFERENCES

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

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

UNIT – I	**BRICKS AND CLAY PRODUCTS**	**20**
	Drawings of brick foundations - buildings in brickwork, bonds columns, corners – structural members in brickwork. Reinforced brick masonry - Arches - Lintels – Corbels - copings. Hollow clay blocks - for walls - partitions - roofs. Roofings - Flat Roofs or Terrace roofs - Sloping roofs. **Plates & assignments**	
UNIT – II	**TIMBER AND ALLIED PRODUCTS**	**15**
	Softwood and hardwood - Physical properties and uses - Defects, Conversion, Seasoning, decay and preservation of timber - Fire retardant treatment, anti-termite treatment. Industrial timbers - plywood, block board, particle board, fibre boards. Manufacture and uses - current developments. **Assignments**	
UNIT– III	**TIMBER JOINERY**	**30**
	Introduction to timber joinery, Details of timber joinery for Windows, doors, ventilators. Timber partitions, paneling - false ceiling, fixed partitions, movable partitions. Timber staircases - Designed staircase - timber trusses - Lean-to – close couple - Kingpost - Queen post - Trusses. Timber floors - timber built-in-furniture. **Plates through case studies**	
UNIT – IV	**COST EFFECTIVE BUILDING TECHNOLOGY**	**10**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	45	75

TEXT

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

REFERENCES

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

WEBSITES

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

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

UNIT – I INTRODUCTION TO BASICS OF COMPUTER **4**

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

UNIT – II BASIC OF AUTOCAD **8**

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

UNIT– III AUTOCAD 2D DRAWINGS **20**

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

UNIT – IV AUTOCAD 3D MODELS **16**

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

UNIT – V RENDERING AND PRESENTATION **12**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	60	60

TEXT

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

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

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	180	180

TEXT

1. Joseph De Chiara, Michael J Crosbie, “Time Saver Standards for Building Types”, McGraw Hill Professional, 2001.
2. Julius Panero, Martin Zelnik, “Human Dimension and Interior Space”, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, “Time Saver Standards for Interior Design and Space Planning”, McGraw Hill, 2001.
4. Ernst Neuferts, “Architects Data,” Blackwell, 2002.
5. Ramsey et al, “Architectural Graphic Standards”, Wiley, 2000.

REFERENCES

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

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

UNIT – I	ANCIENT INDIA	7

Indus Valley Civilization - Culture and pattern of settlement.
Aryan civilization- Evolution of early Aryan architectural forms - origins of early Hinduism - Vedic culture
Vedic village and the rudimentary forms of bamboo and Wooden construction under the Mauryan rule - origins of Buddhism and Jainism.

UNIT–II BUDDIST ARCHITECTURE 10

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

UNIT–III HINDU ARCHITECTURE 8

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

UNIT–IV DRAVIDIAN ARCHITECTURE 10

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

UNIT–V INDO ARYAN STYLE 10

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 402	CLIMATE AND ARCHITECTURE	3	0	0	3
C:P:A	0.6:1.2:1.2	L	T	P	H
		3	0	0	3
UNIT – I	CLIMATE AND THERMAL SENSATION				10

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

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

SUBCODE	SUB NAME	L	T	P	C
XAR 403	DESIGN OF STRUCTURES – I	3	0	0	3
C:P:A	0.6:1.2:1.2	L	T	P	H
		3	0	0	3
UNIT – I	ADVANCED CONCRETE STRUCTURES				9

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

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

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

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

UNIT –III TENSION MEMBERS 9

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

UNIT –IV COMPRESSION MEMBERS 9

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

UNIT –V DESIGN OF CIRCULAR SLAB AND CONCRETE WALLS 9

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

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

UNIT – I ELECTRICAL SYSTEMS 10

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

UNIT – II LIGHTING AND ILLUMINATION 9

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

UNIT –III ENERGY EFFICIENT LIGHTING 14

Energy efficient technologies and design approaches –selection of luminaries, lighting controls and daylighting, glare from lamps, Reducing electric loads, installation and maintenance – LEED certification & energy efficient lighting, energy audit for lighting performance. Solar energy systems for lighting – Photovoltaic systems for Residential/Commercial buildings. Case studies and exercises involving in the above.

UNIT –IV FUNDAMENTALS OF ACOUSTICS 9

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

UNIT –V INDOOR AND ENVIRONMENTAL ACOUSTICS 12

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 405	MATERIALS AND CONSTRUCTION – III	2	0	2	4
C:P:A	1.2:1.2:0.6	L	T	P	H
		2	0	2	5

UNIT – I FERROUS METALS 6

Introduction to Ferrous metals, Types of Ferrous metals, its properties and applications, Manufacturing process by blast furnace, oxygen furnace and production of structural shapes, cast steel, hot rolled, cold rolled steel, Heat treatment of steel, Coated steel.

UNIT – II STEEL CONSTRUCTION 3 0

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

UNIT –III	NON FERROUS METALS	5

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

UNIT –IV	CONSTRUCTION USING NON-FERROUS METALS	28

Aluminum doors and windows, Ironmongery, Aluminum glass framing systems, Curtain walls and structural glazing, Exterior wall claddings, Skylights, Interior dry wall partition, False ceiling. Application of gaskets, caulking and sealants.

Typical Plates:Aluminium windows, doors, shop front curtain walls, structural glazing systems and aluminium composite panel cladding

UNIT –V	GLASS	6

Introduction to glass, Composition and forming process, Extruded section and cast glass blocks, Types of glass, Strength of glass, Fire resistant glass, Insulation glass, Energy conservation and solar control glass, Acoustic properties of glass.

Typical Plates: Showroom glass wall systems, Glass staircase, Balustrade and glass partition systems, installation details of glass.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
15	0	60	75

TEXT

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

REFERENCES

1. B.C.Punmia, Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 1993.
2. Arthur Lyons - Materials for Architects and Builders - An Introduction - Arnold, London,1997.
3. Harold B.Olin, Construction Principles Materials and Methods, The Institute of Financial Education, Chicago, 1980.
4. Time Saver Standards for Architectural Design Data, Calendar JH, McGraw-Hill, 1974.
5. Don A. Watson, Construction Materials and processes, McGraw Hill Co., 1972.

E- REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 406	ARCHITECTURAL DESIGN – III	0	0	6	9
C:P:A	2:4:3	L	T	P	H
		0	0	6	12

UNIT – I	DESIGN STUDIO	70

Problem related to multi room, single use, small span - multiple story, Horizontal and vertical movement, Active cum passive energy, conventional and frame type buildings.
Examples: Department store, Library, higher secondary school, campus students' centre, etc. The projects will consciously provide for movement and use by the physically handicapped and elderly.

UNIT – II	DESIGN STUDIO - RURAL PROJECT	11 0

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	180	180

TEXT

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

REFERENCES

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

COURSE NAME: XARON34 Remote Sensing & GIS for Rural Development-0 0 0 3

COURSE OUTLINE : This course is intended to introduce students to the fascinating world of analog electronics. The emphasis of the course is to build intuition behind the operation of circuits. To do this, we derive circuits ground-up, from first principles. The student is expected to have undergone a basic linear-circuit analysis course, but assumes no knowledge of device physics whatsoever.

Week 1: Introduction to rural development; concepts, issues, and linkages to water and food security **Week 2:** Introduction to geospatial technology (RS&GIS) and its importance in rural development **Week 3:** Introduction to open-source software for RS& GIS applications

Week 4: Introduction to GIS Part -I (Operations on vector data sets)

Week 5: Introduction to GIS Part -II (Operations on raster data sets)

Week 6: Digital remote sensing image processing Part -I (Georeferencing of map data, cartographic maps, shape file creation)

Week 7: Digital remote sensing image processing Part -II (Digital elevation model, land use land cover change analysis)

Week 8: RS & GIS for rural water resources management – (surface water management, groundwater management)

Week 9: RS & GIS for agriculture and soil management (farm linkages, irrigation, crop management, and mapping of storage infrastructure)

Week 10: RS & GIS application for rural healthcare, education, connectivity, and communication

Week 11: RS & GIS for impact assessment of government rural development schemes Week 12: Applications and examples of RS & GIS for rural development: Selected case studies

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

UNIT – I	**NEO CLASSICAL ARCHITECTURE**	**5**

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

UNIT – II	**INDUSTRIAL REVELOUTION AND ITS IMPACT**	**13**

Industrial revolution: Definition, factors caused it, its impact on building industry and city. Discovery of new materials: Cast iron (later Steel) sheet glass and cement and their impact on building industries, discovery of new Services: Lift, Telephone, Room heating, Waste disposal etc. and their impact.

Crystal palace, London by Joseph Paxton, Arts and craft movement: Principle and factors caused it.Art- Noveau movement: Principles and factors caused it, Chicago school of Architects: their principles and work, Example: Louis Sullivan and his skyscrapers, Principles of Gaudi and works: Casa Balto

Principles of Mackintosh and works: Glasco School of Arts

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

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

The contribution made by Bauhaus institute to modern architecture

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

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

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

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

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

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Willam J.Curtis, Modern Architecture Since 1996.
2. Bill Risebero, Modern Architecture and Design.

3. Kenneth Frampton, Modern Architecture: A Critical History, Tahmes and Hudson, London, 2007.

REFERENCES

1. Thomas Metcalf, An Imperial Vision, Faber and Faber, London, 2002.
2. Manfredo Taferi / Francesco dal co., Modern Architecture, Faber and Faber/Electa,1980.
3. Sigfried Giedion, Space Time and Architecture: The Growth of a New Tradition, Harvard University Pre 1978.

SUBCODE	SUB NAME	L	T	P	C
XAR 502	ENVIRONMENTAL SCIENCES	3	0	0	3
C:P:A	3:0:0	L	T	P	H
		3	0	0	3

UNIT – I **IINTRODUCTION TO ENVIRONMENTAL STUDIES AND ENERGY** **12**

Definition, scope and importance – Need for public awareness – Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, flood, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – Role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

UNIT – II **ECOSYSTEMS AND BIODIVERSITY** **7**

Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III **ENVIRONMENTAL POLLUTION** **10**

Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Solid waste management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: flood, earthquake, cyclone and landslide.

UNIT – IV **SOCIAL ISSUES AND THE ENVIRONMENT** **10**

Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation – Consumerism and waste products – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT– V **HUMAN POPULATION AND THE ENVIRONMENT** **6**

Population growth, variation among nations – Population explosion – Family welfare programme – Environment and human health – Human rights – Value education - HIV / AIDS – Women and Child welfare programme– Role of Information Technology in Environment and human health – Case studies.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

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

E- REFERENCES

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

DESIGN OF STRUCTURES -II	**0-0-0-3**
UNIT – I PROPERTIES OF CONCRETE & WORKING STRESS METHOD OF DESIGN	**9**
Structural properties of concrete – Grades and Strength of concrete – Durability – Reinforcing steel – Code Provisions of concrete and steel – Introduction to working stress method – Design of rectangular beams for bending and shear.	
UNIT – II LIMIT STATE DESIGN – INTRODUCTION & DESIGN OF SLAB	**9**
Introduction to the Limit state method – partial safety factor - Limit state design of slab – Design of one way slab – Two way slab using IS Code for various edge conditions - Design of Flat slabs	
UNIT – III LIMIT STATE DESIGN OF BEAM	**9**

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

UNIT – IV DESIGN OF COLUMN AND STAIRCASE	9

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

UNIT – V DESIGN OF FOUNDATIONS	9

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

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	45	0	0	45

TEXT

1. Dayarathnam, Design of Reinforced Concrete Structures, Oxford and IBH Publishing Co., 1983.
2. N.C.Sinha and S.K.Roy, Fundamentals of Reinforced Concrete, S.Chand& co., New Delhi, 1983.

