UNIVERSITY OF CALICUT – B. ARCH. DEGREE COURSE SCHEME – 2017 ADMISSION

COMBINED FIRST AND SECOND SEMESTER										
Course Code	**Subject**	**Credits**	**Hours per Week**			**Duration of Exam**	**Marks**			
			L	**T**	**P/S**		**W**	**J**	**S**	**TOTAL**
AR 17-11	Basic Design *	10	0	0	8	0		200	300	500
AR17-12	Theory of Design - I	4	2	0	0	3	100		50	150
AR 17-13	Building Materials and Construction - I	5	1	0	2	3	100		100	200
AR 17-14	Theory of Structures- I	4	2	1	0	3	100		50	150
AR 17-15	History of Architecture - I	3	2	0	0	3	100		50	150
AR 17-16	Architectural Drawing and Graphics	6	0	0	5	3	100		100	200
AR 17-17	Visual Arts & Presentation	4	1	0	2	3	100		100	200
AR 17-18	Model-making Workshop	2	0	0	2	0			100	100
AR 17-19	Communication Skills	2	0	0	2	0			50	50
TOTAL		**40**	**8**	**1**	**21**		**600**	**200**	**900**	**1700**

* Evaluation by the Jury as per the B. Arch. Degree Manual

L – Lecture, T – Tutorial, P/S – Practical/Studio, W – Written University Examination, J – Jury, S – Sessional Marks

SEMESTER I Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-11	BASIC DESIGN	0-0-8	10	2017

Course Objectives

The Basic Design for students of architecture would,

- Introduce the various elements and principles of design for two and three dimensional compositions.
- Through a series of exercises enable the student to explore graphically the various stages of representations, communication and speculations in drawing and design.
- Help to develop the ability to translate abstract principles of design into Architectural solutions for simple problems.

Course Outcome

- An understanding of the elements and principles of design.
- Comprehension of the diverse ways in which the various design elements could be composed to create a unified whole.

Text books

- Charles Wallschlaeger & Synthia Busic Snyder, Basic Visual Concepts & Principles for artists, architects & designers, McGraw hill, USA, 1992.
- Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001

Reference Books

- Arthur L. Guptill and Susan E. Meyer, 'Rendering in Pen and Ink' , Watson-Guptill, 1997
- Francis D.K.Ching - Architecture - Form Space and Order, Van Nostrand Reinhold Co., (Canada),1979.
- Francis D.K.Ching – Drawing – A creative Process, Van Nostrand Reinhold Co., (Canada),1979.
- Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
- Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
- Maitland Graves,The Art of Colour and Design, McGraw Hill Book Company Inc.,1951
- Mark Karhen, Space planning basics, John Wiley & son - 2004
- Neuferts' Architect's Data, Orbid Publishing Ltd., Know how the complete course in Dit and Home Improvements NO.22,Bed Fordbury,London,W.C.2,1981.
- Owen Cappleman & Michael Jack Kordan, Foundations in Architecture: An Annotated Anthology of beginning design projects, Van Nostrand Reinhold, New York.
- Paul Laseau, Graphic Thinking For Architects and Designers, John Wiley & Sons, New York, 2001.

- Paul Zelanski & Mary Pat Fisher, Design Principles & Problems , 2nd Ed, Thomson & Wadsworth, USA,1996
- Robert Gill, Rendering with Pen and Ink
- Simon Unwin, 'Analizing Architecture', Routledge, 2003
- V.S.Pramar, Design fundamentals in Architecture, Somaiya Publications Pvt.Ltd., New Delhi,1973.
- Wong Wucius, Principles of color composition, Van Nostrand Rein Hold – 1976
- Wang Wucius, , Principles of three dimensional design, Van Nostrand Rein Hold – 1976
- Wang Wucius, Principles of Two dimensional design, Van nostrand Rein hold -1972

MODULE I

FUNDAMENTALS IN DESIGN (48 Hours)

Elements in composition: Point, Line, Plane, Volume, Colour, Texture. Analyzing paintings, compositions, murals, sculptures, building and nature.

Principles of design – Dominance, unity, balance, symmetry, hierarchy, rhythm, contrast, harmony, focus etc. .

Introduction to fundamentals in drawing, composition and understanding graphic medium: Basic exercises in drawing skill building, composition and design vocabulary

MODULE II

CREATIVITY (24 Hours)

Compositional and modeling exercises in 2 D and 3 D using concepts like abstraction, transformation, Illusion, symbolism. Exercises on observation and visual perception on the principles of Gestalt Theory

Forms: Generation of 3 D volumes from 2 D planes. Various organizations of forms and principles involved in articulating forms using architectural examples. Study of Solids and voids.

Study of linear and planar forms using materials like Mount Board, metal foil, box boards, wire string, thermocol etc.

MODULE III

FORMS (32 Hours)

Colour and texture: Study of colour and colour schemes, texture and texture scheme. Perception of colour and texture in light from natural and artificial sources. Study of openings for light, shadow, shades and sciography and their effect on spaces'

Study of fluid and plastic forms using appropriate materials like clay, plaster of paris etc. and explore the play of light and shade.

Scale and proportion: Study of scale and proportioning systems – Classical orders, Golden Section etc. Anthropometrics – Study of space standards and anthropometrics to include physically handicapped and elderly

MODULE IV

DEVELOPMENT OF DESIGN PROCESS (56 Hours)

Major: Design of a fundamental furniture lay-out , circulation, Lighting and ventilation for space such as Living, Dining Bedroom Architect's Office , Doctor's clinics or exterior space like out-door Dining, Gathering space etc.

Minor: Detailing and designing a Furniture used in the Design

Stress should be on concept generation and development of rich design process.

TOTAL HOURS: 160

SEMESTER I Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-12	THEORY OF DESIGN - I	2-0-0	4	2017

Course Objectives

The Theory of Design for students of architecture would,

- To introduce various facets of Architecture and its influencing factors with respect to form and space.
- To introduce the basic elements/principles of form and space as one of the ways to experience the built environment.

Course Outcome

- An exposure to the principles of architecture and applications of the same in buildings and spaces.
- Awareness about various ideologies and philosophies of architecture.
- An exposure to analysis of architecture through case studies of projects by various architects.

Text books

- Francis D. K. Ching, Architecture - Form, Space and Order, Van Nostrand Reinhold Company ,1979
- Roger H. Clark, Michael Pause, Precedents In Architecture, Van Nostrand Reinhold Company ,1996

Reference Books

- K.W.Smithies, Principles of Design in Architecture, Van Nostrand Reinhold Company , 1981 2. Sam F. Miller, Design Process - A Primer For Architectural & Interior Design, Van Nostrand Reinhold Company , 1995
- Ernest Burden, Elements of Architectural Design – A Visual Resource, Van Nostrand Reinhold Company , 1994
- V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications, New Delhi, 1973.
- Paul Alan Johnson - The Theory of Architecture - Concepts and themes, Van Nostrand Reinhold Co. NewYork,1994.
- Helm Marie Evans and Caria David Dunneshil, An initiation to design, Macmillan Publishing Co.Inc.,NewYork,1982.

MODULE I
INTRODUCTION TO ARCHITECTURE (15 Hours)
Understanding the relevant terms – Architecture, Art, Architectural design –Aesthetics in art and architecture.

ELEMENTS OF DESIGN – Understanding the basic elements of design: point, line, plane, volume.
FORMS – Properties of forms - Understanding perceptual effects of geometric forms, cube, sphere, pyramid, cylinder and cone and its section as well as their derivatives with respect to the evolution of architectural form and space – Transformation of forms –Articulation of forms.
SPACE – Understanding perceptual effects of specific configuration of architectural spaces – Elements defining spaces –Spatial relationships - Spatial organisation – centralised, linear, radial, clustered, grid –built form and open space relationships.

MODULE II (10 Hours)
PRINCIPLES OF DESIGN –Understanding the fundamental principles of Architectural compositions: axis, symmetry/asymmetry, balance, hierarchy, rhythm, datum, transformation, unity, harmony, dominance, climax.

PROPORTION AND SCALE IN ARCHITECTURE- Different types of proportioning systems

MODULE III (5 Hours)
CIRCULATION -Movement with reference to the architectural form and space – detailed study of relationship between architectural form and circulation – Types of circulation – Building approach and entrance - Configuration of path- Path space relationship, orientation.

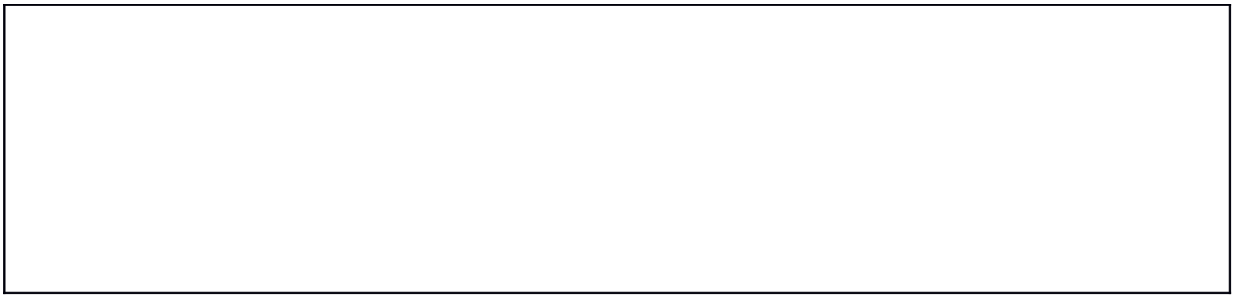
MODULE IV (10 Hours)
DESIGN AND ANALYSIS - Introduction to modes of understanding architecture in totality in terms of the various aspects studied in previous modules– understanding how case studies have used representational, analytic and interpretational tools.

WORKS OF ARCHITECTS - Role of individual architects in the generation of architectural form, through study of exemplary works, architectural inspirations, philosophies, ideologies and theories of architects. (E.g. F L Wright, Le Corbusier, Charles Correa).

TOTAL HOURS: 40

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.



SEMESTER I Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-13	**BUILDING MATERIALS AND CONSTRUCTION - I**	**1-0-2**	**5**	**2017**

Course Objectives

The Building materials and construction course for students of architecture would,

- Introduce to the student different components of buildings and various materials, their properties and uses.
- Provide an exposure to the principles of masonry construction, arches, lintels/ beams, corbelling, cantilever etc.
- Help them to understand the details of construction using stone and soil as well as products derived from them.

Course Outcome

- An understanding of the properties of various building materials and their applications.
- Exposure to the common construction techniques used for constructing various components of a building.
- Development of architectural drafting skills in the representation of construction details.

Text books

- Arora S.P. and Bindra S.P., “Text book of Building Construction”, Dhanpat Rai & Sons, New Delhi, 2012.
- Klans Dukeeberg, Bambus – Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000.
- National Building Code Of India 2005- Part 6 Structural Design- Section 3 Timber and Bamboo.
- Francis D.K. Ching, Building Construction Illustrated John Wiley & Sons 2000.
- Balagopal T.S. Prabhu, “Civil Engineering Drawing Hand book”

Reference Books

- Ghanshyam Pandya, M.P. Ranjan, Nilam Iyer Bamboo and Cane Crafts of Northeast India; National Institute of Design (2004).
- Don A. Watson Construction Materials and Processes McGraw Hill 1972.
- WB Mckay Building construction, Vol 1,2, Longman UK 1981.
- Barry, The Construction of Buildings; Affiliated East West press put Ltd New Delhi 1999.

MODULE I

INTRODUCTION (15 hrs)

Drafting Exercises on Representation of different types of building materials in plan and sections. Symbols used to denote different types of joinery, plumbing fittings and accessories in plan, sections and elevations.

Components of Building – Sub structure and Super structure. Drafting Exercises on Simple, cross section of walls showing various building components in plan and section.

Introduction to Building Materials – Sand, Stone, Brick, Timber, Clay & Ceramic products – their sources, classification, properties, and applications.

MODULE II

FOUNDATIONS (12 hrs.)

Introduction to Foundations – Definition, function, types – selection criteria – bearing capacity of soil – methods of testing – settlement of foundations

Drafting exercises on various types of foundations – Wall Footing, Isolated Footing, Combined Footing

MODULE III

MASONRY (30 hrs.)

Brick Masonry - Types of bricks, principles of brick masonry construction - joints, pointing and finishing, types of brick masonry - brick masonry work using different bonds, rat trap bond, Junctions – T- Junction (1 and 11/2 bricks), L – Junction (1 and 11/2 bricks), Cross junction (2 bricks), Piers – 1, 11/2, 2 bricks, Brick paving, Reinforced Brick Masonry, Cavity wall, Composite Masonry and arches, types of mortar & mortar mix for brick construction- Plastering - Brick masonry for foundation plinth and wall, arches and lintels in brick, coping, steps.

Principles of stone masonry construction - types of stone masonry random rubble masonry/ Ashlar Masonry - stone finishes- jointing types of mortar for stone construction - Stone masonry for foundation, plinth and wall, retaining wall, arches and lintels in stone, coping, steps, flooring, cladding.

MODULE IV

MUD CONSTRUCTION, CLAY PRODUCTS AND RURAL MATERIALS (15 hrs.)

Cob, Rammed earth, Wattle and daub construction- Principles of Masonry construction using Adobe, Compressed Stabilized Earthen Blocks; Foundation and plinth for mud structures, Design of openings (arches, corbelled arches), Mud plaster, mud mortar, Damp and weather proofing of mud structures, Mud flooring, Construction of thatched roof.

Drafting Exercises on Hollow clay blocks – walls, roofs, partitions - Applications of various natural materials (Mud, Bamboo, Casuarinas, Palm, Coconut, Hay, Grass husk) in various parts of the building.

TOTAL HOURS: 72

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTE	Course Name	L-T-P/S	Credits	Year of introduction

R I Course No.				
AR 17-14	**THEORY OF STRUCTURES-I**	**2-1-0**	**4**	**2017**

Course Objectives

The Mechanics of Structures course for students of architecture would,

- Help to acquaint the students with the general methods of analyzing engineering problems.
- Assist in illustrating the applications of the methods to solve practical engineering problems.

Course Outcome

- Understanding of the concepts of mechanics of structures.
- Appreciation of the principles involved in various types of trusses and beams and their loading patterns.

Text books

- Rajasekharan S.and Sankarasubramanian G., Engineering Mechanics-Statics and Dynamics, Vikas Publications, New Delhi
- R.K.Banzal., Engineering Mechanics, Lakshmi Publications Pvt.Ltd., New Delhi
- S.B Junnarkar & H.J Shah, Mechanics of Structures Vol I ,Charotar publishing House, Anand
- R.K.Banzal., Strength of Materials, Lakshmi Publications Pvt.Ltd., New Delhi

Reference Books

- Shames I.H, Engineering Mechanics-Statics and Dynamics, Prentice Hall of India, New Delhi
- Hibbeler R.C., Engineering Mechanics- Statics, Pearson Education, New Delhi
- Timoshenko, Strength of Materials Vol. I & Vol. II, CBS Publishers & Distributors, New Delhi
- James M Gere & Stephen P Timoshenko, Mechanics of Materials, CBS Publishers & Distributors, New Delhi

MODULE I (16 hours)

Introduction to Engineering Mechanics: Principles of statics- Free body diagram - Composition and resolution of forces- Resultant of concurrent force system - Lami's theorem-Parallelogram law of forces - Method of moments - Theorem of Varignon - Parallel force system - Couple - Resultant and equilibrium for a general system of coplanar forces.

MODULE II (16 hours)

Friction: Laws of friction - Equilibrium of a body on a rough inclined plane - Ladder friction
Properties of surfaces: Centre of Gravity - Centroid - Centroid of composite plane figures
Moment of inertia - Parallel and perpendicular axis theorem- Moment of inertia of composite sections and rigid bodies (cylinder, circular rod, sphere) Product of Inertia-Principal axes and principal moment of inertia (Concept only)

MODULE III (14 hours)

Plane trusses: Types of trusses-Analysis of cantilever and simply supported trusses using Method of joints, Method of sections and Graphical method.

Beams: Types of beams- Supports- Loads-Support reactions of simply supported, cantilever and overhanging beams. Principle of virtual work (concept only).

MODULE IV (14 hours)

Bending Moment & Shear force**:** Shear force and bending moment diagrams for cantilever, simply supported and overhanging beams for different types of loading. Relationship connecting intensity of loading, shear force and bending moment

TOTAL HOURS: 60

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER I Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17 – 15	HISTORY OF ARCHITECTURE – I	2-0-0	3	2017

Course Objectives

The History of Architecture - I course for students of architecture would,

- Provide an insight to the architecture of the prehistoric period, ancient civilizations across the world, and Buddhist and Hindu architecture in India.
- Introduce them to the cultural and contextual determinants that influenced the built form and settlement patterns.
- Help them to understand the development of architecture with reference to character, style, materials, technology, climate, geography, religion, and culture.

Course Outcome

- An understanding about the spatial and stylistic qualities associated with architecture of various civilizations.
- Placing architecture within the realm of various social, political and economic upheavals, and as a response to cultural and contextual pressures.
- Enable students to appreciate chronological developments along the timeline and across various civilizations and geographies.

Reference Books

- Banister Fletcher, ‘ Dan Cruickshank Sir Banister Fletcher’s a history of architecture: A History of Architecture’, Architectural Press, 1996
- Percy Brown, ‘ Indian Architecture: Buddhist and Hindu Periods”, D. B. Taraporevala, 1965
- Satish Grover, ‘The Architecture of India: Buddhist and Hindu’, Vikas, 1980
- G.K.Hiraskar, ‘The Great Ages of World Architecture’
- Christopher Tadgell, ‘The History of Architecture in India’, Phaidon, 1994
- Satish Chandra, ‘History of Architecture and Ancient Building Materials in India’, Tech Books Internationals, 2003
- James C. Harle, ‘The Art and Architecture of the Indian Subcontinent’: Second Edition, Yale Univ. Press, 1994
- Henri Stierlin - Hindu India - From Khajuraho to the Temple city of Madurai – Taschen, 2002
- Carmen Kagal, Vistara: the Architecture of India, published by Festival of India, 1998
- Ilay Cooper, ‘Barry Dawson, Traditional Buildings of India’, Thames and Hudson, 1998

MODULE I (16 Hours)

Study of the world civilizations to understand how people lived, their thoughts, beliefs, religions, social customs, cultural practices and related architectural growth.

A brief introduction to World Architecture.

Prehistoric: Factors influencing Architecture, General characteristics.

History, evolution and factors influencing architectural characteristics of the following Civilizations:

Ancient Mesopotamia: Ziggurat of Ur.
Ancient Egypt: Tombs & Temples - Great Pyramid at Giza, Great Temple of Karnak, Ammon, Sphinx.
Ancient Greece: Classical Orders - Optical corrections - Acropolis of Athens, The Parthenon, The Erechtheion, Agora.
Ancient Rome: Tuscan and composite orders - Roman materials and construction techniques - lintels, arches & vaults, aqueducts. Building typologies examples - Pantheon, Colosseum, Basilica of Constantine, Thermae of Caracalla, and Forum.

MODULE II (10 Hours)

Indus Valley Civilization: Culture and pattern of settlement - City planning, domestic architecture, building materials and construction techniques - Mohenjo Daro, Harappa.
Vedic Period: Vedic Village - City Planning in later Vedic period - Building materials and construction techniques.
Buddhist Architecture: Introduction to Buddhist art - Hinayana and Mahayana Buddhism - Architectural Productions during Ashoka's rule - Ashokan Pillar, Sarnath. Development of Chaitya arch. Major building typologies - The Great Stupa at Sanchi, Chaitya Hall, Karli, Main caves of Ajantha and Ellora, Rani Gumpha - Udaigiri

MODULE III (10 Hours)

Early temples: Evolution and major influences on development of form and other architectural elements. Gupta and Early Chalukyan styles - Gupta temple at Tigawa, Main caves at Badami, Ladkhan and Durga temples, Aihole.
Hindu temple architecture: Principles of Design and Construction.
Dravidian style: Contributions of various dynasties
Pallava: Rock cut and structural temples - Rathas and Mandapas at Mahabalipuram, Shore Temple at Mahabalipuram, Kailasanatha Temple at Kanchipuram.
Chola: Brihadeswara temple, Thanjavur.
Pandya: Evolution of Gopurams
Later Chalukya or Hoysala: Hoysaleswara temple, Halebid.
Vijayanagara: Hampi, Vittalaswami temple at Hampi.

MODULE IV (10 Hours)

The late Pandya or Nayak style: Complexity in Temple plan of Srirangam temple, Meenakshi temple at Madurai, Rameshwaram temple.
Indo Aryan Style: Salient features of lndo Aryan Temples
Orissan: Parasurameswara, Lingaraja temples at Bhubaneswar. Sun temple at Konark.
Khajuraho: Kandariya Mahadeva Temple at Khajuraho.
Gujarat: Sun temple at Modhera.

TOTAL HOURS: 46

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER I Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17- 16	ARCHITECTURAL DRAWING AND GRAPHICS	0-0-5	6	2017

Course Objectives

The Architectural Drawing and Graphics course for students of architecture would,

- Introduce students to the fundamental techniques of architectural drawing and develop appropriate manual skills for visualization and technical representation of built forms in different types of drawings. The course also acts as a bridge to understanding basics of computer aided drafting and architectural graphics.

Course Outcome

- An understanding of the concepts of architectural drawing techniques.
- Assisting the students to develop a graphical language of architecture both in 2D and 3D.

