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

UNIVERSITY OF CALICUT

Abstract

Faculty of Engineering-B.Arch programme- Syllabus up to Tenth semester B.Arch Programme with effect from 2022 admission - Approved - Implemented- Orders Issued.

G & A - IV - E

U.O.No. 18721/2024/Admn Dated, Calicut University.P.O, 17.12.2024

Read:-1.U.O.No. 20254/2022/Admn dtd. 27.10.2022

2.U.O.No.10476/2023/Admn dtd. 03.07.2023.

3.U.O.No. 6351/2024/Admn dtd: 12.04.2024

4. Minutes of the online meeting of the Board of Studies in Architecture held on 17.10.2024

5.Email dtd: 09.12.2024 received from the Dean, Faculty of Engineering.

ORDER

1. The Regulation, Curriculum and syllabus for Combined First and Second semester, Third and Fourth semester and Fifth and Sixth semester B.Arch Programme was implemented with effect from 2022 admission, vide paper read as (1, 2 & 3) above .

2. As per paper read as (4), the Board of Studies in Architecture approved the Syllabus of Seventh to Tenth semester B.Arch Programme with effect from 2022 admission.

3. The above resolution of the Board of Studies in Architecture was approved by the Dean, Faculty of Engineering, vide paper read as (5).

4. Considering the urgency, the Vice Chancellor, exercising the powers as per clause 10 (13) of Calicut University Act 1975, accorded sanction to implement the Syllabus up to Tenth semester B.Arch Programme with effect from 2022 admission .

5. The Syllabus up to Tenth semester B.Arch Programme with effect from 2022 admission is, therefore, implemented.

6. Orders are issued accordingly.

(Syllabus appended)

Ajayakumar T.K

Assistant Registrar

To

1. The Principals of affiliated Architecture Colleges.
2. The Controller of Examinations, Pareeksha Bhavan.
3. The Deputy Registrar, B.Tech Branch Pareeksha Bhavan.

Copy to:PS to VC/PA to PVC/PA to Registrar/PA to CE/DR,B.Tech/GA IF/Enquiry/SF/DF/FC

Forwarded / By Order

Section Officer

University of Calicut

Syllabus

of

B.Arch. Degree Course

(2022 scheme)

COMBINED FIRST AND SECOND SEMESTER												
Course Code	**Subject**	**Group**	**Category**	**Credits**	**Hours Per Week** **			**Duration of Exam**	**Marks**			
					L	**T**	**P/S**		**W**	**J**	**C.A.**	**Total**
AR 22-11	Basic Design*	I	PC	16	0	1	7	0		200	300	500
AR 22-12	Theory Of Architecture	III	PC	4	2	0	0	3	100		50	150
AR 22-13	Building Materials & Construction -I	II	BS & AE	6	1	0	2	3	100		100	200
AR 22-14	Theory Of Structures-I	III	BS & AE	6	2	1	0	3	100		50	150
AR 22-15	History of Architecture -I	III	PC	4	2	0	0	3	100		50	150
AR 22-16	Architectural Drawing & Graphics	II	PC	8	2	0	2	3	100		100	200
AR 22-17	Visual Art & Aesthetics	II	PC	6	1	0	2	3	100		100	200
AR 22-18	Model Making & Carpentry	IV	SE	4	0	0	2	0			100	100
AR 22-19	Digital Arts & Graphics	IV	SE	4	0	0	2	0			100	100
TOTAL				**58**	10	2	17		600	200	950	1750

* 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, C.A. - Continuous Assessment.

** One hour per week allotted to Library

Note:
One Hour Tutorial of Basic Design to be dedicated for improving the Communication & Presentation Skills of the students.

Semester: First & Second				
Course No.	**Course Name**	**L-T-P/D**	**Credits**	**Year of Introduction**
AR 22-11	**BASIC DESIGN**	**0-1-7**	**16**	**2022**

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

By the end of this course students should be able to

- Observe deeply, compare, and analyze different forms emerging from the process
- Explore fundamental concepts of proportion, scale, anthropometry, geometry, circulation, spatial expression
- Understand and interpret the elements and principles of design
- Use drawings and physical models as a tool to conceive, organize and develop habitable, three-dimensional space
- Acquaint with attributes of spatial qualities

- Reference Books

- Anthony di Mari and Nora Yoo – 'Operative Design: A Catalog of Spatial Verbs', 2013
- Anthony di Mari - 'Conditional Design: An Introduction to Elemental Architecture', 2014
- 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' Architects' Data.
- 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. Page 29 of 163
- Paul Zelanski & Mary Pat Fisher, Design Principles & Problems, 2nd Ed, Thomson & Wadsworth, USA,1996
- Robert Gill, Rendering with Pen and Ink
- Simon Unwin, 'Analyzing Architecture', Routledge, 2003

- Simon Unwin. 'Exercises in Architecture-Learning to Think as an Architect', Routledge, 2013
- 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 (48 hours)
Introduction to design fundamentals
Elements in composition: Point, Line, Plane, Volume, Colour, Texture. Analysing paintings, compositions, murals, sculptures, buildings and nature. Introduction to and exploration of 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 (24 hours)
Compositional operations and explorative modeling
Exercises in 2 D and 3 D using concepts like abstraction, transformation, Illusion, and symbolism. Exercises on observation and visual perception on the principles of Gestalt Theory Forms: Generation of 3 D volumes from 2D to explore various organizations of forms and principles involved in articulating forms. Study of Solids and voids. Study of linear, planar and curvilinear forms using materials like mount board, metal foil, mill boards, foam boards, wire string, wire mesh, fabric and clay.

MODULE III (32 hours)
Spatial qualities
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 the physically handicapped and the elderly. Literature and cinema as a medium to acquaint with architectural spaces.

MODULE IV (56 Hours)
Design methodologies
Introduction to design methodologies focusing on conceptual design development and iterative design process involving simple functional- well-articulated spaces. Illustration through hand-drafted 2D drawings and models.

Major Project: Designing simple activity spaces for a small user group considering climate, site conditions, and other user requirements. Design of a fundamental furniture layout, circulation, lighting and ventilation for spaces such as Exhibition Pavilion, Gazebo, Architect's offices, Doctor's clinic and the like with an emphasis on built-unbuilt relationships and transitional spaces.
Minor Project: Detailing and designing of furniture used in the Design.

TOTAL HOURS: 160

CONTINUOUS INTERNAL EVALUATION PATTERN:
Design exercises, projects, tests and internal reviews: 270 Marks
Attendance: 30 Marks

Semester: First & Second				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-12	**THEORY OF ARCHITECTURE**	**2-0-0**	**4**	**2022**

Course Objectives

- To familiarize students with the development of architecture as a discipline
- To introduce vocabulary essential to analyse and experiment within architecture
- To understand philosophies, ideologies and theories in architecture

Course Outcome

By the end of this course students should be able to

- Understand the origins of architectural theory and its contribution to practice.
- Enhance thinking, observing, analysing, communication and discourse
- Offer support to develop own frameworks for appreciating architecture
- Appreciate the importance of design principles in analysing and interpreting architecture

Text books

- Johnson, PA (1994), 'The Theory of Architecture: Concepts, Themes & Practices', New York: John Wiley & Sons.
- Broadbent, G (1973), 'Design in Architecture – Architecture and the human sciences', London: John Wiley and Sons
- Simon, U (1997), 'Analysing Architecture', London: Routledge
- Rasmussen, SE (1962), 'Experiencing Architecture', Boston: MIT Press
- Ching, D K (1997), 'Architecture: Form, Space and Order'

Reference Books

- Tanizaki, J (2001), 'In praise of shadows', Vintage classic
- Bachelard, Gaston (2014), 'Poetics of Space', London: Penguin Classics.
- Eagleton, T (1990), 'The Ideology of the Aesthetic'. Basil Blackwell. Cambridge, MA.
- Harries, K (1996), 'The ethical function of Architecture', MIT Press. Cambridge, MA._
- Foucault, M (2004), 'The Order of Things: Archaeology of the Human Sciences', Routledge, New York.
- Jencks, C (1985), 'Modern Movements in Architecture', Anchor Press,_USA.
- Nesbitt, K., 'Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995', Princeton Architectural Press, New York.
- Rowe, C (1982), 'The Mathematics of an Ideal Villa & Other Essays', MIT_Press, 1982.
- Agrest, DI (1991), 'Architecture from Without: Theoretical Framings for a Critical Practice', MIT Press, USA.

- Broadbent, G. Bunt, R & Jencks, C (1980), 'Signs, Symbols &_Architecture', Wiley

MODULE I (10 hours)
The essence of Architecture

Nature of architecture. Part in relation to whole. The construct of Whole. Ordering Architecture – principles of composition. Form and space in architecture. Measure as fundamental engagement, geometry, scale, proportion. Built form, spatial relationships, spatial configuration and organisation.

MODULE II (20 hours)
Architecture and approaches

Design conceptualisation. Influencing factors: climate, society and culture, technology, politics, economy etc. with relevant examples. Relevance of structure and stability. Material and Construction. Archetypes and approaches – Pragmatic, Canonic, Analogic, Iconic and Futuristic.

MODULE III (20 hours)
Creative thinking and Architecture Profession

Vertical and lateral thinking in architecture. Creative thinking in architecture. Principles, abstractions, and dictums. Positions adopted by architects in society and in practice – Architect as visionary, architects as artists, architects as poets, Architects as scientists and technologists through relevant examples from India and abroad

MODULE IV (10 hours)
Theoretical positions

Architectural historicism. Context and contextualism. Type and typology. Determinism. Form and function. Isms – Minimalism, regionalism, parametricism, modernism, postmodernism, etc. Aphorisms – Less is more, Less is bore, Form follows Function etc. Genius Loci

TOTAL HOURS: 60

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one

of them.

Semester: First & Second				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-13	**BUILDING MATERIALS AND CONSTRUCTION I**	**1-0-2**	**6**	**2022**

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

By the end of this course students should be able to

- Understand properties of various building materials and their applications.
- Apply construction techniques used for constructing various components of a building.
- Develop 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 (15 hours)

Introduction

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

MODULE II (12 hours)

Foundations

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, and Combined Footing.

MODULE III (30 hours)

Masonry

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, and Composite Masonry. Types of mortar & mortar mix for brick construction and 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 (15 hours)

Mud construction, clay products and rural materials

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

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments / Viva based on assignments - 60 marks
Two internal tests each of equal weightage - 30 marks
Attendance - 10 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: First & Second

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-14	THEORY OF STRUCTURES-I	2-1-0	4	2022

Course Objectives

- To develop an overall understanding and interest in structural system.
- To apply the principles of mechanics in practical engineering problems.
- To enable an understanding of fundamentals of stress and strain.
- To introduce basic understanding of engineering structures and to explain effective forces on various structural elements.
- To study the sectional properties of various sections.

Course Outcome

By the end of this course students should be able to

- Understand the concepts of stress and strain.
- Differentiate the various structural elements in a building and types of loads acting on it.
- Apply principles involved in various types of beams and their loading patterns.

Text books

- Rajasekharan S. and Sankarasubramanian G., EngineeringMechanics-Statics and Dynamics, Vikas Publications, NewDelhi
- R. K. Banzal., Engineering Mechanics, Lakshmi Publications Pvt. Ltd., NewDelhi
- R. K. Banzal., Strength of Materials, Lakshmi Publications Pvt. Ltd.,

New Delhi
- Bhavikkatti S. S., Engineering Mechanics, New Age International Publishers
- S. Ramamrutham., Strength of Materials, Dhanpat Rai Publishing Company Pvt Limited

Reference Books

- ShamesI. H, Engineering Mechanics- Statics and Dynamics, Prentice Hall of India, New Delhi
- HibbelerR. C., Engineering Mechanics- Statics, Pearson Education, NewDelhi
- 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
- S. B Junnarkar & H. J Shah, Mechanics of Structures Vol I, Charotar publishing House,
- Anand.Kumar, K. L., Engineering Mechanics, Tata Mc Graw Hill Publishing Company Limited.
- Benjamin J., Engineering Mechanics, Pentex Book Publishers and Distributors.
- J.L. Meriam & L.G. Kraige, "Engineering Mechanics", John Wiley and Sons

MODULE I (18 hours)

- Basic concepts of Strength, Stiffness and Stability.
- Introduction to force concepts: Characteristics of force, System of forces.
- Principles of statics- principle of transmissibility, composition and resolution of forces.
- Equilibrium conditions - free body diagrams.
- Resultant of co-planar concurrent forces –Parallelogram law of forces, Lami’s theorem.
- Resultant of co planar non-concurrent forces- Method of resolution, Method of moments - Theorem of Varignon, Couple, Parallel force system.