REFERENCES

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

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

UNIT – I	REFRIGERATION PRINCIPLES AND COMPONENTS	10

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

UNIT – II	HVAC SYSTEMS	14

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

Understanding of HVAC Ducting and piping layout drawings.

UNIT –III	VERTICAL CIRCULATION SYSTEMS	14

Elevators and escalators – types, applications and components. Conveyors, travelators, dumb waiters. Standards for all. Latest technologies in vertical transport systems. Integration of lifts and escalators with building automation systems. Understanding all the above through product catalogues/ field visits. Design exercise on the above through choice, calculations, layout and drawings.

UNIT –IV	FIRE SAFETY - GENERAL PROVISIONS	12

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

UNIT –V	FIRE DETECTION AND FIRE FIGHTING	10

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

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

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

REFERENCES

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

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

UNIT – I **CEMENT & CONCRETE - INGREDIENTS AND PROPERTIES** **12**

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

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

UNIT – II **CONCRETE CONSTRUCTION - I** **18**

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

UNIT –III **CONCRETE CONSTRUCTION - II** **15**

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

UNIT –IV **CONCRETE STAIRCASES** **20**

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

UNIT –V **FORMWORKS & SCAFFOLDING** **10**

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	45	75

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 506	COMPUTER APPLICATIONS IN ARCHITECTURE - II	0	0	2	3
C:P:A	0.5:2.0:0.5	L	T	P	H
		0	0	2	4
UNIT – I	INTRODUCTION				4
	Definition of Computer-based Animation, Basic Types of Animation: Real Time,Non-real-time, Definition of Modelling, Creation of 3D objects. Exploring the Max Interface, Controlling & Configuring the Viewports, Customizing the Max Interface & Setting Preferences, Working with Files, Setting Object Properties & Duplicating Objects, Creating & Editing Standard Primitive & extended Primitives objects, Transforming objects, etc.				
UNIT – II	2D SPLINES & SHAPES & COMPOUND OBJECT				8
	Understanding 2D Splines & shape, Extrude & Bevel 2D object to 3D, Understanding Loft & terrain, Modeling simple 4 objects with splines, Understanding morph, scatter, conform, connect compound objects, blobmesh, Boolean ,Proboolean&procutter compound object.				
UNIT– III	3DMODELLING				20
	Modeling with Polygons, using the graphite, working with XRefs, Building simple scenes, Building complex scenes with XRefs, using assets tracking, deforming surfaces & using the mesh modifiers, modeling with patches & NURBS				
UNIT – IV	KEYFRAME ANIMATION				8
	Creating Keyframes, Auto Keyframes, Move & Scale Keyframe on the timeline, Animating with constraints & simple controllers, animation Modifiers & complex controllers, function curves in the track view, motion mixer etc.				
UNIT – V	SIMULATION & EFFECTS				12

	Bind to Space Warp object, Gravity, wind, displace force object, deflectors, FFD space warp, wave, ripple, bomb, Creating particle system through p-array, understanding particle flow user interface, how to particle flow works, hair & fur modifier, cloth & garment maker modifiers etc.	
UNIT – VI	**LIGHTING& CAMERA**	**8**
	Configuring & Aiming Cameras, camera motion blur, camera depth of field, camera tracking, using basic lights & lighting Techniques, working with advanced lighting, Light Tracing, Radiosity, video post, mental ray lighting etc.	
UNIT– VII	**TEXTURING WITH MAX**	**8**
	Using the material editor & the material explorer, creating & applying standard materials, adding material details with maps, creating compound materials & material modifiers, unwrapping UVs & mapping texture, using atmospheric & render effects etc.	
UNIT – V	**RENDERING WITH V-RAY**	**8**
	V-ray light setup, V-ray rendering settings, HDRI Illumination, Fine-tuning shadows, Final render setting etc.	

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

TEXT

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

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

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

Areas of concern/ focus

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

Design Examples:

The building project shall be of housing typologies – detached, attached, group housing and so on. Shopping centers (Commercial) Home for aged, apartments (residential) Health centers, Nursing homes (institutional) etc.

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

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

TEXT

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
2. Ernst Neuferts Architects Data, Blackwell 2002.

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR601	VERNACULAR ARCHITECTURE	3	0	0	3
C:P:A	2.5:0.5:0	L	T	P	H
		3	0	0	3

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

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997.
2. Amos Rapoport, House, Form & Culture, Prentice Hall Inc. 1969.
3. R W Brunskill: Illustrated Handbook on Vernacular Architecture, 1987.

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR602A	CULTURE AND ARCHITECTURE	3	0	0	3
C:P:A =	3:0:0	L	T	P	H
		3	0	0	3

UNIT – I	INTRODUCTION	10
	History of civilizations - Evolution of first societies - Relationship between man, nature and built forms - Built forms as expressions of culture.	
UNIT – II	RELATIONSHIP BETWEEN MAN, NATURE AND SOCIETY	7
	Introduction to Sociology, an overview of Social Institutions Underlying values of relationships between Man, Nature and Society. Role of Family structure, privacy, religion and occupation, status of women etc. Settlements and its locations- river banks, valleys, fertile soils.	
UNIT – III	ROLE OF CULTURE IN ARCHITECTURE	8
	Introduction to culture and architecture. Relationship between culture and climate. Effect of socio – cultural factors in architecture. Impact of tangible and non-tangible elements on spatial design.	
UNIT – IV	ANTHROPOLOGY OF TRADITIONAL ARCHITECTURE	10
	Architecture as a Process – kinship and house societies – perceptions of built form – conceptions of space – symbolism and technology – study of the above through case study of traditional architecture in India	
UNIT – V	ALTERNATE THEORIES OF HOUSE FORM	10
	Evolution of built forms - influencing factors. Constraining and determining factors – Climate, material resources, construction and technology, site, defense, economics, religion, symbols and meanings.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Amos Rapoport, " House Form and Culture", 1969.
2. Amos Rapoport, "Culture, Architecture and Design", 2005

REFERENCES

1. Amos Rapoport, "The meaning of the Built Environment", 1982.
2. Paul Oliver, Encyclopedia of Vernacular Architecture of the world, Cambridge University Press, 1997.
3. Paul Oliver's "Built to meet needs - Cultural Issues in Vernacular Architecture", 2006

SUBCODE	SUB NAME	L	T	P	C
XAR 603	ESTIMATION, COSTING AND VALUATION	2	0	0	2

C:P:A =	1.875:0.375:0.75	L	T	P	H
		2	0	0	2

UNIT – I	INTRODUCTION TO ESTIMATION	3
	Definition, Aim and object, Scope and importance of subject. Types of Estimates - Approximate and detailed. Units of measurement for different items.	

UNIT – II	METHODS OF ESTIMATION	6
	Preparation of data and analysis of Rates for Civil Work items – as per Municipal or P. W. D. Schedule Rates and Current market rates, Units for rates. Taking of Quantities for Civil Work of Load Bearing Wall structure and preparation of abstract. Taking of Quantities of Civil Works of R. C. C. Frame Building, and preparation of abstract.	

UNIT – III	COST ESTIMATION	8
	Preparation of data and analysis of Rates for Civil Work items – as per Municipal or P. W. D. Schedule Rates and Current market rates, Units for rates. Taking of Quantities for Civil Work of Load Bearing Wall structure and preparation of abstract. Taking of Quantities of Civil Works of R. C. C. Frame Building, and preparation of abstract.	

UNIT – IV	RATE ANALYSIS	8
	Analysis of rates – using standard data and schedule of rates for conventional items – principles of pricing for new items.	

UNIT – V	VALUATION	5
	Necessity – basics of valuation – capitalized value – depreciation – escalation – value of property – calculation of Standard rent – Report preparation.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	0	30

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 604A	GLASS IN ARCHITECTURE	2	0	1	3
C:P:A =	2:0:1	L	T	P	H
		1	0	1	4

UNIT – I	INTRODUCTION	10
	Evolution & importance of glass in modern architecture. Applications of glass in buildings (façade/interior applications). Understanding the production & properties of glass. Value additions including coating technology (importance & necessity) and processing (tempering, heat strengthening, DGU, laminated, ceramic fritting). Types of Glass- mirror, lacquered, fire resistant. Modern glass with different applications. Glass for hospitals, green homes, airports, offices, other buildings. Glass and human safety compliances. Role of glass in fire safety considerations - Class E, EI & EW. Role of glass in acoustics. International standards &codal provisions.	

UNIT – II	GLASS AND GREEN ARCHITECTURE	10
	Building Physics. Theory of electromagnetic radiation. Understanding of internal and external reflections. Day-lighting in Buildings - introduction and basic concepts (VLT). Solar Control and thermal insulation (SF, UV, SHGC). Need for green Buildings. Energy efficient buildings. Achieving energy efficiency using glass. Factors of energy efficient material selection.	

	Performance parameters. Energy codes and Green ratings - ECBC, IGBC, GRIHA. Approaches of energy efficiency - prescriptive method, trade off method. Accommodating passive architecture. Whole Building Simulation.	
UNIT – III	**CASE STUDY**	**10**
	Case study of green building designed predominantly with energy efficient materials. Calculations involving basic factors in glass design. Optimization of Glass - for wastage reduction and standardisation of Design. Construction site/ green building visit report.	
UNIT – IV	**DESIGN WORKSHOP 1**	**15**
	Analysing and creating building using interactive modelling. Analysing of sun path, solar exposure building orientation, daylight, acoustics, site shadow analysis.	
UNIT – V	**DESIGN WORKSHOP 2**	**15**
	Analysis of thickness for safety, consideration of aesthetics, economy, optimisation and wastage, airconditioning load calculations and payback analysis.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. Christian Schittich, 'Glass Construction Manual', Birkhauser Basel, 2007.
2. Architectural Glass Guide', Federation of Safety Glass, 2013.

REFERENCES

1. 'LEED 2011 For India - Green Building Rating System', Indian Green Building Council, 2011
2. 2Energy Conservation Building Code. User Guide', Bureau of Energy Efficiency, 2009.
3. 'IS 875 (Part -3) Reaffirmed 1997. Code of Practice for Design loads', Bureau of Indian Standards,1998.
4. 'IS 7883. Code of Practice for the Use of Glass in Buildings', Bureau of Indian Standards, 2013.

E-REFERENCES

1. Training Manuals & E- Learning, Glass Academy.

SUBCODE	SUB NAME	L	T	P	C
XAR602B	BUILDING AUTOMATION AND MANAGEMENT	3	0	0	3
C:P:A =	0.6:0.9:0.6:0.9	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 CONTROLERS**	**15**
	Importance of Building Information Modeling (BIM), Tools used in BIM, facility operation using BIM. Controllers -Types and functions, Occupancy, Integration using Internet protocol.	
UNIT – III	**ASPECTS OF BUILDING MANAGEMENT SYSTEM**	**15**
	HVAC management – Central plant, Chillers, Cooling towers, VAV, AHU, Exhaust systems, Lighting management, Electrical systems management, Plumbing and Fire fighting systems management - detectors and alarm system integration with BMS. Energy management systems. Case study examples. Designing and drawing of a small building by applying the HVAC systems	
UNIT – IV	**SAFETY AND SECURITY SYSTEMS**	**10**
	Access control systems, Closed circuit television, Intruder Alarm, Perimeter protection, Safety system integration with BMS.	
UNIT – V	**ADVANCEMENTS IN BUILDING MANAGEMENT SYSTEM**	**15**

	Advancements in the field of Building Management System. Intelligent buildings, Role of BMS in energy efficiency and maintenance cost. Case study examples.