Reference Books

- N. D. Bhatt, 'Elementary Engineering'.
- Cari Lara Svensan and Wiliam Ezara Street, 'Engineering Graphics'.
- K. Venugopal, 'Engineering Drawing and Graphics'.
- S. Rajaraman, ' Practical Solid Geometry'.
- Francis D. K. Ching, ' Drawing, Space, Form, Expression'.
- Shankar Mulik, 'Perspectives and Sciography', Allied Publishers, India, 1999

MODULE I (15 Hours)
INTRODUCTION

Introduction to Architectural drawings: types of drawings- Freehand sketches and mechanical drawing for architectural applications and presentation drawings. Different mediums used such as pencil, ink, types of papers, reproduction methods. Demonstration of drawing instruments and their use. Essential kit for making architectural drawings. Single-view and multi-view drawings, Differentiating Paraline and Perspective projections- Sheet layout, title block construction, different types of lines, line thickness, dimensioning lines and dimensioning styles

1. **CONIC SECTIONS**- Ellipse, hyperbola, parabola.
2. **SCALES**

   Use of scale in drawings, Representation fraction (R.F.), Classification of scales- Construction detail of Plain scale, Diagonal scale and Vernier scale.

MODULE II (30 Hours)
BASIC ARCHITECTURAL DRAWING

Introduction to Architectural drafting, symbols, lettering, dimensioning, values in drawn lines, tone, texture and color. Architectural representation of materials on drawings, terminology and abbreviations used in architectural drawings.

Basic Geometric Construction- circles, tangents, drawing polygons.

Spirals, helices and involutes.
Reduction and enlarging of given drawings. Measured drawing to scale of furniture pieces, rooms, doors, windows etc. Representation of wall thickness and openings in walls in geometrical plan shapes.

ORTHOGRAPHIC PROJECTION

Introduction to Orthographic Projection, Differentiating First angle and third angle projection. First Angle Projection- Illustrative examples-points and lines.

First Angle

1. **ORTHOGRAPHIC PROJECTION-PLANES**-Projection of planes: projection of planes/laminae of regular geometric shapes parallel to one plane and inclined to other plane, planes/laminae inclined to both reference planes.
2. **ORTHOGRAPHIC PROJECTION-SOLIDS**- First Angle Projection of solids—- rectangular parallelepiped, cube, prism, pyramid, cylinder, cone, sphere.
3. **DEVELOPMENT OF SURFACE OF SOLIDS**- Geometrical solids such as prism of 4 and 5 sides, cylinder, pyramid of base sides 4 and 5, cone – Truncated solids such as cone, pyramid – Transition pieces such as rectangular reducing to circle, circle to square.

(Minimum 4 Drawing Exercises Suggested)

MODULE III (20 hrs)
ISOMETRIC PROJECTION & CONVERSION

Pictorial Projections- Introduction to Isometric, Axonometric and Oblique projections.

1. **ISOMETRY**- difference between Isometric projection and isometric view - Isometric scale isometric Projection/views of solids like prisms, cylinders, cones pyramids, and spheres. Isometric projection of sectioned and composite solids.
2. **CONVERSION OF PICTORIAL VIEWS INTO ORTHOGRAPHIC VIEWS**- Preparing scaled multi-view drawing from isometric views.

(Minimum 4 Drawing Exercises Suggested)

MODULE IV (20 Hours)
PERSPECTIVE PROJECTION & SCIOGRAPHY

1. **PERSPECTIVE PROJECTIONS**: Definition of perspective elements, classification of perspectives- Visual ray and Vanishing point Methods. Constructing one point and two point perspective views of simple solids and furniture pieces.
2. **INTRODUCTION TO SCIOGRAPHY**- principles of shades and shadows, Drawing shadows of simple objects in plan, elevation and perspective.

(Minimum 4 Drawing Exercises Suggested)

Note:
Number of drawing exercises suggested above is for class work. Additional exercises wherever necessary may be given as home assignments.

TOTAL HOURS: 85

UNIVERSITY EXAMINATION PATTERN

Q I - 2 Questions of 25 marks from module I with choice to answer anyone.
Q II - 2 Questions of 25 marks from module II with choice to answer anyone.
Q III - 2 Questions of 25 marks from module III with choice to answer anyone.

Q IV - 2 Questions of 25 marks from module IV with choice to answer anyone.

SEMESTER I Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17 -17	VISUAL ARTS & PRESENTATION	1-0-2	4	2017

Course Objectives

The Visual Arts & Presentation course for students of architecture would,

- Provide requisite knowledge of visual language involving various media. The primary focus is on developing basic drawing and painting skills, as applied to architecture.
- Help students acquire basic knowledge about the characteristic of colours (water/ poster/ crayon etc.) and develop skills in using various media as effective and versatile presentation tools.

Course Outcome

- An understanding of the techniques of usage of various media and their applications.
- Development of architectural presentation skills using different media.

Reference Books

- J.H. Bustano, ‘Principles of Colour and Colour Mixing’.
- Francis D.K. Ching, ’Architectural Graphics,’ John Wiley, 2002.
- Francis D.K. Ching, ‘Drawing, Space, Form, Expression’.
- Victor Perard, ‘Anatomy and Drawing’.
- Luis Slobodkin, ‘Sculpture-Principle and Practice’.
- Suzanne Huntington, ‘Art of Ancient India’.
- Roy C. Craven, ‘Indian Art’.
- J.C. Harle, ‘Art & Architecture of the Indian Sub-continent’.

MODULE I (15 Hours)
FUNDAMENTALS OF VISUAL ARTS

a. Introduction to Art object, definition and Interpretation. Introduction to History of Art, Artistic Tradition and Theories.
b. Graphic representations – Visual composition and Abstraction- Exercises involving Logo design, collage and calligraphy.
c. Drawing: Types, Characteristics & functions of lines and its visual impacts.

MODULE II (18 Hours)

a. Primary pencil sketching, tonal value and variation, shading techniques and texture technique.
b. Primary ink drawing techniques using nib pens, Radiograph, Rotring pens, tonal value and variation, shading techniques and texture technique.
c. Study of Objects having varied shapes (cuboids, prismatic, spherical, globular etc.) in different media- charcoal, pencils, pastels and ink. Sketching of simple natural / manmade forms in combination with trees , human figures etc

d. Outdoor Study; study of monuments. Buildings in pencils, ink, charcoal, pastels etc. study should focus on Architectural details, wherever relevant.
e. Rendering of perspective with sciography of Architectural Design problems.
f. Sciography - Use, Definition, Direction of Light, Location of object, Method of finding shadows of a sphere, Right circular cone, shade of double curve surface of revolution. Shadows of lines and circles. Shadows of architectural elements. Shadows of circular solids. Shadows on buildings.

Module III (15 HRS)

a. Elements of Painting: Pictorial & Spatial organizations, Form and texture in Painting, Theory of Colour- Chromatic Values, Colour wheel, colour chart, Two-dimensional/ Three dimensional aspects of Painting.
b. Basic psychological aspects of lines, forms and colours, Unity of forms: Gestalt theory.
c. Techniques of Rendering in water, poster, oil, mixed media and New Media.
d. Architectural photography:

- Photography for documentation work.
- Use of Photography for making audio-visual Presentation projects.
- Use of Photography for simulating, overlaying or just positioning of building in different background /environments.
- Special skills and equipment required for photography of buildings-Effects of using various lenses / filters in Photography of buildings.
- Effects of outdoor light on buildings for photography, study of shadow in architectural photography.
- Scale relationships in photography of buildings.-Photographing interiors-special skills and equipment required. Comparative values / effects black and white effects / colour photography in architecture.

MODULE IV (18 Hours)

a. Introduction to Indian aesthetics/ Canonical principles of Indian Art, Sculpture & Painting.
b. Mural Tradition in Kerala- Study of Style, Form and Technique.
c. Languages, Methods & Techniques of Sculpture: Form, Texture, Mass and Volume. Sculpture in relief, Shallow relief, Sculpture in round. Free standing sculpture in relation to Architectural space.
d. Techniques: Molding & casting in Plaster, Mud, Cement and Fiber glass.

TOTAL HOURS: 66

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 30 marks from module I and module II with choice to answer anyone.
Q III - 2 Questions of 30 marks from module III and module IV with choice to answer anyone.

SEMESTER I Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-18	MODEL-MAKING WORKSHOP	0-0-2	3	2017

Course Objectives

The Model-making Workshop course for students of architecture would,

- Equip students with the basic skills necessary to represent their ideas three-dimensionally using simple materials.
- Enable students to get acquainted with various tools essential for creating architectural models.
- Help students to comprehend the exercises of the Basic Design and Architectural Graphics Studio in a better manner, as the subject is to be taught in coordination with them.

Course Outcome

- This course will assist the students to enhance their project presentation skills by the use of simple as well as detailed architectural models.

Reference Books

- Criss. B. M., “Designing with models: A Studio guide to Architectural Process Models”, John Wiley & Sons, Hoboken, 2011.
- Werner, M., “Model Making”, Princeton Architectural Press, New York , 2011.
- Congdon, Roark T., "Architectural Model Building: Tools, Techniques & Materials", Bloomsbury Academic, 2010.
- Knoll, W. and Hechinger, M., “Architectural Models: Construction Techniques", Cengage Publications, 2014.
- Dunn, N., “Architectural Modelmaking”, Laurence King Publishing, 2013.
- Schilling, A., “Basics Model-building”, Birkhauser, Berlin, 2007.
- Mi-Young, Pyo, “Construction and Design Manual: Architectural Model”, Dom Publishers, Germany, 2012.

MODULE I
BASICS OF MODEL-MAKING TECHNIQUES (6 Hours)
Techniques of cutting paper to create regular polygon shapes as 2D planes (3-sided to 10-sided polygons).

Creating basic solid shapes such as square, rectangle, circle & triangle with various paper medium.

MODULE II
GEOMETRIC & FREE-FLOWING FORMS (10 Hours)
Creating platonic solids with suitable paper medium.

Making of models using free flowing materials such as clay, plaster of paris etc.

MODULE III
BLOCK & SITE MODELS (12 Hours)
Creating block models of buildings and detailed site model using suitable materials for roads & landscape elements.

MODULE IV
DETAILED ARCHITECTURAL MODELS (12 Hours)
Creating a detailed building model: Exterior / interior using different materials and paper to represent the actual material in a suitable scale.

TOTAL HOURS: 40

SEMESTER I Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-19	COMMUNICATION SKILLS	0-0-2	2	2017

Course Objectives

The Communications Skills course for students of architecture would,

- Augment their communication skills in English by developing their listening, speaking, reading and writing skills.
- Improve their speaking skills particularly with respect to clients, suppliers, business partners and colleagues and help to develop their architectural vocabulary.
- Enhance their reading particularly architectural journals and books, building rules and regulations, and catalogues.
- Help to cultivate their general as well as analytical writing skills especially writing resumes, letters, emails, proposals and reports.

Course Outcome

- This course will assist the students to hone their communication skills to interact with potential clients and business partners. It would also enhance their architectural vocabulary so as to improve the efficacy of their project presentations.

Reference Books

- Schmalz, Bill. Architect's Guide to Writing: For Design and Construction Professionals, Images Publishing Group Pty Ltd., 2014.
- Greusel, D., Architect's Essentials of Presentation Skills, John Wiley & Sons, New York, 2002.
- Eric H. Glendinning & Beverly Holmstrom, "Study reading - A course in reading Skills for academic purposes", Cambridge University Press,1992.
- John Kirkman, "Good style - writing for science and technology", E&FN Spon, an Imprint of Chapman & Hall, 1992.
- Anderson, P.V, Technical Communication: A Reader-centered approach, Wadsworth, Eighth Edition, USA, 2014.
- Krishna Mohan and Meera Banerji: Developing Communication Skills (Mac Millan India Ltd)[2000].
- John Seely, The Oxford Guide to Writing and Speaking, Oxford University Press, New Delhi, 2004.
- Lewis, N., Speak Better Write Better , W.R.Goyal Publishers& Distributors, Delhi, 2011.
- Wren, P.C. & Martin, H., High School English Grammar & Composition, S. Chand Publishing, 2017.
- Thorpe, E. and Thorpe, S., Objective English, Pearson Education India, New Delhi, 2016.
- Sen, L., Communication Skills, Prentice Hall India Learning Pvt. Ltd., New Delhi, 2007.
- Carnegie, D., The Quick and Easy Way to Effective Speaking, Rupa & Co., New Delhi, 2016.
- Bansal, R. K. and Harrison, J.B., Spoken English: A Manual of Speech & Phonetics, Orient Blackswan, Hyderabad, 2013.
- Murphy Raymond, Essential English Grammar 2Ed, Cambridge University press
- Thakkar Prathesh , The Ultimate Guide to IELTS Writing, MK Book Distributors

- Oxford Advanced Learners Pocket Dictionary 4th Ed.

MODULE I
BASICS OF COMMUNICATION SKILLS (12 Hours)
Introduction to Phonetics and Phonetic symbols – Relevance in the area of pronunciation-Transcription of words using phonetic symbols especially the recurring words in the field of Architecture –Reduction of speech sounds in natural speech -Oral presentations and role plays (5 minutes activities)
Practice session in using a dictionary effectively with special focus on the origin, meaning and pronunciation of words
Listening – Listening to news bulletins and related voice modulations- interviews and discussions from various media
Speaking – Giving directions and instructions, negotiating meaning, convincing people, describing places, telephone conversations, participating in small group discussions -stress , rhythm and intonation in connected speech
Reading –News papers and lengthy articles related to architecture and construction
Writing - process descriptions, formal emails & letters, blogs
Vocabulary Development – Abbreviations, appropriate words to describe topics in architecture
Grammar – Basics-Suitable tenses to write descriptions in the field of Architecture

MODULE II
DESCRIPTIVE TECHNIQUES (8 Hours)
Listening – Description of places, conversations and answering questions
Speaking - making a power point presentation on a given topic
Reading - architecture manuals / regulations
Writing - writing a resume/CV, business letters, report, Memos etc.
Vocabulary – Vocabulary building activities.
Grammar - collocations

MODULE III
ANALYTICAL SKILLS (8 Hours)
Listening - TED talks
Speaking - participating in group discussions
Reading - reading and interpreting visual information
Writing - writing analytical and argumentative essays
Vocabulary - suitable words to be used in analytical and argumentative essays
Grammar - subject-verb agreement

MODULE IV
PRESENTATION SKILLS (12 Hours)
Listening – Developing listening skills in relation to IELTS,TOEFL, GRE and CAT examinations
Speaking – Elements of effective presentation tools-Voice Modulation-Power point presentations-Audience Analysis-talking about one's project proposal-body language-how to face the interview board-mock interviews-group discussion-debates-soft skills-emotional literacy
Reading - reading essays on construction, buildings, different schools of architecture

Writing – writing proposals, role of references / bibliography, table of contents, index
Vocabulary - related vocabulary
Grammar - Cohesive devices

TOTAL HOURS: 40

File Ref.No.181386/GA - IV - E1/2016/Admn

UNIVERSITY OF CALICUT

Abstract

Faculty of Engineering-B.Arch programme-Revised syllabus-Third to Sixth semester-Resolution of the Academic council-implemented-Orders issued.

G & A - IV - E

U.O.No. 8825/2018/Admn Dated, Calicut University.P.O, 24.07.2018

Read:-1.U.O.No.11016/2017/Admn dated 31.08.2017
2.Item No.1 of Minutes of the meeting of the Board of Studies in Architecture held on 19-04-2018.
3.Item No. 2(i) of Minutes of Faculty of engineering meeting held on 03-07-2018
4.Item No.II (J) of minutes of academic council meeting held on 18-07-2018

ORDER

As per U.O read as (1), the revised regulations and the Syllabus for combined First and Second semester B.Arch Programme was implemented with effect from 2017 admission. According to paper read as (2), the Board of Studies in Architecture discussed and approved the Syllabus for Third to Sixth semester B.Arch programme. The resolution of the Board of Studies was approved by the Faculty of Engineering vide paper read as (3). According to paper read as (4), the Academic council, approved the Minutes of the meeting of the Faculty of Engineering held on 03.07.2018 and the Minutes of the meeting of the Board of studies in Architecture read as (2).

The Vice Chancellor has accorded sanction to implement the above resolution of the Academic Council.

The following orders are therefore issued:

1.The Revised Syllabus of Third to Sixth semester B.Arch Programme is implemented with effect from 2017 admission.
(Syllabus appended)

Ajitha P.P

Joint Registrar

To
1.The Controller of Examinations
2.Principals of affiliated B.Arch Colleges
Copy to:PA to VC/PA to PVC/PA to Registrar/PA to CE/DR, B.Tech/EX&EG sections/SF/DF/FC

Forwarded / By Order

Section Officer

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-31	ARCHITECTURAL DESIGN I	0-0-10	10	2017

Course Objectives

The Architectural Design I course for students of architecture would,

- Help them to understand space requirements related to human activities and study anthropometric data.
- Introduce concept to the process of design.
- Introduce students to standards and norms related to different functions.
- Introduce students to rules and regulations related to building design.
- Enable them to conceive 3 dimensional forms and establish relation to functional requirements which will result in optimal utilization of space.
- Help them to develop a basic understanding of building materials.

Course Outcome

- To develop a basic understanding of space, form, structure and the built environment

Reference Books

- De Chiara and Callender, Time Saver Standard for building types, McGraw Hill Co.
- Neufert Architect's data, Bousmaha Baiche & Nicholas Walliman, Blackwell science ltd.
- KMBR
- Simon Unwin, "Analyzing Architecture", Routledge 2003
- Francis D.K.Ching, "Architecture, Form, Space and Order"; III Edition, John Wiley, 2007
- Leland M.- Roth, "Understanding Architecture: Its Elements- History, and Meaning", Icon Editions, 1993
- Steen Eiler Rasmussen, "Experiencing Architecture", MIT Press 1964
- Peter von Meiss, "Elements of Architecture - From Form to Place", Span Press, 1992
- Bryan Lawson, "How Designers Think", Architectural Press Ltd" London, 1980.

Projects:
Two projects - one minor and one major - shall be completed during this semester and these shall have minimum complexity in terms of design and site challenges.
Minor Project: Design of small span, single space, single use spaces with simple movement, predominantly horizontal, as well as simple function public buildings of small scale like bus shelter/ fast food kiosks/ entrance gateways/ park Shelters etc.
Major Project: Design of a residence within a set of limited specific requirements

Process & Deliverables:
Students should attempt data collection from various reference books, carryout adequate number of relevant case studies. The concepts of architectural programming shall be introduced to assist the design process. Handmade sketches, manual drafting and scaled study models shall be made part of the design process. Deliverables shall be manually drafted presentation drawings including free hand perspectives, scaled working models etc.

TOTAL HOURS: 120

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-32	THEORY OF DESIGN - II	2-0-0	3	2017

Course Objectives

The Theory of Design II course for students of architecture would,

- introduce factors that lend meaning to design , expression, communication.
- introduce thorough case studies, tools for representing, analyzing and interpreting architecture.

Course Outcome

- An understanding of Architecture as a product of historical context through introduction to aspects of style, character and architectural movements.
- An understanding of the generation of individual meaning in architecture through study of philosophies/ theories and exemplary works of architects.
- Development of architectural drafting skills in the representation of construction details.
- An exposure to analysis and experience of architecture through case studies.

Text books

- Scott- Design fundamentals
- G .Broadbent – Design in Architecture
- Architectural Criticism – Definition, Sources, Types of Criticism by Wayne Attoe
- Jon Lang – Positive and Normative Theories in Architecture

Reference Books

- Garry Stevens – The reasoning Architect
- K.W.Smithies, Principles of Design in Architecture, Van Nostrand Reinhold Company 1981
- Sam F. Miller, Design Process - A Primer For Architectural & Interior Design, Van
- NostrandReinhold Company , 1995
- Ernest Burden, Elements of Architectural Design – A Visual Resource, Van Nostrand
- Reinhold Company,1994
- V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications, New Delhi, 1973
- Y.Ashihara – Exterior design in Architecture
- Diane Ghirardo – Architecture after Modernism
- Peter von Meiss, “Elements of Architecture - From Form to Place”, Span Press, 1992
- Bryan Lawson, “How Designers Think”, Architectural Press Ltd" London, 1980
- Hanno Rauterberg, “Talking Architecture, Interview with Architects”, Prestel 2008
- The A-Z of Modern Architecture-Taschen 2007
- Antony Catanese and James C. Snyder, Introduction to Architecture, McGraw-Hill, 1979

MODULE I (12 HRS)

Architectural theory in historical perspective:
Types of Design: Pragmatic design, Iconic Design, Analogical Design, Canonic Design Advantages and Disadvantages and outstanding examples

Architectural Criticism:
Definition & Sources, to examine fundamental questions of what Architectural criticism actually is, its role and function in architecture and the relationship between criticism and judgment.

MODULE II (6 HRS)

Society and design:
Role of designer in the society. Design for performance, Behavioral Aspects of Design.
Design generation process: Role of logic and intuition in concept generation.
Step by step development of design from problem definition, site analysis to post occupancy evaluation as the last stage of design.

MODULE III (10 HRS)

Creativity and Design: Concepts of creativity. Techniques of creative thinking. Different tools of Creativity, Issues of creative design, Difference between Innovation and Creativity. Impact of computer applications on creativity and design.

MODULE IV (12 HRS)

Contemporary movements in architecture
Role of individual architects in the generation of architectural form, through study of exemplary works, architectural inspirations, philosophies, ideologies and theories of architects.
Modern Movement Theory including Organic Architecture – Le Corbuiser and Frank Llyod Wright
Post Modern Theory –Robert Venturi, Louis Sullivan
Deconstructivism – Zaha Hadid, Frank Gehry

TOTAL HOURS: 40

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-33	BUILDING MATERIALS AND CONSTRUCTION - II	1-0-3	3	2017

Course Objectives

The Building materials and construction course for students of architecture would,

- Introduce the study of building materials (concrete, iron, steel & aluminium), their application and construction methods.
- Help them to understand the details of construction.

Course Outcome

- An understanding of the properties of various building materials and their applications.
- Exposure to the common construction techniques used for constructing various components of a building.
- Development of architectural drafting skills in the representation of construction details.