MODULE II (14 hours)

- Simple stresses and strains - Types of direct stresses (Tension, compression and shear) and indirect stresses (Bending and Torsion).
- Elastic theory- stress strain diagram- Hooks Law- Working stress- Poisson’s ratio.
- Elastic Constants- Relationship between elastic constants (Derivations not required)
- Elongation of bars of constant and varying cross sections (Concept only), Thermal stresses (Simple problems only)

MODULE III (14 hours)

- Beams: Types of beams and Supports.
- Load types - Point load, uniformly distributed and varying loads.

- Support reactions of simply supported, cantilever and overhanging beams.
- Plane trusses: Types of trusses-Analysis of cantilever and simply supported trusses using Method of joints (Method of sections and Graphical method (Concept only)

MODULE IV (14 hours)

- Centre of gravity - Concept and Definition - Center of mass- Centroid - Determination of centroid of plane figures, composite and cut out sections.
- Moment of inertia - Concept and Definition - Perpendicular axis theorem, Parallel axis theorem - Moment of inertia of plane and composite areas (Rectangle, square, triangle, circle, I -section, Angle section) - Polar moment of inertia

TOTAL HOURS: 60

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

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

Semester: First & Second				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-15	**HISTORY OF ARCHITECTURE I**	**2-0-0**	**4**	**2022**

Course Objectives

- To explore concepts of culture, time and space through the lens of historic architecture.
- 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 through ages.
- Help them to understand the development of architecture with reference to character, style, materials, technology, climate, geography, religion, and culture.

Course Outcome

By the end of this course students should be able to

- Develop a sense of curiosity and to sharpen powers of observation.
- Understand about the spatial and stylistic qualities associated with architecture of various civilizations.
- Analyse architecture within the realm of various social, political and economic upheavals, and as a response to cultural and contextual pressures.
- Appreciate chronological developments along the timeline and across various civilizations and geographies.

Texts

- Christopher Tadgell , 'The History of Architecture in India', Phaidon, 1994.
- Percy Brown, 'Indian Architecture (Buddhist and Hindu Period)', Taraporevala and Sons, Bombay, 1983.
- Satish Grover, 'The Architecture of India (Buddhist and Hindu Period)', Vikas Publishing Housing Pvt. Ltd., New Delhi, 2003.
- Upinder Singh, 'A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century', Pearson Education India, 2008

References

- Banister Fletcher, 'Dan Cruickshank Sir, Banister Fletcher's a history of architecture: A History of Architecture', Architectural Press,1996.
- Ching, Francis, Vikramadithya Prakash, Mark M Jarzombek, 'A Global History of Architecture', John Wiley & Sons, 2011.
- Dora P. Crouch, June G. Johnson, 'Traditions in Architecture: Africa, America, Asia, and Oceania', OxfordUniversity,2000.
- Ilay Cooper, 'Barry Dawson, Traditional Buildings of India', Thames and Hudson, 1998.
- Satish Chandra, 'History of Architecture and Ancient Building Materials in India', Tech Books International,2003.
- James C. Harle , 'The Art and Architecture of the Indian Subcontinent:' Second Edition, Yale UniversityPress,1994.

- Michael Raeburn, 'Architecture of the Western World', Rizzoli, 1982.

Module I (16 Hours)

Introduction to the architecture of the ancient western world. To generate an understanding about the development of civilization and its architectural implications.

Prehistoric architecture of the West, East and Middle East: General characteristics of the earliest Human Settlements: Gobekli Tepe, Catal Huyuk, Jericho, Jomon culture.

Cross-cultural understanding of factors influencing early settlement and built form of Ancient Civilizations:

Ancient Mesopotamia: History, evolution and characteristics. Example: Ziggurat (Sumerian), Palace of Sargon (Assyrian), Ishtar Gate (Babylonian).

Ancient Egypt: History, evolution and characteristics. Example: Early tomb architecture and later temple architecture: Examples- Giza Pyramid Complex, Great Temple of Karnak.

Ancient Greece: History, evolution and characteristics. Study of principles of design, proportion, Optical corrections and Classical Orders. Example: Acropolis of Athens and structures within, Agora.

Ancient Rome: History, evolution and characteristics. Study of planning principles adopted, Tuscan and composite orders, Roman Engineering Skills- lintels, arches & vaults, Aqueducts, building typologies, Forum. Examples - Pantheon, Colosseum.

Module II (8 Hours)

Early Settlements in India: Mehrgarh, Early Harappan. Indus Valley Civilisation: City Planning. Domestic Architecture. Building materials and construction techniques. Example: Great Bath, Mohenjo- daro

Vedic Period: Vedic Village. City Planning in the later Vedic period. Building materials and construction techniques.

Buddhist & Jain Period: History, evolution and characteristics. Major building typologies; Stupa, Chaitya hall, Vihara. Examples: The Great Stupa at Sanchi, Chaitya Hall at Karli, Main caves at Ajanta & Ellora.

Module III (12 Hours)

A brief overview of Hindu Architecture - Hindu Temple planning, essential features, philosophy and ritual creating specific architectural vocabulary.

Early Hindu temple architecture and rock-cut architecture of the Gupta, Chalukyan and Pallava periods – Tigawa Temple,Main caves at Badami, Ladh Khan and Durga Temple, Aihole; Rathas of Mahabalipuram.

North Indian Temple Architecture (Nagara style)- Evolution and salient features of North Indian Temple Architecture and its regional variations in Orissa, Gujarat & Madhya Pradesh. Examples - Lingaraja Temple, Bhubaneswar; Sun Temple, Modhera; Khandariya Mahadeo temple, Khajuraho.

Module IV (12 Hours)

South Indian Temple Architecture (Dravida style) : Evolution under different rulers and characteristic features

Examples:- Pallavas: Shore Temple at Mahabalipuram; Chola: Brihadeshwara Temple, Thanjavur; Pandya : Evolution of Gopurams and

temple towns- Meenakshi Temple, Madurai; Vijayanagara: Vittalaswami Temple, Hampi; Nayaks: Rameswaram Temple.
Central Indian Temple Architecture (Vesara style) – Evolution under different rules and characteristic features
Examples:- Chalukyas: Virupaksha Temple, Pattadakal; Rashtrakutas: Kailashnath Temple, Ellora; Hoysala: Hoysaleswara Temple, Halebid.

TOTAL HOURS: 48

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: First & Second				
Course No.	**Course Name**	**L-T-P/D**	**Credits**	**Year of Introduction**
AR 22-16	**ARCHITECTURAL DRAWING & GRAPHICS**	**2-0-2**	**8**	**2022**

Course Objectives

- To equip students with the fundamental basics of drawings, methods, mediums and techniques
- To enable students to visualize geometric objects and buildings in 2 and 3 Dimensions
- To develop appropriate manual skills for visualization and technical representation of built forms by means of different types of drawings.
- To bridge to higher semesters the application of skills in the design process, computer-aided design and presentation

Course Outcome

By the end of this course students should be able to

- Understand the concepts of architectural graphics and drawing techniques
- Represent geometric objects, furniture or buildings using various architectural drawing methods
- Visualize and represent drawings with precision and render drafting quality

Textbooks

- N. D. Bhatt, 'Elementary Engineering'
- Giesecke, Mitchell, et.al, 'Engineering Graphics' (7th edition)
- Fraser Reekie, 'Reekie's Architectural Drawing'
- Ching, Francis D. K., 'Architectural Graphics'
- Ching, Francis D. K., Design Drawing'
- Ching, Francis D. K., 'Drawing, Space, Form, Expression'
- Shankar Mulik, 'Perspectives and Sciography', Allied Publishers, India, 1999
- Norling. Earnest R., 'Perspective Made Easy', New York: Dover Publications, Inc.,1999

MODULE I (12 hours)

1. INTRODUCTION TO DRAWING - Introduction to Architectural drawings: types of drawings- Freehand sketches and mechanical drawings for architectural applications. Different mediums used such as pencil, ink, papers, and reproduction methods—demonstration of drawing instruments and their use.
2. FREE-HAND DRAWING - Introduction to line weights, free-hand sketching
3. TECHNICAL DRAWING & TOOLS - Horizontal, vertical and diagonal lines (using 30^0, 45^0, and 60^0 set squares), construction of regular polygons, terminologies used in architectural drawing, and material representations in a drawing.
4. SHEET FORMATTING & DRAWING CONVENTIONS- Sheet layout, title block preparation, different types of lines, line thickness, dimensioning lines and dimensioning styles

5. LETTERING - Introduction to lettering, simple writing exercises
6. SCALES – Types of scales, Use of scale in drawings, Enlarging/reduction of drawings, Representation fraction (R.F.), Construction detail of Plain scale.

(Minimum 4 Drawing Exercises Suggested)

MODULE II (20 hours)
INTRODUCTION TO SOLIDS & ORTHOGRAPHIC PROJECTION - Introduction
1. DEVELOPMENT OF SURFACE OF SOLIDS- (Frustum and truncated- prisms, cylinder, cone and pyramids)
2. ORTHOGRAPHIC PROJECTION OF SOLIDS (prisms, cylinder, cone and pyramids)
3. ORTHOGRAPHIC PROJECTION OF OBJECTS (simple objects and furniture)
4. MEASURED DRAWING- Drafting Plan, Elevations and Sections of single-room structures

(Minimum 4 Drawing Exercises Suggested)

MODULE III (20 hours)
PARA-LINE PROJECTIONS: Introduction
1. ISOMETRY- Projections and Views- Drawing isometric views and projections of simple solids and furniture pieces- Conversion from isometric 3D to orthographic 2D
2. AXONOMETRY - Axonometric drawing and exploded views of simple objects and documented spaces in the campus.

(Minimum 4 Drawing Exercises Suggested)

MODULE IV (16 Hours)
PERSPECTIVE PROJECTION & SCIOGRAPHY: Introduction
1. PERSPECTIVE PROJECTIONS: Definition of perspective elements, 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:
The number of drawing exercises suggested above is for class work. Additional exercises wherever necessary may be given as home assignments.

Total Hours: 68 Hours

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments / Viva based on assignments - 60 marks
Two internal tests each of equal weightage - 30 marks
Attendance - 10 marks

UNIVERSITY EXAMINATION PATTERN

Q I - 3 Questions from each module with a choice to answer any two, carrying 25 marks from module I.
Q II - 3 Questions from each module with a choice to answer any two, carrying 25 marks from module I.
Q III - 3 Questions from each module with a choice to answer any two, carrying 25 marks from module I.
Q IV - 3 Questions from each module with a choice to answer any two, carrying 25 marks from module I.

Semester: First & Second

Course No.	Course Name	L-T-P/D	Credits	Year of Introduction
AR 22-17	VISUAL ART AND AESTHETICS	1-0-2	6	2022

Course Objectives

- Holistic development of students by understanding the role and importance of art as a means of expression.
- Ways of seeing Art as a medium of collective engagement and giving aesthetical orientation among students.
- Help students acquire basic knowledge in critical appraisal of various art forms.
- Provide requisite knowledge of the visual language and presentation techniques involving various mediums.

Course Outcome

By the end of this course students should be able to

- Develop an orientation for seeing and sensitizing.
- Express ideas, thoughts, and experiences through various visual modes.
- Create compositions and models in 2D and 3D.

Textbooks

- E.H. Gombrich- 'The Story of Art'
- Partha Mitter, Parul Deve Mukhrji, Rakhee Balram- '20th Century Indian Art- modern, post-independence, contemporary'.
- Matthew Collings- 'This is Modern Art'
- Ocvirk, Stinson, Wigg, Bone and Cayton- 'Art fundamentals -theory and practice'
- J.H. Bustano- 'Principles of Color and Color Mixing'.
- 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 VISUALART AND DESIGN VOCABULARY

- Introduction to art object- Definition and Interpretation.
- Introduction to western art history- artistic tradition and theories, different isms/movements like realism, impressionism, expressionism, cubism, surrealism, constructivism, de still, abstract art, pop art, conceptual art.
- Basic elements and principles of art and the correlation between art, design and architecture.

MODULE II (18 hours)

INTRODUCTION TO SOLIDS & ORTHOGRAPHIC PROJECTION - Introduction

COLOR THEORY AND RENDERING TECHNIQUES

- Tonal value and variation, shading and texture techniques using pencil, pen and ink, pastels, water color, Poster color, acrylic color.
- Color wheel and Color theories- Chromatic Values, Two-dimensional/Three-dimensional aspects of Painting.
- Rendering of 2D shapes and 3D forms (geometric and organic).
- Perspectives and sciography- Use, Definition, Direction of Light, Location of the object, Shadow of architectural elements.
- Outdoor study- study of buildings in relation to the context and rendering in different mediums.