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 604C	ADVANCED BUILDING TECHNOLOGY	2	0	1	3
C:P:A =	2:0:3	L	T	P	H
		2	0	1	4

UNIT – I	**MODERN MATERIALS**	**10**
	Dry wall construction, Special Use of waste products and industrial by-products in concrete making- smart materials– Geo-textiles and geo-synthetics – nano materials.	
UNIT – II	**MODERN CONSTRUCTION METHODS**	**15**
	Tall buildings structural systems – Rigid frames – Braced frames – Shear wall – Buildings – Wall frame buildings – Tubular buildings – Tube-in tube buildings – Outrigger braced system – Types – single, double &multilayered grids – two way & three way space grids, connectors, Grids – Domes - various forms. examples of tensile membrane structures – types of pneumatic structures. Biomimetics -Definition, Replicating natural manufacturing methods as in the production of chemical compounds by plants and animals; Mimicking mechanisms found in nature, Imitating organizational principles from social behavior of organisms; Examples: Spider-silk as a substitute for steel, Lotus effect in self-cleansing glass, Dinosaur spine in bridge design, Lily pad structure, termite mound cooling system, swarm theory, aerodynamic structures etc.	
UNIT – III	**PREFABR1CATION AND CONSTRUCTION TECHNIQUES**	**15**
	Modular co-ordination, standardization and tolerances-system of prefabrication. Pre-cast concrete manufacturing techniques, Moulds –construction design, maintenance and repairPre-casting techniques - Planning, analysis and design considerations -. Joints -Curing techniques including accelerated curing such as steam curing, hot air blowing etc., -Test on precast elements - skeletal and large panel constructions - Industrial structures. Pre-cast and pre-fabricating technology for low cost and mass housingschemes. Small pre-cast products like door frames, shutters, Ferro-cement in housing - Water tank service core unit. Quality control - Repairs and economical aspects on prefabrication	
UNIT – IV	**DEMOLITION**	**10**
	Advanced techniques and sequence in demolition and dismantling of buildings.	
UNIT – V	**SAFETY ASPECTS INVOLVED IN CONSTRUCTION**	**10**
	Construction accidents - Construction Safety Management: - Environmental issues in construction - occupational and safety hazard assessment. Safety Programmes- Job-site assessment - Safety in hand tools- Safety in grinding- Hoisting apparatus and conveyors- Safety in the use of mobile cranes-Manual handling- Asbestos cement roofs-Safety in demolition work- Trusses, girders and beams- First- aid- Fire hazards and preventing methods- fire accidents - earthquake resistant design of buildings.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	50

TEXT

1. Peurifoy, R.L., Ledbette. W.B., Construction Planning, Equipment and Methods, McGraw Hill Co., 2000.
2. Jimmy W. Hinze, Construction Safety, Prentice Hall Inc., 1997.

REFERENCES

1. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, Construction Safety and Health Management, Prentice Hall Inc., 2001.
2. Hand Book on Construction Safety Practices, SP 70, BIS 2001.
3. N.D. Kaushika, Energy, Ecology and Environment, Capital Publishing Company, New Delhi.
4. John Fernandez, Material Architecture, Architectural Press, UK.

SUBCODE	SUB NAME	L	T	P	C
XAR604D	BUILDING AUTOMATION AND MANAGEMENT	2	0	1	3
C:P:A =	0.6:0.9:0.6:0.9	L	T	P	H
		2	0	1	4

UNIT – I	INTRODUCTION	5
	Introduction to Basics of Building Management Systems (BMS), Integrated Building Management Systems (IBMS), Building Information Modeling (BIM) and Building Automation System (BAS). Scope and Importance of Building Management Systems	
UNIT – II	BUILDING INFORMATION MODELLING AND CONTROLERS	15
	Importance of Building Information Modeling (BIM), Tools used in BIM, facility operation using BIM. Controllers -Types and functions, Occupancy, Integration using Internet protocol.	
UNIT – III	ASPECTS OF BUILDING MANAGEMENT SYSTEM	15
	HVAC management – Central plant, Chillers, Cooling towers, VAV, AHU, Exhaust systems, Lighting management, Electrical systems management, Plumbing and Fire fighting systems management - detectors and alarm system integration with BMS. Energy management systems. Case study examples. Designing and drawing of a small building by applying the HVAC systems	
UNIT – IV	SAFETY AND SECURITY SYSTEMS	10
	Access control systems, Closed circuit television, Intruder Alarm, Perimeter protection, Safety system integration with BMS.	
UNIT – V	ADVANCEMENTS IN BUILDING MANAGEMENT SYSTEM	15
	Advancements in the field of Building Management System. Intelligent buildings, Role of BMS in energy efficiency and maintenance cost. Case study examples.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 605	MATERIALS AND CONSTRUCTION - V	1	0	2	3
C:P:A =	2.4:0:0.6	L	T	P	H
		1	0	2	5
UNIT – I	CONSTRUCTION SYSTEMS DEVELOPED BY RESEARCH ORGANISATION				6
	Study of construction system innovated through research organizations like CBRI, NBO, SERC, etc. Floor, wall and roofing systems. Ferrocement its properties, uses and application in building construction including the techniques of preparation, casting, curing, etc.				
UNIT – II	FOUNDATIONS				30

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

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

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR606	**ARCHITECTURAL WORKING DRAWING AND SPECIFICATIONS**	**0**	**0**	**2**	**2**
C:P:A =	**1:0.5:0.5**	**L**	**T**	**P**	**H**
		0	**0**	**4**	**4**
UNIT – I	**ARCHITECTURAL WORKING DRAWING**				**45**

	RIBA stages of work, Tender documentation, Structure of Information, Primary structuring and secondary structuring of Working drawing, drawing numbering systems. Construction drawings of allied discipline – structural, Mechanical, electrical and Plumbing. Preparation of Working drawing for a residential, commercial project - Foundation plans, Centre line plans, all floor plans, Elevations and Sections, Door window schedules, Part Wall Sections, Blown up details, Staircase details, Kitchen details, Toilet and Bath details, approval drawing.	
UNIT – II	**SPECIFICATION WRITING**	**15**
	Necessity of specification, importance of specification, - How to write specification, - Types of Specification, -Principles of Specification writing, - Important aspects of the design of specification – sources of information – Classification of Specification. Detailed specification for earthwork excavation, plain cement concrete, Reinforced concrete, first class and second class brickwork, Damp proof course, ceramic tiles/marble flooring and dadoo, woodwork for doors, windows frames and shutters, cement plastering, painting & weathering course in terrace. **Specification writing of simple residential building & commercial building.**	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	60	60

TEXT

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

REFERENCES

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

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

UNIT – I	**DESIGN STUDIO**	**180**
	Design of large structures - Multiuse, multispan, multilevel - building types involving technology and services – Concentrating in the interior designing - Design and detailing for movement and use by physically challenged people within and around building. Design of green and sustainable buildings. **Areas of concern/focus:** Exploring the relationship between building, space, landscape and movement in a context involving diverse user groups. **Examples:** College, office buildings (Institutional) Large Commercial Complex (Commercial) Resorts (Recreational) - Mixed Residential Developments (Residential) etc. Working drawings for any one design Using Computer for presentation Skills.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
0	0	210	210

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 701	HUMAN SETTLEMENT PLANNING	3	0	0	3
C:P:A =	2.4:0:0.6	L	T	P	H
		3	0	0	3

UNIT – I	INTRODUCTION TO HUMAN SETTLEMENTS	8
	Elements of human settlement. Forms of human settlement, Growth factors of human settlement – functions, linkages, networks. Anatomy & classification of human settlements. Characteristics of human settlement at various phases of its growth stage.	
UNIT – II	INTRODUCTION TO PLANNING AND PLANNING CONCEPTS	10
	Evolution of planning profession, role and scope of a planner, planning in history – town planning in ancient India, Greek, roman and medieval. Urban forms and pattern. Planning concepts proposed by Ebenezer Howard, Patric Geddes, Lewis Mumford, CA Perry, le Corbusier. Writings of Jane Jacobs	
UNIT – III	COMPONENTS OF PLANNING	12
	Various aspects of planning - Land use planning, transportation planning, environmental planning, infrastructure planning. The fundamentals of the land use planning, Zoning principles and basis for formation of zoning laws. Growth management system, infrastructure (Infrastructure, Road, Water supply, Sanitation, Solid Waste Disposal) development and maintenance - Forecasting infrastructure needs of the town based on set of parameters such as population and size of the city, growth trend.Development Control Regulations and bye-laws, standards, CZR in India. Critical analysis of standards. ICT in city management.	
UNIT – IV	URBAN PLANNING AND URBAN RENEWAL	10
	Tools and techniques utilized at the local, regional, and state level –master plan, structure plan, and zonal plan. Local Governance and Administration: Objectives, Functions, Responsibilities and Organizational structure of: (i) Village Panchayats (ii) Municipalities (iii) Corporations and (iv) Urban Development Authorities.Urban Renewal Plan – Meaning, Redevelopment, Rehabilitation and Conservation – Govt. schemes – case studies.	
UNIT – V	CITIES -PARADIGM OF SOCIO POLITICAL EXPRESSION	5
	Self sustained communities – SEZ – transit development – integrated townships – case studies. Cities as symbolic expressions of power – Chandigarh, Delhi, Bhubaneshwar, Brasilia, Regulations and standards in India. Critical analysis of standards.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

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

REFERENCES

1. C.L.Doxiadis, Ekistics, "An Introduction to the Science of Human Settlements", Hutchinson, London, 1968.
2. Government of India, "Report of the National Commission on Urbanisation", 1988.
3. AndroD.Thomas, "'Housing and Urban Renewal", George Allen and Unwin, Sydney, 1986.
4. Rodwin, Lloyd, ed., 1987. Shelter, Settlements and Development (Hemel Hempstead, United Kingdom, Unwin Hyman Ltd.)