Text books

- Arora S.P. and Bindra S.P., "Text book of Building Construction", DhanpatRai& Sons, New Delhi, 2012.
- P C Varghese, Building Materials, Prentice Hall of India Pvt. Ltd, New Delhi, 2010
- Shetty M.S, Concrete Technology
- Francis D.K. Ching, Building Construction Illustrated John Wiley & Sons 2000.
- Balagopal T.S. Prabhu, "Civil Engineering Drawing Hand book"

Reference Books

- Don A. Watson Construction Materials and Processes McGraw Hill 1972.
- WB Mckay Building construction, Vol 1,2, Longman UK 1981.
- Barry, The Construction of Buildings; Affiliated East West press put Ltd New Delhi 1999.
- Neville A M and Brooks J J , Concrete Technology

MODULE I
CONCRETE (12hrs)
Ingredients of Concrete: Cement, Fine aggregate, Coarse aggregate, Water, Reinforcement.
Concrete: PCC and RCC, Grades, Properties, Water cement ratio.
Process of concreting : Formwork for concrete, Mixing of concrete, Cutting, bending and placing of reinforcement, Placing of concrete, Scaffolding, Curing
Properties of concrete: fresh concrete, workability, segregation and bleeding, factors affecting workability & strength. Various types of concrete.

Exercise: site visit & field observations of onsite concreting work

MODULE II

DEEP FOUNDATION (16 hrs.)

Pile foundation: Bearing piles, friction piles – concrete, timber, steel and composite piles. Cased and uncased cast in situ concrete piles, Bored piles, pressure piles and precast concrete piles. Screw piles & disk piles. Under reamed piles. Bored compaction piles. Sand piles. Sheet piles. Pile cap. Caissons: Box caissons, Open caissons & pneumatic caissons

Timbering and trenching of foundations

Exercise: Drawings of various types of Pile foundations & site visit

MODULE III

IRON, STEEL, ALUMINIUM, (12 hrs.)

Iron: Forms of Iron used for building construction–Properties and uses - Cast iron, Wrought iron

Steel: Properties , Uses, Anti corrosive measures, mechanical and heat treatment of steel

Forms of steel used for building construction: steel for reinforcement-Hot rolled bars, Cold rolled steel, TMT bars, Welded wire fabrics. Structural Steel, Stainless steel, Steel alloys, current developments.

Aluminium in building construction: Properties, Advantages, Available Forms-Extrusion, casting, foil, powder & sheet - uses- finishes - anodising, surface texture, colour coating & painting. Applications in buildings.

Exercise: study of standard aluminium & steel products and profiles used for building construction.

MODULE IV

JOINERY, DOORS&WINDOWS (16 hrs.)

Joinery: Joinery details in wood, Terms for various members, fasteners and fixtures used in joinery.

Door: Different types of doors and uses. Wooden doors, PVC doors, glass doors, Steel doors

Solid doors, Flush doors, revolving doors, folding doors, sliding doors, swinging doors, collapsible doors.

Windows: Aluminium, Steel & UPVC windows - French windows, bay windows - fixed, casement, sliding & pivoting windows.

Drawings: Joinery details, Paneled door, battened door, glazed door , sliding door, folding door Aluminium and steel window.

TOTAL HOURS: 56

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-34	BUILDING CLIMATOLOGY	3-0-0	3	2017

Course Objectives

The Building Climatology course for students of architecture would,

- Help students develop an understanding and appreciation of climate and its influence on built form and architecture of a region.
- Equip the students with the competence required to design climate responsive buildings, by providing an understanding of the various climatic zones and the climate responsive considerations in the design of spaces – built-up and open.

Course Outcome

- An understanding of the relation of climate to human comfort.
- Awareness about various types of climate and the corresponding design strategies for climate-responsive buildings and spaces.

Text books

- Koenisberger, O. H., Ingersoll, T.G., Mayhew, A. and Szokolay, S.V., Manual of Tropical Housing and Building – Climatic Design, Orient Longman Pvt Ltd, Chennai, 2003.
- Bureau of Indian Standards IS 3792 (1987), Hand book on Functional requirements of buildings other than industrial buildings, (Part I – IV), BIS, New Delhi, 1995.

Reference Books

- Krishnan, A., Szokolay et.al, Climate Responsive Architecture-A Design Handbook for Energy Efficient Buildings, Tata McGraw Hill, New Delhi, 2010.
- Evans, M., Housing Climate and Comfort – Architectural Press, London. (1980).
- Allan, K., Design Primer for hot Climates, The Architectural Press Ltd, London, 1980.
- Givoni, B., Passive and low energy cooling of Buildings, John Wiley and Sons, 1994.
- Markus, T.A. and Morris E. N., Buildings Climate and Energy, Pitman Pub., 1980.
- Fry. M and Drew. J, Tropical Architecture in the Dry and Humid Zones, Londres: Bestford, 1964.
- Giovoni, B., Man, Climate and Architecture, Van Nostrand Reinhold, 1981.
- Kukreja, C.P.,Tropical Architecture, Tata McGraw Hill Pub. Co. Ltd New Delhi, 1978.
- Olgyay, A. and Olgyay, V., Solar Control and Shading Devices, Princeton University Press, New Jersey, 1976.

MODULE I

CLIMATE AND HUMAN COMFORT (12 Hours)

Factors that determine climate of a place - Elements of climate – Measurement and representation techniques of climatic data – Global climatic zones – Macro, Micro, Site and Urban climate - Human body heat balance - Mechanism of comfort in human system in various climatic environments - Concept of effective temperature, its correction and application – ET/CET nomogram – Pychrometric chart - Comfort indices - Bio-climatic chart.

MODULE II

PRINCIPLES OF THERMAL DESIGN (10 Hours)

Basic concepts of heat transfer, terminology and units – K value and U value – Sol-air temperature and Solar gain factor – Heat exchange of buildings – Transmittance of composite walls – Thermal gradients – Periodic heat flow concept – Time-lag and Decrement factor - Thermal characteristics of common building materials and building components.

MODULE III

MEANS OF THERMAL CONTROL (12 Hours)

Structural controls: solar control – heat absorbing glasses - geometry of solar movement - altitude & azimuth angles - sun path diagram/solar chart - horizontal and vertical shadow angles - use of shadow angle protractor - design of shading devices.

Ventilation and air movement: functions of ventilation – stack effect – air flow through buildings – air flow around buildings – humidity control.

MODULE IV

CLIMATE-RESPONSIVE ARCHITECTURAL DESIGN (8 Hours)

Architectural design strategies for different climatic zones - Passive design techniques in built and un-built environment.

The climatic design process: forward analysis – plan development – element design – The Mahoney tables – Activity charts.

Models and Analogues: wind tunnel – solarscope – artificial sky.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-35	BUILDING SCIENCE LAB	0-0-3	3	2017

Course Objectives

- Building Science laboratory practical sessions are to introduce use of various equipment and materials used for understanding a building's performance in terms of structural strength, illumination levels of spaces, acoustical qualities, thermal properties of materials etc.

Course Outcome

- A practical experience of the properties and behaviour of various building materials.
- Hands-on experience of calculating climatic data using various climatic instruments.

Course Content:

1. Tests on Cement
   a) Fineness of cement
   b) Normal Consistency
   c) Initial Setting time of Cement
   d) Final Setting time of Cement

2. Tests on aggregate for Concrete
   a) Bulking of Sand
   b) Particle size distribution of coarse aggregate

3. Tests on building materials
   a) Compressive strength of country burnt bricks
   b) Tensile strength of steel rods

4. Properties of Fresh Concrete
   a) Workability tests
   b) Slump Test

5. Measurement of illumination levels from a point source by using lux meter

6. Wet and dry bulb thermometer

7. Determination of air circulation of room by using anemometer

8. Finding the maximum and minimum temperature of a particular location by using maximum and minimum thermometer

TOTAL HOURS: 30

Sessional Requirements:

Laboratory work Marks: 50 marks
Record: 10 marks
Tests: 30 marks

Regularity: 10 marks
Total: 100 marks

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-36	THEORY OF STRUCTURES - II	2-1-0	3	2017

Course Objectives

The Theory of Structures – II course for students of architecture would,

- Help enable an understanding of fundamentals of stress and strain and their applications in structural analysis and design.

Course Outcome

- Understanding of the concepts of stress and strain.
- Appreciation of the way in which stress and strain impacts beams and columns.

Reference Books

- F.V.Warnock, Strength of Materials, Sir Isaac Pitman Sons Ltd.
- E.P. Popov, Mechanics of Materials , SI Version, Prentice Hall, India
- William. A. Nash, Strength of Materials, SI Version, Schaum's Out line Series
- S.S. Bhavikkatti, Structural Analysis Vol. I, Vikas Publishing House Pvt. Ltd.
- Ramamrutham S. And R. Narayan, Theory of Structures, Dhanpat Rai Publishing Co., 2012
- R.K Bansal., Strength of Materials, Lakshmi Publications Pvt Ltd
- M.M. Ratwani & V.N. Vazirani, Analysis of Structures, Vol. 1, Khanna Publishers – Delhi, 1987.
- Timoshenko, S.P. and D.H. Young, Elements of Strength of Materials, Fifth edition, East West Press, 1993

MODULE I (12 hrs)

Types of external loads, self-weight internal stresses, normal and shear stresses, strain, Hooke's law, Poisson's ratio, relationship between elastic constants, stress-strain diagrams, working stress, elongation of bars of constant and varying cross sections, thermal stresses.
Stress on inclined planes for axial and bi-axial stress fields, principal stresses, Mohr's circle of stress, principal stresses. (Concept only).

MODULE II (10 hrs)

Theory of simple bending, limitations, bending stresses in beams of different cross sections, moment of resistance, beams of uniform strength, beams of two materials, principal stresses in bending, strain energy due to bending, shearing stresses in bending, distribution of shear stress in various cross sections.

MODULE III (10 hrs)

Differential equation of the elastic curve, slope and deflection of beams by method of successive integration, Macaulay's method, moment area method.
Deflection of beams by strain energy method -application to simple beams.

MODULE IV (10 hrs)

Torsion of circular and hollow shafts, power transmission.
Axial loading of short strut, Long columns, Euler's formula, Rankine's formula, eccentric loading, direct and bending stresses.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-37	HISTORY OF ARCHITECTURE – II	3-0-0	3	2017

Course Objectives

- The objective of the course is to develop an understanding of appreciation of Islamic architecture and its influence in India's local and regional history of architecture, its changes in social processes and lifestyle. Architecture is to be seen as an important and long lasting by-product of development of civilization by understanding the role of technology, construction techniques, climate and materials with inherent visual aspects like spatial organization, scale, compositional organization, Architectural vocabulary and design grammar.

Reference Books

- Percy Brown , 'Indian Architecture (Islamic Period)' ,D.B. Taraporevala Sons & Co. Private Ltd.,
- Bombay, 1997.
- Satish Grover , 'Islamic Architecture in India', CBS Pub, New Delhi, 2002
- Banister Fletcher, Dan Cruickshank Sir Banister Fletcher's a History of Architecture, Architectural
- Press, 1996
- Christopher Tadgell , 'The History of Architecture in India', Phaidon Press Ltd, 1994.
- John Julius Norwitch : Great architecture of the world
- Stephen Gardiner: Introduction to architecture
- Henri Sterlin : Encyclopedia of world Architecture

MODULE I - (12 Hours)

A brief introduction into origin & characteristics of Islamic architecture: building types, elements, structural systems, construction techniques.

Islamic Architecture of Syria and Egypt- Great Mosque of Damascus, Syria , Dome of the Rock, Jerusalem , The Mosque of Ahmad Ibn ,Tulun, Cairo

Persia - The Masjid-i Shah, Isfahan

Spain - The great mosque at Cordoba. The Alhambra

Morocco -King Hassan II Mosque, Casablanca

MODULE II - (10 Hours)
Beginning of Islamic Architecture in India
Islamic Architecture in Delhi (Imperial Style)
Slave dynasty -Quwat-ul-Islam mosque, Qutb Minar, Mosque at Ajmer, Sultan Ghari, Tomb of Iltumish, Tomb of Balban.
Khilji Dynasty -Alai Darwaza, Jamat Khana masjid
Tughlaq dynasty -Tomb of Ghias-Ud-din, City of Tughlaqabad, City of Firoz Shah Kotla, Khirki Mazjid.
Sayyid and Lodi dynasty-Tomb of Mubarak Shah, tomb of Mohamed Sayyid, Garden tomb of Sikander Lodi , Bara Khan ka Gumbad, Chota Khan ka Gumbad, Shish Gumbad, Bara Gumbad.

MODULE III - (10 Hours)
Provincial styles:
Punjab -Tomb of Shah Rukhn-I-Alam.
Jaunpur -Atala Masjid, Jami Masjid
Bengal –Dakhil Darwaza, Firoze Minar, and Adina Masjid.
Gujarat -Jami Masjid, Teen Darwaza, Well retreats of Ahmedabad.
Malwa –Hindola Mahal, Jami Masjid at Mandu, Jahaz Mahal, Hawa Mahal
Deccan - Charminar at Hyderabad, Tomb of Golconda.
Bijapur - Jami Masjid, Golgumbaz.

MODULE I V- (10 Hours)
Evolution of Mughal style and the different eras of rule:
Early period -Babar, Humayun, Sher Shah
Akbar - Tomb of Humayun, Jahangir Mahal, Agra,
Fatehpur Sikri - city planning & the various structures inside.
Jahangir -Akbar's tomb.
Shah Jahan -Red fort at Agra, Taj Mahal, City of Shahjahanabad(Delhi fort), Jami Masjid at Delhi.
Aurangazeb -Tomb of Rabi Durrani at Aurangabad, Moti Masjid at Delhi fort.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-38	COMPUTER-AIDED VISUALIZATION – I	0-0-2	2	2017

Course Objectives

The C A A D Laboratory –I course for students of architecture would,

- Enable learning of CAD software by doing graded exercises
- Help them to understand various CAD Commands – creating two dimensional drawings and editing commands.
- Help in the preparation of hardcopy of drawings using normal architectural scales.

Course Outcome

- An understanding of CAD software for preparing two-dimensional drawings.

Reference Books

- Omura George, "Mastering AutoCAD, BPB Publications, New Delhi
- AutoDesk AutoCAD Manual
- Kolareric Branko, Architectural Rendering and Modelling with AutoCAD, John Wiley, New York, 1998.
- Synder James, Architectural Construction Drawings with AutoCAD, John Wiley, New York, 1998

Projects:

Suggested Projects for the lab:

1) Graded exercises - measured drawing, site plan, Component details. Lettering, dimensioning & Layering standards.
2) Preparation of drawings in layers & layouts.
3) Municipal drawing preparation for a medium-sized residence.

Exercises:

1. Starting up - Drawing I- Measured drawing (plan and section) of a room.
2. Architectural Drawing II- Drawing Plans, sections and elevations of Residence design project
3. Starting up- Preparing drawing with layer system, CTB & Creating hatch patterns, Importing /exporting files
4. Architectural Drawing III- Preparing drawings for approval of Apartment Design Project

TOTAL HOURS: 30

SESSIONAL REQUIREMENTS:

Class work Exercises = 60 marks
Lab Series test = 2X15 = 30 marks
Attendance = 10 marks
Total = 100 marks

SEMESTER IV Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-41	ARCHITECTURAL DESIGN - II	0-0-10	10	2017

Course Objectives

The Architectural Design II course for students of architecture would help,

To create a holistic understanding of the socio-cultural, geographic and economic aspects that shapes the built environment

To expose students to the methodology of conducting various surveys covering physical, visual characteristics and demographic aspects.

To introduce concept to the process of design.

To understand the climatic and topographic aspects related to the site and how they influence the design.

To undertake a comprehensive study of a building/settlement/ or part of an urban area that is an example of design evolved organically over a period of time.

To emphasis the importance of designing built form and open spaces that meet the aspirations of the community.

Course Outcome

The Course creates an understanding of design as a response to context and program and develops a holistic approach to design.

Students develop skills to create architectural solutions for simple problems with a thrust on evolution of concepts and response to site and climatic challenges.

Reference Books

Julius Panero, Martin Zelnik, “Human Dimension and Interior Space”, Whitney Library of Design, 1975

Ramsey et al, “Architectural Graphic Standards”, Wiley, 2000

Kevin Lynch, “Site planning”, MIT Press, Cambridge, 1984

Sam F. Miller, “Design Process: A Primer for Architectural and Interior Design”, Van Nostrand Reinhold, 1995

Francis D. K. Ching, 'Architectural Graphics', Wiley, 2009

Francis D. K. Ching, ‘Architecture: Form, Space and Order’, John Wiley & Sons, 2007

Simon Unwin, ‘Experiencing Architecture’, Routledge, 2003

Simon Unwin, ‘An Architecture Notebook’ Routledge, 2000

Geoffrey Broadbent, ‘Design in Architecture’ John Wiley and Sons, 1973

Simon Unwin, ‘Doorway’, Routledge, 2007

Projects:
Two projects - one minor and one major - shall be completed during this semester and these are to address context in terms of topography, site and built elements.

Minor project: Projects involving public and community oriented buildings - multi room, single use, small span, double storied, having horizontal and vertical movement

Major project: Projects involving study of a building / settlement / or part of an urban area.

Process and deliverables:

Students should conduct data collection from various reference books, study the context, conduct relevant case studies; carry out detailed site analysis before attempting design.

Formulation of a detailed design brief, evolution of concept shall be part of the architectural programming.

Handmade sketches, manual drafting and scaled study models shall be made part of the design process.

Deliverables shall be manually drafted presentation drawings including free hand perspectives, graphical representation of concept, scaled models etc.

TOTAL HOURS: 120

UNIVERSITY EXAMINATION PATTERN
Jury will be conducted as per the B.Arch. Degree Course Manual.

SEMESTER IV Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-42	SITE SURVEYING AND ANALYSIS	2-0-1	3	2017

Course Objectives

To understand the fundamental concepts and methods of surveying using basic & advanced instruments for surveying and levelling.

To appreciate the importance of the site and context in the architectural design process.

Course Outcome

An understanding of the concepts and methods of surveying using various instruments.
Knowledge about the various steps involved in the site analysis and planning process as a prelude to the architectural design process.
An understanding about the process of layout of site utilities.

Text Books

Surveying Vol. I, II & III, by Kanetkar T.P.
Surveying Vol. I & II, by Punmia B.C.
Advanced Surveying by Satheesh Gopi, R. Sathikumar & N. Madhu.
Edward T. White, Site Analysis, Architectural Media Ltd., 1983.
Kevin Lynch - Site planning - MIT Press, Cambridge, MA - 1967.

Reference Books

Joseph De.Chiarra (J) and Lee Coppleman - Urban Planning and Design Criteria - Van Nostrand Reinhold Co., 1982.
Storm Steven, Site engineering for landscape Architects, John Wiley & Sons Inc, 2004.
John Ormsbee Simonds, “Landscape Architecture: A manual of Site Planning and Design”, McGraw Hill, 1961.
Thomas H. Russ, “Site Planning and Design Hand Book”, Pearson Education, 2002.
Diane Y. Carstens, “Site Planning and Design for the Elderly”, Van Nostrand Reinhold, New York, 1993.

MODULE I (12 Hours)

General principles and classification of surveying-- Chain survey: instruments - ranging and chaining of lines – chain survey procedure – recording and field notes – plotting, conventional signs.
Compass survey - Description, use and adjustments of prismatic and Surveyors compass – True magnetic meridians, bearings – local attraction – compass traverse - plotting - errors and adjustments.
Plane Table Survey: Instruments and other accessories - different methods of plane table surveying.

MODULE II (12 Hours)

Levelling - levelling instruments - temporary and permanent adjustments of dumpy and tilting level – Height of instrument method, Rise and Fall method.
Theodolite surveying - study of vernier theodolite - temporary and permanent adjustments - measurement of horizontal angles by repetition and reiteration -

measurement of vertical angles.
Introduction to Total Station Surveying - Advantages and disadvantages of Total Station Surveying.

MODULE III (8 Hours)
Importance of site analysis - 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 - Preparation of site analysis diagram.
Study of contours: slope analysis - grading process - grading criteria - functional and aesthetic considerations.

MODULE IV (10 Hours)
Context of the site: Impact of proposed developments on the surroundings especially with reference to large scale projects - Aspects such as increase in traffic, noise and pollution to surroundings - Study through notable examples.
Organization of vehicular and pedestrian circulation: types of roads, hierarchy of roads, networks, road widths and parking regulations.
Principles of positive drainage and grading for drainage – location of sewage treatment plants - methods to control soil erosion - Location of utility lines to simplify maintenance planning for rain water harvesting - Incorporation of services such as drinking water pipelines, fire hydrants, communication and networking facilities at site.
Improving climatological conditions on site through landscaping.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN
Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER IV Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-43	BUILDING MATERIALS AND CONSTRUCTION - III	1-0-3	3	2017

Course Objectives

The Building materials and construction III course for students of architecture would,

Introduce to the student different components of buildings and various materials, their properties and uses.

Familiarize students with market study of building components and details.

Course Outcome

Comprehend the application of various building components and their construction.
Exposure to the common construction techniques used for constructing various components of a building.

Text books

Arora S.P. and Bindra S.P., "Text book of Building Construction", DhanpatRai& Sons, New Delhi, 2012.
P C Varghese, Building Construction, Prentice Hall of India Pvt. Ltd, New Delhi, 2010
Francis D.K. Ching, Building Construction Illustrated John Wiley & Sons 2000.
Balagopal T.S. Prabhu, "Civil Engineering Drawing Hand book"

Reference Books

Don A. Watson Construction Materials and Processes McGraw Hill 1972.
WB Mckay Building construction, Vol 1,2, Longman UK 1981.
Barry, The Construction of Buildings; Affiliated East West press put Ltd New Delhi 1999.
RC Smith & TL Honkala, 'Principles and Practices of Light Construction', Prentice Hall, Englewood Cliff, 1986.
Relevant BIS codes.