MODULE III (15 hours)

VISUAL PERCEPTION AND STUDY OF COMPOSITION

- Gestalt theory of visual perception- Basic psychological aspects of lines, forms and colors.
- Creative exercises –visual composition and abstraction, logo design, collage, calligraphy and typography.
- Art appraisal- critical analysis of different art forms, expressions and Interpretations.

MODULE IV (18 Hours)

PART 1- INDIAN ART AND AESTHETICS

- Introduction to Indian aesthetics- principles of Indian art, rasa theory.
- Different Indian Art forms- Development of Indian Art forms through different ages. Cave paintings, Indus valley art, Mural tradition, Miniature paintings, tribal and folk arts, company painting, Revival movement, Modern Indian Art.

PART 2- FORM EXPLORATIONS AND SCULPTING

- Languages, Methods & Techniques of Sculpture- Form, Texture, Mass and Volume.
- Sculpting in Clay or Plaster, Molding & casting.
- Installation Art and New media practices.

Total Hours: 66 Hours

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments / Viva based on assignments - 60 marks
Two internal tests each of equal weightage - 30 marks
Attendance - 10 marks

UNIVERSITY EXAMINATION PATTERN

Q I- 8 short type questions of five marks, two from each module.

Q II- 2 questions of 30 marks from module 1 and module 2, with choice to answer anyone.

Q III- 2 questions of 30 marks from module 3 and module 4, with choice to answer anyone.

Semester: First & Second				
Course No.	**Course Name**	**L-T-S-P/D**	**Credits**	**Year of introduction**
AR 22-18	**MODEL-MAKING & CARPENTRY**	**0-0-2**	**4**	**2022**

COURSE OBJECTIVE

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

COURSE OUTCOME

By the end of this course students should be able to

- Enhance their project presentation skills by the use of simple as well as detailed architectural models.
- Create models ranging from study to presentation and in varying scales and materials.

REFERENCE BOOKS

- Criss. B. M., “Designing with models: A Studio Guide to Architectural Process Models”, John Wiley & Sons, Hoboken, 2011
- Dunn, N., “Architectural Modelmaking”, Laurence King Publishing, 2013
- Model Making by Werner, Megan
- Schilling, A., “Basics Model-building”, Birkhauser, Berlin, 2007.
- Knoll, W. and Hechinger, M., “Architectural Models: Construction Techniques", Cengage Publications, 2014

MODULE I (6 hours)

Need for architectural models, Role of scale models in design; General practices in the model making; Types of models: block, detailed, construction & interior models. Introduction to concepts of model making and various materials used for model making. Techniques of cutting paper to create regular polygon shapes as 2D planes (3-sided to 10- sided polygons). Creating basic solid shapes such as squares, rectangles, circles & triangles with various paper mediums.

MODULE II (8 hours)

Creating platonic solids with a suitable paper medium.

Making of models using free-flowing materials such as clay, Plaster of Paris, etc.

Introduction to block models of objects (3D Compositions) and buildings involving the use of various materials like Soap/Wax, Boards, Clay, etc.

MODULE III (12 hours)

Introduction to Wood as a material.

Simple exercises in cutting, finishing, form exploration, and joinery with simple blocks, the composition of basic geometrical forms, etc.

Simple joinery details in wood. Use of carpentry tools and making joints such as Dovetail joint, Mortise, and Tenon joint, Lap joint, Butt joint, etc. Metal-welded joints, nut bolt joints.

MODULE IV (14 hours)

Making models of the various structural systems used in buildings like; Space frames – using Match sticks, and wires; Different forms of shell roofs, and Tensile structures using fabric.

Creating a detailed building model: Exterior/interior using different materials and paper to represent the actual material on a suitable scale.

Flexible for the teacher to decide on assignments for representing innovative ideas, and using new materials and techniques.

Ex: Architectural detailed models of famous buildings, Historic models, Working models, etc.

Total: 40 hours

CONTINUOUS INTERNAL EVALUATION PATTERN:

Demonstrations / Presentations / Drawings (Course work)	- 50 marks
Records / Portfolio	- 20 marks
Final test / Viva	- 20 marks
Attendance	- 10 marks

COMBINED FIRST AND SECOND SEMESTERS				
Course No.	**Course Name**	**L-T-S-P/D**	**Credits**	**Year of Introduction**
AR 22-19	**DIGITAL ARTS & GRAPHICS**	**0-0-2**	**4**	**2022**

COURSE OBJECTIVE

- To familiarize students with basic core skills of digital media.
- To support students to develop synthesis between observation/ analysis, and representation/documentation essentials within architecture
- To introduce and use range of digital media and vocabulary used in architecture
- To encourage students to use range of graphical and illustration medium to articulate design

COURSE OUTCOME

By the end of this course students should be able to

- communicate ideas and arguments through range of digital media.
- identify and explore various digital medium for progressing and developing architectural design
- Explore various tools and medium to speculate and provoke new ideas.
- Develop visual awareness and analysis, for developing critical thinking and representations.

REFERENCE BOOKS

- Cook, S., 2013. Drawing: The Motive Force of Architecture, 2nd Edition. John Wiley & Sons.
- Calvino, I., 2013. Invisible Cities.: Houghton Mifflin Harcourt.
- Cook, S., 2016. Architecture Workbook: Design through Motive. John Wiley & Sons.
- Ingels, B., 2010. Yes is more. Köln: Taschen.
- Kahn, L. and Merrill, M., n.d. Louis Kahn: The Importance of a Drawing. USA: Lars Muller Publishers. Spiller, N., 2013. Drawing architecture. Chichester: Wiley.

MODULE I (20 hours)

Photography: Photography as a medium of communication in architecture- Critical communication through photography, creative and speculative idea development.

Skill Development:

- Basic Introduction to digital photography
- Basics of image editing software like photoshop
- Post processing of images in software like photoshop

Sample Exercise: Suggested Projects for this module

- Preparing a collage to narrate a story of a place through the photographs students have taken
- Prepare a poster on a topic

MODULE II (20 hours)

Film making: Relevance of motion pictures in architecture, concept communication

Skill Development

- Basic Introduction to digital videography
- Basics of video editing software like After Effects, Adobe Premiere Pro to build a project

Sample Exercise: Suggested Projects for this module

- Preparing a two-minute video to narrate an architectural story

MODULE III (20 hours)

Architectural communication mediums I:

Representation as integral part of design process and production – studying origins of architectural representation and its transformation to digital media and technology

The study of works of Archigram, Superstudio, BIG architects etc... to understand the way of communication of architecture projects through various mediums.

Skill Development

- Basic Introduction to graphic software like Adobe illustrator
- Basic Introduction to drafting software like Autocad

Sample Exercise: Suggested Projects for this module

Prepare series of conceptual drawings to describe an architectural project, using images, drawings and illustrations.

TOTAL HOURS: 60

CONTINUOUS INTERNAL EVALUATION PATTERN:

Demonstrations / Presentations / Drawings (Course work) - 50 marks
Records / Portfolio - 20 marks
Final test / Viva - 20 marks
Attendance - 10 marks

THIRD SEMESTER												
Course Code	**Subject**	**Group**	**Category**	**Credits**	**Hours Per Week** **			**Duration of Exam**	**Marks**			
					L	**T**	**P/S**		**W**	**J**	**C.A.**	**Total**
AR 22-31	Architectural Design-I *	I	PC	10	0	1	9	0		200	300	500
AR 22-32	Building Climatology	III	PC	3	2	0	1	3	100		50	150
AR 22-33	Building Materials & Construction -II	II	BS & AE	4	2	0	2	3	100		100	200
AR 22-34	Theory Of Structures -II	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-35	History of Architecture-II	III	PC	3	3	0	0	3	100		50	150
AR 22-36	Building Services-I (Water Supply & Sanitation)	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-37	Computer Aided Visualization - I	IV	SE	3	0	0	3	0			100	100
TOTAL				**29**	11	3	15		500	200	700	1400

* 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, C.A. - Continuous Assessment.

** One hour per week allotted to Library

Note:

One Hour of Climatology to be dedicated for conducting experiments in Building Science lab.

Semester: Third				
Course No.	**Course Name**	**L-T-P/D**	**Credits**	**Year of Introduction**
AR 22-31	**ARCHITECTURAL DESIGN-I**	**0-1-9**	**10**	**2022**

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

After the completion of this course, the students will be able to

- To develop a basic understanding of space, form, structure and the built environment
- Application of knowledge to initiate architectural design process by using space standards and environmental aspects to formulate concepts and design.
- Analysis and inference through data collection, case studies of projects related to the design project and developing skills so as to create a design programme.

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

CONTINUOUS INTERNAL EVALUATION PATTERN:

Design exercises, projects, tests, and internal reviews**:** 270 Marks

Attendance: 30 Marks

Semester: Third				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of introduction**
AR 22-32	**BUILDING CLIMATOLOGY**	**2-0-1**	**3**	**2022**

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

After the completion of this course, the students will be able to

- An understanding of the relation of climate to human comfort.
- Awareness about various types of climates 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 (12 hours)

UNDERSTANDING CLIMATE
Climate and weather definitions- Elements. Measurement. representation of data- climatic zones – micro and macro climate –– global climatic zones characteristics (temperature, humidity, wind, precipitation, etc). Weather Tools to Analyze Climate Data (Climate consultant , Ecotect etc)

MODULE II (10 hours)
CLIMATE, BODY AND COMFORT
Human body heat balance – comfort in different climatic zones – ET/CET concept and application – comfort indices – bioclimatic chart.

MODULE III (16 hours)
NATURE OF CLIMATE
Heat transfer (concepts, terminology, units) - Hot air, solar gain, K- value, U value, Heat exchange – transmittance, thermal gradient, heat flow concepts, time lag & decrement. Geometry of solar movement – altitude, azimuth, sun path, solar chart, shadow – angles,
Ventilation and air movement – functions, stack effect, air movement through building, humidity. Transmittance of composite walls.

MODULE IV (16 hours)
CLIMATE AND BUILDINGS
Thermal characteristics of building materials and components, structural controls, heat absorptive materials. Vernacular techniques of climatic adaptation. Design for different climatic zones – passive design techniques in built and unbuilt environment.
Climatic design process:
Design of shading devices: Horizontal and vertical shadow angles, Use of shadow angle protractor
Design using wind tunnel, solar scope, heliodone and analysis of 3D analog & digital models using software.

TOTAL HOURS: 54

CONTINUOUS INTERNAL EVALUATION PATTERN:

Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.

Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Third

Course No.	Course Name	L-T-P/S	Credits	Year of Introduction
AR 22-33	BUILDING MATERIALS AND CONSTRUCTION II	2-0-2	4	2022

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.
- Knowledge of construction techniques with sustainable building practices.

COURSE OUTCOME

After the completion of this course, the students will be able to

- Demonstrate an understanding of the basic principles of building construction including the roles of structural systems, building components, and materials.
- Exposure to the common construction techniques used for constructing various components of a building.
- Develop architectural drafting skills for 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 (12 hrs)

Ingredients of Concrete: Cement, Fine aggregate, Coarse aggregate, Water, Reinforcement, Various types of concrete and applications.

Process of concreting & concrete construction techniques: Formwork for concrete, Cutting, bending and placing of reinforcement,

scaffolding, batching, mixing, placing, compacting, curing.
Properties of concrete: fresh concrete, workability, segregation and bleeding, factors affecting workability & strength, water -cement ratio.
Mix Design of concrete-Understanding concrete mix design, Grades of concrete, PCC & RCC.
Specifications for concreting : CPWD manual, Relevant BIS Codes
Exercise: Concrete - onsite experience – listing out observations and site report

MODULE II

DEEP FOUNDATION (16 hrs.)

Pile foundation: Need for deep foundations, Classification of piles according to function: End bearing piles, friction piles, screw piles, sheet pile, tension/uplift pile, batter piles, fender piles, sheet piles.
Classification based on materials and composition: Concrete piles, Timber piles, Steel piles, Composite piles
Precast and cast in situ piles, Driven and Bored piles, Cased and uncased cast in situ concrete piles, pressure piles, Under reamed piles, Bored compaction piles. Sand piles, Pile Cap
Caissons: Box caissons, Open caissons & pneumatic caissons,
Timbering and trenching of foundations.
Exercise: Drawings of various types of Pile foundations-Concrete pile, steel pile .(Refer to IS codes)- Site visit & Observations

MODULE III

IRON, STEEL, ALUMINIUM (12 hrs.)