5. Town and country planning Act 1971 with amendments

SUBCODE	SUB NAME	L	T	P	C
XAR 702	PROFESSIONAL PRACTICE AND ETHICS	3	0	0	3
C:P:A =	1.3:1:.06:01	L	T	P	H
		3	0	0	3
UNIT – I	INTRODUCTION TO ARCHITECTURAL PROFESSION CODE OF CONDUCT AND ETHICS				9
	Importance of Architectural Profession and Role of Architects in Society – Registration of Architects – Architect's office and its management –, organizational structure - Infrastructure requirement, skills required, elementary accounts – Tax liabilities- Setting up Architectural Practice. Role of the Indian Institute of Architects – Architects Act 1972 (intent, objectives, provisions with regard to architectural practice) – Council of Architecture (role and functions) – Importance of ethics in professional practice – Code of conduct for architects, punitive action for professional misconduct of an architect. - A visit to Architectural Practice in City - A joint discussion with IIA Chapter/Centre.				
UNIT – II	ARCHITECT'S SERVICES, SCALE OF FEES & COMPETITIONS				9
	Mode of engaging an architect – Comprehensive services, partial services and specialized services – Scope of work of an architect – Schedule of services – Scale of fees (Council of Architecture norms) – Mode of payment – Terms and conditions of engagement – Letter of appointment. Importance of Architectural competitions – Types of competitions (open, limited, ideas competition) – Single and two stage competitions – Council of Architecture guidelines for conducting Architectural competitions – National and International Competitions – Case studies.				
UNIT – III	PROJECT MANAGEMENT - TENDER & CONTRACT				12
	Tender -Definition - Types of Tenders - Open and closed tenders - Conditions of tender – Tender Notice - Tender documents - Concept of EMD - Submission of tender - Tender scrutiny - Tender analysis – Recommendations – Work order - E-tendering (advantages, procedure, conditions). Contract – Definition - Contract agreement - its necessity – Contents (Articles of Agreement, Terms and Conditions, Bills of Quantities and specifications, Appendix) – Certification of Contractors Bills at various stages. New trends in project formulation and different types of execution (BOT, DBOT, BOLT, BOO, etc.) - Role of Architect in Project execution stage (A visit to major project site and interaction with Project managers).				
UNIT – IV	LEGAL ASPECTS				6
	Arbitration (Definition, Advantages of arbitration, Sole and joint arbitrators, Role of umpires, Award – Arbitration clause in contract agreement (role of architect, excepted matters) Easement – (meaning, types of easements, Copy rights and patenting – (provisions of copy right acts in India, copy right in architectural profession) Consumer Protection Act (Intent, Architects responsibility towards his clients).				
UNIT – V	IMPORTANT LEGISLATIONS AND CURRENT TRENDS				9
	Planning Parameters evolving from master plan of a city – case study 2nd master plan CMDA- Development Regulations in Second Master Plan for CMA- Building Rules emerging from National Building Code- case study Chennai Corporation Building Rules 1972 – (A visit to CMDA and a visit Chennai Corporation) Factories Act – Persons with Disabilities Act – Barrier Free Environment – Costal Regulation Zone – Heritage Act. Globalisation and its impact on architectural profession – Preparedness for International practice – Entry of Foreign architects in India – Information Technology and its impact on architectural practice. Emerging				

	specializations in the field of Architecture – Architect as construction / Project manager – Architectural journalism – Architectural photography

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Architects Act 1972.
2. Publications of Council of Architecture-Architects (Professional conduct) Regulations 1989, Architectural Competition guidelines.
3. Roshan Namavati, Professional practice, Lakhani Book Depot, Mumbai 1984.
4. Ar. V.S. Apte, Architectural Practice and Procedure, Mrs. Padmaja Bhide, 2008.
5. Madhav Deobhakta, Architectural Practice in India, CoA; 2007

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 703A	DISASTER RESISTANT IN 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.

SUBCODE	**SUB NAME**	**L**	**T**	**P**	**C**
XAR703B	**ARCHITECURAL LIGHTING AND ACOUSTICS**	**3**	**0**	**0**	**3**
C:P:A =	**2:2:2**	**L**	**T**	**P**	**H**
		3	**0**	**0**	**3**

UNIT – I	**ACOUSTICS**	**10**
	Fundamentals – Sound waves, frequency, intensity, wave length, measure of sound, decibel scale, speech and music frequencies, and Reverberation time. Acoustics and building design- site selection, shape volume, treatment for interior surfaces, basic principles in designing open air theatres, cinemas, broadcasting studios, concert halls, class rooms, lecture halls, schools, residences, office buildings including constructional measures and sound reinforcement systems for building types – case studies	
UNIT – II	**INTRODUCTION TO LIGHTING**	**10**

	An overview of the history of architectural lighting design - Impact of Lighting design over the composition of Architectural & Interior spaces –Quality of light, brightness, colour and glare - Impact of finishes and Materials - The psychology of light and space - The impact of light on health and human behavior.	
UNIT – III	**LIGHT CONTROL SYSTEMS**	**7**
	Optical systems - Principles of controlling light (reflection/refraction) reflectors & lenses - Types of luminaires - Luminaire evaluation, components, features and accessories - Electronic Controls - Basic dimming/control logic and equipment – Specifications - The lighting specification process, various specification formats and written specifications.	
UNIT – IV	**DESIGN APPLICATIONS**	**10**
	Lighting Principles - Concepts and guidelines for general lighting, wallwashing, floodlighting, orientation lighting and beam angle studies for accent lighting - Design Concepts - Geographic context and client program requirements; visualization, communication techniques (hand sketch, computer modelling and/or rendering), lighting simulations, mock-up and lighting design narrative - Layout and documentation - Basics of architectural drawings, lighting drawings, reflected ceiling plans, luminaire schedule, specifications and typical lighting details.	
UNIT – V	**ENERGY EFFICIENT LIGHTING DESIGN**	**8**
	Understanding of Sustainable design issues related to energy usage in lighting - Energy Codes & requirements – Light level guidelines & standards of practice – CFL- LED lighting technology.	

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

TEXT

1. Work of Architecture in the Age of Mechanical Reproduction, Differences MIT press, 1997.
2. Peter Eisenman, Vision Unfolding, Architecture in the Age of Electronic Media, 1992.
3. William J Mitchell, the Logic of Architecture: Design, Computation and Cognition. MIT Press, Cambridge, 1995
4. Ali Rahim, “Contemporary Process in Architecture”, John Wiley & Sons, 2000
5. Contemporary Techniques in Architecture”, Halsted Press, 2002

REFERENCES

1. Gillian Hunt, “Architecture in the Cybernetic Age”, Architectural Design Profile no.136,1998
2. Sarah Chaplin, “Cyberspace Lingering on the Threshold”, (architecture, postmodernism and difference, Architectural Design Profile No. 118: Architects in Cyberspace, 32-35, London: Academy Edition, 1995
3. Rob Shields (ed.), “ Cultures of the internet: Virtual Spaces, Real Histories, Living bodies”, Sage, London, 1996
4. John Beckman, The Virtual Dimension, Architecture, Representation and Crash Culture, Princeton Architecture Press, 1998.
5. William J Mitchell, “City of bits: Space, Place and the Infobahn”. MIT Press, Cambridge, 1995

SUBCODE	SUB NAME	L	T	P	C
703 C	BEHAVIORAL STUDIES IN BUILT ENVIRONMENT	3	0	0	3
C:P:A =	1.2:1.2:0.6	L	T	P	H
		3	0	0	3

UNIT – I	CONCEPTS AND CONCERNS OF PERCEPTION	5
	Definition - Visual perception - perceptual constancy, objective and spatial vision, attention and awareness, methods of vision perception and science	
UNIT – II	DEVELOPING SENSIVITY TO THE NEEDS OF USERS AND CLIENTS	5
	Architectural assumptions and Environmental Designs, Designs and social practices, involvement of clients and user in Designs and built environment, realities of clients and public their impact projects and designs	
UNIT – III	DESIGNING AND PLANNING FOR URBAN QUALITY	10
	Quality of urban environment and living - past, present and futuretrends, role of urban design in urban environment, planning for quality living in urban areas	
UNIT – IV	MICRO AND MACRO BUILT ENVIRONMENT AND BEHAVIORALASPECTS	5
	Relationship of built environment to society, spatial relationship within built - environment, influence of physical environment on human behavior, influences of built environment on human behaviour	
UNIT – V	BUILT - ENVIRONMENT AND PERCEPTION	9
	Case studies of tall buildings, low raise neighborhoods, interior and exterior elegance of built environment, local and regional level landscape.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Parfeet M and Power G, Planning for urban quality, Rent ledge, London 1977.
2. JohathanBatnett - Urban Design as public polody - Haxper and row Publications New York,1983

REFERENCES

1. Yantis .S (2001), Visual perception, Psychology Press, Philadelphia.
2. Nicol D and Pilling S (2000), changing Architectural education - Towards new propersimalism, Spon Press, London.
3. Frey H, (1999), Eand FN Spon, London.
4. 4. Dovey K, (1999) Framing Places, meditiating power in built form, Rent ledge, London.

SUBCODE	SUB NAME	L	T	P	C
XAR704	LANDSCAPE DESIGN	2	0	1	3
C:P:A	1.2:1.8:0	L	T	P	H
		2	0	1	4

UNIT – I	**INTRODUCTION**	**10**
	Introduction to Landscape, Categories and Materials in Landscape, Objective and Professional Scope of Landscape. Basic concepts of ecology and the impact of human activities on them. Bio, Geo, chemical cycles including water cycle, carrying capacity of an ecosystem. Environmental impact assessment. Reclamation and restoration of derelict lands.	
UNIT – II	**ELEMENTS IN LANDSCAPE DESIGN**	**13**
	Introduction to hard and soft landscape elements. Different types of hard landscape elements. Plant materials, Plants as design elements- classification structural characteristic of plants – visual characteristics of plant viz. line, form, texture, colour, etc. – basic data for plant selection. water and landform - classification, characteristics, use and application in landscape design.	
UNIT – III	**GARDENS**	**10**
	Catagories of garden, Indian, Japan, Spanish, Chinese, English French, Italian, Mugal Garden (TajMahal) Japanese gardens: Italian Renaissance gardens, Outline of landscape and garden design in Indian history. Gardens depicted in Sanskrit literature, Nandavanams and residential gardens of South India. Mughul gardens. Public parks and residential gardens of the colonial period. Contemporary public landscape projects. Study of notable examples. Spatial development in landscape design.	
UNIT – IV	**PLANTING DESIGN**	**15**
	Behavioral principles, landform design, Landscape character – Landscape Composition – Plant Association– Landscape effects-Organisation of spaces- circulation, built form and open spaces- exercises on planning for neighbourhood parks and campus developments..	
UNIT – V	**LANDSCAPE DESIGN OF FUNCTIONAL AREAS / /PUBLIC OPEN SPACES**	**12**
	Urban open spaces and principle of urban landscape. Street landscaping, landscape design for waterfront areas and functional areas in urban centres like squares, plazas . Green infrastructure including green roofs and walls Landscaping for residential layout – ecreational facilities, like parks, play fields- water front areas – hill areas , Consideration and key factors to landscaping of above context. **Design Assignment**: landscape proposal and Drawing preparation for assigned projects.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
40	0	20	60

TEXT

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

REFERENCES

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

COURSE CODE	**XAR705**	**L**	**T**	**P**	**C**
COURSE NAME	**MATERIALS AND CONSTRUCTION – VI**	**2**	**0**	**2**	**3**
PREREQUISITES	**MATERIALS AND CONSTRUCTION – IV**	**L**	**T**	**P**	**H**
C:P:A	**1:1:1**	**1**	**0**	**4**	**5**

UNIT – I DAMP AND WATER PROOFING	**15**

Damp proofing materials - Asphalt, Bentonite clays, butyl rubber, silicones, vinyls, Epoxy resins and metallic sheets - properties, uses. Water proofing materials - rug, asbestos, glass, felt - plastic and synthetic rubber -vinyls, butyl rubber, neoprene polyvinyl chloride (PVC) - prefabricated membranes - sheet lead, asphalt - properties and uses, Expanded polystyrene roof insulation and extruded polystyrene foam insulation. Application of the above under various situations - basement floors, swimming pools, terraces, etc. – plates and assignments

UNIT II THERMAL INSULATION **15**

Heat transfer – Heat gain and heat loss by materials – Types of insulation materials - vapor barriers and rigid insulation. Blanket, poured and reflective insulation - properties and uses of fiber glass, foamed glass, cork, vegetable fibers, mineral fibers, foamed plastics and vermiculite. Gypsum - manufacture, properties and uses, Plaster of Paris and anhydride gypsum. Foam based insulation. Internal wall insulation and EFIS – External façade insulation system.Construction details of the material application of floors, walls and roofs – Cold storages- Detailing for physically handicapped.