MODULE I

WALL SYSTEMS (15hrs)

Concrete System: Concrete columns, concrete walls. Lintels and sunshades
Masonry System: Masonry walls unreinforced and reinforced, solid walls and cavity walls, masonry columns and pilasters, Arches.
Steel System: Structural steel framing, steel columns, light gauge steel studs, balloon framing.
Wooden System: Wood stud framing, stud wall sheathing, wood columns, wood post and beam framing.
Partition wall systems.
Drawings: Types of arches , RCC lintel and sunshade

MODULE II

FLOOR SYSTEMS (15 hrs.)

Concrete: One-way slab, One-way joist slab, Two-way slab, Two-way slab and Beam.

Steel: One-way beam system, Two-way beam system, Triple beam system, Semi rigid connections, Open- web steel joists, Metal decking, Light-gauge steel joists.

Wood: Wood joists, Wood joist framing, wood beams supports and connections, plank and beam framing.
Drawings : RCC column, slab and beam

MODULE III
ROOF SYSTEMS (15hrs.)
Flat roof, Sloping roof and Curved roof. Deciding the slope or curvature of roof, Roof terminology
Wood trusses: Different types of trusses, King post truss, Queen post truss, Fink Truss, North light truss
Structural Steel roof framing: Different types of Steel trusses and their construction details.
Roof covering - thatching, tiling, AC sheets, GI and Aluminium sheets, FRP and RMP sheets and modern roofing. Roof drainage systems
Introduction to Space frames and Composite roof Systems
Drawings:_ Types of Arches, Truss – King post truss, Queen post truss, Steel- angular and tubular truss, details of roof covering and gutter details.

MODULE IV
VERTICAL TRANSPORTATION SYSTEMS (15 hrs)
Planning of vertical transportation systems – design parameters.
Ramps: Planning of ramps, slope, finishes, safety precautions.
Stairs: Planning staircases - Standards, rules and regulations. Components of stairs, Support conditions like inclined slab, cranked slab, cantilever. Stair plans- stairs with straight, circular and curved flights.
Construction details of Wood stair, fire escape stairs, Concrete stair, Steel stair and Composite stair.
Elevators: Planning and grouping of elevators. Elevator design parameters. Different types of elevators – passenger elevators, observation elevators, hospital elevators and freight elevators. Construction details – lift shaft, lift pit, machine room etc.
Escalators: Planning and details of escalators and travelators.
Drawings: Wooden stair, RCC stair, Steel Stair, Composite stair, Passenger lift, Capsule lift, Escalator.

TOTAL HOURS: 60

UNIVERSITY EXAMINATION PATTERN
Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER IV Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
AR 17-44	BUILDING SERVICES – I (WATER SUPPLY AND SANITATION)	3-0-0	3	2017

Course Objectives

The objective of the course is to help students to develop an understanding of the fundamentals of water supply and sanitary engineering - students will learn about sources of water, water treatment, waste water treatment, solid waste management, etc.

Course Outcome

An understanding of demand, consumption, sources, treatment and distribution of water.
Awareness about treatment and disposal of wastewater, and solid-waste management.

Text books

Modi, P. N., Sewage Treatment and Disposal and Wastewater Engineering, Standard Book House, New Delhi,2008.
Birdie, G. S., and Birdie, J. S., Water Supply and Sanitary Engineering, Dhanpat Rai and Sons, New Delhi,2007.
Garg, S. K., Environmental Engineering, Vol. II, Khanna Publications, New Delhi, 2009.
Duggal, K. N., Elements of Environmental Engineering, S Chand and Co. Ltd., New Delhi, 2008.

Reference Books

Mark J. Hammer and Mark J. Hammer Jr., Water and Waste Water Technology, Prentice Hall of India Pvt. Ltd.New Delhi, 2009.
Ernest W. Steel and Terence J. Mc Ghee, Water Supply and Sewerage, McGraw Hill, New York, 1991.
Ehlers, V. M. and Steel, E. W., Municipal and Rural Sanitation, McGraw Hill, 2009.
Fair, Geyer and Okun, Water and Wastewater Engineering, John Wiley and sons, Inc., 2010
Metcalf and Eddy, Wastewater Engineering Treatment, Disposal and Reuse, Tata McGraw Hill, 2007.
Kiely, G., Environmental Engineering, McGraw Hill, McGraw Hill, 2009.
Relevant BIS Codes.

MODULE I (8 hrs)

Water Supply Engineering – Quantity of water, types of water demand, fluctuation in demand, factors affecting consumption, forecasting population – design period. Sources of water – surface water sources, intakes, ground water sources.

MODULE II (16 hrs)

Quality of water – drinking water standards – physical, chemical and bacteriological analysis of water. Treatment of water – aeration, coagulation, flocculation, sedimentation, filtration, disinfection. Miscellaneous and advanced treatment methods – removal of iron and manganese, fluoridation and de-fluoridation, water softening, arsenic removal, desalination, membrane filtration. Transmission of water-gravitational, pumping and combined schemes. Lay out of distribution networks, intermittent and continuous systems of distribution-laying, testing and maintenance of distribution pipes.

MODULE III (12 hrs)

Wastewater characteristics-Preliminary treatment of wastewater – screens, grit chamber, detritus tank, sedimentation tank. Biological treatment - Activated sludge process, Trickling filter, Oxidation pond. Anaerobic treatment - Anaerobic digesters. Wastewater disposal – disposal into land, water bodies - stream, ocean - disposal by irrigation – sludge treatment and disposal. Septic tank and soak pit.

MODULE IV (12 hrs)

Solid waste management - sanitary land fill, incineration, composting.
Sanitary plumbing - sanitary fixtures, systems of piping - Septic tank and soak pit. House drainage, connection of house drains and street sewers.

TOTAL HOURS: 48

UNIVERSITY EXAMINATION PATTERN
Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER IV Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
AR 17-45	THEORY OF STRUCTURES - III	2-1-0	3	2017

Course Objectives

The Theory of Structures III course for students of architecture would

Help them to understand the concept of indeterminate structures and the various methods of analysis of such structures.

Course Outcome

An understanding of shear force, bending moment in beams and frames.

Exposure to various methods involved in analysis of indeterminate structures.

Reference Books

R Junarkar S. B. and Shah S. J., Mechanics of Structures (Vol. I), 30/e, Charotar Publishing House Pvt. Ltd., New Delhi, 2012

Junnarkar S. B. and H. J. Shah, Mechanics of Structures, Vol – II, 23/e, Charotar Publishing House, 2013.

Punmia B. C., A. K. Jain and A. K Jain, Theory of Structures (SMTS- II), Laxmi Publications Pvt. Ltd., 2004.

Ramamrutham S. And R. Narayan, Theory of Structures, Dhanpat Rai Publishing Co., 2012

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

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

MODULE I (12 hrs)

Determinate and Indeterminate beams.(Static Indeterminacy) - Consistent deformation method – fixed and propped cantilever Shear Force Diagram – Bending Moment Diagram

MODULE II (12 hrs)

Analysis of continuous beams using Three moment theorem Shear Force Diagram – Bending Moment Diagram, Support settlement case. (derivation not required)

MODULE III (12 hrs)

Introduction to slope deflection method-simple beams only (settlement case not required.)

Moment distribution methods – shear force and bending moment diagrams of beams (Simple cases)

MODULE IV (12 hrs)

Moment distribution methods – shear force and bending moment diagrams of frames (Non-sway only.)

TOTAL HOURS: 48

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER IV Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17 - 46	HISTORY OF ARCHITECTURE – III	3-0-0	3	2017

Course Objectives

The History of Architecture – III course for students of architecture would,

Help to provide awareness about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.
To study the influences of events which have led to the outcome of styles such as Romanesque, Gothic & Renaissance and their architects in Italy, France and Britain comprehending the rich vocabulary of forms & shapes and structural systems.

Course Outcome

An understanding of demand, consumption, sources, treatment and distribution of water.
Awareness about treatment and disposal of wastewater, and solid-waste management.

Reference Books

Sir Banister Fletcher's –"A History of Architecture", Architectural Press, 1996
Louis Grodecki–"Gothic Architecture", Rizzoli,1991
History of World Architecture (Series), Vols. Titled "Ancient Architecture, Primitive Architecture, Greek Architecture, Roman Architecture and Byzantine Architecture", 1980.
Kenneth Frampton : Modem Architecture -A Critical History
"Builders of Ancient World", A National Geographic Society Publication, 1986.
Raeburn Michael, "Architecture of the Western World", Popular Press, England, 1988.
John Julius Norwich: Great Architecture of the World.
Stephen Gardiner : Introduction to Architecture
Monographs of Modem Architects
Henri Sterlin : Encyclopedias of World Architecture

MODULE I (8 hours)

Introduction to society and culture of 400 -1150 AD in Europe
Early Christian Architecture: Evolution of Church form, surface treatment and materials of construction, Old St. Peters Basilica.
Byzantine Architecture: Greek cross and Latin cross plans, Technique adopted to construct domes, surface treatment and material of construction. Pendentive sand Squinch arch construction, e.g., Hagia Sophia, St.Marks Venice.

MODULE II (10 Hours)

Romanesque Architecture: Design evolution - Development of Romanesque architecture from Early Christian architecture, Planning principles and structural details of Romanesque architecture.

Types:
Italian Romanesque architecture (Pisa Cathedral Complex),
French Romanesque (Abbey-Aux-Hommes at Cane)
British Romanesque (Durham's Cathedral).

Module III (12 hours)

Introduction to society and culture of 1150 –1350 AD in Europe
Gothic Architecture: Evolution of structural systems in Gothic Architecture –pointed arches, ribbed vaults, flying buttress, pinnacles etc;
Types:
French Gothic Architecture (Notre Dame (Reims Cathedral), Paris)
British Gothic Architecture (West Minister Abbey, Salisbury Cathedral)
Italian Gothic Architecture (Milan Cathedral)

Module IV (12 hours)

Renaissance Architecture:
Introduction of different styles existed in renaissance period, to society and culture of 1400 -1800 AD. The Idea of rebirth and revival of Art, Architectural character during Renaissance period. Division of Renaissance architecture into Early, Mature and Late periods. Structural contributions - Ribbed dome, Lantern dome.
Italian renaissance –St.Peters Rome, Florence Cathedral. Works of Brunelleschi, Alberti, Bramante and Michael Angelo, Palaces and Villas, Palladio's contribution – Villa Rotunda
French renaissance: Palace of Louvres, Paris de Versailles.
British renaissance: St. Paul's Cathedral, London –White Hall Palace, London. Contributions of Inigo Jones and Christopher Wren
Revival of classical orders and principles – Neo-Classicism

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN
QI – 8 short type questions of 5 marks, 2 from each module
QII – 2 questions of 15 marks from module I with choice to answer anyone
QIII –2 questions of 15 marks from module II with choice to answer anyone
QIV– 2 questions of 15 marks from module III with choice to answer anyone
QV– 2 questions of 15 marks from module IV with choice to answer anyone

SEMESTER IV Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17 - 47	ENVIRONMENTAL STUDIES	2-0-0	3	2017

Course Objectives

The Environmental Studies course for students of architecture would,

Help them to understand the problems of pollution, loss of forest, solid waste disposal, degradation of environment, loss of biodiversity and other environmental issues and create awareness among them to address these issues and conserve the environment in a better way.

Course Outcome

An understanding of the importance of environmental issues.
Awareness about sustainable development.
An understanding of the importance of waste and water management.

Text Books

Daniels & Krishnaswamy, Environmental studies, Wiley India pvt ltd, 2009
Raman Sivakumar, Introduction to environmental science and engineering, 2nd edn, Tata McGraw Hill, 2010
Anindita Basak, Environmental Studies, Pearson Education, 2009
Suresh K.D, Environmental Engineering and Management, Katson Books, 2007
Benny Joseph, Environmental studies, 2nd edn, McGraw Hill, 2009

Reference Books

Raghavan Nambiar, K Text book of Environmental Studies, Scitech Publishers(India) Pvt. Ltd
S.P Misra, S.N Pandey, Essential Environmental studies, Ane books, Pvt Ltd, 2009
P N Palanisamy, P Manikandan, A Geetha, Manjula Rani, Environmental Science, Pearson
Education, 2012
D.L. Manjunath, Environmental Studies, Pearson Education, 2011

Module I (12 hours)
The Multidisciplinary nature of environmental science. Definition-scope and importance-need for public awareness. Natural resources. Renewable and non-renewable resources: Natural resources and associated problems-forest resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their defects on forests and tribal people- water resources: Use and over utilization of surface and ground water, floods, drought , conflicts over water, dams-benefits and problems.- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.-Food resources: World food problems, changes caused by agriculture over grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.-Energy resources: Growing energy needs, renewable and non-renewable energy resources, use of alternate energy resources, Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Module II (10 hours)
Ecosystems-Concept of an ecosystem-structure and function of an ecosystem –producers, consumers, decomposers-energy flow in the ecosystem-Ecological succession- Food chains, food
webs and Ecological pyramids-Introduction, types, characteristics features, structure and function of the following ecosystem-Forest ecosystem- Grassland ecosystem –Desert ecosystem-Aquatic ecosystem(ponds, streams, lakes, rivers, oceans , estuaries)
Biodiversity and its consideration Introduction- Definition: genetic, species and ecosystem diversity- Bio-geographical classification of India –value of biodiversity: consumptive use, productive use, social ethical , aesthetic and option values Biodiversity at Global, national , and local level-India at mega –diversity nation-Hot spot of biodiversity-Threats to biodiversity: habitat loss, poaching of wild life, man , wild life conflicts – Endangered and endemic species of India-Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Module III (10 hours)
Environmental pollution Definition-Causes, effects and control measures of Air pollution- Water
pollution –soil pollution-Marine pollution-Noise pollution-Thermal pollution-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: floods , earth quake, cyclone and landslides-Environmental impact assessment

Module IV (10 hours)
Environment and sustainable development-Sustainable use of natural resources-Conversion of renewable energy resources into other forms-case studies-Problems related to energy and Energy auditing-Water conservation, rain water harvesting, water shed management-case studies-Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust-Waste land reclamation Consumerism and waste products-Reduce, reuse and recycling of products-Value education.

TOTAL HOURS: 42

Sessional Requirements
Assignments = 15 marks
2 Tests 2 x 15 = 30 marks
Regularity = 5 marks
Total = 50 marks

UNIVERSITY EXAMINATION PATTERN
QI – 8 short type questions of 5 marks, 2 from each module
QII – 2 questions of 15 marks from module I with choice to answer anyone
QIII –2 questions of 15 marks from module II with choice to answer anyone
QIV– 2 questions of 15 marks from module III with choice to answer anyone
QV– 2 questions of 15 marks from module IV with choice to answer anyone

SEMESTER IV Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-48	COMPUTER-AIDED VISUALIZATION - II	0-0-2	2	2017

Course Objectives

The C A A D Laboratory –II course for students of architecture would,

equip the students with skills required in using computer as a digital media for design and preparation of 3D images of Architectural drawings.

provide an introduction to various Graphics Software.

Course Outcome

An understanding of CAD and other software for preparing three-dimensional models and walk-throughs.

Reference Books

1. Adele and Seth Green Berg – Fundamental Photoshop.
2. Bain – Using Corel Draw.
3. Sketchup Manual.
4. Prezi manual.

Projects:

Suggested Projects for the lab:

1. Introduction to 3D modeling and generating 2D drawings using application software like AUTOCAD, SKETCHUP, REVIT, ARCHICAD Etc.
2. Elementary animation- Walk through a small structure in Lumion.
3. Introduction to Graphics Software – Photoshop / Corel Draw / Prezi.

Exercises:

1. Architectural Drawing III- Preparing three dimensional drawing of Residence design project.
2. Presentation I- Preparing rendered image of Residence Design Project
3. Presentation II- Preparing a simple walkthrough of Residence Design project.
4. Presentation III - Preparing a simple schematic concept through Graphic software.

TOTAL HOURS: 30

SESSIONAL REQUIREMENTS:

Class work Exercises = 60 marks
Lab Series test = 2 x 15 = 30 marks
Attendance = 10 marks
Total = 100 marks

SEMESTER V Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-51	ARCHITECTURAL DESIGN - III	0-0-10	10	2017

Course Objectives

The Architectural Design III course for students of architecture would help,

- To study the feasibility of a project/ activity with respect to surrounding/neighboring locality
- To understand the complexities related to designing public spaces
- To enable the students to understand the importance of spatial planning within the constraints of Development Regulations in force for urban areas.
- To enable the students to design for large groups of people in a socially and culturally sensitive manner, taking into account aspects such as user perception, crowd behaviour, large scale movement of people and identity of buildings.
- To emphasis on the importance of understanding the relationship between open space and built form, built form to un-built form and site planning principles involving landscaping circulation network and parking.
- To introduce MEP services, acoustics and other specialized inputs required during design process
- To understand LEED, IGBC and GRIHA rating systems

Course Outcome

- The Course prepares the students to understand the process of designing buildings involving multiple layers, use of appropriate building materials, building services, structural grids and large span structures. Students will learn to integrate intelligent service systems into the design of the building.

Reference Books

- Kerala Municipal Building Rules
- National Building Code
- Sam F. Miller, “Design Process: A Primer for Architectural and Interior Design”, Van Nostrand Reinhold, 1995
- Julius Panero, Martin Zelnik, “Human Dimension and Interior Space”, Whitney Library of Design,
- Wakita / Linde, The Professional practice of Architectural working drawing, John Wiley & sons, 1984.
- Andrew Alpern, ‘Handbook of speciality Elements in Architecture’, McGraw Hill Book CO., 1982.
- New Metric Handbook – Patricia Tutt and David Adler – The Architectural Press
- Arthur L. Guptill and Susan E. Meyer, 'Rendering in Pen and Ink' , Watson-Guptill, 1997

- Joseph De Chiara, Michael J Crosbie, “Time Saver Standards for Building Types”, McGraw Hill Professional 2001.
- Joseph De Chiara, Julius Panero, Martin Zelnik, “Time Saver Standards for Interior Design and Space Planning”, McGraw Hill 2001.

Projects:

Two projects - Students are expected to conceive large public spaces and multi-functional complexes with an emphasis on physical context and exploration of architectural vocabulary, fire and safety aspects for buildings, earthquake resistant design methods.

- A minimum of two projects shall be completed during the semester. These shall be multi storied buildings including Convention centres/ clubhouses/ medium sized office complexes/ Bus stations/ assembly halls or auditoriums.

Process and deliverables:

- Students have to understand the importance of spatial planning within the constraints of Development Regulations in force for urban areas. Apart from site and context, activities, services and construction methods shall also be studied and analyzed. Formulation of a detailed design brief, evolution of concept shall be part of the architectural programming.
- Energy saving measures used in the design shall be listed and integrated into design by students.
- They are expected to explore computer aided presentation techniques involving 2D and 3D drawings and models as required.
- Deliverables shall be computer assisted presentation drawings including 3d massing and graphical representation of concept explanation and design evolution, computer rendered perspectives etc.

TOTAL HOURS: 120

UNIVERSITY EXAMINATION PATTERN

Jury will be conducted as per the B.Arch. Degree Course Manual.

SEMESTER V Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-52	LANDSCAPE DESIGN	3-1-0	3	2017

Course Objectives

- The scope of the subject is to make students aware of architecture beyond buildings.
- To familiarize students with the various components of landscape architecture and the principles of landscape design.
- To provide an overview of Sustainable landscape system & Urban Landscape terms.

Course Outcome

- Understanding of the scope of landscape architecture.
- Understanding basic landscape architecture from an architect's perspective.

Text books

- Landscape Architecture: The Shaping of Man's Natural Environment, New York, J. O. Symonds. McGraw Hill Publications.
- The Landscape of Man - Geoffrey and Susan Jellicoe, Thames and Hudson, 1991.

Reference Books

- An Introduction to Landscape Architecture - Michael Laurie, Elsevier, 1986.
- Brian Hacket, Planting Design, McGraw Hill Inc., 1979.
- Cliff Tandy, "Handbook of urban landscape", Architectural Press, 1973.
- Appleton, The Experience of Landscape, Wiley, 1996.
- Grant W Reid, From Concept to Form in Landscape Design, Van Nostrand Reinhold Company, 1993.
- Dee, C. Form and Fabric in Landscape Architecture : A visual introduction, Taylor & Francis, 2001.

MODULE I (10 Hours)

Introduction to landscape architecture definitions, importance, need and scope; Role of landscape design in architecture and their comparison.

Landscape and garden design in history - French, English, Chinese, Japanese, Persian and Moghul. Study of notable examples.

MODULE II (10 Hours)

Principles of Landscape design – Unity, Line, Form, Texture, Color, Scale, Balance, Simplicity &Variety, Emphasis, Sequence.

Plant materials, classification, characteristics, use and application in landscape design; Role of plants in landscape design, avenue planting, Local & Scientific names of plants.

Landscape components: Hard & soft-scape in landscape, landscape lighting, street furniture.

MODULE III (8 Hours)

Landscape's effect on climate & Microclimate, Relationship between climate, landscape and architecture.

Landscape as environmental modifier against noise, soil erosion, land, air, water pollution, water logging & depletion of water resource.

Landscape water harvesting systems – swale, bio-swale, ponds- Use of Geo-textiles in landscaping.

Urban open spaces, urban avenue, urban forest and urban heat island.

MODULE IV (14 Hours)

Effects & construction of: Podium landscape, green walls, xeriscaping, green retaining wall, green fire tender road.

Landscape water elements: Fountain, cascade, mirror pool, swimming pool – Mechanism of plant room.

Landscape grading, land form design & drainage design.