Iron: Forms of Iron used for building construction–Properties and applications in construction.
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, advanced uses of steel.
Aluminium: Properties, applications in construction, available forms-Extrusion, casting, foil, powder & sheet -finishes - anodising, surface texture ,colour coating & painting.
Exercise : Market study - study of standard aluminium steel products and profiles used for building construction .
Refer to relevant BIS codes for the specifications.

MODULE IV

JOINERY, DOORS & WINDOWS (16 hrs.)

Joinery: Wooden joinery details, terms for various members, fasteners and fixtures used in joinery.
Door: Different types of doors and uses. Wooden doors, Steel doors ,Aluminum doors PVC doors, glass doors, Solid doors, Flush doors, revolving doors, folding doors, sliding doors, swinging doors, collapsible doors.

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

Drawings: Battened door , sliding door details, folding door Aluminium , steel window , Joinery details.

TOTAL HOURS-56

CONTINUOUS INTERNAL EVALUATION PATTERN:

Assignments / Viva based on assignments - 60 marks
Two internal tests each of equal weightage - 30 marks
Attendance - 10 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Third

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-34	**THEORY OF STRUCTURES**-II	**2-1-0**	**3**	**2022**

Course Objectives

The Theory of Structures II course for students of architecture would help

- To develop an overall understanding of structural behavior of structural elements under various loading conditions.
- To interpret shear force and bending moment diagrams for various types of beams and loading conditions.
- To study the internal stresses (bending and shear stresses) in beams and strength of sections.

Course Outcome

After the completion of this course, the students will be able to

- Understand the various structural elements in a building and types of loads acting on it.
- Achieve fundamental knowledge of the sectional properties of various sections.
- Analyze different types of beams with different loading conditions.

Text books

- S.S Bhavikkatti, Strength of materials, New Age International Publishers
- R.S. Khurmi, Strength of materials, S. Chand & Company Ltd, New Delhi
- R. K. Banzal., Strength of Materials, Lakshmi Publications Pvt. Ltd., New Delhi
- S. Ramamrutham., Strength of Materials, Dhanpat Rai Publishing Company Pvt. Limited

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 hours)

- Beams - different types. Types of loading on beams.

- Concept of bending moment and shear force, Sign convention
- Shear force and bending moment diagrams of cantilever beams, simply supported beams and overhanging beams for different type of loads (Point load, uniformly distributed load, Moment). Point of contra flexure.
- Relationship between intensity of load, shear force and bending moment.

MODULE II (12 hours)

- Theory of simple bending, Derivation of equation, assumptions and limitations.
- Calculation of normal stress in beams, moment of resistance
- Variation of bending stress across the cross section, Maximum bending stress, section modulus, moment of resistance. Beams of uniform strength, bending of composite beams – simple problems

MODULE III (10 hours)

- Shear stress in beams – derivation of equation.
- Variation of shear stress across the cross section.
- (Derivation required for rectangular, circular and triangular sections only)
- Stress on inclined planes for axial and bi-axial stress fields, principal stresses, Mohr's
  circle of stress, principal stresses. (Concept only).

MODULE IV (14 hours)

- Differential equation of the elastic curve
- Slope and deflection of beams by method of successive integration,
- Slope and deflection of beams by Macaulay's method,
- Slope and deflection of beams by moment area method.
- Deflection of beams by strain energy method -application to simple beams.
  (Only concentrated load, uniformly distributed loads required)

TOTAL HOURS: 48

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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

Semester: Third				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-35	**HISTORY OF ARCHITECTURE II**	**3-0-0**	**3**	**2022**

Course Objectives

- 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.
- To understand the role of technology, construction techniques, climate and materials with inherent visual aspects like spatial organization, scale, compositional organization, Architectural vocabulary and design grammar.

Course Outcome

After the completion of this course, the students will be able to

- Identify major typologies, characteristics and forms of Islamic architecture.
- Identify major succeeding dynastic periods together with principal monuments and their main stylistic features.

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 Palace.

Morocco -King Hassan II Mosque, Casablanca.

MODULE II - (10 Hours)

Beginning of Islamic Architecture in India; Islamic Architecture in Delhi (Imperial Style)

Mamluk Dynasty -Quwat-ul-Islam mosque, Qutb Minar, 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.

Deccan - Charminar at Hyderabad, Tomb of Golconda.

Bijapur - Jami Masjid, Golgumbaz.

MODULE I V- (10 Hours)

Evolution of Mughal style and the contributions during the different eras of rule:

Early period:

Babar- Jama Masjid, Sambhal; **Humayun**- City of Din Panah; **Sher Shah**-Qila Kunha Masjid, Sher Shah's Tomb

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

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Third

Course No.	Course Name	L-T-P/D	Credits	Year of Introduction
AR 22-36	BUILDING SERVICES-I (WATER SUPPLY AND SANITATION)	2-1-0	3	2022

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

After the completion of this course, the students will be able to

- Understand about demand, consumption, sources, treatment and distribution of water.
- Acquire knowledge 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 hours)

Water

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.Quality of water – drinking water standards – physical, chemical and bacteriological analysis of water.

MODULE II (16 hours)

Water treatment: 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: Types - gravitational, pumping and combined schemes. Lay out of distribution networks, intermittent and continuous systems of distribution

MODULE III (12 hours)

Wastewater: Systems of sanitation, types of sewerage systems, components of a sewerage systems, Wastewater characteristics

Wastewater treatment : Preliminary treatment of wastewater – screens, grit chamber, detritus tank, sedimentation tank. Biological treatment - Activated sludge process, Trickling filter, Oxidation pond.

Wastewater disposal: disposal into land, water bodies - stream, ocean - disposal by irrigation. Septic tank and soak pit.

MODULE IV (12 Hours)

Sewage collection from houses and building: General principles governing the design of a sanitary plumbing system. Functions and types of traps used in sanitary plumbing systems, systems of plumbing (4 types), sanitary fittings and other accessories

Disposal of municipal solid waste: Solid waste management - collection, transportation and segregation of MSW, recycling. Disposal of MSW - sanitary land fill, incineration, composting.

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

Total Hours: 48

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Third

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-37	COMPUTER AIDED VISUALIZATION-I	0-0-3	3	2022

Course Objective

- 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.
- Help them in creating 3D of buildings using Sketchup

Course Outcome

After the completion of this course, the students will be able to

- Achieve an understanding of CAD software for preparing two-dimensional drawings.
- Create 3D architecture forms

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

MODULE 1 (35 hours)

All commands needed for the preparation of drawing Plan, Elevation and Section in Autocad

- Revision of basic commands
  (Commands- Units, Line, Polyline, Circle, Rectangle, Arc, Spline, Hatch, Extension line, Limits, LTscale, Measure, pan, zoom, Move, Copy, rotate, Stretch, Extend, Mirror, Offset, Array, Trim, Break, Linetype, Text, Mtext, Dist, Area, fillet, Redraw, Regen, Purge, Flatten)
- Creation and importing of blocks into AutoCAD
- Coordinate system-UCS, WCS
- Understanding layers and usage of CTB for doing drawings with proper gradation
- Dimensioning- Linear, Angular, Radial
- Model space & Paper space, To setup sheet in paper space, Incorporating title block and setting sheet layout
- Plotting

Exercises

1. Starting up - Drawing I- Measured drawing (plan and section) of a room.
2. Architectural Drawing II- Drawing Plans using layers, sections and elevations of Residence design project, setting the drawings in sheet using layout.

MODULE 2 (25 hours)

3D Modelling using Sketchup

- Importing 2D Plan from AutoCAD
- Setting up Scale and Units
- Basic commands- Push/Pull, Paint bucket, Move, Rotate, Scale, Measure, Introduction to basic tools-line, eraser, circle, rectangle, arc,
- Importing additional blocks, components etc. (window, doors, trees, furniture's)
- Application of materials
- V-ray/other Plugins for rendering

Exercises

1. Starting up – Basic 3d model of a house with application of materials, windows, doors, landscaping etc.
2. 3D Rendering using V-Ray - of the same project

Other 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.
4) Starting up- Preparing drawing with layer system, CTB & Creating hatch patterns, Importing /exporting files

TOTAL HOURS: 60

CONTINUOUS INTERNAL EVALUATION PATTERN:

- Demonstrations / Presentations / Drawings (Course work) - 50 marks
- Records / Portfolio - 20 marks
- Final test / Viva - 20 marks
- Attendance - 10 marks

FOURTH SEMESTER												
Course Code	**Subject**	**Group**	**Category**	**Credits**	**Hours Per Week** **			**Duration of Exam**	**Marks**			
					L	**T**	**P/S**		**W**	**J**	**C.A.**	**Total**
AR 22-41	Architectural Design-II *	I	PC	10	0	1	9	0		200	300	500
AR 22-42	Site Analysis & Planning	III	PC	3	2	1	0	3	100		50	150
AR 22-43	Building Materials & Construction -III	II	BS & AE	4	2	0	2	4	100		100	150
AR 22-44	Theory Of Structures -III	III	PC	3	2	1	0	3	100		50	150
AR 22-45	History of Architecture-III	III	BS & AE	3	3	0	0	3	100		50	150
AR 22-46	Building Services-II (Lighting & Electrical Services)	III	PC	3	2	1	0	3	100		50	150
AR 22-47	Computer Aided Visualization - II	IV	SE	3	0	0	3	0			100	100
TOTAL				**29**	11	4	14		500	200	700	1400

* 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, C.A. - Continuous Assessment.

** Two hours per week allotted to Library

Note:

One Hour Practical time of Site Analysis and Surveying to be earmarked for survey practical.

One Hour Studio time of Building Services to be dedicated in teaching the application of Building Services in the previous year design problem.

Semester: Fourth

Course No.	Course Name	L-T-P/D	Credits	Year of Introduction
AR 22-41	ARCHITECTURAL DESIGN-II	0-1-9	10	2022

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

After the completion of this course, the students will be able to

- Achieve an understanding of design as a response to context and program and develops a holistic approach to design.
- 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.

Major Project

A detail study of any rural settlements, or any vernacular settlements needs to be undertaken to understand basic aspects of human built environment. The study should include

- The interrelationship between built form and society will be studied, understood and established, starting from either end as required.

- Study of specific modes of rural/vernacular/traditional architecture including their morphology, local materials and construction techniques, details, meaning, etc., will be done to give an insight into the particulars and universals of architecture.

- Appropriate tools and processes can be used to aid the understanding. These include different methods of historical and socio-cultural study, oral history, discussions, information collection, surveys, maps, perceptual sketches, documentation through drawings, demographic study, assimilation and analysis.

- Transformations across time need to be traced to understand constants and dynamics in human society. They will also be critically evaluated through discussions with experts. Rising from this, future changes can be projected/ envisaged and if found required, policy and physical interventions can be suggested/ explored.

Minor Project

- The physical interventions necessary which are found in the major project will be taken up as design situations. This could range from individual to community level and involve any aspect of the physical environment (including building projects) as the situation/viewpoint warrants.

- If the context does not warrant a building need, a small community oriented building design will be given as a separate project in addition to the major project. For building projects, the scale and complexity of planning and construction usually involved will be simple - small or medium span, ground plus two storeyed maximum, simple horizontal and vertical movement, simple/ local materials and construction, passive energy.

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/digital drafted presentation drawings including free hand perspectives, graphical representation of concept, scaled models etc.
TOTAL HOURS: 160

CONTINUOUS INTERNAL EVALUATION PATTERN:

Design exercises, projects, tests, and internal reviews**:** 270 Marks

Attendance: 30 Marks

Semester: Fourth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-42	**SITE ANALYSIS & PLANNING**	**2-1-0**	**3**	**2022**

Course Objectives

- To understand the importance of site in architectural design whereby the relationship between the built and the un-built environment and principles of site planning is established.
- To analyse ecological and geomorphological characteristics of a site which govern the siting of a building or group of buildings in a given site.
- To teach various techniques of site analysis through exercises and case studies.