UNIT III ACOUSTIC INSULATION **15**

Porous, Baffle and perforated materials such as plastic, acoustic tiles, wood, particle board, fiber 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 -Linoleum, 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 **10**

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
	25	0	50	75

TEXT

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 706	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	21 0

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

SUBCODE	SUB NAME	L	T	P	C
XAR 801	PRACTICAL TRAINING	0	0	0	4
C:P:A	3:1:0				
		L	T	P	H
		0	0	0	100

The Practical Training would be done in offices / firms in India empanelled by the Institution in which the principal architect is registered with the Council of Architecture if the firm is in India or in an internationally reputed firm established abroad.The progress of practical training shall be assessed internally through submission of log books supported by visual documents maintained by students every month along with the progress report from the employer/s of traineesThe students would be evaluated based on the following criteria:1. Adherence to time schedule, Discipline.2. Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings

.3. Ability to work as part of a team in an office.4. Ability to participate in client meetings and discussions5. 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

SUBCODE	URBAN DESIGN	L	T	P	C
XAR 901	URBAN DESIGN	3	0	0	3

C:P:A =	2.4:0.6:0	L	T	P	H
		3	0	0	3

UNIT – I	**INTRODUCTION TO URBAN DESIGN**	**06**
	Introduction to cities, Components of urban space such as blocks, density, neighborhood, streets etc and their interdependencies - outline of issues/ aspects of urban space and articulation of need for urban design- scope and objectives of urban design as a discipline.	
UNIT – II	**HISTORIC URBAN FORM**	**10**
	Overview of rise and fall of various river civilizations**.** Detailed study of urban development throughout the globe.**Western:** Morphology of early cities - Greek agora - Roman forum - Medieval towns-Renaissance place making - ideal cities – Industrialization and city growth - the eighteenth century city builders Garnier's industrial city - the American grid planning- anti urbanism and the picturesque- cite industrielle- citte nuovo- radiant city. **Indian:** Evolution of urbanism in India- Temple towns - Mughal city form- medieval cities -colonial urbanism- urban spaces in modernist cities: Chandigarh, Bhuvaneshwar and Gandhi Nagar subsequent directions – case studies.	
UNIT – III	**THEORIES AND ILLUSTRATIONS OF URBAN DESIGN**	**9**
	To understand urban design thru reading and illustrations. Ideas of Image ability and townscape: Cullen, Lynch- place and genius loci - collective memory historic reading of the city and its artifacts: Rossi- social aspects of urban space: life on streets and between buildings, life style, gender and class, Jane Jacobs, William Whyte. Contemporary theories in Urbanism, New Urbanism concepts.	
UNIT – IV	**URBAN DESIGN AND URBAN ANALYSIS**	**10**
	Understanding various tools thru which an urban setting could be perceived - maps, sketches, photo documentations, reading, data collections, transects etc. Students to have a broad knowledge of various techniques to read a city. The various aspects of urban growth esp. in Asian cities, city limits/boundaries, urban structure, urban architecture, typologies as well as infrastructural planning, parcellation, public space and design guidelines will be introduced. The critical role that transportation plays in structuring the city will also be examined.	
UNIT – V	**SUSTAINABLE URBAN DESIGN AND DEVELOPMEMNT**	**10**
	Overview of urban ecology. Contemporary issues of urban ecology in Asian context and its articulation towards urban design. Urban sustainability focuses on forms and flows of urban, industrial and natural systems. Two main categories of spatial typologies and ecological flows to be studied thru case studies from western as well as eastern parts of the globe. The sessions conclude with the discussion of urban and environmental design that is essential to the professional practices of ecologically sound urban and environmental design	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. A.E.J. Morris, "History of Urban Form before the Industrial Revolution", PrenticeHall, 1996.

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

REFERENCES

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

SUBCODE	SUB NAME	L	T	P	C
XAR 902	PROJECT MANAGEMENT	3	0	0	3
C:P:A =	2:0:3	L	T	P	H
		3	0	0	3

UNIT – I	INTRODUCTION TO PROJECT MANAGEMENT	5
	Project management concepts-objectives, planning, scheduling Controlling and role of decision in project management. Traditional management system, Gantt’s approach, Load chart. Progress Chart, Development of bar chat, Merits and Demerits.	
UNIT – II	PROJECT PROGRAMMING AND ANALYSIS	15
	Project Network-Events Activity, Dummy, Network Rules, Graphical Guidelines for Network, Numbering the events, Cycles, Development of Network-planning for Network Construction, Models of Network construction, steps in development of Network. Work Break Down Structure, hierarchies. Concepts: critical path method-process, activity time estimate, Earliest Event time, Latest allowable Occurrence time, start and finish time of activity, float, critical activity and critical path problems. Cost model-Project cost, direct cost, indirect cost, slope curve, Total project cost, optimum duration contracting the network for cost optimization. Steps in cost optimization, updating, resource allocation-resource smoothing, resource leveling.	
UNIT – III	PROGRAMMING EVALUATION REVIEW TECHNIQUE	10
	PERT network, introduction to the theory of probability and statistics. Probabilistic time estimation for the activities for the activities of PERT Network.	
UNIT – IV	COMPUTERIZED PROJECT MANAGEMENT	10
	Introduction: Creating a New project, building task. Creating resources and assessing costs, Refining your project. Project Tracking-Understanding tracking, recording actual. Reporting on progress. Analyzing financial progress	
UNIT – V	TOTAL QUALITY MANAGEMENT	5
	Introduction to TQM principles, TQM tools, SPC tools and quality systems - Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, TS16949, ISO 14000 – Concepts, Requirements and Benefits	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
45	0	0	45

TEXT

1. Elaine Marmel, 'Microsoft Project 2016 Bible', Prentice Hall, 2016
2. K.K.Chikkara, Construction Project Management, McGraw Hill Education; 3rd edition (9 June 2014).
3. U.K.Srivastava, published by Galgotia Publications Pvt Ltd in 2000

REFERENCES

1. Dr. B. C. Punmia (Author), K. K. Khandelwal Project Planning and control with PERT and CPM, Laxmi Publications Pvt Ltd; 4th edition (10 September 2017)
2. K.G. Krishnamurthy (Author), S.V. Ravindra, Construction and Project Management CBS Publishers and Distributors PVT LTD; 2nd edition (28 February 2017)
3. Kumar Neeraj Jha, Construction Project Management, Theory and Practices Pearson Education; 2nd edition (30 November 2014)

SUBCODE	SUB NAME`	L	T	P	C
XAR 903	HOUSING	3	0	0	3
C:P:A	3:0:0	L	T	P	H
		3	0	0	3

UNIT – I 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 tocompletion

; 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 transcations.

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 UniversityPress, 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.

SUBCODE	SUB NAME	L	T	P	C
XAR904B	INTERIOR DESIGN	2	0	1	3
C:P:A =	2.0:0.0:1	L	T	P	H
		2	0	2	4

UNIT – I	INTRODUCTION TO INTERIOR DESIGN	10
	Definition of interior design - Interior design process - Vocabulary of design in terms of principles and elements - Introduction to the design of interior spaces as related to typologies and functions, themes and concepts - Study and design. Influence of historical styles, folk arts in interior design	
UNIT – II	ELEMENTS OF INTERIOR DESIGN - ENCLOSING ELEMENTS	15
	Concept & theme Development: Enclosures & envelops to formulate the volumes, response to functional spaces; Functionality: Spatial organization& Planning; different treatment methods for walls, floor, ceilings, services. Derivation of quantitative aspect of spaces based on User - Activity Analysis, furniture / equipment, Anthropometry, Ergonomics, Layout, Circulation, etc.; qualitative aspects based on ambience	
UNIT – III	ELEMENTS OF INTERIOR DESIGN– LIGHTING ACCESSORIES & INTERIOR LANDSCAPING	15
	Technical decisions -Constructional details &Material specification - Exploration & selection responding to functionality & aesthetics; Decisions for aesthetics: Color, textures, patterns, surface finishes, ornamentation, furnishings, accessories, lighting, interior Landscaping, etc. with reference to visual comfort & ambience in the interiors.	
UNIT – IV	ELEMENTS OF INTERIOR DESIGN – FURNITURE DESIGN & SPACE PLANNING	10
	Study of the relationship between furniture and spaces - human movements & furniture design as related to human comfort - Function, materials and methods of construction - - Study on furniture for specific types of interiors like office furniture, children's furniture, residential furniture, display systems, etc. – Design Projects on Residential, Commercial and Office Interiors.	
UNIT – V	INTERIOR DESIGN PROJECTS	10
	Develop a working drawing for interior design detailing for office spaces, hotel lobbies etc. Residential/ commercial / Retails / Offices / Institutional / Hospitality / Recreational / Sports / Healthcare / Others. Site extent: Ranges from 200 m^2 to 600 m^2.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. Francis .D.K. Ching, *Interior Design Illus*trated, V.N.R. Pub., NY 1987.
2. Julius Penero and Martin Zelnik, *Human Dimensions and Interior space Whitney Library of Design*, NY 1979

REFERENCES

1. Steport - De Van Kness, Logan and Szebely, *Introduction to Interior Design* Macmillan Publishing Co., NY 1980.
2. *Inca / Interior Design* Register, Inca Publications, Chennai, 1989.
3. Kathryn .B. Hiesinger and George H.Marcus, *Landmarks of twentieth Century Design*; Abbey Ville Press, 1993.
4. Syanne Slesin and Stafford Ceiff - *Indian Style*, Clarkson N. Potter, Newyork, 1990.

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

SUBCODE	SUB NAME	L	T	P	C
XAR 904C	ENERGY EFFICIENT ARCHITECTURE	2	0	1	3
C:P:A	2.0:1.0:0	L	T	P	H
		2	0	1	4

UNIT – I	PASSIVE DESIGN	10
	Significance of Energy Efficiency in the contemporary context, Simple passive design considerations involving Site Conditions, Building Orientation, Plan form and Building Envelope - Heat transfer and Thermal Performance of Walls and Roofs.	
UNIT – II	ADVANCED PASSIVE ARCHITECTURE- PASSIVE HEATING	10
	Direct Gain Thermal Storage of Wall and Roof - Roof Radiation Trap - Solarium - Isolated Gain.	
UNIT – III	PASSIVE COOLING	15
	Evaporative Cooling - Nocturnal Radiation cooling - Passive Desiccant Cooling – Induced Ventilation - Earth Sheltering - Wind Tower - Earth Air Tunnels. Exercise: design a building with passive cooling techniques	
UNIT – IV	DAY LIGHTING AND NATURAL VENTILATION	15
	Daylight Factor - Daylight Analysis - Daylight and Shading Devices - Types of Ventilation - Ventilation and Building Design. Exercises : Design a small building to achieve natural ventilation	
UNIT – V	CONTEMPORARY AND FUTURE TRENDS	10
	Areas for innovation in improving energy efficiency such as Photo Voltaic Cells, Battery Technology, Thermal Energy Storage, Recycled and Reusable Building materials, Nanotechnology, smart materials and the future of built environment, Energy Conservation Building code.	