Preparation of landscape master plan for a third year level design project with hard–soft scape and levels along with site sections.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER V Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-53	BUILDING MATERIALS AND CONSTRUCTION - IV	1-0-3	3	2017

Course Objectives

The Building materials and construction course for students of architecture would,

- Introduce students to the various building finishes and their application.
- Provide exposure to the various materials used as wall and floor finishes through relevant market studies and site visits.

Course Outcome

- An understanding of the properties and application of various building materials used as building finishes, construction methods.
- Students should be able to identify or assign finishes appropriate for different design projects.

Text books

- Arora S.P. and Bindra S.P., "Text book of Building Construction", DhanpatRai& Sons, New Delhi, 2012.
- P C Varghese, Building Construction, Prentice Hall of India Pvt. Ltd, New Delhi, 2010
- Francis D.K. Ching, Building Construction Illustrated John Wiley & Sons 2000.

Reference Books

- WB Mckay Building construction, Vol 1,2, Longman UK 1981.
- Barry, The Construction of Buildings; Affiliated East West press put Ltd New Delhi 1999.
- Harry Parker, ' Materials and Methods of Architectural Construction', John Wiley & Sons Canada, 1958.
- Relevant BIS codes.

MODULE I
WALL FINISHES (12 hrs)
Plaster: Lime plaster and gypsum plaster. Fire resistant plaster, X-Ray shielding plaster and acoustic plaster. Plaster over masonry and ceiling.
Paints and varnish: Characteristics of an ideal paint and varnish. Classification – various types of paints. Painting process. Defects in painting works. Process of varnish.
Wall cladding- stone cladding, tile cladding, Wooden cladding and metal cladding. Stucco finish and other finishes.
Sketches : Stone cladding, Metal cladding

MODULE II
FLOOR FINISHES (12 hrs)
Types of flooring, methods of laying, furnishing of floors with different floor finishes like cement, colored cement, mosaic, terrazzo, tiles, wood, parquet flooring, stone, brick etc.
Classification & properties of tiles used in flooring. Selection criteria & Methods of fixing various types of tiles.
Different type of resilient and vibration resistive floor like rubber, Linoleum and PVC flooring.

Sketches : Tile flooring, wooden flooring

MODULE III
WOOD SUBSTITUTES (15 hrs)
Industrial products as substitutes for natural hard wood. Characteristics, physical properties, areas of application, available forms and sizes of: Veneers and veneer ply woods, particle board, hard board, fiberboard, block board, lamina-boards, glulam, laminates, cement particle board, e-board, bamboo ply,etc.

MODULE IV
GLASS AND GLAZING (15 hrs.)
Glass products : Types of glass – wired glass, fiber glass, laminated glass, glass building blocks, Heat strengthened glass- toughened glass, laminated glass Special purpose glasses- Low emissivity glass, Solar control glasses and variable transmission glass, Fire resistant glass, Self cleaning glass
their properties and uses in buildings
Glazing: Single, double and triple glazing Glazed curtain walls & sky lights.

Sketches : Structural glazing

TOTAL HOURS: 54

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER V Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-54	BUILDING SERVICES II (LIGHTING & ELECTRICAL SERVICES)	3-0-0	3	2017

Course Objectives

- To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.

Course Outcome

- An understanding of the fundamentals of electrical services in buildings.
- Knowledge about the Indian Electricity Rules.
- An awareness about the present trends in lighting practices.

Reference Books

- Electrical Technology – H. Cotton
- Electrical wiring, Estimating and Costing - L .Uppal
- Electrical Wiring, Design and Estimation – Raina & Bhattacharya
- Electrical systems for Architects - Aly. S. Dadras
- Simplified design of building lighting - Marc Schiler
- National Electrical Code
- Lighting Manual

MODULE I (12 Hours)

Introduction to electrical services, commonly used terminology.
Supply and distribution of electricity to buildings – familiarization with Substations and components like High Tension and Low Tension Panels and switchgear, transformers, captive power plants – electrical system in multi storied commercial and industrial buildings, apartments, hospitals etc.

MODULE II (12 Hours)

Distribution systems, underground and overhead - Cabling systems, surface and concealed wiring systems, PVC and metal conduits, casing and capping system. Panel boards, switches, distribution boards.
Earthing systems and protective devices such as fuses, MCB's, MCCB's, ELCB's etc. –lightning protection - safety standards and IS codes. Cinema Act - Electrical installation in a cinema theatre.
Introduction to Indian Electricity Rules.
Introductory exercise in electrical load calculations and estimation.

MODULE III (10 Hours)

Commonly used terminology in illumination – laws of illumination – measurement

of luminous flux and lux meter.
Ambient, task and accent lighting – direct and indirect luminary systems.
Natural lighting – use of daylight – concept of day light factor.
Atrium lighting – methods and uses.
Energy efficient lighting system.

MODULE IV (8 Hours)
Sources of illumination – point source – row lighting, area illumination – evaluation of total flux
– colouring aspects of lamps – linear and surface sources of illumination – common luminaries – incandescent, fluorescent/CFL, HID's, MV, SV lamps etc.
Criteria and standards for different purpose/activity illumination - flood lighting, functional buildings like hospitals, sports stadia, swimming pools and underwater luminaries – street lighting, commercial display lighting.
Design considerations, estimation exercise, preparation of a lighting and electrical scheme.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER V Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-55	DESIGN OF STRUCTURES - I	2-1-0	3	2017

Course Objectives

The Design of Structures I course for students of architecture would,

- provide them with the knowledge of the behaviour of reinforced concrete structural elements and enable them to design such elements.

Course Outcome

- Awareness about the analysis and design of reinforced concrete structural elements.
- An exposure to the relevant IS codes for structural analysis and design.

Reference Books

- Pillai S. U. and Menon D., Reinforced Concrete Design, Tata McGraw Hill
- Sinha S. N., Reinforced Concrete Design, Tata McGraw Hill
- Varghese P. C., Limit State Design of Reinforced Concrete, Prentice Hall of India
- Punmia B. C., Jain A. K. and Jain A. K., Limit State Design of Reinforced Concrete, Laxmi Publications (P) Ltd., 1st Edition, 2007.
- Park and Paulay, Reinforced Concrete
- Mallick S. K. and Gupta A. K., Reinforced Concrete, Oxford and IBH.
- Jain A. K., Reinforced Concrete- Limit State Design, Standard Book House.
- Jain and Jaikrishna, Plain and Reinforced Concrete Vol I, Nemchand
- Gambhir M. L., Design of Reinforced Concrete Structures, Prentice Hall of India
- IS 456:2000- Code of Practice for Plain and Reinforced Concrete

MODULE I (12 hours)

Limit State Method of design of RC sections - principles and assumptions - partial safety factors
Analysis and design of singly reinforced rectangular sections subjected to flexure, shear and torsion using Limit State Method. Design for shear. Bond-flexural and anchorage bonds, development length.

MODULE II (12 hours)

Analysis and design of doubly reinforced rectangular sections subjected to flexure, shear and torsion. Effective flange width of flanged beam sections. Analysis of flanged sections.(Simple problems only)

MODULE III (12 hours)

Design of one way slab. Design of two way slabs with corners held down and corners not held down.

MODULE IV (12 hours)

General principles in the design and detailing of various types of stairs – stairs with waist slab, stringer beam stairs, and stairs with cantilever steps. (Concept only)
Design of columns subjected to axial load.
Types of footings. Design of isolated footings for axially loaded columns.

NOTE:

1) All designs shall be done using limit state method of design.
2) Special importance shall be given to detailing.
3) SI units shall be followed.
4) Use of IS: 456:2000 shall be permitted in the examination hall.

TOTAL HOURS: 48

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER V Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-56	HISTORY OF ARCHITECTURE IV	3-0-0	3	2017

Course Objectives

- To provide the student an in-depth knowledge of modern design philosophies in the evolution of innovative architectural forms and designs.

Course Outcome

- Introducing the students to various design philosophies of Modern & Post Modern Architecture.

Reference Books

- Kenneth Frampton, Modern Architecture: A Critical History, Thames and Hudson, London.
- Sigfried Giedion, Space time and Architecture: The Growth of a new tradition, Harvard University Press.
- Tzonis Alexander, Santiago Calatrava, International Publications, January 2005, New York.
- Steele James, Hassan Fathy - The complete works, London: Thames and Hudson.
- Ghirardo, Diana, Architecture after Modernism, 1996, Thames and Hudson.

MODULE I (9 Hours)

SELF CONSCIOUS MODERNITY
Neo classicism, industrial revolution and its impact, new materials – steel, glass, concrete, arts and crafts movement, Art Nouveau – works of Gaudi, Chicago school, Art Deco, Louis Sullivan works, Adolf Loos and his arguments on ornamentation, Futurism, Expressionism – works of Mendelsohn and Taut, Destijl movement, Walter Gropius: Bauhaus and Harvard, Peter Behrens and the German Werkbund.

MODULE II (12 Hours)

EARLY MODERN ARCHITECTURE
Cubism, Constructivism, works of architects: Philip Johnson – Glass house, Connecticut, Seagram Building, New York, Mies Vander Rohe - Barcelona Pavilion, Illinois Institute of Technology, Chicago, F. L. Wright - Falling water, Pennsylvania, Guggenheim Museum, New York , Richard Neutra - Kaufmann Desert House, California, Oscar Niemeyer - Cathedral of Brasília, Museu Oscar Niemeyer ,Brazil Alvar Alto - Finlandia Hall, Finland , Le Corbusier – Villa Savoye, France , Notre Dame Ronchamp, Paris, Louis Kahn - The National Assembly Building, Bangladesh, Kimbell Art Museum, Texas.

MODULE III (12 Hours)

LATER MODERN ARCHITECTURE
Post Modernism and International style. Ideas and works of architects: Paul Rudolph - Arts and Architecture building, Yale University, Orange County Government Center, New York, I. M. Pei - Grand Louvre, Paris, Everson Museum of Art, Kenzo Tange –Olympic Arena, Tokyo, Fuji, Broadcasting Center, Tokyo, Minoru Yamasaki – Dahran International Airport, McGregor Memorial Conference Community Center, Detroit, Kisho Kurokawa - The Museum of Modern Art, Wakayama, Capsule Tower, Tokyo, Richard Meier – Jubilee Church, Los Angeles, Smith house, Connecticut, Toyo Ito - U House, Tokyo, Serpentine Pavilion, London, John Utzon - Sydney Opera House.

ALTERNATIVE PRACTICES AND IDEAS
Critical regionalism, works and ideas of Hassan Fathy, Geoffrey Bawa, Tadao Ando, Laurie Baker and Paulo Soleri, Robert Venturi, Renzo Piano, Pompidou Centre, Richard Rogers, Mario Botta, Alvaro Siza.

MODULE V (12 Hours)

21st CENTURY ARCHITECTURE

Deconstructivism – Works of Zaha Hadid - London Aquatic Complex, 2012 Olympics, Zaragoza Bridge Pavilion, Spain, Daniel Libeskind – Jewish Museum, Berlin, World Trade Center, New York, Frank Gehry -Guggenheim Museum, Bilbao, Spain, Peter Eisenman - Cardinal Stadium, Arizona, City of Culture of Galicia,
Santiago Calatrova and his structural concepts – Lyon-Satolas TGV Station, France, Milwaukee Art Museum, U.S.A, News forms and ideas of Norman Foster - American Air Museum, Cambridge, UK, Stansted Airport, London , Greg Lynn –Embryological house, U.S.A .

TOTAL HOURS: 45

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER V Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-57	SPECIFICATION, ESTIMATION AND COSTING	2-1-0	3	2017

Course Objectives

- To enable the students to prepare detailed and approximate estimate and to have a clear picture of the project expenditure.
- To enable the students to have a thorough idea regarding the quality and quantity of materials, quantity and classes of skilled and unskilled labour, tools and plants required for the project.
- To equip the students with basic knowledge about property valuation.

Course Outcome

- An understanding of the concepts and methods of estimating project costs.
- Knowledge about the specification of various building materials.
- An understanding about the process of valuation.

Text Books

- Dutta B N, Estimation and costing in Civil Engineering, UBSPD,1992
- Chakrabarthi, Estimation, costing and specification in Civil Engineering, 1981
- Mahajan S P, Civil Estimating and Costing, Sathyaprakasam,1988
- Shah N A, Quantity surveying and specification in Civil Engineering,1981

Reference Books

- IS 1200(1968), Methods of measurement of building and civil engineering works

MODULE I (12 Hours)

Preparation of specification for materials of construction and items of work: Detailed specifications of common building materials like cement, sand, brick, stone, timber, tile, steel, concrete, etc. – building components like foundation, flooring: PCC, tile, timber, slabs and beams, door and window: wooden, aluminium, steel, stairs, roofs, etc.
Specification for first class buildings and second class buildings.
Introduction to Estimation, Types of estimates, detailed estimate, revised estimate, supplementary estimate, maintenance estimate, approximate estimate. Explanation of terms-contingencies; work charged establishments, provisional sum, lump sum item.
Introduction to approximate estimate methods-plinth area method, cubic rate method, unit rate method and bay method.

MODULE II (15 Hours)

Quantity Surveying.
Methods of building estimate-centre line method and long wall-short wall method.

Preparation of detailed estimate for simple buildings of load bearing walls.
Details of measurements and calculation of quantities & Abstract of estimate.

MODULE III (10 Hours)

Analysis of rates for main items of work in buildings based on PWD schedule of rates and standard data book.

Introduction to valuation of real properties: Depreciation – sinking fund –methods of valuation - straight line method – constant percentage method –S.F method-rental method –profit based method depreciation method – valuation of land – belting method - development method -hypothecated buildings scheme method.

MODULE IV (8 Hours)

Cost parameters of the building –building shape, height, enveloping area, structural elements, service finishes, architectural features-initial cost and maintenance cost.

TOTAL HOURS: 45

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VI Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-61	ARCHITECTURAL DESIGN - IV	0-0-10	10	2017

Course Objectives

The Architectural Design IV course for students of architecture would help,

- To understand the design requirements of high rise buildings with respect to services [HVAC, STP], fire and safety aspects etc.
- To study vertical transportation requirements and design considerations for high rise buildings.
- To understand the role of architect as primary consultant for a project and co-ordinate with various other consultants offering specialized services.
- To understand the dimension of marketing as required for a building intended for outright sale/lease/ rent and outline market standards or requirements.
- To understand the design and form of building typologies that are the result of pressure on urban lands with a thrust on issues like urban land economics, technology and ecology
- To create an awareness with regard to the design of green buildings and sustainable architecture.
- To inculcate the importance of services integration and construction in spatial planning in the context of design of High-rise buildings and service intensive buildings.

Course Outcome

- The Course prepares the students to conceive large scale multi-storied buildings and complexes for Residential/ Commercial/ Institutional/ Mixed-Use in an urban context with focus on visual characteristics, service integration and sustainable practices.

Reference Books

- Kerala Municipal Building Rules
- Ernst Neuferts, “Architects Data”, Blackwell, 2002
- National Building Code of India, Vol. 1-5, 2005
- Kevin Lynch, “Site Planning”, MIT Press, Cambridge, 1984
- Mili Mazumdar, “Energy Efficient Buildings in India”, TERI, New Delhi, 2012
- Diane Tsang, “SPACE Shopping Mall”, Pace Publishing, 2011
- Lara Menzel, “Office Architecture and Design”, Braua Publishers, 2009
- Sheri Koones, “Prefabulous and Sustainable: Building and Customizing an affordable, Energy efficient home”, ABRAMS, 2010
- Daniel Williams, “Sustainable Design: Ecology, Architecture & Planning”, John Wiley & sons Inc, New Jersey, 2007

- Richard P. Dober, “Campus Architecture: Building in the Groves of Academe”, McGraw-Hill, 1996

Projects:

- A minimum of two projects and a short project on concept presentation shall be completed during the semester. Projects may be on multi-storied commercial, public, semi-public and any other appropriate design. Projects shall have enough emphasis on technology and the application of various building services and circulation systems. These shall be high rise apartments/ large scale office buildings/ mall-multiplex/ super hypermarkets/ hospitals. The short project of Concept presentation shall be for a gated community/integrated township with a focus on marketing aspects.

Process and deliverables:

Institutional buildings –

- These are buildings with complex spatial organizations, multifunctional spaces, large spans and variable circulation patterns. Environmental issues are emphasized and the design studio aims to inculcate the techniques of designing for sustainability.
- Students are expected to do the landscape layout in detail to develop appreciation of a holistic environmental design. E.g. College / specialty Hospital / theatre etc.
- Study of the various techniques of energy-efficient design and recycling technologies for water and wastes is mandatory as these have to be incorporated in the design proposals. Awareness about LEEDS rating and best practices is expected.

Office buildings –

- Students get exposed to the various services, structural systems and vertical access systems such as elevators, escalators etc of multi-storied buildings both in designing and detailing.
- Knowledge about various types of cores, fire-fighting systems and special building rules applicable to multi-storied buildings are to be incorporated in design.
- Students will be required to do the Interior design scheme in detail.
- Sale area computations and sale drawings shall be prepared. E.g. Multi-storied office buildings.

TOTAL HOURS: 120

UNIVERSITY EXAMINATION PATTERN

Jury will be conducted as per the B.Arch. Degree Course Manual.

SEMESTER VI Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-62	INTERIOR DESIGN	1-0-3	3	2017

Course Objectives

- To introduce the discipline of interior design to students and to develop the basic skills required for handling simple interior design projects.

Course Outcome

- Awareness about the basics of Interior Design.
- Exposure to the prevailing trends in materials and finishes.

Reference Books

- Ching, Francis, “Form, Space and Order”, Van Nstrand Reinhold, London.
- Ching, Francis, "Interior Design illustrated", Van Nostrand Reinhold, London, 1987.
- Helsel, M.D., "Interior Designer's Drapery Sketch File", Watson Guptill Publishing Co., 1969.
- Scott, "Design Fundamentals".
- Panero Julious & Zclink Martin, "Human Dimensions and Interior Space".
- Alexander and Mercourt, “Design of interior environment”.
- Halse, “The use of colour in interiors”.
- Colin, Boyne and Lance Wright, "The best architects Working Details” Vol. 1 & 2.
- Shirish Vasat Bapat , “Living Areas - Internal Spaces”.
- Lan Grant, "Great Interiors”, Spring Books.

Module I (12 hours)

Introduction to interior designing.

Brief description of interior designing. History based on different style and furniture designs in interior designing (traditional, contemporary, minimalist, industrial, Islamic, Victorian, Gothic etc.)

Study on anthropometrics of different space (residential, commercial, hospital, educational, industrial)

Project: Views- One point, two points, Birds-eye and worms-eye of interiors, Building elements in interiors.

Module II (12 hours)

Principles and forms in Interior Design.

Effect of enclosure on space perception - size, volume, proportion and shape of enclosures, ideal space proportions, use of scales for space representation, psychological

effect of space, modulation of space - design elements, criteria for different situations.
Back ground for applied decoration - color, texture, plane and fixtures, emphasizing space through change of levels and structural forms.
Introduction to furniture layout, flooring layout, and reflected ceiling layout.

Project: preparation of interior drawing - design flooring pattern/ wall pattern/ ceiling pattern with its detailed drawings and perspective views.

Module III (18 hours)

Interior lighting and ventilation: Natural and Artificial lighting in interior designing - Different modes of natural lighting and its effect on interior designing - Effect of natural ventilation in interior design - Different type of artificial lighting and its effect in interior designing.
Surface treatments: Elements of furnishing and surface treatment their need and scope- decorative materials for ceiling, walls, floors, drapery and upholstery for openings and furniture.
Introduction to wall finish drawings, electrical and lighting drawing.

Project: Design a lobby space or bedroom with working drawing.

Module IV (18 hours)

Interior landscaping: Elements and application of interior landscape, interior plant materials, growth condition, maintenance, importance of plantscaping - aesthetics, functional etc.
Exhibits in interiors - private and public.
Water bodies in interiors
Professional practice and material estimation - Study on material estimation and presentation.
Introduction to fixed furniture, detail drawing and material board.

Project: Complete interior detail of a studio apartment or Lobby or any commercial space.

TOTAL HOURS: 60

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VI Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-63	BUILDING MATERIALS AND CONSTRUCTION - V	1-0-3	3	2017

Course Objectives

The Building materials and construction course for students of architecture would,

- Introduce to the student the advanced structural concepts in Architecture.
- Help them understand the details and application of advanced construction methodologies.

Course Outcome

- An understanding of the properties of various building materials and their applications.
- Exposure to advanced construction techniques used for constructing various components of a building.

Text books

- Arora S.P. and Bindra S.P., "Text book of Building Construction", DhanpatRai & Sons, New Delhi, 2012.
- P C Varghese, Building Construction, Prentice Hall of India Pvt. Ltd, New Delhi, 2010
- Francis D.K. Ching, Building Construction Illustrated John Wiley & Sons 2000.

Reference Books

- WB Mckay Building construction, Vol 1,2, Longman UK 1981.
- Barry, The Construction of Buildings; Affiliated East West press put Ltd New Delhi 1999.
- Relevant BIS codes.
- Harry Parker, 'Materials and Methods of Architectural Construction', John Wiley & Sons Canada, 1958.
- H Leslie Simmons, 'Construction- Principles, Materials & Methods', John Wiley & Sons Inc., New York, 2001.

MODULE I
STUDY OF ADVANCED CONCRETE (12 hrs)

Lightweight, high density, fiber reinforced, polymer concrete, outline of manufacture, properties and uses of the above.
Admixtures - Water repellent, waterproofing compounds, accelerators, air entraining agents, hardeners, plasticizer - Their properties and uses.

MODULE II
ADVANCED STRUCTURAL CONCEPTS IN ARCHITECTURE (16 hrs)

Pre stressed concrete structures: Precast pre stressed construction.. Two-way waffle slab, Two-way flat plate, Pre tensioning, Post tensioning, Hollow core slabs, T beam and slab.
Tensile structures: Concept of tensile structures, classification, uses, materials used. Application of cable structures in architecture.
Plate structures: Definition, classification and application, folded plates, flat slab and coffered slab.
Special Structures: Concept, Classification and Application of Pneumatic Structures, Kinetic Structures and Mobile Structures, Portal frames: Definition, and Application.