Course Outcome

After the completion of this course, the students will be able to

- Learn various terms involved in site planning and their relevance in design of buildings of varying scales
- Understand various parameters that need to be considered in site analysis and its implications on site
- Evaluate the consequences of interventions in a site at micro and macro scales
- Apply the principles of site planning learnt in real/ studio projects

Text books

- Kevin Lynch, ‘Site Planning’, MIT Press, Cambridge, MA. 1957.
- White T. Edward, ‘Site Analysis: Diagramming Information for Architectural Design’, Architectural Media Publisher, 1983
- James A La Gro, Site Analysis, Informing Context Sensitive and Sustainable Site Planning and Design, John Wiley and Sons, 2013

Reference Books

- John Ormsbee Simonds, ‘Landscape Architecture: A manual of Site Planning and Design’, McGraw Hill, 1961. • McHarg, lan, ‘Design With Nature’, Wiley Series in Sustainable Design,1995
- Joseph De Chiarra and Lee Coppleman, ‘Planning Design Criteria’, Van Nostrand Reinhold Co., New York, 1988.
- Thomas H. Russ, ‘Site Planning and Design Hand Book’, Pearson Education, 2002.
- Christopher Alexander et.al., A Pattern Language: Towns, Buildings, Construction (Center for Environmental Structure Series),2015

MODULE I (15 hours)

Site Surveying

Introduction: Importance and principles of Surveying.

Chain surveying, Compass surveying, Theodolite surveying, Plane table surveying

Levelling: levelling instruments-temporary and permanent adjustment of dumpy and tilting level- Height of instrument method, Rise and fall

method

Introduction to modern surveying equipment's:

UAV Drone, Total Station, GPS, Distomat, Digital Levels and Auto-Levels Electromagnetic distance measurement (EDM) - Principle of EDM, Total Station – Parts of a Total Station – Accessories – Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey.

Exercise 1: Computation of height, distance and area using Total Station

Exercise 2: Determination of elevation of points on ground by differential levelling

MODULE II (10 hours)

Site Analysis

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, visual analysis

Preparation of site analysis diagram. Study of contours: slope analysis - grading process - grading criteria - functional and aesthetic considerations.

Environmental consideration, Site Analysis tools and Techniques

Exercise: Preparation of Slope analysis, Relief map and drainage map for Contour Site

MODULE III (10 hours)

Site Planning

Definition of plot, site, land and region, units of measurements.

Objective of Site Planning, Site Planning Process, Design and management of site, Site Planning and Site Layout Principles

Site Context: Impact of proposed development on surrounding- aspects such as increase in traffic, noise and pollution to surroundings, Environment impact assessment, study through notable examples

MODULE IV (10 hours)

Site design guidelines for Pedestrians- Open space requirements- Playground design-seating.

Street and Parking design: Organization of vehicular and pedestrian circulation, types of roads, hierarchy of roads, networks, road widths and parking, regulations. Turning radii and street intersections

Site Grading- Balancing Cut and Fill- measures to minimize impact of site grading- grade changes- site stabilization techniques- slope stability- retaining walls- erosion and sediment control

Storm water management- swales- detention and retention basins- Gray water systems- sanitary sewers- on site sewage disposal systems- sewage treatment plants

Exercise: Preparation of parking area plan in a master plan, making dimension, turning radius for various vehicles, marking detail levels and incorporating storm water drainage solutions.

TOTAL HOURS: 45

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

Semester: Fourth

Course No.	Course Name	L-T-P/S	Credits	Year of Introduction
AR 22-43	**BUILDING MATERIALS AND CONSTRUCTION III**	**2-0-1**	**3**	**2022**

COURSE OBJECTIVES

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

- Understanding the fundamental principles of architectural construction.
- Developing technical skills in the design and implementation of floor systems, roof systems, wall systems, and vertical transportation systems.
- Familiarizing oneself with the various types of materials and systems used in construction, such as concrete, steel, wood, glass, and masonry, and learning how to select and combine them effectively to achieve the desired performance and appearance.

COURSE OUTCOME

After the completion of this course, the students will be able to

- Comprehend the application of various building components and their construction.
- Understand the principles of structural engineering and learn about the different materials and methods used in construction and how to analyze and design structural systems.
- Achieve proficiency in technical drawing and detailing.

Text books

- Arora S.P. and Bindra S.P., “Text book of Building Construction”, Dhanpat Rai & 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 (15hrs)

WALL SYSTEMS

Concrete System: Lintels and sunshades, concrete columns, concrete walls, concrete arches.

Masonry System: Masonry walls unreinforced and reinforced, solid walls and cavity walls, masonry columns and pilasters.

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: RCC lintel and sunshade with material specifications, Cavity wall details.

MODULE II (15 hrs.)

FLOOR SYSTEMS

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

Steel floor system: 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 floor system: Wood joists, Wood joist framing, wood beams supports and connections, plank and beam framing.

Exercise : Site visits and field observations- concreting, steel structural framing

: Beam and slab details with material specifications - one-way slab, two-way slab

: RCC column detail

MODULE III (15hrs.)

ROOF SYSTEMS

Roof design -Basic roof types: Flat roof, Sloping roof and Curved roof, deciding the slope or curvature of roof, roofing materials - thatching, tile roofing, G.I & Aluminium sheets, FRP and RMP sheets, green roofing, roof drainage systems.

Roof framing and truss design -Wood trusses: Different types of trusses, King post truss, Queen post truss, Howe truss , Fink truss,

Pratt truss, Bowstring truss, North light truss.

Short span structures, Medium span structures, Large span Structures-Introduction to Space frames, Composite roof Systems, shell structures, folded plates.

Drawings: Truss – King post truss, Queen post truss, Steel angular truss, roof covering and gutter details.

MODULE IV (15 hrs)
VERTICAL TRANSPORTATION SYSTEMS

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 travellators.

Exercise: Analyis :Standards, rules & regulations of ramps, elevators, staircases, escalators from Kerala Building Rules and NBC.

Drawings : Wooden stair, RCC stair, Steel Stair, Composite stair.

TOTAL HOURS-60
CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments / Viva based on assignments - 60 marks
Two internal tests each of equal weightage - 30 marks
Attendance - 10 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Fourth

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-44	**THEORY OF STRUCTURES**-III	**2-1-0**	**3**	**2022**

Course Objectives

The Theory of Structures III course for students of architecture would help them

- To understand torsion in shafts, structural behavior of columns and struts.
- To understand the concept of indeterminate structures and the various methods of analysis of such structures.

Course Outcome

After the completion of this course, the students will be able to

- Describe shear force, bending moment in beams and frames.
- Achieve an understanding about various methods involved in analysis of indeterminate structures.
- Discuss the way in which stress and strain impacts beams and columns.

Text books

- S.S Bhavikkatti, Strength of materials, New Age International Publishers
- Rajasekharan S. and Sankarasubramanian G., EngineeringMechanics-Statics and Dynamics, Vikas Publications, NewDelhi
- R. K. Banzal., Engineering Mechanics, Lakshmi Publications Pvt. Ltd., NewDelhi
- R. K. Banzal., Strength of Materials, Lakshmi Publications Pvt. Ltd., New Delhi
- Bhavikkatti S. S., Engineering Mechanics, New Age International Publishers
- S. Ramamrutham., Strength of Materials, Dhanpat Rai Publishing Company Pvt Limited

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 hours)

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

MODULE II (12 hours)

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

MODULE III (14 hours)

- Analysis of continuous beams using Three moment theorem Shear Force Diagram –
  Bending Moment Diagram, Support settlement case. (derivation not required)
- Introduction to slope deflection method-simple beams only (settlement case not required.)

MODULE IV (10 hours)

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

TOTAL HOURS: 48

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

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

Semester: Fourth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22 - 45	**HISTORY OF ARCHITECTURE – III**	**3-0-0**	**3**	**2022**

Course Objectives

- 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

After the completion of this course, the students will be able to

- Acquire knowledge to identify the common characteristics among the monuments of a particular style.
- Ability to recognize the role of technology and material in development of structure, ornament & detail, form & iconography in architecture across different contexts.

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.

TOTAL HOURS: 42

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Fourth

Course No.	Course Name	L-T-P/D	Credits	Year of Introduction
AR 22-46	BUILDING SERVICES-II (LIGHTING & ELECTRICAL SERVICES)	2-1-0	3	2022

Course Objectives

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

Course Outcome

After the completion of this course, the students will be able to

- Understand about the fundamentals of electrical services in buildings.
- Acquire Knowledge about the Indian Electricity Rules.
- Know about the present trends in lighting practices.

Textbooks

- 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 (16 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. Introduction to Indian Electricity Rules.

Exercise: Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings/ photos. Design of electrical layout for buildings of small scale through drawings.

MODULE III (16 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 (16 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. Lighting simulation and performance analysis using software.

Exercise: Design exercise involving lighting design for appropriate projects of simple scale through choice, calculations, layout, drawings, simulations, physical models.

Total Hours: 60

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Fourth

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-47	COMPUTER AIDED VISUALIZATION-II	0-0-3	3	2022

COURSE OBJECTIVE

To equip the students to acquire enough skills in Autodesk Revit and to gain confidence in them for using digital media for preparation of drawings and 3D views.

COURSE OUTCOME

After the completion of this course, the students will be able to

- Prepare all necessary drawings for a project using software along with 3D views.

REFERENCE BOOKS

- Revit Manual
- Autodesk Revit for Architecture Certified User Exam Preparation (Revit 2024 Edition)

MODULE 1

- Introduction to Autodesk Revit Architecture
- Starting an Architectural Project
- Navigation Tools, Configuring Global Settings, Creating Walls, Creating Architectural Walls
- Using Basic Building Components-I-Adding Doors, Adding Windows and Wall Openings
- Using the Editing Tools, Working with Selection Sets
- Editing Tools - Grouping Elements, Retrieving Information About Elements
- Working with Datum Planes and Creating Standard Views, Working with Levels, Working with Grids, Working with Reference Planes and Work Planes, Controlling the Display of Elements, Working with Project Views

MODULE 2

- Using Basic Building Components-II - Creating Floors, Creating Roofs, Shape Editing Tools, Creating Ceilings, Adding Rooms
- Using Basic Building Components-III -Working with Components, Adding Stairs, Adding Railings and Ramps, Creating Curtain Walls
- Adding Site Features- Working with Site Features, Property Lines and Building Pads, Adding Site Components

MODULE 3

- Using Massing Tools- Understanding Massing Concepts, Creating Massing Geometry in the Family Editor, Editing Massing Geometry in the Family Editor, Massing in the Conceptual Design Environment, Creating Massing Geometry in a Project, Creating Building Elements from Massing Geometry, Creating Families
- Adding Annotations and Dimensions -Adding Tags, Room Tags,

Keynotes, Adding Symbols and Dimensions, Dimensioning Terminology and Dimensioning Tools, Adding Alternate Dimension Units and Spot Dimensions

- Creating Project Details and Schedules- Project Detailing in Autodesk Revit Architecture, Crop Regions, Fills Patterns, and Detail Components, Adding Text Notes, Creating Drafting Views, Revision Clouds, Working with Schedules

MODULE 4

- Creating Drawing Sheets, and Plotting, Creating Drawing Sheets, Creating Duplicate Dependent Views, Printing in Revit Architecture
- Creating 3D Views- Three Dimensional (3D) Views, Dynamically Viewing Models with Navigation Tools, orienting a 3D View, Generating Perspective Views, Using a Section Box
- Rendering Views and Creating Walkthroughs- Rendering in Revit Architecture, Working with Materials, Lights, Decals and Entourage, Rendering Settings o Creating a Walkthrough, Autodesk 360 | Rendering

PROJECTS

- To make all the drawing for a chosen building type (apartment, commercial building etc.) which has minimum 4 floors.
- Preparing complete set of drawing for a building including all floor plans, sections, sectional views, details, 3D views, and walkthrough

TOTAL HOURS: 60

CONTINUOUS INTERNAL EVALUATION PATTERN:

- Demonstrations / Presentations / Drawings (Course work) - 50 marks
- Records / Portfolio - 20 marks
- Final test / Viva - 20 marks
- Attendance - 10 marks

FIFTH SEMESTER												
Course Code	**Subject**	**Group**	**Category**	**Credits**	**Hours Per Week** **			**Duration of Exam**	**Marks**			
					L	**T**	**P/S**		**W**	**J**	**C.A.**	**Total**
AR 22-51	Architectural Design-III *	I	PC	10	0	1	9	0		200	300	500
AR 22-52	Landscape Design & Planning	III	PC	4	3	0	1	3	100		50	150
AR 22-53	Building Materials & Construction - IV	II	BS & AE	3	2	0	1	3	100		100	200
AR 22-54	Design Of Structures-I	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-55	History of Architecture-IV	III	PC	3	3	0	0	3	100		50	150
AR 22-56	Building Services-III (HVAC & Mechanical Services)	III	BS & AE	3	2	0	1	3	100		50	150
AR 22-57	Specification & Cost Estimation	III	PC	3	1	2	0	3	100		50	150
TOTAL				**29**	13	4	12		600	200	650	1450

* 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, C.A. - Continuous Assessment.