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

1. Manual on Solar Passive Architecture, IIT Mumbai and Mines New Delhi, 1999
2. Arvind Krishnan & Others, " Climate Responsive Architecture", A Design Handbook for Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2001
3. Majumdar M, "Energy-efficient Building in India", TERI Press, 2000.
4. Givoni .B, "Passive and Low Energy Cooling of Buildings", Van Nostrand Reinhold, New York, 1994

REFERENCES

1. Fuller Moore, "Environmental Control Systems", McGraw Hill INC, New Delhi - 1993
2. Sophia and Stefan Behling, Solpower, "The Evolution of Solar Architecture", Prestel, New York, 1996
3. Patrick Waterfield, "The Energy Efficient Home: A Complete Guide", Crowood press ltd, 2011.
4. Dean Hawkes, "Energy Efficient Buildings: Architecture, Engineering and Environment", W.W. Norton & Company, 2002 5. David Johnson, Scott Gibson, "Green from the Ground Up: Sustainable, Healthy and Energy efficient home construction", Taunton Press, 2008

SUBCODE	SUB NAME	L	T	P	C
XAR904D	MATERIAL AND TECHNOLOGIES FOR SUSTAINABLE ARCHITECTURE	2	0	1	3

C:P:A =	2.0:0.0:1	L	T	P	H
		2	0	1	4
UNIT – I	**INTRODUCTION**				**10**
	Architecture and the survival of the planet- Assessing patterns of consumption and their alternatives- Profit and politics- Natural building movement – new context for codes and regulations				
UNIT – II	**DESIGN PRINCIPLES**				**15**
	Principle 1: Conserving energy; Principle 2: Working with Climate; Principle 3: minimizing new resources; Principle 4: respect for users; Principle 5: respect for site; Principle 6: holism- Illustrated with examples				
UNIT – III	**SUSTAINABLE CONSTRUCTION**				**15**
	Design issues relating to sustainable development including site and ecology, community and culture, health, materials, energy, and water- Domestic and Community buildings using self help techniques of construction; adaptation, repair and management.-.portable architecture				
UNIT – IV	**SYSTEMS MATERIALS AND APPLICATIONS**				**10**
	Adobe- Cob- Rammed Earth- Modular contained earth- light clay- Straw bale- bamboo- earthen finishes, etc.- their sustainability; adaptability to climate; engineering considerations, and construction methods; Waste as a resource Portable architecture to Applications through specific case studies				
UNIT – V	**CASE STUDIES FROM THE CONTEMPORARY SCENARIO**				**10**
	Ranging from small dwellings to large commercial buildings, drawn from a range of countries to demonstrate best current practice				

LECTURE	TUTORIAL	PRACTICAL	TOTAL
30	0	30	60

TEXT

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

REFERENCES

1. Brenda and Robert Vale; Green Architecture: Design for a sustainable future; Thames and Hudsson;1996
2. Lynne Elizabeth and Cassandra Adams; Alternative Construction: Contemporary Natural Building Methods
3. Victor Papanek; The Green Imperative; Thames and Hudson; 1995
4. Steven Harris and Deborah Berke; Architecture of the Everyday; Princeton Architectural Press; 1997
5. Pilar Echavarria; Portable Architecture- and unpredictable surroundings; Page One Publishing Pvt. Ltd.; 2005

XAR 905 DISSERTATION 0 – 0 – 2 - 4

OBJECTIVES:

To motivate students to involve in individual research and methodology.

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

The main areas of study and research can include advanced architectural design, including contemporary design processes, urban design, environmental design, conservation and heritage precincts, housing etc. However, the specific thrust should be architectural design of built environment. Preparation of presentation drawings and reports are part of the requirements for submission.METHOD OF SUBMISSIONThe Dissertation shall be submitted in the form of drawings, project report, CDs and reports.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	0	0	60	60

XAR 906 ARCHITECTURAL DESIGN– VI 0 – 0 – 16 – 8

UNIT– I DESIGNSTUDIO 240

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/buildingscale.

Examples: Any part of a city exploring specific urban design typologies and alternatives for revitalization. Hill Architecture, High Tech Buildings, Green buildings, urban nodes/streets/district Large Transportation terminals, Conservation and Re-development, revitalization of historic core, etc.

TOTAL : 240

TEXT BOOKS:

1. D. Gosling and Maitland - Urban Design - St. Martins Press1984.
2. Ian Bentley - Responsive Environment - A manual for Designer - Architecture Press, London -1985.

REFERENCES:

3. 1.E and OE planning 11iffe Books Ltd, London1973.
4. P&D Act1995.
5. Edward D Mills planning 4 volumes Newnes - Butterworths, London1976.
6. Gordon Cullen - the concise Townscape - The Architecturalpress

XAR1001 THESIS 0 – 0 – 0 – 17

TOPICS OF STUDY

The main areas of study and research shall be Architecture, Urban design, Urban renewal, urban and ruralHousing and settlements, Environmental Design, Conservation, Landscape Design, etc. However, thespecific 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.

TEXT BOOKS & REFERENCES

As per requirement of Topic and as suggested by the supervisor of Thesis. **TOTAL : 450**

SYLLABUS-M.ARCH

YAR101 EMERGING PRACTICES IN URBAN HOUSING 3 0 0 3

UNIT I - INTRODUCTION	**10**
Introduction to this building type, from its industrial beginnings in London and Paris to New York City's Lower East Side and the 20th-century designs of Le Corbusier, Antonio Sant'Elia, and Mies van der Rohe to mention a few. Investigation of contemporary life and its influence on space and architecture-Globalization and influences on economy- Alternate housing solutions: Commune, Co Housing, Cooperatives, etc.	
UNIT II - SINGLE FAMILY, MULTI FAMILY HOUSING	**10**
Review of latest developments in single family and multi family housing by examining the works of WielArets, Shigeru Ban, Ben van Berkel, KeesChristiaanse, Philippe Gazeau, Frank O. Gehry, Steven Holl, Hans Kollhoff, Morger&Degelo, , Jean Nouvel, Kas Oosterhuis, MVRDV	
UNIT III - HIGH DENSITY HOUSING	**6**
Issues and concerns- Review of the current state of high density houses - the perspectives and future developments through a study of a few international projects.	
UNIT IV - NEW FORMS OF LIVING AND HOUSING IN THE DIGITAL ERA	**10**
Hyper Housing- Multi cultural Housing- lab rooms and cyber homes- Network housing- hybrid buildings- individual sheltered residences; residence cities and bio homes for senior citizens- Works of UN Studio; FOA; OMA	
UNIT V - DEFINITION OF HOUSING IN THE INDIAN CONTEXT	**9**
Design strategies in the context of Indian metropolitan cities will be explored through a studio exercise	
Total: 45 Hours	

REFERENCES

1. Manuel Gausa and Jaime Salazer; Housing+ Single Family Housing; Birkhauser- Publishers for Architecture; 2005
2. VinceneGuillart; Sociopolis:Project for a city of the Future; ACTAR; 2004
3. Jingmin ZHOU; Urban housing Forms; Architectural Press; 2005
4. Adrienne Schmitz; Multifamily Housing Development Handbook; Urban Land Institute; 2001
5. CarlesBronto; Innovative Public Housing; Gingko Press; 2005

YAR102 APPROPRIATE MATERIALS AND 3 0 0 3

TECHNOLOGY FOR SUSTAINABLE ARCHITECTURE

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 **6** 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 **12** 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 **9** Ranging from small dwellings to large commercial buildings, drawn from a range of countries to demonstrate best current practice.**Total: 45 Hours**
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

YAR103 – ADVANCED STUDIES IN REGIONAL AND VERNACULAR ARCHITECTURE

3 – 0 – 0 – 3

SUBCODE	SUB NAME	L	T	P	C
YAR103	ADVANCED STUDIES IN REGIONAL AND VERNACULAR ARCHITECTURE	3	0	0	3
C:P:A	1.8:0:1.2	L	T	P	H
		3	0	0	3

UNIT – I INTRODUCTION	**5**
Brief introduction to vernacular architecture in global context – concepts and approaches in the study of vernacular architecture.	
UNIT – II VERNACULAR ARCHITECTURE IN INDIAN CONTEXT	**8**
The different vernacular architectural styles in India with examples. Northern region – Kashmir Architecture , Eastern region – Bengal Architecture, Western Region – Gujarat and kutch architecture, Rajasthan havelis, Southern Region – Kerala and Chettinadu Architecture.	
UNIT – III CONCEPTS AND PRINCIPLES IN VERNACULAR STYLE	**12**
Study and understand the concepts and principles of Indian vernacular styles in terms of climate response, materials and indigenous construction techniques followed.	
UNIT – IV CASE STUDY OF AN IDENTIFIED SETTLEMENT	**15**
Detailed study of a traditional settlement and analyzing in terms of the above discussed concepts and principles.	
UNIT – V SUITABILITY IN PRESENT CONTEXT	**5**
Discussion on the Suitability of the vernacular concepts in present context with examples.	

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	45	0	0	45

REFERENCES

1. Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997.
2. Amos Rappoport, House, Form & Culture, Prentice Hall Inc. 1969.
3. V.S.Praman, Havali- Wooden Houses & Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
4. Kullrishan Jain &Minakshi Jain - Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad, 1992.
5. G.H.R. Tillotsum- The tradition of Indian Architecture Continuity, Controversy - Change since 1850, Oxford University Press, Delhi, 1989.
6. Carmen Kagal, VISTARA - The Architecture of India, Pub: The Festival of India, 1986.

YAR104 - SERVICES IN HIGH RISE BUILDINGS 3 0 0 3

UNIT I - INTRODUCTION **3**

General introduction to Services in both horizontal spread and vertical rise layouts- Standards of high Rise buildings- Aspects and Integration of services- Relative costs- Concepts of Intelligence Architecture and Building Automation

UNIT II - WATER SUPPLY AND WASTE DISPOSAL **9**

Water supply and waste water collection systems- water storage and distribution systems- Planning and Design- Selection of pumps- rain water harvesting – Sewage collection systems and recycling of water- solid waste disposal.

UNIT III - HVAC, Electrical and Mechanical Systems **15**

Natural and Mechanical Ventilation systems- Air conditioning systems and load estimation- Planning and design for efficiency- Automation and Energy Management. Natural lighting systems- Energy efficiency in lighting systems- load and distribution- Planning and Design for energy efficiency- Automation. Types of elevators, systems and services- Lobby design- Escalators - safety principles

UNIT IV - SAFETY AND SECURITY **6**

Security systems- Access Control and Perimeter Protection- CCTV Intruder alarms- Passive fire safety- Fire Detection and Fire Alarm Systems- Planning and Design- NBC.

UNIT V - CASE STUDIES **12**

Case Studies of High Rise, High tech buildings and skyscrapers through appropriate examples- Norman Foster; Ove Arup; Ken Yeang, etc. **Total: 45 Hours**

REFERENCES

1. A.F.C Sherratt, Airconditioning and Energy Conservation, The Architectural Press, London, 1980.
2. National Building Code.
3. Handbook for Building Engineers in Metric systems, NBC, New Delhi, 1968.
4. Philips Lighting in Architectural Design, McGraw-Hill, New York, 1964.
5. William H.Severns and Julian R.Fellows, Air-conditioning and Refrigeration, John Wiley and Sons, London, 1988.

YAR105 - ARCHITECTURAL DESIGN STUDIO –I (HOUSING) 0 0 16 8

Objective:

To identify and address the issues of Housing in both urban and rural context through precedent studies; literature review; case studies, etc,. The objective also includes the study of the impact of globalization, real estate development, legal issues involved, policy and infrastructure development.