Sketches : folded pate, Post tensioned slab, Pre tensioned slab, Portal frame.

MODULE III
PRE-FABRICATION & MODULAR CO-ORDINATION (12 hrs)

Introduction to concepts of Modular Coordination. Definition of Basic Module. Modular controlling dimensions, Planning Modules.
Introduction to concepts of prefabrication. Advantages & disadvantages of onsite & off-site prefabrication. Methods of prefabrication .Process of prefabrication. Various issues related to prefabrication industry & Examples of prefabrication concepts.

MODULE IV
DAMP PROOFING,CONSTRUCTION JOINTS (12 hrs)

Damp proofing: Causes and methods of damp proofing of foundation, walls, floors , roofs. DPC of bathrooms, swimming pools, roof gardens, water tanks.
Construction Joints and Expansion joints: Definition, Methods of construction, filling of joints and waterproofing.

Drawings : Sketches of construction joints, expansion joints.
Sketches of DPC for foundation, walls, roofs.

TOTAL HOURS: 52

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VI Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-64	BUILDING SERVICES III (HVAC & MECHANICAL SERVICES)	3-0-0	3	2017

Course Objectives

- To impart the knowledge and skills required for understanding the building services of Heating, Ventilation and Air-conditioning and their integration with Architectural Design.

Course Outcome

- An understanding of the fundamentals of HVAC & Mechanical services in buildings.
- Knowledge about the ASHRAE standards.
- An awareness about the present trends in HVAC & Mechanical services.

Reference Books

- Refrigeration & air conditioning- Ramesh Chandra Arora
- Refrigeration & Air conditioning-Manohar Prasad
- Refrigeration & air conditioning- Ahmadul Ameen
- Refrigeration & Air conditioning-C.P.Arora
- Refrigeration & Air conditioning-W.F.Stocker
- Refrigeration & Air conditioning-P.L.Balleny
- Refrigeration & Air conditioning-Dossat
- Heating ventilation and A/C by Fage C Mcquiston & Jarald D Parker - John Wiley & Sons
- Refrigeration & air condition by Regiput
- ASHRAE data book

Module I (11 hours)

General introduction - Principles of heat transfer – Conduction – Convection – Radiation - Fourier law of heat conduction - Conduction through plane wall, Newton's law of cooling - heat transfer through composite cylinder - critical thickness of insulation – free and forced convection, Over all heat transfer coefficient - simple problems - Stephan Boltzmann's law, radiation shield, reflectivity, absorptivity, transmissibility, Kirchhoff's law, emissive power, emissivity, Wien's displacement law – Insulation - Properties of insulation.

Module II (11 hours)

Principles of Refrigeration – Capacity - Coefficient of performance (COP)- Carnot refrigeration cycle - vapor compression systems - Theoretical and practical cycles - Thermodynamic analysis using PH diagram - Standard refrigerants including eco-

friendly refrigerants and their properties - Study of refrigeration system components – Compressors – Condensers - Expansion devices – evaporators - cooling towers.

Module III (9 hours)

Psychrometry - Psychrometric properties - Psychrometric chart - Psychrometric process - adiabatic mixing - Sensible heating and cooling - humidifying and dehumidifying - bypass factor - sensible heat factor - room sensible factor - RSHF and GSHF line - Human comfort – comfort chart - Effective temperature - Factors governing effective temperature.

Module IV (14 hours)

Air conditioning systems - Room air conditioning systems - window A/C, split-packaged systems - central and unitary systems – summer – winter - year round air conditioning systems - Cooling load calculation - various heat sources - Design of air conditioning systems - AHU, Duct design - air distribution systems - draft - throw - entrainment ratio – spread - location of air outlets - location of return air openings - general consideration in air duct design and layout - noise and noise control. Determination of duct size using equal friction (constant pressure loss) method.

TOTAL HOURS: 45

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VI Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-65	DESIGN OF STRUCTURES - II	2-1-0	3	2017

Course Objectives

The Design of Structures II course for students of architecture would,

- Familiarize them to the fundamental aspects of structural behaviour and design of steel structures and also expose them to the concept of design of timber structures.

Course Outcome

- Awareness about the analysis and design of steel structural elements.
- An exposure to the relevant IS codes for structural analysis and design.

Reference Books

- A.S. Arya, Structural Design in Steel, Masonry and Timber, Nemchand and Bros, Roorkee, 1971
- Dayaratnam P., Design of Steel Structures, Oxford and IBH Publishing Co.
- IS 883:1994 – Code of Practice for Design of Structural Timber in Buildings
- IS 800:2007 – Code of Practice for use of Structural Steel in General Building Construction
- L.S. Negi, Design of Steel Structures – Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997
- S. Ramachandra, Design of Steel Structures - Standard Book House, Delhi, 1984
- N. Subramanian, Design of Steel Structures
- S.K. Duggal, Limit State Design of Steel Structures

MODULE I (12 hours)
Steel: Introduction, Properties of structural steel, Design of riveted and welded connections.(Moment connections not required)design of struts and ties

MODULE II (12 hours)
Design of tension member – plate, single angled member, Compression Member-Design of Strut-normal sections, single angled section.

MODULE III (12 hours)
Solid and Built –up Columns for axial load-battens and lacing (Theory only). Design of laterally restrained beam

MODULE IV (12 hours)

Introduction to design of timber beams , types of timber – classification, allowable stresses-design of beams-flexure, shear, bearing and deflection considerations, design of struts and ties and columns

NOTE:

5) Use of IS 800:2007 and IS 883:1994 shall be permitted in the examination hall

TOTAL HOURS: 48

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VI Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-66	HISTORY OF ARCHITECTURE V	3-0-0	3	2017

Course Objectives

- To provide the student an in-depth knowledge of modern design philosophies in the evolution of innovative architectural forms and designs.

Course Outcome

- Introducing the students to various Design philosophies of colonial, post independent and contemporary architecture in Indian context.

Reference Books

- Miki Desai, Architecture and Independence, Oxford University Press, 2000.
- Vikram Bhatt and Peter Scriver, Contemporary Indian Architecture: After the Masters, Mapin.
- Lang, Desai, Desai – Architecture & Independence, Oxford University Press, New Delhi.
- Sarbjit Bahga et al, Modern Architecture in India, Galgotia Publishing Company, New Delhi.

MODULE I
ARCHITECTURE IN COLONIAL INDIA (8 Hours)

Early colonial period – Examples – St.Pauls Cathedral, Calcutta, Victoria Memorial – Architectural character of Indo-Saracenic and Classical revival –University of Madras Senate House, Ripon Building, Central railway station Chennai – Later Colonial period – Contribution of Edwin Lutyens & Herbert Baker to the lay-out and Architecture of New Delhi - Rashtrapathi Bhavan & Parliament House.

MODULE II (12 Hours)
POST-NEHRUVIAN MODERNIST ARCHITECTURE

Modernism, Utilitarian modernism and Neo-modernism, Brutalism. Criticisms on the modern movement in India, countering the stigma of colonialism, the neo-vernacular, the community architectural movement, integrating the new and the old, revivalism and post-modernism.

MODERNISM AFTER CORBUSIER AND KHAN

Corbusier' works in India – Chandigarh and the Ahmedabad buildings - their influence on the modern rationalists; Louis Kahn's works in India - their influence on the empiricists.

MODULE III
POST INDEPENDENT ARCHITECTURE (12 Hours)

Influences of post-independence Architects - Architecture of Charles Correa - British Council Library Delhi, Kanchenjunga Apartments, Mumbai , Achuyut Kanvinde – IIT Kanpur, Nehru science center, Mumbai, Anant Raje - Bhopal Development Authority Headquarters, Institute for Forest Management , Bhopal, B.V.Doshi – Sangath Office, Ahemedabad, IIM Bangalore, Raj Rewal – Pragati Maidan New Delhi, Asian Games Village, New Delhi, Uttam Jain - University of Jodhpur, Jodhpur, Neelam Cinema Theatre, Sanchore, Hasmukh C Patel's - Entrepreneurship Development Institute of India, Gandhinagar, Sabarmathi River-front Development, Ahmedabad.

MODULE IV
WORKS OF CONTEMPORARY ARCHITECTS (10 Hours)

Architects and their ideologies - Nari Gandhi, Hafeez Contractor, Christopher Benninger, Brinda Somaya, Sanjay Mohe – Lecture Hall Block, IIM Bangalore, Karunashraya, Bangalore, Sanjay Puri – Mosaic Hotel Delhi, CIE Cochin, CNT - Tata Dhan Academy, Madurai, Dr. Reddy's laborator , Hyderabad, Morphogenesis - Pearl Academy of Fashion, Jaipur, PVR Bangalore, Jaisim –C R Simha, Bangalore, IIPM, Bangalore, Shirish Beri – Laboratory for the Conservation of Endangered Species, Hyderabad, Chitra Vishwanath – Yellow Train School, Coimbatore.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VI Course No.	Course Name	L-T-P/D	Credits	Year of introduction
AR 17-67	TOWN PLANNING	3-0-0	3	2017

Course Objectives

Town Planning course for students of architecture would,

- Introduce the history and evolution of Town Planning and various concepts, also its relevance in present scenario.
- Help them to acquire basic knowledge of various legislation and development schemes in Town Planning.

Course Outcome

- Understanding of the importance of Town Planning and various concepts.
- Basic awareness about the various Town planning regulations.

Text books

Arthur B. Gallion, “Urban Pattern”.
AE.J. Morris, “History of Urban Form”.
Peter Hall, “Urban and Regional Planning”.
C.A. Doxiadis, “Ekistics: An Introduction to Town and Country planning”.

Reference Books

- Keeble Lewis, “Principals and Practice of Town Planning”.
- Kevin Lynch, “Image of the city”.
- Peter Hall & Ulrich Pfeiffer, “Urban Future”.
- Ministry of Urban Affairs, Govt. of India – “Urban Development Plans Formulation and Implementation Guidelines”.
- John Ratcliffe, “Introduction to Town and Country Planning”.

MODULE I (12 HOURS)
HISTORY & EVOLUTION

Origin and evolution of Human settlements: Development of Town planning in the historical perspective -Town planning in ancient, medieval, renaissance, industrial & post-industrial age - Town planning in India: ancient, medieval, colonial and modern - Development of new towns and cities: Chandigarh and Navi Mumbai.
Contributions to modern town planning thoughts: Patrick Geddes, Ebenezer Howard, C A. Doxiadis, Lewis Mumford, Le Corbusier and Clarence Stein.

MODULE II (12 HOURS)
NEED FOR TOWN PLANNING

Impact of Urbanization on cities, Urban Environmental Problems: Land Use, Traffic and Road Network, Urban Land use: CBD, Urban Nodes, fringe areas and suburbs, Urban Rural Continuum - Contemporary urban problems: growth and changes, overcrowding, slums, sporadic growth and conurbation - Need for sustainable city planning.

MODULE III(12 HOURS)
URBAN DEVELOPMENT PLANNING SYSTEM AND PROCESS

Regional Plan, Master plan, Development Plan, Annual Plan - Town Planning Schemes and Neighborhood Planning - The planning components/elements: land use, zoning, floor area ratio, land development techniques & surveys.

MODULE IV(9 HOURS)
NEED FOR TOWN PLANNING LEGISLATION

Land Acquisition Act - 74th Amendment Act - Coastal Regulation Zones and its relevance – SEZ - JNNURM.
Land use Plan Tools for land use control - Zoning regulations, building byelaws, Subdivision regulations, Plot reconstitution, Betterment Tax.

TOTAL HOURS: 45

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.
Q II - 2 Questions of 15 marks from module I with choice to answer anyone.
Q III - 2 Questions of 15 marks from module II with choice to answer anyone.
Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.
Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VII Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-71	ARCHITECTURAL DESIGN - V	0-0-12	12	2017

Course Objectives

The Architectural Design V course for students of architecture would help,

- To enable the student to comprehend and conceive grouping of buildingswherein relationship between open space and built form, built form to built form plays an important role
- To enable the student to design multifunctional buildings with complex spatial organizations for a large user groups across a section of a society.
- To understand the importance of site planning principles in projects of large scale emphasizing the role of landscape in achieving sustainability.
- To understand circulation patterns in buildings or group of buildings having multiple entries and exits.
- To study and apply the standards in terms of services in buildings having large number of occupants along with aspects of segregation and integration of users, services and goods.
- To understand the building codes formulated for energy conservation and its applications.
- To introduce concepts of inclusive design in public buildings

Course Outcome

- The Course prepares the students to conceive buildings in groups with focus on transitional, incidental spaces in between along with massing of buildings and emerging circulation patterns.

Reference Books

- Kerala Municipal Building Rules
- National Building Code of India,Vol 1-5, 2005.
- Kevin Lynch, “Site Planning”, MITPress, Cambridge, 1984.
- Richard P. Dober, “Campus Architecture: Building in the Groves of Academe”, McGraw-Hill, 1996.
- Kanvinde, “Campus design in India”, American year Book, 1969
- UDPFI guidelines
- Alexander C, ‘A Pattern Language’, Centre for Environmental Structure Series
- Alexander C, ‘Timeless way to build’, Centre for Environmental Structure Series

Projects:

A minimum of two projects shall be completed during the semester. Projects may be on campus design and housing layouts with buildings of public, semi-public nature. Projects shall have enough scope for application of various socio – economic, environmental factors taking into consideration demographic, cultural, historic aspects of a design problem. These shall be campus design/ housing / institutional buildingsof public and semipublic nature.

Process and deliverables:

- Campus Design – Projects that has scope to design a group of buildings so that apart from learning about grouping of buildings students learn to segregate and integrate pedestrian and vehicular traffic, creation of human scaled open spaces and their networking, impacts on micro climate, landscaping, way finding and signage and so on.

- Housing –Projects having low, medium, high risebuildings having detached, semi-detached, row, cluster houses, walk up apartments - typologies for varied user groups with necessary civic amenities and services.Design should be inclusive in nature with enough potential for future growth and unpredictable change.

UNIVERSITY EXAMINATION PATTERN

Jury will be conducted as per the B.Arch. Degree Course Manual.

SEMESTER VII Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-72	URBAN DESIGN	3-0-0	3	2017

Course Objectives

- To introduce urban design principles and theories and the concept of public realm
- To enable students to perceive urban spaces as a three-dimensional entity that operates at multiple scales
- To create inquisitiveness among students to understand the buildings and the city as the product of a complex and multi-layered community based process

Course Outcome

- Ability to use appropriate language and terminology to describe urban spaces,
- Gain ability to understand, interpret and apply theories of urban design and familiarize a range of methodological approaches that guide urban space design and development

Reference Books

- Community Design and Culture of Cities – Eduardo E. Lozano
- Exterior Design in Architecture – Yoshinobu Ashihara
- Architecture of Towns and Cities – Paul D.Spreiregen
- The Social Logic of Space –Bill Hillier and Julienne Hanson
- The New Theory of Urban Design – Alexander Christopher
- The Image of the City – Kevin Lynch
- Design of Cities – Edmund N. Bacon
- Life Between Buildings: Using Public Space-Jan Gehl
- Cities for People-Jan Gehl
- The City Shaped: Urban Patterns and Meanings Through History- Spiro Kostof
- The Urban Pattern- City Planning And Design- Arthur Gallion
- The New Landscape – Charles Correa
- The Architecture of Cities – Rossi, Aldo
- The Concise Townscape – Cullen, Gordon
- Finding lost space-Theories of Urban Design – Roger Trancik
- The Art of Building Cities: City Building According to Its Artistic Fundamentals – Sitte, Camillo

MODULE I (8 Hours)

Definition of Urban Design, its evolution as a discipline interfaced between Architecture, and Urban Planning, Need, scope and Objectives Urban Design;
Urban form of traditional cities and historic place making from ancient-medieval-renaissance-industrial and modern times; concepts of post-modern urbanism and its influences in contemporary urban space design and development.

MODULE II (12 Hours)

Methodological approaches in understanding urban spaces: visual surveys-Kevin Lynch's Image of the city, ecology-landform-climate-shape-size-pattern-grain-texture, public spaces-morphology-building typology-open spaces-street networks-character districts-pedestrian paths-vista & skyline-circulation pattern-activity nodes etc.; urban Scale: relation with human vision-neighbourhood size; enclosure qualities; built-open relationships, urban mass etc.; Gordon Cullen's Townscape analysis; basic urban design principles, concepts of urban spatial organization; place making theories etc.

MODULE III (12 Hours)

Overview of the contribution of Urban Theorists in understanding public spaces- Camillo Sitte, Jane Jacobs, Donald Appleyard, William H. Whyte, Le Corbusier, F.L.Wright, Edmund Bacon, Christopher Alexander, Peter Calthorpe, Aldo Rossi, Bill Hillier, Rob Krier, Richard Rogers, Charles Correa, Jan Gehl, John Lang etc.
Emerging concepts in Urban Space Design: Neighbourhood concept; Space Syntax Theory, Transit-Oriented Development, New Urbanism, Mixed Use Developments, Smart City Concepts

MODULE IV (10 Hours)

Understanding Urban Design Projects through case studies: Brownfield development (Urban redevelopment-revitalization- renewal-regeneration-rehabilitation, Urban Conservation etc.), Greenfield development, urban water front development etc.
Urban design process, structure plan, development control guidelines -master plan/development plan -zoning regulations-formulation of policies for landscape, infrastructure & built-forms, relevant acts and regulations, Art and Heritage commission, other government and non-government agencies, Urban design project implementing agencies, financing agencies etc.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VII Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-73	ARCHITECTURAL DETAILING AND WORKING DRAWING	0-0-4	3	2017

Course Objectives

- To be conversant with project delivery methods of architectural design including digital methods.
- To understand the need of integrating structural design, construction and service requirements in architectural planning and design.
- To enable the development of architectural design drawings to make it the basis for structural and service drawings.
- To prepare architectural details and working drawing for a project.

Course Outcome

- Preparation of individual portfolios containing relevant drawings done in the semester preferably in digital form derived from the works of the student.
- Competency in preparation of drawings required for construction of a building project.
- Realization of the need for integration of all technical aspects of construction in architectural design.
- Ability to design and detail buildings.

Reference Books

- Ralph W Liebing, Architectural working drawings
- Edward J Muller, James G Faussett, Philip A Grau. Architectural drawing and Light construction
- Jefferis, A. and Madsen, D.A. (2005). Architectural Drafting and Design. 5th Ed. New York: Thomson Delmar Learning.
- Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). The professional practice ofarchitectural working drawings. 4th Ed. Hoboken: John Wiley & Sons.

Module I (12 hours)

Study of Architectural standards to be followed in the preparation of working drawing &detailing.
Case study of sample detailed drawings and working drawings from general to specific details- Site plan, grading plan, landscaping plan,centre line drawings, building plans, enlarged detailed plans, sections, staircase details, toilet details, joinery, water supply/plumbing, fire protection, mechanical, electrical drawings and HVAC details.
Students may be divided into groups for study and seminars on varioustopics.

Module II (20 hours)

Developing the design of a medium complexity building done by the student in the previous semester upto the stage for the preparation of working drawing or for a new design project for preparation of working drawing.

Preparation of working drawing for the design project including
a. Developing site plan, grading plan, landscaping plan and details,floor plans, Detailed Part plans, Roof Plan /Terrace Plan,schedules etc
b. Excavation drawings, Foundation drawings, Center-line drawings, Floor Plans,Sections, Elevations.
c. Basic internal electrical and plumbing lay outs.
d. Enlarged plans for areas like toilet, kitchen, staircase etc.

Module III (12 hours)

Detailsof joinery, finishing materials,built-in furniture, components like doors, windows, ventilators, wardrobe, storage cabinets, counters, fittings and fixtures etc. Details of septic tank, STP, Rain water harvesting etc.

Module IV (8 hours)

Documentation of construction details for various types of staircase, lifts, dumb waiters, escalators etc. through case study. Students may be divided into groups for study and seminars on varioustopics.

TOTAL HOURS: 52

Sessional requirements:

Class work (Drawings & projects)	-70 marks
Assignment	-20 marks
Regularity	-10 marks
Total	-100 marks

SEMESTER VII Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-74	BUILDINGSERVICES - IV (ACOUSTICS &FIRE FIGHTINGSERVICES)	3-0-0	3	2017

Course Objectives

The Building services – IV (Acoustics & Fire-fighting services) course for students of architecture would help

- To understand the importance of acoustics inbuildings.
- To get familiarized with various acoustical materials, their properties and their constructiondetails.
- To integrate architectural design with acousticconsiderations.

Course Outcome

- An understanding of the fundamentals ofacoustics.
- Knowledge about Fire safety building rules.
- Awareness about fire safety and noise control in day to daylife.

Reference Books

- Kinsler, L. E., & Frey, A. R. (1962). *Fundamentals of acoustics*. New York: Wiley.
- Templeton, Duncan (Ed.) (1993). *Acoustics in the Built Environment.* Oxford: Butterworth Architecture.
- Knudsen, V. O., & Harris, C. M. (1988). *Acoustical designing in architecture*. Woodbury: Acoustical Society of America.
  Cavanaugh, W. J., Tocci, G. C., & Wilkes, J. A. (2010). *Architectural acoustics: Principles and practice*. Hoboken, NJ: John Wiley & Sons.

MODULE I (9 Hours)

Introduction to Acoustics: Nature of Sounds- Propagation of Sound- Velocity, Frequency, and wavelength of sound-sound intensity-sound pressure- loudness-Decibel- Human ear and hearing characteristics.