** One hour per week allotted to Library

Note:

One Hour of Building Services to be dedicated to applying knowledge to a design problem.

Semester: Fifth

Course No.	Course Name	L-T-P/D	Credits	Year of Introduction
AR 22-51	**Architectural Design-III**	**0-1-9**	**10**	**2022**

COURSE OBJECTIVES

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

- To study the impact of site, context and climate on spatial design and formulate an apt concept for the design.
- To bring about optimum design solutions.
- To introduce site planning principles involving landscaping, circulation network and parking.
- To learn to analyse sloping sites and explore possible design options.
- To do user study and analysis in framing an optimum design circulation solution.
- To emphasize on the importance of understanding the essential building services like water supply, sanitation and electrification.

COURSE OUTCOME

After the completion of this course, the students will be able to

- design structures that are climate responsive while reducing the building's reliance on artificial energy.
- learn and practice a logical method of drafting design area programs.
- do site analysis to formulate and propose site development as part of design process.
- Integrate building services systems, water supply & sanitation and lighting 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,
- Bansal, N.K., Hauser, G. and Minke, G., "Passive Building Design: A Handbook of Natural Climatic Control", Elsevier Science. 1994
- 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.

Projects: A minimum of two projects shall be completed during the

semester.

Major project – Project shall have enough emphasis on site planning principles and climate responsiveness. These shall be medium sized buildings such as Resorts, Schools, medium sized office complexes or mid-rise apartments.

Minor project - The short project of conceptual design presentation with enough emphasis on site planning. These shall be design of club house, fitness centre or any similar facility used in conjunction with the major project.

Process and deliverables:

- Data collection from various reference books, building bye-laws and national building code.
- Study and presentation of similar designs (literature and live) to formulate a detailed design brief and architectural area programme.
- Analysis based on study, site, context, activities, users, services to draw inferences and evolve concept with emphasis on site and climatic analysis.
- Development of the design from the concept within the constraints of bye-laws and regulations.
- Deliverables shall be graphical representation of study, concept explanation and design evolution, computer aided presentation drawings of design, physical model in appropriate scale etc.

TOTAL HOURS: 160

CONTINUOUS INTERNAL EVALUATION PATTERN:

Design exercises, projects, tests, and internal reviews**:** 270 Marks
Attendance: 30 Marks

Semester: Fifth

Course No.	Course Name	L-T-P/S	Credits	Year of Introduction
AR 22-52	LANDSCAPE DESIGN AND PLANNING	3-0-1	4	2022

COURSE OBJECTIVES

- To introduce students about Site Planning & Landscape Design so as to integrate basic principles in architectural design
- To understand the importance of sustainable development and managing natural resources.
- To understand the scope of Landscape Architecture and Planning through various examples from past to present.

COURSE OUTCOME

By the end of this course students will be able to

- Understand the scope of landscape architecture
- Apply effective grading and storm water management for Architecture design Projects.
- Create landscape construction details for the projects.

TEXT BOOKS

- *Simonds*. *J. O.* (1961). *Landscape Architecture, The Shaping of Man's Natural Environment*. London: F.W. Dodge Cooperation.
- Jellicoe, *Geoffrey, and Susan Jellicoe*. (1975) *The Landscape of Man*: Shaping the Environment from Prehistory to the Present Day. London.

REFERENCE BOOKS

- *Laurie, Michael.* (1975). *An introduction to landscape architecture*. New York: American Elsevier Pub. Co.
- *Hackett, Brian*. (1979). *Planting design*. New York: McGraw-Hill
- *Tandy*, *Cliff*. (1972). *Handbook Of Urban Landscape*, The Architectural Press, London.
- *Motloch J. L.* 2000 *Introduction to landscape design* Second Edition, *John Wiley & Sons*, *USA*
- *Appleton*, J. (1975). The *experience of landscape*. London, England: Wiley.
- *Reid* GW. (1993). From *concept to form: In landscape design*. New York: John Wiley & Sons.
- *Dee*, *C*. (*2001*). *Form* and *Fabric* in *Landscape Architecture*: A *Visual Introduction* (1st ed.). *Taylor* & *Francis*.
- *McHarg*, I. L. (1969). *Design with nature*. [1st ed.]. Garden City, N.Y.,
- *Bose T.K. and Choudhary, K.* (1991) *"Tropical Garden Plants in Colour"* Horticulture and Allied Publishers

MODULE I (13 hours)

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

Landscape planning: The concept of Landscape Planning: definitions and scope.

Contribution of Fredrick Law Olmsted, Example such as Central Park, New York & Emerald Necklace, Boston and its contribution to the city.

Elements and principles of landscape design

- Elements of Design (Line, Form, Texture, Color, Visual Weight)
- Principles of Design (Scale & Proportion, Balance, Rhythm, Unity, Emphasis)

The role of landscape components in modifying microclimate with respect to temperature, humidity, precipitation, air corridors, heat islands, wind speed etc., in cities.

Exercise: *Identifying elements and principles from selected landscape designed spaces*

MODULE II (12 hours)

Plant material: Plant materials, classification, characteristics, use and application in landscape design; Role of plants in landscape design, Native, Exotic and Invasive species

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

Landscape resources: Understanding landscape resources, Threats to urban landscape resources

Watersheds and their characteristics, protection of natural water bodies: water retention structures, water harvesting techniques, swales, bioswales.

Urban open spaces, Urban Forest: It's ecological social and environmental dimensions. Its role in the urban landscape.

Exercise: *Preparing a chart with different plant materials used in landscape with common name, scientific name and images along with Site Visit.*

MODULE III (12 hours)

History of landscape architecture

Landscape and garden design in history -Italy, France, England, China, Japan, Persia. Study of notable examples.

Garden design in Indian History. Sacred groves. Mughal and Rajput Landscapes

Exercise: *Sketching the studied gardens in the history of Landscape*

MODULE IV (15 hours)

Landscape engineering

Introduction to grading, landform modifications, stormwater management and surface water drainage.

Basic grading principles, cut and fill process, retaining walls, surface drainage.

Preparation of grading and drainage plan

Landscape construction

Driveways, Pathways, Plazas, Walls, Steps, Ramps

Planting: Planters, Beds, Edges, Terraces

Water elements: Swimming Pool, Water bodies

Exercise:

Preparing a master plan marking hardscape and softscape, showing levels and incorporating strategies for storm water management.

Sketching details of pathways, steps, planters, and swimming pool used in landscape
(For the above exercise their fifth semester Architecture Design Project shall be considered.)

TOTAL HOURS-52

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Fifth

Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 22-53	BUILDING MATERIALS AND CONSTRUCTION IV	2-0-1	3	2022

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

By the end of this course students will be able to:

- Understand the properties and application of various building materials used as building finishes, construction methods.
- Study the application of glass as an advanced construction material.
- Identify or assign finishes appropriate for different design projects.

TEXT BOOKS

- Arora S.P. and Bindra S.P.,"Text book of Building Construction", Dhanpat Rai & 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

- W.B. 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 (13 hours)

WALL FINISHES

Plaster: Introduction, types of plaster- Lime plaster and gypsum plaster, Fire resistant plaster, X-Ray shielding plaster and acoustic plaster. Process of plastering.

Paints and varnish: Characteristics of an ideal paint and varnish. Classification - various types of paints. Painting process. Defects in painting works. Process of varnishing.

Wall cladding- stone cladding, tile cladding, Wooden cladding and metal cladding. Stucco finish and other finishes.

Exercises: Study the specifications of wall finishes from relevant BIS codes,

Stone cladding details, Metal cladding details

Market study: Various wall finishes-plasters, paints, cladding

materials etc.

MODULE II (13 hours)
FLOOR FINISHES
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 and Methods of fixing various types of tiles.
Different type of resilient and vibration resistive floor like rubber, Linoleum and PVC flooring.
Exercises: Study the specifications from relevant BIS Codes.
Tile flooring details, wooden flooring details.

MODULE III (15 hours)
WOOD SUBSTITUTES
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.
Exercises: Study the specifications from relevant BIS Codes.
Case study :Site visit for studying and analyzing different wood substitutes, material selection criterias, specifications , application etc.

MODULE IV (15 hours)
GLASS AND GLAZING
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.
Exercises : Study the specifications from relevant BIS Codes, Structural glazing details.
Market study : Different types of glass and its application in construction.

TOTAL HOURS-56

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments / Viva based on assignments - 60 marks
Two internal tests each of equal weightage - 30 marks
Attendance - 10 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Fifth

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-54	DESIGN OF STRUCTURES-I	2-1-0	3	2022

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

By the end of this course, students will be able to:

- Acquire awareness about the analysis and design of reinforced concrete structural elements.
- Get exposure to the relevant IS codes for structural analysis and design.

TEXT BOOKS

- 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.

REFERENCE BOOKS

- Pillai S. U. and Menon D., Reinforced Concrete Design, Tata McGraw Hill
- Sinha S. N., Reinforced Concrete Design, Tata McGraw Hill
- 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 (11 hours)

- Introduction-Plain concrete and Reinforced concrete, Types of loads, Design philosophies – Working stress method, Ultimate load method, Limit state method.
- Limit state method- Principles and assumptions, Types of limit state, Characteristic strength, Characteristic load, Partial safety factors.
- Singly reinforced beam- Design and analysis of beams subjected to flexure, shear and torsion. (Simply supported case only)

MODULE II (11 hours)

- Doubly reinforced beam- Design and analysis of beams subjected to flexure, shear and torsion. (Simply supported case only)**.**
- Flanged beams- Effective flange width of flanged beam section, Analysis of flanged sections (Simple problems only)
- Development length, Flexural and anchorage bond, IS recommendations regarding curtailment of reinforcement.

MODULE III (11 hours)

- Introduction- One way and two-way action of slabs, load distribution in a slab.
- Design of one-way slab and two-way slab
- Stairs – Types of stairs, general principles in design and detailing of various types of stairs.

MODULE IV (11 hours)

- Columns- Introduction- Classification, Effective length, Short columns and Long columns
- Design of Axially loaded short columns- Rectangular and Circular columns
- Foundations- Introduction-Classification and Design concepts of footings.

TOTAL HOURS: 44

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

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

Note: IS 456:2000- Code of Practice for Plain and Reinforced Concrete is permitted in the examination hall.

Semester: Fifth				
Course No.	**Course Name**	**L-T-S-P/D**	**Credits**	**Year of Introduction**
AR 22-55	**History of Architecture I**	**3-0-0**	**3**	**2022**

Course Objectives

To help students understand design principles that shape innovative architectural styles and forms.

Course Outcome

By the end of this course students will be able to comprehend various design philosophies of Modern and Post-Modern Architecture.

References

- Ching, Francis D. K., et al. A Global History of Architecture. John Wiley and Sons, 2010.
- Frampton, Kenneth. Modern Architecture: A Critical History (Fifth) (World of Art). Thames and Hudson, 2020.
- Radford, Antony, and Amit Srivastava. The Elements of Modern Architecture: Understanding Contemporary Buildings. National Geographic Books, 2020.
- Curtis, W. J. (1996, June 27). Modern Architecture Since 1900. Phaidon.
- Sigfried Giedion, Space time and Architecture: The Growth of a new tradition, Harvard University Press.
- McCarter, R., & Pallasma, J. (2012, October 22). Understanding Architecture. Phaidon Press.

MODULE I (9 hours)

BEFORE MODERNISM: THE BEGINNING

- European Architecture: An Introduction ; Neo classicism- works of Étienne-Louis Boullée -Bibliothèque Nationale , Cenotaph for Sir Isaac Newton ;
- Industrial revolution and its impact, new materials – steel, glass, concrete- Eiffel Tower, Sir Joseph Paxton’s Crystal Palace, London ;
- Arts and crafts movement – William Morris ; Art Nouveau – works of Antoni Gaudí – Sagrada Femilia;
- Skyscrapers – Works of Louis Sullivan- Wainwright Building ;
- Adolf Loos -Ornament and crime, Raumplan-Moller House, Vienna;
- Deutsche Werkbund- Peter Behrens - AEG Turbine Factory, 1908-09, Berlin;

- Expressionism – Works of Mendelsohn-Einstein Tower ,
- Destijl movement- Schröder House, Netherlands ;
- Russian Constructivism - Tatlin’s Tower
- Walter Gropius: The Bauhaus.