The design problem shall include the horizontal spread or vertical rise housing projects including by critically analyzing the standards, services, legal issues involved, the principles and concepts in the present trend and the current technological development.**Total: 240 Hours**

YAR 201- CONTEMPORARY: THEORIES AND TRENDS 3 0 0 3

UNIT I - OVERVIEW OF WORLD ARCHITECTURE SINCE 1970 6 Chronological Development leading to the High-tech architecture also known as Late Modernism or Structural Expressionism, Post Modernism and Deconstructivism
UNIT II - CRITICAL REGIONALISM 8 The idea of critical regionalism - Works of Architects: Studio Granda, Eduardo Souto de Moura, Mazharul Islam, Alvaro Siza, Rafael Moneo, Glenn Murcutt, Ken Yeang, Juhani Pallasmaa, Wang Shu, JuhaLeiviskä, Peter Zumthor, Carlo Scarpa
UNIT III POST-MODERN FUTURISTIC ARCHITECTURE 10 Postmodern architecture began as an international style - Continues to influence present-day architecture. Ideas and works of Architects: Cesar Pelli, Santiago Calatrava, Archigram, Louis Armet, Welton Becket, Arthur Erickson, Future Systems, John Lautner, Anthony J. Lumsden, Wayne McAllister, Oscar Niemeyer, William Pereira, Patricio Pouchulu, Eero Saarinen
UNIT IV ANALYSIS OF ARCHITECT'S WORKS 15 Canonical architect's buildings that have exerted significant influences on the development of architecture will be studied in detail. Analysis of a building through drawings, text, bibliography and a physical model in a format ready for documentation and exhibition.
UNIT V SEMINAR PRESENTATION 6 Student's presentation on the ideas and works of architects known for process oriented approach to architecture. Topics to be discussed with course faculty prior to presentation.**Total: 45 Hours**
REFERENCES 1. Paul Allan Johnson. Theory of Architecture, Routledge 2000. 2. Kenneth Frampton. Modern Architecture since 1900. 3. Michael Hays (ed) Architectural Theory since 1960, MIT Press, 2000. 4. Bryan Lauson- How Designers Think, Architectural Press Ltd., London 1980. 5. Tom Health- Method in Architecture, John Wiley & Sons, New York, 1984. **6.** Christopher Alexander, Pattern Language, Oxford University Press.

YAR 202 RESEARCH METHODOLOGY **3 0 0 3**

UNIT I – INTRODUCTION **9**

Basic research issues and concepts- orientation to research process- types of research: historical, qualitative, co-relational, experimental, simulation and modeling, logical argumentation, case study and mixed methods- illustration using research samples.

UNIT II - RESEARCH PROCESS **9**

Elements of Research process: finding a topic- writing an introduction- stating a purpose of study- identifying key research questions and hypotheses- reviewing literature- using theory- defining, delimiting and stating the significance of the study, advanced methods and procedures for data collection and analysis- illustration using research samples.

UNIT III - RESEARCHING AND DATA COLLECTION **9**

Library and archives- Internet: New information and the role of internet; finding and evaluating sources- misuse- test for reliability- ethics Methods of data collection- From primary sources: observation and recording, interviews structured and unstructured, questionnaire, open ended and close ended questions and the advantages, sampling- Problems encountered in collecting data from secondary sources.

UNIT IV - REPORT WRITING **6**

Research writing in general- Components: referencing- writing the bibliography- developing the outline- presentation; etc.

UNIT V - CASE STUDIES **12**

Case studies illustrating how good research can be used from project inception to completion- review of research publications**Total: 45 Hours**

REFERENCES

1. Linda Groat and David Wang; Architectural Research Methods;15
2. Wayne C Booth; Joseph M Williams; Gregory G. Colomb; The Craft of Research, 2nd Edition; Chicago guides to writing, editing and publishing;
3. Iain Borden and KaaterinaRuedi; The Dissertation: An Architecture Student's Handbook; Architectural Press; 2000
4. Ranjith Kumar; Research Mehodology- A step by step guide for beginners; Sage Publications; 2005
5. John W Creswell; Research design: Qualitative, Quantitative and Mixed Methods Approaches; Sage Publications; 2002
6. Amos Rapoport; House, form and culture;
7. Christopher Alexander; Pattern Language
8. Diagram Diaries; Peter Eissenman;

YAR203A- Advanced Materials and Construction Technology 3-00-3

UNIT I – MODERN MATERIALS **6**

Dry wall construction, Special Use of waste products (fly ash, micro silica) and industrial by-products in concrete making- Self compacting concrete - reinforced polymers – Geo-textiles and geo-synthetics – nano materials.

UNIT II – MODERN CONSTRUCTION METHODS **12**

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 **12**

Modular co-ordination, standardization and tolerances-system of prefabrication. Pre-cast concrete manufacturing techniques, Moulds –construction design, maintenance and repair. Pre-casting techniques - Planning, analysis and design considerations - Handling techniques -Transportation Storage and erection of structures. 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 housing schemes.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 **6**

Advanced techniques and sequence in demolition and dismantling

UNIT V – SAFETY PRACTICES IN CONSTRUCTION **9**

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-Interesting experiences at the construction site against the fire accidents - earthquake resistant design of buildings. **Total: 45 Hours**

REFERENCES

1. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, Construction Safety and Health Management, Prentice Hall Inc., 2001.
2. Hand Book on Construction Safety Practices, SP 70, BIS 2001.
3. N.D. Kaushika, Energy, Ecology and Environment, Capital Publishing Company, New Delhi.
4. John Fernandez, Material Architecture, Architectural Press, UK.
5. Rodney Howes, Infrastructure for the built environment, Butterworth Heineman
6. Peurifoy, R.L., Ledbette. W.B., Construction Planning, Equipment and Methods, McGraw Hill Co., 2000.
7. Jimmy W. Hinze, Construction Safety, Prentice Hall Inc., 1997

YAR 203B ARCHITECTURE AND CRITICAL THEORY 3 0 0 3

UNIT I - INTRODUCTION 6

Architectural Theory and practice- Relation between theory and practice.Traditions in/of architectural theory.CriticalTheory.Qualities and challenges of critical theory.

UNIT II POWER AND BUILT ENVIRONMENT10

Forms of power.Power and knowledge.Panopticon.Colonialism as a form of dominance.Colonialism in India.Production of Indo-Saracen architecture.Ideas of segregation, control and surveillance in colonial towns.Discussing New Delhi as a part of imperial vision.Idea of Ghetto, surveillance and control in contemporary cities.

UNIT III ENCOUNTERING MODERNISM/MODERNITY 10

Phenomenology and architecture.Architecture and sense of place.Fragmentation and Nihilism as conditions of modern society. Counter claims. Encountering the idea of functionalism - Semiotic and Deconstruction as a critical tool. Architecture of Resistance.The idea of critical regionalism.

UNIT IV SPECTACLE AND ARCHITECTURE 10

Society of spectacle.Spectacle as a form of seduction.Debating Aestheticization of architectural issues.Critiquing learning from Las Vegas.World in a shopping wall.ThematicEnvironments.Theme parks and privatization of public spaces.Visual regime in architecture.Media and architecture.

UNIT V ISSUES IN ARCHITECTURE 9

Gender and space.Heritage and politics of memory.City as contested geography.Technology and Architecture. **Total: 45 Hours**

REFERENCES

1. Neil Leach (ed) Rethinking Architecture, Routledge 2000
2. Paul Allan Johnson. Theory of Architecture, Routledge 2000
3. Michael Hays (ed) Architectural Theory since 1960,MIT Press, 2000
4. Anthony king, Urban Development in Colonialism
5. Nazzar Al Sayaad (ed) Forms of Dominance,
6. Lawrence vale. Architecture and Nationalism and identity,
7. Anil Lomba, Colonialism, 2000
8. Thomas Metcalf Imperial vision, Oxford
9. Neil Leach, Aesthetics and Anesthetics,
10. Guy Debord. Society of Spectacle.

YAR 204 DIGITAL DESIGN PROCESS IN ARCHITECTURE 2 2 0 3

Unit –I INTRODUCTION **10** Contemporary theories in Digital Architecture Evolution of Digital Architecture – Driving forces behind Digital Architecture – Digital Output and its process.
Unit – II SOLIDS, SURFACES & VIRTUAL MEDIA **10** Works of Zvihecker – Shape Grammar – Hyper Surfaces – Interactive Architecture – Virtual Architecture .
Unit- III Genetic Algorithms: **20** Fractal theory – Veronoi patterns – Cellular Automata-Linden Mayor systems – Basic Concepts and its application
Unit – IV IDEAS AND WORKS OF CONTEMPORARY ARCHITECTS **10** Greg Lynn, Reiser + Umemotto , Lars spuybroek/NOX Architects, UN Studio, Diller Scofidio, Dominique Perrault, Aranda Lasch, Herzog and De Meuron, Neil Denari, Michael Hasmeyer.
Unit – V BIOMIMICS **10** Concept of Biomimics - Biomimicry and its application – Project based on Biomimics – Evolution of Biomimics in Architecture – Design Assignment based on Biomimics (either Digital or Manual) Lab Classes in Scripting and Rhino + Grasshopper. **Total: 60 Hours**
REFERENCES: 1. Animate from – Greg Lyres 2. Chaos making of new science – James Gleict 3. The self made taps by: Patters formed in Nahre - Philip Ball. 4. Finding forms :Tourrds an Architecture of the Minimal – Frei otto and Bodo Rasch. 5. Godel, Escher and Bach : An external Golden Baid – DouglarR.Hoftstader. 6. Emergence Staner Johnson **7.** The Autopiesis of Architecture – Patrict Schumacher.

YAR205 BUILDING MANAGEMENT SYSTEMS 2 2 0 3

UNIT - 1 INTRODUCTION **10**

Introduction to Basics of Building Management Systems (BMS), Integrated Building Management Systems (IBMS) and Building Automation System (BAS).Scope and Importance of Building Management Systems.Introduction to Facilities Management (FM) Building Information Modeling (BIM), Management Information systems (MIS). Introduction to Manitenance systems - Predictive Maintenance (PdM) , Corrective Maintenance.

UNIT- 2 ASPECTS OF BUILDING MANAGEMENT SYSTEM **10**

HVAC management –Central plant optimization (CPO) , Chillers, Cooling towers, VAV, AHU, Exhaust systems, Lighting management, Electrical systems management, Plumbing and Fire fighting systems management. Safety and Security systems management – Alarm systems, Access control systems, Closed circuit television, Intruder Alarm, Perimeter protection, Safety systems

UNIT - 3 CONTROL SYSTEMS, PROTOCOLS AND SERVICE INTEGRATION 16

Controllers-Types and functions, Pneumatic control systems, electric control systems.
Computerized control systems, Direct digital control, Sensors and Actuators-Types and functions. Occupancy, Integration using Internet protocol.Open protocols Vs Proprietary systems, BacnetVsLonmark, Fully Integrated system Vs Standalone operations.Integration of services – water pump monitoring & control - Control of Computerized HVAC Systems –Direct Digital Control - chillers, pumps, BTU monitoring & control – IBMS system and its components – centralized control equipments – sub- station and field controllers – field sensors.

UNIT - 4 TRENDS IN BUILDING MANAGEMENT SYSTEM **12**

Energy Management and Control Systems (EMCS), Management Information systems (MIS) Building Energy Management systems (BEMS), BMS retrofitting, BMS towards sustainability and green practices. Intelligent buildings, Role of BMS in energy efficiency and maintenance cost. Case study, examples.

UNIT – 5 INTELLIGENT MANAGEMENT SYSTEMS AT URBAN LEVEL **12**

BMS Future cities, Intelligent/Smart cities, Smart grids, Demand driven distribution, District cooling and Heating, Wireless Building Technology, Intelligent wireless street lighting system, Intelligent Traffic Management systems, Intelligent guidance systems.