MODULE II (10 Hours)

Sound in Enclosed Space , Acoustical Construction And Materials: Room acoustics- behavior of sound in enclosed spaces-sound reflection, diffusion, and diffraction -room resonance- sound absorption coefficient- sound absorptive materials and applications - porous absorbers-membrane absorbers- cavity resonators-space absorbers variable absorbers-measurement of sound absorption.

MODULE III (10 Hours)

Reverberation: Reverberation-Calculation of reverberation time- sabine's formula- acoustical defects in the enclosed spaces, acoustical design of auditoriums-rooms for music, speech.

MODULE IV (13 Hours)

Noise Control. Acoustic Design of Various Buildings And Fire Safety Provisions

Effect of noise in human being- air borne and structure borne noise- noise criteria-transmission loss noise control in specific building types- auditoriums, schools, hospitals, residences and offices.

Fire resistance of building elements, fire rating and assessment. Building bye-laws relating the fire safety provisions in the buildings. Firefighting equipment - automatic sprinklers, fire alarms, smoke detectorsetc.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module

Q II – 2 questions of I5 marks from module I with choice to answer anyone

Q Ill - 2 questions of I5 marks from module II with choice to answer anyone

Q IV - 2 questions of I5 marks from module III with choice to answeranyone

Q V - 2 questions of I5 marks from module IV with choice to answer anyone

SEMESTER VII Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-75	**Building Economics and Sociology**	**3-0-0**	**3**	**2017**

Course Objectives

- To familiarize the students with the basic concepts of sociology &economics and their influence on architecture

Course Outcome

- Introduction to sociology and elements of sociology and how it influences architecture.
- Understanding the issues faced by Indian society in relation to urbanization and housing
- Introduction to basics of economics
- Understanding economics factors affecting different stages of a building.

Reference Books

- Jones, Paul (2011). The Sociology of Architecture: Constructing Identities. Liverpool University Press.
- Houses forms and culture – Amos Rappoport
- Urban sociology – Dr. Valsyayan
- Openstacks College (2012) Introduction to Sociology. Openstacks College.
- Samuelson, P. and Nordhaus, W. (2010) Economics. McGraw-Hill Education
- Building Economics for Architects. Wiley- Mann, Thorbjoern (1992)

MODULE I (10 hours)

Introduction to sociology: Definition of sociology, Nature and scope and utility in architecture and the built environment; Definitions of sociological terms: society, community, family, culture. Relation between culture and built form (exploration of architectural examples).

MODULE II (10 hours)

Communities: Origin, growth and nature of settlements and communities. Their characteristics and spatial patterns.
Urban and Rural Communities: Definitions of the terms “urban” and “rural”. The social, economic and spatial characteristics associated with urban and rural settlements
Cities and Society: Urbanization – definition; causes. Effects of urbanization on rural areas. Impact of growing urbanization on urban life, viz. health, housing, transportation. The origin and characteristics of slums in Indian cities. Governmental and non-governmental approaches to engaging with issues regarding slums in Indian cities.

MODULE III (10 hours)

Introduction to economics: Definition of economics; Definitions of terms: Goods; Utility, Value, Price and Wealth, micro and macroeconomics.
Economics and the market: Consumption, wants and needs and their characteristics.
Concepts of economics: Supply and demand Opportunity cost; Laws of supply and demand.

MODULE IV (12 hours)

Urban land values: Various factors affecting the value of urban land.
Building Economics: Building Efficiency and cost reduction through planning and design of building components. Total cost of building, Initial cost, Operational cost, maintenance cost. Life cycle cost.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VII Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-76-1	SUSTAINABLE ARCHITECTURE AND PLANNING	3-0-0	3	2017

Course objectives

The objective of the course is to develop

- An understanding to reduce, or completely avoid depletion of critical resources; prevent environmental degradation caused by facilities and infrastructure throughout their life cycle; and create built environments that are livable, comfortable, safe, and productive.
- An understanding of relevant techniques in formulating various sustainable strategies.
- An insight into various Energy Efficient Materials and Sustainable Construction Technology.
- An awareness regarding various policies and principles related to sustainability in a global level.

Course outcome

- The programs seek to prepare students to be successful professionals recognized for theirconsideration of global and societal concerns, ethics, and sustainability in the process of making design decisions.

REFERENCES:

- Brenda and Robert Vale; Green Architecture- Design for a Sustainable Future; Thames and Hudson, 1996
- Daniel Vallero and Chris Brasier; Sustainable Design- The science of sustainability and Green Engineering; Wiley, 2008
- Trivedy R. K- Handbook of Environmental Laws, Guidelines, Compliance & Standards, Vol. 1 & 2
- Sustainability How-to Guide Series Green Building Rating Systems- IFMA Environmental Stewardship and Sustainability Strategic Advisory Group (ESS SAG)
- Jong-Jin Kim, Brenda Rigdon; Qualities, Use, and Examples of Sustainable Building Materials .
- Szokolay, S. V., 2004. Introduction to Architectural Sciences: The Basis of Sustainable Design, Architectural Press, Oxford.
- TERI, 2004. Sustainable Building Design Manual Volume 2, The Energy & Resources Institute, India.

MODULE I (10 Hrs)

Impact of people on the environment and vice versa, Introduction to sustainability,Sustainable development goals,Sustainable architecture and Green Building definition, its historical precedence, E's of sustainability - environmental, economic, social and cultural dimensions. Its correlation to population growth.

"Three R's" of sustainability, Goals of Sustainable development. Global, national & local relevance.

Basics ofGreen rating systems - BREAM, LEED,IGBC,GRIHA,BEE.

MODULE II (12 Hrs)

Integrated approach to environmental design, Building and its interactions with the environment, Urban ecology

General principles for minimizing environmental impact of buildings- Site planning considerations, Building design considerations, working with climate: passive design principles, building envelope design, indoor environment quality, sustainable building services

Energy management, Waste management, Water management, Environmental management of sensitive areas

MODULE III (12 Hrs)

Sustainable Building Materials – Biodegradable & Non-Biodegradable Materials –Eco-friendly building materials, Concept of Renewable, Recyclable and Reusable materials, Regional materials,alternative materials, Sustainable building technologies – Traditional, vernacular and advanced technologies

Environmental Impact of building materials-embodied energy of different building materials and technologies, operational energy, carbon foot print- considerations for choice of materials for low energy- life cycle analysis- optimizing construction, site management, post occupancy building management,sick building syndrome.

Energy Efficient Construction Technologies - Technologies developed by CBRI,TERI,Traditional Building Construction Technologies,Introduction to other Technological interventions to save Energy, Intelligent Buildings –Case studies.

MODULE IV (8Hrs)

Policies and principles: Bruntland Commission Report, Basic understanding of Earth Summit, Kyoto protocol, UN frame work convention of climate change

National policies on sustainable and energy efficient development, Environmental Legislations, The Energy Conservation Act 2001 (Amendments 2010)- Main Amendments and its legal framework, Energy Conservation Building Code (ECBC), Environmental impact assessment (EIA) based on the Environmental Protection Act (EPA) 1986, LEED, IGBC, GRIHA, ECBC, BEE

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VII Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-76-2	COST-EFFICIENT CONSTRUCTION TECHNIQUES	3-0-0	3	2017

Course Objectives

- To introduce the concept of cost-efficient construction techniques.
- To study and analyze various cost-efficient construction techniques.

Course Outcome

- An awareness of various cost-efficient construction techniques developed by various agencies and the knowledge to adopt appropriate technology for various situations.

Reference Books

- Centre for Resourceful building Technology (April, 1995) - Indigenous building materials – An overview
- Hand book of low cost housing
- G.C. Mathew - Low cost housing in development countries
- Publications of CBRI, SERC, RRL, NBO, COSTFORDetc
- Proceedings of International Seminar on Low cost Housing and Alternative Building Materials(1988), CBRI Roorkee
- Jagdish– Sustainable Building Technologies
- Baker Laurie (1988) – Mud
- Hassan Fathy (1997) – An Architecture for People
- Geoffrey Bawa (2015) –A Conscious Perception

MODULE I (8 Hours)

Introduction to cost-efficient construction techniques – significance, need and approaches.
Cost factors – land cost, cost for site development, services, initial construction cost, maintenance cost, life cycle cost and social cost.
Time factor, labor requirement, transportation cost, wastage reduction and recycling of materials - sustainability considerations.

MODULE II (12 Hours)

Concept of systemsapproach,standardization, modular coordination & prefabrication for cost reduction. Introduction to Integrated building construction and management (detailed study is not expected).
Various planning techniques. Cost reductionof earth work,roads,pavement and other site components and services.
Critical study of techniques for cost reduction for foundation developed by various agencies.

MODULE III (12 Hours)

Cost-efficient construction techniques for walls and wall finishesdeveloped by various agencies – use of industrial and agricultural waste –Mud plastering, Mud construction- Adobe, CSEB, Wattle & Daub, Rammed Earth, Straw Bale etc. - use of interlocking bricks, prefabricated components - documentation and critical analysisbased on different materials and finishes.

MODULE IV (10 Hours)

Study and critical analysis of cost-efficient construction methods for roof and floor slabs - Techniques developed by various agencies – Prefabricated Slab, Waffle slab, Filler slab, Thin slabs, etc.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VII Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-76-3	BARRIER-FREE ENVIRONMENT DESIGN	3-0-0	3	2017

Course Objectives

- To introduce the concept of barrier-free environment designto students.

Course Outcome

- Awareness about the fundamental principles of Barrier-free built environment.
- Exposure to the special design considerations for diverse building types.
- Awareness about Standards and Regulations stipulated by authorities.

Reference Books

- Barrier free design: A Manual for Building Designers and Managers, James Holmes-Seidle, Architectural Press, 1996.
- Barrier free design, Oliver Heiss, Birkhauser, 2010.
- Building without barriers for the disabled, Harkness, Sarah P. and Groom, James N., Watson-Guptill Publications, 1976.
- Disability and Rehabilitation Handbook, Goldenson, Robert M., McGraw Hill USA, 1978.
- Handbook on Barrier Free and Accessibility, CPWD, New Delhi, 2014.
- Guidelines and Space Standards for Barrier-free Built Environment for Disabled and Elderly Persons, CPWD, New Delhi, 1998.

Module I (8 hours)

Back ground of the subject - Types of disabilities- temporary, characteristic and long established conditions – Why a barrier-free environment? – Goal of a barrier-free design - Fundamental principles for designing Barrier-free built environment.

Module II (12 hours)

Typical barrier problems of the disabled- Listing common barriers-parking and approaches - Travel within buildings – Services - Hazards.
Special design considerations for building types - Housing, Institutions, Public buildings, Transportationterminals, and outdoor spaces.

Module III (12 hours)

Construction and Maintenance standards considering the types of Disabilities - Mobility devices - Material study -Techniques and details for the design elements within and outside the buildings - Case studies.

Module IV (10 hours)

Objectives of barrier free standards- existing standards - Study of norms and bye-laws set by Central Government which would be applicable to all buildings and facilities used by the public.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER VII Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-76-4	VERNACULAR ARCHITECTURE	3-0-0	3	2017

Course Objectives

- To introduce the discipline of vernacular architectureto students and to provide an exposure to the diversity of vernacular traditions in Indian architecture.

Course Outcome

- Awareness about the fundamental theories of Vernacular Architecture.
- Exposure to the vernacular traditions in various regions of India.

Reference Books

- A Rapoport (1969) *House Form and Culture*, Prentice-Hall, Englewood-Cliffs, New Jersey.
- B Rudofsky (1964) *Architecture without Architects*, Academy Edition, London.
- P. Oliver (1992) *Encyclopedia of Vernacular Architecture*, University of Oxford Press, Cambridge.
- V.S. Pramar, *Haveli – Wooden Houses and Mansions of Gujarat*, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
- S. Muthiah et al, *The Chettiar Heritage*; 2000.
- Thampuran, Ashalatha. (2001). *Traditional Architectural Forms of Malabar Coast*, Calicut :VastuvidyaPrathishtanam.
- Desai et al, *The Bungalow in Twentieth Century India*, Ashgate Publishing Ltd, 2012.
- Desai, Madhavi. (2007). *Traditional Architecture: House Form of the Islamic Community of Bohras in Gujarat*, Pune: Design Directions Pvt. Limited.
- Aishwarya Tipnis (2011) *Vernacular traditions; Contemporary architecture*, The Energy & Resource Institute (TERI) publication.

Module I (8 hours)
Introduction to vernacular architecture

Definitions, theories and classifications,
Urban and Rural Vernacular,
Various factors influencing Vernacular Architecture,
Role of sustainability in Vernacular architecture,
Traditionalism and Vernacular.

Module II (12 hours)
Tribal Architecture of India – Building materials and construction techniques

Forms, spatial planning, cultural aspects, symbolism, materials and construction techniques of different tribal settlements in India - *Naga houses of North East India, Bhil houses of Madhya Pradesh and Gujarat, Toda houses of Tamil Nadu* etc.
Documenting any vernacular settlement in your locality – relation of houses and settlement, belief systems, architectural morphology, contextual responses, materials and construction methods etc.

Module III (12 hours)
Regional variations in Vernacular Traditions of India

Forms, spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction technique of the vernacular architecture of the following:
Havelis of Rajasthan
Bohra Houses of Gujarat
Banglas(village huts) of Bishnupur, Bengal
Chettinad Houses of Tamil Nadu
Nalukettu (and its variations) of Kerala

Module IV (10 hours)
Contemporary vernacular architecture

ICOMOS International charter on built heritage
Importance of vernacular in 21st century
Developmental vernacular.
Knowledge of Vernacular in contemporary regional designs – works of eminent Architects

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

EIGHTH SEMESTER (S8)

AR17-81

PRACTICAL TRAINING

Credits: 15

The students shall undergo practical training immediately after the completion of the 7th semester B.Arch. examinations as per the practical training manual. The training shall be under a registered architect with minimum of five years experience and approved by the Dept of Architecture of the teaching institution. The students are required to submit a report including the details of their work illustrated with sketches, prints and other documents connected with the projects on which he/she has worked both in office and at site, a work diary, originals of monthly report, and a certificate regarding their conduct and performance of work done during the training period. Evaluation committee will award the marks of end semester examination as per the B.Arch Degree Course Manual-Practical Training. For details refer Practical Training Manual.

SEMESTER IX Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-91	ARCHITECTURAL DESIGN - VI	0-0-12	12	2017

Course Objectives

The Architectural Design VI course for students of architecture would help,

- To help students comprehend a group of buildings in a public realm having multiple stakeholders.
- Learn to address the interface between public and private realm of buildings.
- To develop design solutions as a response to the surrounding urban environs.
- To help students understand the correlation between, physical, socio-cultural, environmental and socioeconomic dimensionssuch as heritage, gender, class, dynamics of urban growth of the built environments.
- To enable the students to address issues in urban areas – transportation, sustainability, heritage, sprawl, place making, identity, collective memory Mixed use programming.
- Learn to apply basic tools of master planning in a large scale project
- To enable the student to solve large span structures.

Course Outcome

- The Course prepares the students to perceive buildings as part of a larger urban fabric emphasizing on the interrelationships between the disciplines of architecture, urban design and town planning.

Reference Books

- Kerala Municipal Building Rules
- National Building Code of India, Vol. 1-5, 2005.
- Kevin Lynch, Site Planning, MIT Press, Cambridge, 1984.
- Carmona, M., Heath, T., Oc, T. and Tiesdell, S. (2010). Public Places Urban Spaces. Oxford Architectural Press.
- Lang, J. T. (2005). Urban Design: A Typology of Procedures and Products. Oxford:Elsevier/Architectural Press.
- Jonathan Barnett, An Introduction to Urban Design, Harper and Row; 1982
- Jan Gehl, Life between Buildings- Using Public Space, ArkitektensForleg 1987.
- Time Savers Standard for Urban Design, Donald Watson, McGraw Hill, 2005.
- Malcolm Moore & Jon Rowland Eds, Urban Design Futures, Routledge, 2006.
- Edmund Bacon, Design of Cities, Penguin, 1976.
- Gordon Cullen, The Concise Townscape, The Architectural Press, 1978.
- Lawrence Halprin, Cities, Reinhold Publishing Corporation, New York, 1964.
- Gosling and Maitland, Urban Design, St. Martin's Press, 1984.
- Bjorn N Sadaker, On span and space: Exploring structures in architecture

Projects:

An urban study is to be conducted -either by undertaking an intense study in an urban context or by introducing a large scale urban project which will impact on the immediate environs necessitating a detailed contextual study.
Study should address the above stated objectives and issues are to be identified. Architectural solutions for the urban area with necessary policy guide lines shall be worked out as the major project.
A building which requires large span structuresshall be the second project.

Process and deliverables:

- Projects where there is an exploration of buildings in the urban context with a thrust on understanding interdependencies between architecture, urban design and town planning; private and public realms.
- Adaptive usage of heritage buildings/areas, urban revitalization projects, water front development, new town developments, transportation terminals,transit-hubs, market squares, densification along transit corridors, mixed use complexes etc. can be projects which can be taken up.
- Buildings that require large span structures like convention centers, sports complex,galleries and pavilions, transportation terminals where in new age materials and construction techniques can be explored by students.

UNIVERSITY EXAMINATION PATTERN

Jury will be conducted as per the B.Arch. Degree Course Manual.

SEMESTER IX Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-92	EARTHQUAKE-RESISTANT STRUCTURES	3-0-0	3	2017

Course Objectives

- To familiarize the basic concepts of seismic design.
- To integrate the architecture design process with seismic concept to produce safe buildings.
- To gain an understanding of the tools for hazard and vulnerability assessment at the city level and to have an overview of the different types of technological hazards.

Course Outcome

- Understanding of the concepts of seismic design.
- Development of the skill set required for design of earthquake-resistant structures.

Reference Books

- Ambrose, J; Vergun, D: Simplifed building design for wind and Earthquake forces, John Wiley, New York, USA
- Arnold, C; Reitherman, R : Building configuration and Seismic design, 1982, John Wiley, New york USA
- Bolt, B.A: Earthquakes, Fourth edition, 1999, W H Freeman, Sanfransisco, USA
- Dowrick, D.J: Earthquake resistant design for Engineers and Architects, 1987, Second edition, John Wiley, New York,USA
- Hugo Bachmann : Seismic conceptual design of buildings- Basic principle for engineers, architects, building owners and authorities; Swiss Federal Office for Water and Geology and Agency for Development and Cooperation, Switzerland.
- Lagario, H.J: Earthquakes: An architect's guide for non structural seismic hazards, John Wiley and sons, New York, USA.
- Murty, C.V.R: Earth quake tips, National information centre for Earthquake Engineering, IITK, Kanpur.
- IGNOU: Notes on disaster management.
- Ramani, S. Disaster management- Advanced course on modern trends in housing- SERC, Vol 2, Chennai, 1980.

Module I (10 hours) Introduction

Seismic zones in India and earthquake hazard. Role of architect and structural designer in safe building design, Comparison of seismic and conventional design. Causes of earthquake, social & economic consequences. Major Earthquake case studies, impact on built environment, classification of observed building failure patterns: Global, Indian.

Basic terms: Fault line, focus, Epicenter distance, Focal depth, Peak ground acceleration etc. Impact of soil characteristics on buildings, seismic zoning and micro zoning

Module II (10 hours) Earthquake Basics:

Consequences of earthquake ground motion: Ground rupture and ground failure, liquefaction, Landslides, Fire, Tsunamis. Structure of the Earth-Plate Tectonics-Evolution of Indian subcontinent. Waves generated by ground motion and their characteristics: Body Waves (Longitudinal waves; Transverse waves), Surface waves (Rayleigh waves). Attenuation of waves, Random direction of Shaking. Distribution of earthquakes: Global, Indian. Measurement of earthquakes: Introduction of instruments used for measuring earthquakes, Seismograph, accelerograph, various scales of magnitude, various scales of intensity.

Module III (12 hours) Design of buildings for earthquake resistance:

Factors affecting earthquake loading: Mass, Natural period, Damping, Ductility. Seismic Design Code Provisions: Basic terms used in seismic codes and their meanings, horizontal design seismic coefficient, base shear of building and vertical distribution of loads. Building Configuration: scale of building- size in horizontal plane- size in vertical plane- Building proportions- Symmetry of building (Torsion), Re-entrant corners, Redundancy, irregularities in building, Horizontal plane, Vertical plane (Soft storey; short column; discontinuous walls).

Module IV (10 hours) Disaster Management:

Introduction to the concept of disaster management and mitigation. Types of disasters-nature, causes, impact. Hazard and vulnerability assessment, concepts, tools and techniques, pre-disaster mitigation and protection of lifelines and critical facilities against natural hazards. Concepts and overview of technological hazards at the city level. Safety management system: Strategies for implementation, fire safety at the city level, emergency planning, preparedness and response at the city level. Principles and methods of community-based approaches for disaster management practice.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V- 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER IX Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-93	DISSERTATION	0-3-0	3	2017

Course Objectives

- To understand the process involved in a research.
- To conduct research in a structured manner.
- To compile and write the work done at various stages of research in a comprehendible manner.
- To learn Standard referencing conventions and technical writing norms.

Course Outcome

- The Course provides an opportunity for students to undertake independent research on a topic of their choice related to architecture.

Reference Books

- Borden, I. and Ray, K. R. (2006). The dissertation: an architecture student's handbook. 2nd Ed. Oxford : Architectural Press.
- Fink, A. (1998). Conducting research literature reviews: from paper to the Internet. Thousand Oaks : Sage.
- Groat L.& Wang D. (2002), Architectural Research Methods, John Wiley and Sons Inc
- Kothari C. R. 1990 Research Methodology Sultan Chand & Sons, New Delhi
- Creswell, John W. 2003 Research Design: Qualitative, Quantitative and Mixed Methods Approach Sage Publications

Manual:

Allotment of Guide

- A guide has to be allotted to each student for supervising the dissertation work by the head of the institution.