MODULE II (12 hours)

MODERN ARCHITECTURE: Modernism. Ideas and works of architects:

- Philip Johnson – Glass house;Seagram Building, New York.
- Mies Vander Rohe - Barcelona Pavilion, Farnsworth House.
- F. L. Wright - Falling water, Pennsylvania; Guggenheim Museum, New York ,
- Richard Neutra - Kaufmann Desert House, California.
- Oscar Niemeyer - Cathedral of Brasília, Casa das Canoas.
- Alvar Alto - Säynätsalo Town Hall Finland , Villa Mairea.
- Le Corbusier – Sarabhai House ,Villa Savoye, France , Notre Dame Ronchamp, Paris,
- Louis Kahn - The National Assembly Building, Bangladesh, Salk Institute California.

MODULE III (12 hrs)

POST MODERN ARCHITECTURE : Post Modernism. Ideas and works of architects:

- Robert Venturi- Vanna Venturi House, Phiadelphia.
- Paul Rudolph – The Colonnade Condominiums, Singapore.
- I M. Pei - Grand Louvre, Paris.
- Kenzo Tange – Yoyogi National Gymnasium Tokyo.
- Richard Meier – Jubilee Church, Los Angeles; Barcelona Museum of Contemporary Art.
- Toyo Ito - Meiso no Mori Crematorium, Japan
- John Utzon - Sydney Opera House, Bagsvaerd Church Denmark
- James Stirling- Neue Staatsgaleria.

ALTERNATIVE PRACTICES AND IDEAS

Critical regionalism.

- Hassan Fathy-New Gourna Village.
- Geoffrey Bawa – Bawa’s House Colombo; Bentota Beach Hotel.
- Louis Barragan- Chapel and Convent of the Capuchinas, Mexico; Casa Estudio,Mexico.
- Tadao Ando- Church on the water, Japan; Modern Art Museum of Fort Worth, USA
- Mario Botta- Theatre of the Architecture, Switzerland.
- Alvaro Siza- Mimesis Museum.
- Carlo Scarpa- Canova Museum, Castelvecchio Museum.

Modern And High-Tech Architecture

- Renzo Piano- Pompidou Centre, Paris.
- Richard Rogers- Lloyd’s of London Office Building London.
- Norman Foster -HSBC Office Building, China.

Module IV (12 hrs)
21st CENTURY ARCHITECTURE

Deconstructivism.

- Zaha Hadid – Vitra Fire Station Germany; MAXXI Italy
- Daniel Libeskind – Jewish Museum, Berlin.
- Frank Gehry -Dancing Building, Prague; Guggenheim Museum Bilbao, Spain,
- Peter Eisenman – State Farm Stadium, Arizona.
- Santiago Calatrava – Quadracci Pavilion,USA;

Architecture as Experience

- Glenn Murcutt- Arthur and Yvonne Boyd Education Centre, Australia; Simpson-Lee House.
- Peter Zumthor- Brother Klaus Field Chapel; Thermal Baths Vals, Switzerland

TOTAL HOURS: 45

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Fifth

Course No.	Course Name	L-T-P/S	Credits	Year of Introduction
AR 22-56	BUILDING SERVICES III (HVAC & MECHANICAL SERVICES)	2-0-1	3	2022

Course Objective

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

By the end of this course students will be able to:

- Achieve an understanding of the fundamentals of HVAC & Mechanical services in buildings.
- Get knowledge about the ASHRAE standards.

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)

Introduction - Role and Purpose of HVAC systems in everyday use. Need for architects to study the system.

The scope and impact of Mechanical systems- Impact of space planning - Impact on Architectural Design - Impact on High-rise Buildings - Impact on construction cost – Impact on the Global environment.

Engineering Fundamentals **-** Principles of Heat transfer – Conduction, convection, radiation, Thermodynamics.

Document any traditional context where passive system for thermal comfort is implemented.

MODULE II (11 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 - Thermal Comfort- Human comfort,

comfort chart - Standard requirements of ventilation for different conditions of living and work. Conditions for comfort - Control of quality, quantity, temperature, and Humidity of air. Indoor Air Quality, Techniques and Adaptations of different climatic conditions. Effective temperature – Factors governing effective temperature.

MODULE III (12 hour)

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.

Exercise: *Site visits to study various air conditioning systems.*

MODULE IV (12 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.

Sustainable design approaches **-** Materials and systems for insulation, energy efficient techniques regarding HVAC systems.

Awareness of VRF system design, diversity factor in HVAC, district cooling system

Heating systems- modern sustainable solutions like heat pumps

Exercise: *Documentation and case studies of small scale and large-scale buildings, reading drawings, understanding notations, legends, symbols, and sizes.*

TOTAL HOURS-46

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2)	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module

Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.

Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Fifth

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-57	SPECIFICATION AND COST ESTIMATION	1-2-0	3	2022

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 required for the project.
- To equip the students with basic knowledge about property valuation.

COURSE OUTCOME

By the end of this course the students will be able to:

- Describe the concepts and methods of estimating project costs.
- Formulate the specification of various building materials.
- Perform the process of valuation.

TEXT BOOKS

- B.N. Dutta, Estimating and costing in Civil Engineering, USB publishers and distributers Ltd. New Delhi
- D.D. Kohli, RC Kohli, A textbook of Estimating and costing, S Chand Publishing, 2011
- Dr. S. Seetharaman, M. Chinnasamy, Estimation and Quantity Surveying, Anuradha Publications, Chennai

REFERENCE BOOKS

- BS Patil, Civil Engineering contracts and estimates, Universities press
- CPWD data book and schedule of rates
- V N Vazirani & S P Chandola, Civil engineering Estimating and Costing, Khanna Publishers.
- IS 1200 (1968), Methods of measurement of building and civil engineering works

MODULE I (12 hours)

- General Introduction- Quantity Surveying, Basic principles- Types of estimates - Detailed estimate, Revised estimate, Supplementary estimate, Maintenance estimate, Approximate estimate, Abstract of estimate. Explanation of terms- Contingencies, Work charged establishments, Provisional sum, Lump sum item.
- Specifications- Introduction, Purpose and basic principles. Types of specifications- General and Detailed specifications- Types of detailed specification.
- Detailed specification for building materials and execution of major items of work (Earthwork excavation for foundation, Masonry works, Concrete works, Finishing).

MODULE II (12 hours)

- Detailed estimate including measurements and calculation of quantities, abstract and preparation of various items of works for

RCC single storied buildings using centre line method.

- Long wall-short wall method (Concept only). Bar-bending schedule (Concept only)

MODULE III (12 hours)

- Analysis of rates – Introduction to the use of CPWD data book and schedule of rates.
- Preparation of data and analysis of rates for various items of work connected with building construction (Earthwork excavation for foundation, Masonry works, Concrete works, Finishing)

MODULE IV (12 hours)

- Valuation - Explanation of terms, Types of values, Sinking fund, Years purchase, Obsolescence, Depreciation - Straight line method, Constant percentage method, Sinking fund method.
- Valuation of real properties- Rental method, Profit based method, Depreciation method.
- Valuation of landed properties – Belting method, Development method, Hypothecated building scheme method

TOTAL HOURS: 48

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

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

Note:- For analysis of rate and cost estimation, unit rate and labour requirement should be given along with the questions in the question paper. No other charts, tables, codes are permitted in the examination hall. If necessary, relevant data shall be given along with the question paper.

SIXTH SEMESTER												
Course Code	**Subject**	**Group**	**Category**	**Credits**	**Hours Per Week** **			**Duration of Exam**	**Marks**			
					L	**T**	**P/S**		**W**	**J**	**C.A.**	**Total**
AR 22-61	Architectural Design-IV *	I	PC	10	0	1	9	0		200	300	500
AR 22-62	Interior Design	II	EC	4	1	0	3	3	100		100	200
AR 22-63	Building Materials & Construction -V	II	BS & AE	3	2	0	1	3	100		100	200
AR 22-64	Design Of Structures -II	III	BS & AE	3	2	1	0	3	100		50	150
AR 22-65	History of Architecture-V	III	PC	3	3	0	0	3	100		50	150
AR 22-66	Building Services-IV (Acoustics & Fire Fighting)	III	BS & AE	3	2	0	1	3	100		50	150
AR 22-67	Working Drawing	IV	PC	3	0	0	3	3			100	100
TOTAL				**29**	10	2	17		500	200	750	1450

* 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, C.A. - Continuous Assessment.

** One hour per week allotted to Library

Note:

One Hour of Building Services to be dedicated to applying knowledge to a design problem.

Semester: Sixth

Course No.	Course Name	L-T-P/D	Credits	Year of Introduction
AR 22-61	**Architectural Design-IV**	**0-1-9**	**10**	**2022**

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 namely HVAC, STP, electrification, fire and safety aspects etc.
- To study vertical circulation systems and design considerations for high rise buildings.
- To incorporate structural grids in to design.
- To create an awareness of green building design and sustainable architecture.
- To understand LEED, IGBC and GRIHA rating systems
- To inculcate the importance of construction in spatial planning, services integration in the context of design of High-rise and service intensive buildings.

COURSE OUTCOME

After the completion of this course, the students will be able to

- Incorporate green building rating systems in the design process.
- Gain knowledge on the integration of building services in the process of design.
- Explore advanced construction techniques and related structural details in design.
- Design and integration of varied functional spaces catering to multiple category of users in a single built space.

REFERENCE BOOKS

- Kerala Municipal Building Rules
- National Building Code
- Mili Majumdar, “Energy Efficient Buildings in India”
- S N Srinivas , “Implementing energy efficiency in buildings”
- 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.
- 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:

Projects may be public/semi-public, multi-storied commercial /mercantile, institutional, office/ business. A minimum of two projects may be given.

- Major -Projects shall have enough emphasis on advanced technology and the application of various building services, construction and circulation systems. These shall be hospital/ star rated hotel / large scale office building/ high rise apartment /shopping mall.

- Minor-The project can focus on aspects related to sustainable building planning and construction practices used in the Major project.

Process and deliverables:

- A detailed design program has to be formulated based on studies, site context and requirement of the project.
- Case studies of selected built forms to understand the details and application of green building concepts and advanced construction methods in design.
- Study of the various techniques of energy-efficient design and recycling technologies for water and wastes to be incorporated in the design proposals.
- Students have to incorporate detailing of various services, structural systems and vertical access systems such as elevators, escalators in design presentation.
- Students are expected to do the landscape layout in detail to develop appreciation of a holistic environmental design.
- Deliverable shall be computer assisted presentation drawings including graphical representation of concept explanation and design evolution, computer rendered perspectives, physical models etc.

TOTAL HOURS: 160

CONTINUOUS INTERNAL EVALUATION PATTERN:

Design exercises, projects, tests, and internal reviews: 270 Marks
Attendance: 30 Marks

Semester: Sixth

Course No.	Course Name	L-T-P/S	Credits	Year of Introduction
AR 22-62	INTERIOR DESIGN	1-0-3	4	2022

Course Objectives

- To introduce the principles and practices of interior design.
- To explore foundational concepts, historical perspectives, and practical applications through hands-on exercises and case studies.
- To provide a comprehensive understanding of spatial design principles, preparing students for the dynamic field of interior architecture.

Course Outcome

By the end of this course students will be able to

- Describe about the basics of Interior Design.
- Understand prevailing trends in materials and finishes.

Text books

- "Interior Design Illustrated" by Francis D. K. Ching and Corky Binggeli
- "The Fundamentals of Interior Design" by Simon Dodsworth

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 Design

Definition and Scope of Interior Design: Clarify the boundaries and intersections between interior design and architecture.

Historical Evolution: Evolution of interior design styles through different historical periods-Influential designers and movements emphasizing their impact on contemporary practice.

Design Process: Detailed exploration of the stages involved in interior design projects, including research, concept development, design

documentation, and implementation.

Exercise: *Analyze case studies of renowned interior design projects, highlighting the integration of design principles with practical considerations. Views- One point, two points, Birds-eye and worms-eye of interiors.*

MODULE II (13 hours)

Fundamentals of Interior Design

Client Engagement: Emphasize the importance of client collaboration, effective communication, and understanding client needs and preferences.

Space Analysis: Techniques for spatial analysis, including site evaluation, programmatic requirements, and circulation patterns.

Building Systems: Overview of building structures, materials, and systems, with a focus on their implications for interior design.

Technical Drawing: Introduction to technical drawing methods and conventions, with practical exercises in drafting plans, elevations, and sections.

Exercise: Spatial Transformation- Redesign a residential or commercial space to enhance spatial perception, incorporating design principles.

MODULE III (12 hours)

Spatial Organization and Human Factors

Space Planning: Principles of space organization, anthropometrics, and ergonomics, with an emphasis on creating functional and aesthetically pleasing interiors.