Total: 60 Hours

REFERENCES

1. Smart Buildings Systems for Architects,Owners and Builders -By James M Sinopoli.
2. Intelligent Buildings and Building Automation - ByShengwei 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- ByG. J. Levermore.
5. Smart grid home- ByQuentin Wells

YAR 206 ARCHITECTURAL DESIGN STUDIO – II 0 0 16 8

Large scale projects such as campus design, airport, civic centre, urban recreational centers, mixed use high rise development.Application of building management system, services details are to be incorporated in the detailed design drawings **Total :240 Hours**

YAR 301 SUSTAINABLE LANDSCAPE DESIGN 3 0 0 3

UNIT I - ECOLOGY AND LANDSCAPE
6

Concept of Ecosystem: General Structure and Function - Energy flow, Primary & Secondary Production - Types of Biogeochemical cycles; Carbon cycle, Global water cycles, nitrogen cycle bioaccumulation and biomagnifications and - Analysis and evaluation. Concept of ecosystem services.- Types of Ecosystems Environmental Impact Assessment and the Environmental Impact Statement: Theory and Practice. Illustrative examples from India to demonstrate the degree of effectiveness.The role of Environmental Legislation and the Ministry of Environment and Forests.

UNIT II - PLANTS AND DESIGN 10

Basic plant structure/morphology/anatomy - Basic plant functions/growth & development / physiology - Principles of taxonomy / classification, identification and naming Familiarity with local flora. Ecological and Botanical considerations in landscape design. Plant data sheet.Planting as a design element for structuring the landscape.Structural and visual characteristics of plants.Principles of visual composition.Plant association. The role of plant material in environmental improvement, (e.g. soil conservation, modification of microclimate).

UNIT III - CULTURAL AND HISTORIC LANDSCAPE 10

Early traditions and beliefs about landscape and environment in east.Ancient Indian traditions – Vedic, Jainism, Buddhism and later Hindu movements. Symbolic meanings and sacred value of natural landscapes.Transfer of concepts through Buddhism to China –Chinese landscape development – gardens of China – Pre Buddhist Japanese landscapes – impact of China on Japanese gardens – Japanese gardens.Nomadic culture of central Asia – advent of Islam – concept of Paradise as a garden – spread of Islamic traditions to the West and East. Eastern expression of Islam – Samarkhand and Mughal India – Tomb and pleasure garden – Mughal concepts of site planning.Western expression of Islam – Spain Alhambra and General life, Granada.

UNIT IV- CONTEMPORARY LANDSCAPE 10

Industrialization and urbanization – impacts and development of the concept of public open spaces, open space development in new towns, parks movement.Study of selected works of modern landscape architects. Frederick Law Olmsted, *Martha Schwartz*, Burle Marx, *Ravindra Bhan* and other pioneers.

UNIT V- CASE STUDY 9

Issues in contemporary India, Analysis and understanding of philosophies of Contemporary landscape works in India, case studies. **Total: 45 Hours**

REFERENCES

1. Geoffrey and Susan Jellico, The landscape of Man, Thames & Hudson Publication, 1995
2. Robert Holden, New landscape Design, Lawrence king publishing, UK, 2003
3. Penelope Hill, Contemporary history of garden design, Birkhauser publishers, 2004
4. Elizabeth Barlow Rogers, Landscape Design – A Cultural &Architectural History, Hary& Abram inc. publishers, 2001.
5. Phillip Pregill& Nancy Volkman, Landscapes in History, Van Nostrand publishers, 1993.
6. Jonas Lehrman, Earthly Paradise- Garden and courtyard in Islam, Thames and Hudson,1980.
7. G.B.Tobey, A history of American Landscape architecture, American Elsevier Publishing Co.,NY, 1973.
8. PieluigiNicholin, Francesco Repishti, Dictionary of today's landscape desig, SkiraEditores P.A, 2003.

YAR 302 HERITAGE CONSERVATION PLANNING 3 0 0 3

UNIT – I INTRODUCTION TO ARCHITECTURAL CONSERVATION 6

Introduction to architectural conservation of heritage buildings, environmental conservation, purpose & scope of conservation projects in Indian context – Role of architect in such programmes, values & ethics of conservation programme- involvement of community & social organisations – public participation – conflict and compatibility between conservation and development.

UNIT – II PROCEDURE FOR CONSERVATION 10

Procedure for listing of structures for conservation. Inventories, inspection, documentation, degree of intervention for prevention of deterioration, prevention of existing state, consolidation of the fabric, restoration, rehabilitation, reproduction, reconstruction , etc. – to study the structural elements of buildings such as beams, arches, and domes, walls, piers & columns, foundation etc, causes of decay in buildings by natural and human factors, The role of conservation architect & his team.

UNIT – III STRUCTURAL CONSERVATION 10

Behavioral properties of traditional construction materials- various methods and techniques involved in structural conservation, case studies and examples.

UNIT – IV LEGISLATION AND INSTITUTIONS 11

Special legislation – Central and State.New concepts and emerging trends in conservation. Methods and procedures adopted by agencies such as UNDP, UNESCO, ICOMOS, ICCROM, ASI, INTACH

UNIT- V CASESTUDIES 8

Case studies of conservation projects in Indian and International context. Appraisal of conservation project in view of the above issues- success & failure – reasons for it.**Total: 45 Hours**

REFERENCES

1. Conservation and development in historic towns & cities – Pamela Ward Press Ltd.
2. Planning for conservation – Kain Roger – St.Martin N-Y 1981.
3. Character of towns – An approach to conservation – Worskett Roy, Arch. Press – London.
4. Guidelines for conservation by INTACH.
5. Conservation of Historic Buildings, Sir Bernard M. Felidan, - Arch Press, 1982.
6. Gerald Glenn, “Presentation & Rehabilitation” (1996), ASTM International.
7. History of Architectural conservation, (1st Pub 1999, Reprint 2005) – Butterworth, Oxford, UK.

YAR 303 URBAN DESIGN PRACTICES **3 0 0 3**

UNIT I INTRODUCTION TO URBAN DESIGN THEORY	**10**
City as a three – dimensional entity, study of volumes & open spaces, a brief Historic review of the development of the urban design discipline and principles.Historic developments of streets and squares	
UNIT II ELEMENTS OF URBAN DESIGN	**10**
Urban form as determined by the inter-play of masses, voids, building typology, scale, harmony, symmetry, colour, texture, light & shade, dominance, height, urban signage & graphics, organization of spaces & their articulation in the form of squares, streets, vistas & focal points, image of the city & its components.	
UNIT III URBAN DESIGN METHODOLOGIES	**10**
Methods of urban design surveys, documentation and representation.Cognitive mapping – contemporary and traditional, architectural expressions.Seminar presentation on transport planning in urban design.	
UNIT - IV URBAN RENEWAL & DEVELOPMENT	**8**
Historic overview of urban renewal, Development strategies for regeneration of inner city areas, recycling, renewal, etc. Case studies of urban renewal. Adaptive reuse and Brown Field projects in India and abroad.Infrastructure up gradation, economic regeneration, financing and management of urban renewal schemes.Institutional framework for urban conservation and renewal strategies in India.	
UNIT V CASE STUDIES	**9**
Legal & administrative aspects, policies, charters, case studies of proposals for urban design projects from India & Abroad	**Total: 45 Hours**

REFERENCES

1. Jon Lang, "Urban design" – a typology pf procedures & products 2005, Glsevier, North America.8
2. Gcoffrey Broadbent, "Emerging concepts in Urban Space Design-(1995), Jayker& ravels.
3. Cliff Monghtin, "UD-Street &Squace," (2003), Architectural Press.
4. Jonathan Barnett, "Designing cities without designing building", (1982), Harper & Row, New York.
5. Edmond Bacon, "Design of cities", (1976), revised edition, Viking Penguin Inc; U.S.A.

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YAR 304B ENERGY SIMULATION AND MODELLING 2 -2 - 0- 3

UNIT I - INTRODUCTION TO ENERGY **10** Definition and units of energy, power, Forms of energy, Conservation of energy, second law of thermodynamics, Energy flow diagram to the earth. Origin of fossil fuels, time scale of fossil fuels, Renewable Energy Resources, Role of energy in economic development and social transformation.
UNIT II - INTRODUCTION TO SOLAR ENERGY **10** Solar Spectrum, Solar Time and angles, day length, angle of incidence on tilted surface; Sunpath diagram; Shadow angle protractor; Solar Radiation: Extraterrestrial Radiation; Effect of earth atmosphere; Estimation of solar radiation on horizontal and tilted surfaces; Measurement of Solar radiation, Analysis of Indian solar radiation data and applications.
UNIT III - INTRODUCTION TO ENERGY MODELING **10** Definition of energy modeling, Answers that energy modeling provide, Building modeling tools: Daylighting/ lighting modeling, Computational fluid dynamics(CFD), Building component analysis, HVAC analysis, Building thermal analysis, Whole building energy simulation programs.
UNIT IV - INTERFACES AND SOFTWARE PACKAGES **15** Introduction to interfaces of energy modeling software packages, DOE2, ENERGY PLUS, ECOTECT, CLIMATE CONSULTANT, HEED, BERS, GREEN BUILDING STUDIO.
UNIT - V CASE STUDY **15** Literature case study and live case study, Energy modeling of a residential building. **Total: 60 Hours**
REFERENCES 1. Eddy Krygiel., Bradley Nies, Green BIM Wily publishing, Canada, 2008. 2. Advanced Energy Design Guide For Small Office Buildings, American Society of Heating Refrigerating and Airconditioning, USA 2004. 3. Davies, Morris Grenfell, Building Heat Transfer, Wiley, 2008. 4. Underwood, Chris, Modelling Methods For Energy In Buildings, Wiley Blackwell, 2008. 5. International Energy Conservation Code 2003, International Code Council. 6. Baker, Nick, Energy And Environment In Architecture, Taylor & Francis, 2000. **7.**Dobbelsteen, Andy van den, Smart Building In A Changing Climate, Island Press, 2009.

YAR 305 DISSERTATION **0 0 6 3**

Topics related to various aspects of Architecture would be chosen in consultation with faculty members, comprehensively researched, and findings presented in a series of seminars by individual students.
The materials would be documented and formally presented as a Dissertation at the end of the semester
Total: 90 Hours

YAR 306 ARCHITECTURAL DESIGN STUDIO –III0 0 16 8

Large scale architectural design projects with the scope includes urban design and landscape issues.Projects such as neighborhood development, redevelopment, urban renewal projects, study documentation, analysis and proposal for inner city development, historic precinct development with the conservation and landscaping details. **Total: 240 Hours**

YAR 401 THESIS **0 0 0 14**

Thesis may be either THESIS BY DESIGN or THESIS BY RESEARCH

THESIS BY DESIGN

The design thesis is an independent topic explored and defined by the student in the previous semester. Students continue to take forward the thesis areas, leading to the development of a clear design proposal to be supervised by a faculty team and evaluated by an external jury. The tutorial will assist the students to strengthen the theoretical base of the thesis and analyze relevant successful design demonstrations through case studies.

THESIS BY RESEARCH

The thesis by research is an independent research on a topic defined by a student, to be completed in the form of a comprehensive report under the supervision of an advisor and evaluated by an external jury. The tutorial will assist the student in research methodologies, conducting of surveys, identifying case studies etc. Types of research: descriptive vs Analytical, applied vs fundamental, quantitative vs qualitative, conceptual vs empirical research Introduction to urban research, Research design methodology, Descriptive research, Explanatory research, diagnostic, experimental research.
Total: 525 Hours