Area of Research

- Area of research has to be identified by the student from architecture and its allied subjects. A concern which is currently relevant to the society has to be brought out from the identified area of research. The research concern so identified has to have scope to be conducted as a study for dissertation and has to be approved by the Department of Architecture.Student is expected to have a critical understanding of the topic, analyse the results on the data collected and present the work in a structured manner.
- Students may be encouraged to utilise dissertation as an opportunity for pre-Thesis study but this is optional. Selection of topic may be done in such a manner that the study done here can form the base work for the Thesis of the semester X.

Conduct of work

- The dissertation work shall be independently carried out by the student under the guidance of their respective guides in the IX semester degree course period.

- On the day of registration to IX semester students shall submit the choices of their research concern to the dissertation coordinator appointed by head of the department.

- A review board shall be constituted with a senior faculty as Chairman, dissertation coordinator and guide. After the approval of the topic in the first review they are required to submit the synopsis and start the study.

- The Schedule of work at various stages is outlined in the table given below.Students shall present the progress of the study at various stages during the IX semester.

- At the completion of study prior to final evaluation students are expected to submit a report of maximum 8000 words. Standard referencing conventions and technical writing norms must be adhered to.

- Final assessment of the students' work shall be based on the report as well as oral presentation with a greater weightage given for writing and research content of the study.
- Report should be checked for plagiarism which shall not be tolerated.

Evaluation

- The entire 100 marks allotted to the dissertation will be awarded in the followingmanner.
- Approval of topic 10 marks (internal)
- Two progress assessment 20 marks each (internal)
- Final evaluation 50 marks (conducted by Institute)

After the approval of the topic the internal evaluation shall be conducted in 2 progress assessment stages by the review board. Internal marks shall be awarded as given below:

- Preliminary Stage –Literature study, Data Collection (20marks)
- Intermediate Stage – Results and Interpretation, Draft Report (20 Marks)

The Final evaluation shall constitute 50 marks and shall be conducted by the Dissertation review Board constituted by the Institute.The dissertation assessment board for final evaluation shall consist an external member either from academic or a research institute or a practicing COA registered architect with minimum five years' experiencewho shall be identified and appointed by the institute apart from Chairman who will be a senior faculty member appointed by the institute and Members Dissertation Coordinator/Internal faculty member.The jury members will independently evaluate the final presentation.

- Evaluation of the final report in the form of bound volume - 25 marks.
- Evaluation of research work and Presentation of Slides- 25 marks.

Head of the Department shall publish the marks of the Dissertation on the nextworking day after the completion of the Jury.

- A candidate has to obtain 50% aggregate marks for dissertation (internal assessment + Jury) for a pass.
- If the dissertation is not completed satisfactorily, the student has to work further and again appear for a final assessment on a specified date, not earlier than one month after the first evaluation.
- A candidate who fails for dissertation in this final assessment stage as well, has to reappear either in full or for the Final Jury only with any regular batch. He/she is required to register with the Head of the Department for the same.

S. No.	Evaluation Stage	% Marks Allotted	Evaluation Board	Schedule
1	***Approval of topic*** – Research proposal detailing the aim, objective,methodology and scope of the study.	10%	The project guide and two other faculty members of the same institute.	First week of IX Semester
2	***Preliminary Stage*** – Review of literature and data collection methodology.	20%	The project guide and two other faculty members of the same institute.	Fourth week of IX Semester
3	***Intermediate Stage*** – Data collection, Analysis and Inferences.	20%	The project guide and two other faculty members of the same institute.	Tenth - twelfth week of IX Semester
4	***Final Evaluation (Conducted by Institute)*** – Final Presentation and Report (2 copies, bound)	50%	***Chairman:*** A senior faculty member appointed by the institute ***Members:*** 1. Dissertation Coordinator/Internal faculty member, 2. An external member either from academic/research institute or practicing COA registered architect with minimum five years' experience shall be appointed by the institute.	End of IX Semester

SEMESTER IX Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-94	CONSTRUCTION AND PROJECT MANAGEMENT	3-0-0	3	2017

Course Objectives

- To establish and develop project management skills with reference to construction management.
- To understand CPM network analysis and network logic.
- To learn probabilistic time estimate and PERT network analysis.

Course Outcome

- Understanding of the different methods and techniques used in scheduling a project.
- Ability to schedule a project using various techniques.

Text books

- Srinath, L.S: PERT and CPM Principles and Application.
- Robert B. Hanis: Precedence and Arrow Networking Techniques for Construction.
- Steven James, D: Techniques or Construction Network Scheduling.
- Bhattacharjee,S.K: Fundamentals of PERT/CPM and Project Management.

Module I (10 hours)

Introduction to construction management, need and importance, objectives of project management, types of construction management, introduction to traditional management systems, role of Project or Construction Managers in the building industry. Project management cycle-planning, scheduling, monitoring and controlling

Module II (10 hours)

Introduction to construction scheduling techniques - Bar chart - Gantt chart. - Work break down structure, Network representation, Principles and application of CPM & PERT.

Module III (10 hours)

Network analysis, development of CPM network-Identification of critical path-Different float computations. PERT Network- Probabilistic time estimates of activities-Analysis of PERT Network – Development of Critical path.

Module IV (12 hours)

Expediting the project - Time cost tradeoff – Optimization, Allocation of resources - Resource levelling and smoothing - Project management software packages.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V- 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER IX Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-95	PROFESSIONAL PRACTICE	3-0-0	3	2017

Course Objectives

The Professional Practicecourse for students of architecture would help,

- To gain an exposure to architectural professional practice and the role of concerned professional and statutory bodies.
- To have an understanding about the code of conduct and ethics in professional practice as per the Architects Act 1972.
- To study about project management and execution practices such as tendering, contracting etc.

Course Outcome

- Understanding of professional and statutory bodies controlling the profession of architects.
- Understanding of the professional function and responsibilities of architects.
- Understanding of the processes of competitions, tenders, contracts and project execution.

Reference Books

- Architect's Act 1972
- Publications of Handbook on professional practice by IIA
- Publication of Council of Architecture – (Architects professional conduct/Regulations 1989, competition guidelines
- Roshan Namavati "Professional Practice" "Lakshmi book depot, Mumbai 1984
- Ar. V.S. Apte "Architectural Practice and procedure" Mrs. Padmaja Bhide 2008

MODULE I (6 Hours)

ARCHITECT'S ACT 1972
Functions and powers, Architects Regulations, Architect's office and its management. Role of Indian Institute of Architects- Code of conduct for architects, punitive action for professional misconduct.

MODULE II (12 Hours)

ARCHITECTS SERVICES
Scale of fees for professional services as per COA , Modeof engagement of architects- comprehensive services, practical services and specialized services

COA guidelines for Architectural competitions – Types of competitions (open, limited, ideas competition) – single stage and two stage competitions

MODULE III (14 Hours)

TENDER & CONTRACT
Tender – definition -Types of tenders (open and closed tenders) – conditions of tender – Tender Notice- Tender documents – EMD – submission of Tender – Tender scrutiny – Tender analysis – Recommendations – work order – E- Tendering (advantages, procedures, conditions)

Contract – definition – contract agreement – articles of agreement – Terms and conditions of contract, Bill of quantities and specifications – certification of contractors bills at various stages

New trends in project formulation and different types of execution (BOT, DBOT, BOLT, BOO etc.) Execution of projects – the process (Expression interest, request for proposal, mode of evaluation – classification – valuation reports – methods of valuation

MODULE IV (10 Hours)

LEGAL ASPECTS
Arbitration – definition, advantages of arbitration, sole and joint arbitrators, Role of umpires, award, conduct of arbitration proceedings – Arbitration clause in contract agreement (role of architect, expected matters)
Easement – meaning, types of easements, acquisition, extinction and protection
Copyrights and patenting – provisions of copyright acts in India and abroad, copyrights in architectural profession-consumer protection act- intent, Architects responsibility towards clients

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module

Q II – 2 questions of I5 marks from module I with choice to answer anyone

Q Ill - 2 questions of I5 marks from module II with choice to answer anyone

Q IV - 2 questions of I5 marks from module III with choice to answer anyone

Q V - 2 questions of I5 marks from module IV with choice to answer anyone

SEMESTER IX Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-96-1	Architectural Conservation	3-0-0	3	2017

Course Objectives

- To introduce the concept of Conservation
- To appreciate the value of heritage and realize the need for conservation
- To understand the present conservation scenario
- To learn the process of conservation
- To equip with necessary skills to initiate a conservation strategy

Course Outcome

- An understanding of the value and necessity of conservation
- Awareness about the various procedures involved in conservation

Reference Books

- Ashurst, John &Ashurst, Nicola (1988). Practical Building Conservation – English Heritage Technical
- Handbook Vol I, II, III,IV and V, Gower Technical Press. England.
- Earl, John. (2003). Building Conservation Philosophy. Donhead Publishing
- Ltd. Dorset. UK.
- Feilden, Bernard (1989), Guidelines for Conservation, A Technical Manual,
- INTACH, New Delhi
- Feilden, Bernard M. (1982). Conservation of Historic buildings. Butterworth Co. London.
- Hollis, Malcolm. (2000). Surveying Buildings. RICS Business Services Limited. Coventry. UK.
- Marshall, John. (1922). Conservation Manual. Govt. Press. Delhi.
- Oxley, R. (2003). Survey and Repair of Traditional Buildings., Donhead Publishers. Dorset. UK.
- Richardson, Barry A. (1995). Remedial Treatment of Buildings. Butterworth Heinemann Ltd. Britain.

MODULE I (10 hours)

Definitions: Tangible and Intangible - Natural heritage, Built heritage, Cultural Heritage, Challenges toConservation, Values, Ethics, Introduction to Degrees of Intervention, Need and scope for multidisciplinaryexpertise, Classification of Heritage, World Heritage Sites, Grades of Monuments

Module II (10 hours)

History and Evolution of Conservation, Contributions of John Ruskin, William Morris, Violet-le-Duc, formation of SPAB, Scrape and Anti –Scrapesocieties,
Formation of the ASI – Alexander Cunningham
Agencies: International and National - United Nations, ICCROM, ICOMOS, ASI, State departments of Archaeology, Town Planning departments,State Art and Heritage Commission & INTACH.
Charters: Venice charter (1964), Burra charter (1979).

MODULE III (12 hours)

Preparatory procedures for conservation: Reconnaissance survey, Listing, Inventories, Preliminary inspections, Documentation, Research,

Evaluation and Assessment: Techniques of Documentation (measured drawings, photogrammetric techniques)

Degrees of intervention: Prevention, Preservation, Consolidation, Restoration, Rehabilitation, Reproduction, Reconstruction.

To formulate a case for conservation (case study – class work)

MODULE IV (10 hours)

Causes of decay in Cultural Property: Natural causes (gravity, sun, rain, frost and snow and ice, groundwater, dust, wind) - Biological causes (animals, birds, insects, trees and plants, fungi, moulds and lichen, algae and moss) - Natural disasters (earthquakes, fire) - Manmade causes (wars, alterations, changes in groundwater levels, atmospheric pollution, vibrationdamage, fire, theft, vandalism and arson, tourism, neglect)

Deterioration – Systematic investigation, recording of decay, assessment and diagnosis offailures and damages in historic buildings.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

SEMESTER IX Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-96-2	SERVICES IN HIGH RISE BUILDINGS	3-0-0	3	2017

Course Objectives

The Services in High Rise Buildings course for students of architecture would help,

- To learn how to incorporate different services in a high rise building.
- To understand the complexity in design of services in tall buildings and to provide safe and efficientservices.

Course Outcome

- Upon completion of study the students shall be able to incorporate different services in a high risebuilding.

Reference Books

- National Building Code of India 2005– Bureau of Indian Standards, 2005.
- Manual on Water Supply and Treatment (1991) third Edition, Central Public Health andEnvironmental Engineering Organization, Ministry of Urban Development, New Delhi
- W.G. McGuiness and B.Stein 'Mechanical and Electrical equipment for buildings,John Wiley and sons Inc., N.Y.
- Riley Shuttleworth,(1983)'Mechanical and electrical Systems for Construction',McGraw Hill BookCo. U.S.
- ASHRAE: Handbook–HVAC Systems and Equipment (1992), HVAC Applications (1991)ASHRAE, Inc. Atlanta.
- Energy Conservation building code-2007-Bureau of Energy Efficiency-Govt. of India.
- ASHRAE the Hand Book on Green Practices.
- Langdon -Thomas.G.J., -'Fire Safety in Buildings, Principles and practice'- Adam and Charles Blade, London, 1972.

MODULE I (6 Hours)

Introduction-High rise buildings-definition. Services in High Rise Buildings – Standards - integration of Services – Relative costs –ergonomics aspects of Service Design – Concepts of Intelligent Architecture and Building Service Automation.

MODULE II (12 Hours)

Water Supply, Drainage and Fire safety in tall buildings-Water Supply and waste water system planning collection systems – Water storage and distribution systems –Rain water harvesting – Sewage treatment-Recycling and reuse of water-Fire Safety in high rise buildings- Fire Detection and Fire alarm systems - planning and Design-Provisions in the NBC

MODULE III (15 Hours)

Lighting,Ventilation and Air-conditioning -Natural lighting systems – Energy efficiency in lighting systems – Load and Distribution – Planning for intelligent lighting system.
Natural and Mechanical Ventilation Systems - Air-conditioning systems and load estimation - Planning and Design -Automation and energy Management

MODULE IV (9 Hours)

Electrical, Mechanical,Security and Surveillance systems
Electrical wiring systems in high rise buildings, Automation - Planning and Design of elevator systems and services - Elevator lobbyarea- Escalators, moving walls and ramps - safety aspects.
Security system - Access control and Perimeter Protection - CCTV intruder Alarm safety and security.

TOTAL HOURS: 42

Note:
Site visitsduring different construction stages of Air conditioning, Electrical Wiring, Water supply, Drainage, Firefighting and Vertical transportation systems shall be incorporated, and students shall submit a report as part of their field study.

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module

Q II – 2 questions of I5 marks from module I with choice to answer anyone

Q Ill - 2 questions of I5 marks from module II with choice to answer anyone

Q IV - 2 questions of I5 marks from module III with choice to answer anyone

Q V - 2 questions of I5 marks from module IV with choice to answer anyone

SEMESTER IX Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-96-3	ARCHITECTURAL JOURNALISM	3-0-0	3	2017

Course Objectives

- To create an awareness in students about architectural journalism and photo journalism.

Course Outcome

- To create an awareness in students about architectural journalism and photo journalism.

Reference Books

- Agarwal V. B., Handbook of Journalism.
- Kamath K. V., Professional Journalism.
- Kamath K. V., Journalist hand book.
- Roger Hicks, Practical Photography, Cassel. London 1996.
- Atoe Wayne, "Architecture and Critical imagination", John Wiley & sons, Ltd., 1978.
- Nieman Reports: Architectural Criticism: Dead or Alive by Blair Kamin.
- The Failures of Architecture Criticism, by Lance Hosey in the Huffington Post.
- Writing Architecture: A Practical Guide to Clear Communication about the Built Environment, by Carter Wiseman
- Architectural website, such as archrecord.com; archpaper.com; Archdaily .com; and dezeen.com

MODULE I (12 Hours)

Introduction to Architectural Journalism & writing

What is Journalism and why it is important? Relation between Architecture and Journalism. Journalism skills: research, reporting, writing, editing, photography, columnists, public relationships, criticism.

Assignment: Reading a broad range of contemporary and historical writings by journalists and critics and discuss how these stories reveal different approaches, attitudes, and biases in covering design.

Writing on different kinds of articles - from news stories tocritical essays on particular buildings and social issues. Reading a broad range of contemporary and historical writings by journalists and critics and discuss how these stories reveal different approaches, attitudes, and biases in covering design.

Assignment:Writing Architecture:

A Practical Guide to Clear Communication about the Built Environment, by Carter Wiseman Read book/Write 500-word description of a project you designed for a studio. Explain your overall design strategy for the project and the key elements within it. Engage the reader and communicate what makes the project interesting or important.

Assignment:Reporting on architecture

Architectural website, such as archrecord.com; archpaper.com; archdaily.com; and dezeen.com Read stories on one site/Write essay on the particular perspective and biases of this site. Who are the targeted readers of this site and what do they expect from it?

MODULE II (12 Hours)
The state of Architectural Criticism
Introduction to Criticism and Importance of Criticism. Relationship between Architecture and Criticism. Failures of Architectural Criticism. Analysis of various critical themes, and their comparison and learn how to criticize a built environment in various aspects and writing about criticism.

Assignment: The state of architectural criticism today
Nieman Reports: Architectural Criticism: Dead or Alive by Blair Kamin. http://niemanreports.org/articles/architecture-criticism dead-or-alive.

Assignment: Ada Louise Huxtable/Charles Jencks
Collected Reflections on a Century of Change, by Ada Louise Huxtable, Walker Books, 2010. Read the series of essays on the World Trade Center and Ground Zero from the book/Write a 500-word essay examining Huxtable's views over time—what changed in her approach and what remained the same.

MODULE III (10 Hours)
Structure of Architectural Journals & Photo Journalism
Learning to document the collected information. Formatting, page composition, editing write-ups, content writing. Learning the techniques of clicking photographs through specific angles of built environment and their editing and modification. Learning the technique of how the photographs are supporting the write-ups about built environment, to help them understand the expression of pictorial, verbal and visual relationship of architecture journalism.

MODULE IV (8 Hours)
The Built Environment & How We Live Today?
Looking at and explaining a building in today's scenario. What's happening now and what should be the future? Read articles and write an essay on recent projects. Writing about the new technologies in today's architecture and new construction techniques.

Assignment:The built environment and how we live today
Mysteries of the Mall: And Other Essays, by WitoldRybczynski, Farrar, Straus and Giroux, 2015.Write a 500-word essay on a topic Rybczynski did not cover in the book.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module

Q II – 2 questions of I5 marks from module I with choice to answer anyone

Q Ill - 2 questions of I5 marks from module II with choice to answer anyone

Q IV - 2 questions of I5 marks from module III with choice to answer anyone

Q V - 2 questions of I5 marks from module IV with choice to answer anyone

SEMESTERIX Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-96-4	URBAN HOUSING	3-0-0	3	2017

Course Objectives

The Urban Housing course for students of architecture would,

- Help them understand the housing problems in India and the importance of housing and related infrastructure at an individual level to a National level.
- Make students aware of the issues related to housing and familiarize them with the different housing schemes, policies, finance, acts and design standards.

Course Outcome

- To develop a basic understanding about the issues related to Housing in India, its importance in the overall development of the country, the various measures introduced by the government to delve with the issues and thus recognize the role and scope of architects in resolving the housing issues in India.

Reference Books

- Innovative Approaches To Housing for the Poor – K. Thomas Poulose
- Harjinder Singh, Leslie Kilmartin – Housing in the Third World
- Karl Kramer – Housing Groups
- Habitat India – Dr. Misra and B.S. Bhooshan
- Habitat Asia – Dr. Misra and B.S. Bhooshan
- National Housing and Habitat Policy 2007
- National Housing Policy Paper, Government of India, Ministry of Urban Development, New Delhi, May 1988.
- Slum Improvement Act, 1956
- Reading Material on Housing – Lectures Compiled by ITPI
- UDPFI guidelines

MODULE I (10Hours)
Importance and Shortcomings

- Evolution of early settlements form, types of settlements.
- Housing Typologies viz. traditional houses, plotted development, multi-storied housing, slums and squatters, night shelters, etc.
- Importance and role of Housing at an individual to a National level
- Nature and magnitude of housing problems in India: Housing shortage; reasons for housing shortage: Housing stock; Affordable housing; Slums: Causes and effects of slums, their origin and growth.

MODULE II (10 Hours)
Agencies and Policies

- Housing Policies and programs introduced in the various Five Year Plans, NitiAyog.
- National Urban Housing and Habitat Policy (2007): Need & Objectives, Critical appraisal

of the same.

- Housing agencies at Central, State and Local level.
- Co-operative housing in India. Housing the poor through Non Governmental agencies and through mass involvement – Concept of aided self help. Importance of community participation in housing projects.

MODULE III (10 Hours)
Initiatives and Schemes

- Important Housing Schemes in India for various economic categories Eg. RAY, PMAY, VAMBAY , schemes under JNNURM etc.
- Slum Clearance Program- Improvement method, Complete removal method. The slum area improvement and clearance act, 1956, Slum free cities – guiding policies and a way forward.
- Housing Finance: Institutional finance for housing, Sources of housing finance and essential characteristics, Major housing finance agencies at the National and the State level like the NHB, HDFC, LICHF, GIC, etc.
- Study of High-rise Housing: Problems and Prospects.

MODULE IV (12 Hours)
Design and Planning for Residential Neighbourhoods

- International case studies of affordable housing- Alejandro Aravena, Shigeru Ban etc.
- Principles of neighbourhood planning &Case studies .
- Planning and design criteria for modern neighbourhoods, norms and criteria for area distribution, net residential density and gross residential density, UDPFI guidelines for housing.

Total Hours: 42

UNIVERSITY EXAMINATION PATTERN

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 Questions of 15 marks from module I with choice to answer anyone.

Q III - 2 Questions of 15 marks from module II with choice to answer anyone.

Q IV - 2 Questions of 15 marks from module III with choice to answer anyone.

Q V - 2 Questions of 15 marks from module IV with choice to answer anyone.

TENTH SEMESTER (S10)

AR17-101 ARCHITECTURAL THESIS

Credits: 25

Students are required to prepare an Architectural Design Thesis during the last six months of the B.Arch. Degree program. The duration of the thesis will be six months from the date of commencement of the tenth semester of B.Arch. Degree Course. The thesis project shall include an individual's work on a topic selected by the students and approved by the department. The project selected may be either a live architectural project or hypothetical one so that the student gets training in tackling projects similar to what he/she is likely to face in his/her professional career. For details refer Thesis Manual.