Human Interface: Selection and specification of materials, finishes, furnishings, and lighting to enhance user experience and accommodate diverse needs.

Interior Drawings: Designing flooring patterns, wall patterns, and ceiling patterns with detailed drawings and perspective views. Advanced techniques in interior drawing, including rendering, perspective drawing, and digital modelling.

Exercise: Preparation of interior drawing - design flooring pattern, wall pattern, ceiling pattern with its detailed drawings and perspective views.

MODULE IV (13 hours)

Design communication and Integration of MEP services in interior design.

Design Communication: Techniques for effective presentation and communication of design concepts, including digital rendering, 3D modelling, and multimedia presentations.

Integration of MEP services in interior design: Space planning based on services, aesthetic integration of MEP, layout preparation, sustainable MEP systems, technology integration.

Exercise: Prepare detailed drawings (Plans & Sections) of any space- Electrical, plumbing, HVAC

TOTAL HOURS-50

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments / Viva based on assignments - 60 marks
Two internal tests each of equal weightage - 30 marks
Attendance - 10 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Sixth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-63	**BUILDING MATERIALS AND CONSTRUCTION V**	**2-0-1**	**3**	**2022**

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

By the end of this course students will be able to

- Understand the properties of various building materials and their applications.
- Remember 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", Dhanpat Rai & 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 6 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 (12 hours)

STUDY OF ADVANCED CONCRETE

Concrete types -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.

Exercises: Study the specifications of concrete from relevant BIS codes.
Market study: Different admixtures and method of application.

MODULE II (13 hours)
ADVANCED STRUCTURAL CONCEPTS IN ARCHITECTURE
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.
Shell structures and domes: Construction methods
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.

Exercises: Study the specifications from relevant BIS codes.
Sketches : Folded pate, Post tensioned slab, Pre tensioned slab, Portal frame.
Case study : Studying different structure types and detailing.

MODULE III (10 hours)
PRE-FABRICATION & MODULAR CO-ORDINATION
Modular co-ordination: Introduction to concepts of Modular Coordination. Definition of Basic Module. Modular controlling dimensions, Planning Modules.
Prefabrication: Introduction to concepts of prefabrication, Advantages and disadvantages of onsite & off-site prefabrication, Methods of prefabrication, Process of prefabrication,Various issues related to prefabrication industry , Examples of prefabrication concepts.
***Exercise: Literature study of the projects with prefabrication or modules*.**

MODULE IV (10 hours)
DAMP PROOFING, CONSTRUCTION JOINTS
Damp proofing: Damp proofing materials, 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.
Exercises: Study the specifications from relevant BIS codes.
Sketches: construction joints, expansion joints,

DPC for foundation, walls, roofs.

TOTAL HOURS-45

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments / Viva based on assignments - 60 marks
Two internal tests each of equal weightage - 30 marks
Attendance - 10 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Sixth

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-64	DESIGN OF STRUCTURES-II	2-1-0	3	2022

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

By the end of this course students will be able to

- Perform the analysis and design of steel structural elements.
- Apply relevant IS codes for structural analysis and design

Text books

- 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.

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 bolted and welded connections. (Moment connections not required)

MODULE II (12 hours)

- Design of tension member – plate, single angled member
- Design of laterally restrained beam

MODULE III (12 hours)

- Compression Member- Design of Strut-normal sections, single angled

sections.
- Solid and Built-up Columns for axial load-
- Battens and lacing (Theory only).

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

TOTAL HOURS: 48

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

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

Note: The following codes are permitted in the examination hall.

- 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

Semester: Sixth				
Course No:	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR22-66	**History of Architecture V**	**3-0-0**	**3**	**2022**

COURSE OBJECTIVES

To help students understand design principles that shape innovative architectural styles and forms.

COURSE OUTCOME

By the end of this course students will be able to Interpret various design philosophies of Colonial, Post-independence and Contemporary architecture in India.

REFERENCES

- Lang, J. T., Desai, M., & Desai, M. (1997, January 1). Architecture and Independence. Oxford University Press, USA.
- Metcalf, T. R. (2002, January 1). An Imperial Vision.
- Bahga, S., & Bahga, Y. (1993, January 1). *Modern Architecture in India*.
- Tadgell, C. (1990, January 1). *The History of Architecture in India*.
- Kagal, C. (1986, January 1). *Vistāra The Architecture of India*.

MODULE I (10 Hours)

ARCHITECTURE IN COLONIAL INDIA

Indo-Saracenic Architecture.

Colonial architecture in the cities of:

- Kolkata : St.Pauls Cathedral, Victoria Memorial;
- Chennai: University of Madras Senate House, Ripon Building, MGR Central railway station Chennai;
- Mumbai: Chhatrapati Shivaji Maharaj Terminus, Eros Cinema.
- New Delhi : Contribution of Edwin Lutyens and Herbert Baker to the lay-out and Architecture of New Delhi - Rashtrapathi Bhavan and Parliament House.
-

MODULE II (10 Hours)

POST-INDEPENDENCE MODERNIST ARCHITECTURE

Criticisms on the modern movement in India, countering the stigma of colonialism, the community architectural movement, the Neo-Vernacular-integrating the new and the old and Postmodernism.

MODERNIST ARCHITECTURE OF THE NEHRU ERA

- Le 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.

Modernism, Utilitarian modernism, Brutalism and Neo-modernism.

MODULE III (10 Hours)

MODERNISM AFTER CORBUSIER AND KAHN

- Joseph Allen Stein-India Habitat Center, Delhi; Triveni Kala Sangham, Delhi.
- Laurie Baker -Loyola Chapel Trivandrum; CDS Trivandrum.
- Charles Correa - Gandhi Smarak Sangrahalaya; Ahmedabad,

Kanchanjunga 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, Ahmedabad; IIM Bangalore.
- Raj Rewal – Pragati Maidan New Delhi; Asian Games Village, New Delhi.
- Uttam C Jain - University of Jodhpur, Jodhpur.
- Hasmukh C Patel- Newman Hall, Ahmedabad.

MODULE IV (14 Hours)
WORKS OF CONTEMPORARY ARCHITECTS
Architects and their ideologies

- Poppo Pingel- Afsanah Guest House.
- Karl Damchen-The Brunton Boatyard Hotel, Kochi.
- Neelkanth Chhaya- Centre for Environmental Education, Ahmedabad.
- Christopher Benninger- Centre for Developmental Studies and Activities, Pune.
- Saprem Mani- The Vikas Community, Auroville.
- CNT – MindTree East Campus, Banglore.
- Vir.Mueller Architects- Institute of Engineering and Technology, Ahmedabad University.
- Sanjay Mohe –Titan Integrity Campus, Bangalore.
- Shirish Beri – Laboratory for the Conservation of Endangered Species, Hyderabad.
- Bijoy Jain-Ganka Maki Textile Studio.
- Bijoy Ramchandran-Bangalore International Centre.
- Chitra Vishwanath –The Atelier, Bangalore.
- Anupama Kundoo-Wall House, Auroville.

TOTAL HOURS: 44

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Sixth				
Course No	**Course Name**	**L-T/P-T**	**Credits**	**Year of Introduction**
AR 22-66	**BUILDINGSERVICES - IV (ACOUSTICS & FIRE FIGHTING SERVICES)**	**2-1-0**	**3**	**2022**

COURSE OBJECTIVES

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

- To understand the importance of acoustics in buildings.
- To get familiarized with various acoustical materials, their properties and their construction details.
- To integrate architectural design with acoustic considerations.
- To learn the basics of fire fighting.

COURSE OUTCOME

After the completion of this course, the students will be able to

- remember the fundamentals of acoustics.
- understand about Fire and Life safety.

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
- Barendra Mohan Sen – Fire Fighting . (2021).
- N Sesha Prakash . Manual Of Fire Safety (2017).
- National Building Code 2011 – Part 4 – Fire and Life Safety (Fire prevention).

Module 1 (10 hours)

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

Module 2 (12 hours)

Sound in Enclosed Space, Acoustical Construction: 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. Acoustic property of various materials. Technical details/drawings.

Module 3 (12 hours)

Reverberation: Reverberation-Calculation of reverberation time- sabine’s formula- acoustical defects in the enclosed spaces. Topography and sound propagation. Terminologies related to Acoustics (STC, NRC, Speech Privacy, Privacy Index, Articulation Index, Attenuation etc.).

Acoustic Design of Various Buildings – Auditorium, Theatre, Lecture Hall, Office, Hospital. Effect of noise in human being- air borne and structure borne noise- noise criteria- transmission loss.

Module 4 (12 hours)
Fire and life safety provisions in various buildings. Fire resistance of building elements, fire rating and assessment. Building bye-laws relating the fire and life safety provisions in the buildings. (NBC – *Fire prevention* and Kerala Building Rules - *Fire safety provisions for high rise buildings*). Active and passive firefighting systems. Firefighting equipment - automatic sprinklers, fire alarms, smoke detectors etc. Case study on firefighting systems in High Rise Buildings.

Activities
Seminar by Acoustic Consultants on Acoustic construction methods.
Seminar by Fire Consultants on Fire Fighting systems.

TOTAL: 46 hrs.

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2)	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

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: Sixth

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-67	ARCHITECTURAL DETAILING AND WORKING DRAWING	0-0-3	3	2022

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

By the end of this course students will be able to

- Create working drawings required for construction of a building project.
- Integrate technical aspects of construction in architectural design.

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 of architectural working drawings. 4th Ed. Hoboken: John Wiley & Sons.
- IS 1200(1968), Methods of measurement of building and civil engineering works
- Styles, Keith; Bichard, Andrew; Working Drawings Handbook, RIBA

MODULE I (10 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, 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 various topics.

MODULE II (15 hours)

- Developing the design of a medium complexity building done by the student in the previous semester up to 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, floor plans, Detailed Part plans, Roof Plan /Terrace Plan, schedules etc.
  b. Excavation drawings, Foundation drawings, Centre -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)

- Details of joinery, finishing materials, built-in furniture, components like doors, windows, ventilators, wardrobe, storage cabinets, counters, fittings and fixtures etc. (done using different materials like Wood, steel, Aluminum, WPC...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 various topics.

TOTAL HOURS: 45

CONTINUOUS INTERNAL EVALUATION PATTERN:

Demonstrations / Presentations / Drawings (Course work)	- 50%
Records / Portfolio	- 20%
Final test / Viva	- 20%
Attendance	- 10%

SEVENTH SEMESTER											
Course Code	**Subject**	**Group**	**Category**	**Credits**	**Hours Per Week**			**Duration of Exam**	**Marks**		
					L	**T**	**P/S**		**W**	**J**	**C.A.**	**Total**
AR 22-71	Practical Training *	V	PE	20	N.A.			0		300	300	600
TOTAL				**20**	0	0	0		0	300	300	600

* 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, C.A. - Continuous Assessment.

Semester: Seventh				
Course No.	**Course Name**	**Duration in days**	**Credits**	**Year of Introduction**
AR 22-71	**Practical Training**	**100**	**20**	**2022**

Course objectives

The Practical Training course for students of architecture would help,

- To raise awareness about future responsibilities as a practicing architect.
- To gain experiences in the working and management of an architecture office.
- To familiarize themselves with office activities apart from designing/producing drawings.
- To use the opportunity to connect with and learn more from experts of allied services in preparing themselves for future practice.

Process and deliverables:

- The students shall undergo practical training for minimum 100 days, immediately after the completion of the 6th semester B.Arch. examinations as per the practical training manual.
- The training shall be under a CoA registered architect with minimum of 5 years professional experience and approved by the Dept of Architecture of the teaching institution.
- Copy of Monthly report of the work done has to be mailed to the department with in the first week of the subsequent month.
- Deliverables shall be
    - Training portfolio including the details of all the work and other documents connected with the projects handled in office and at site,
    - a work diary,
    - originals of monthly report,
    - Training Completion certificate stating their conduct and performance during the training period.

Internal Evaluation pattern:

Subject code	Deliverables	Internal Marks	Total Internal Marks
AR 22-71	Log sheets of attendance. Portfolio of drawings done in office.	200	300
	Field observation study of Architecture Design	50	
	Study on Bill of Quantities	25	
	Study report on office structure and management.	25	

External Jury evaluation will be as per the B.Arch Degree Course Manual for Practical Training.

EIGHTH SEMESTER												
Course Code	**Subject**	**Group**	**Category**	**Credits**	**Hours Per Week** **			**Duration of Exam**	**Marks**			
					L	**T**	**P/S**		**W**	**J**	**C.A.**	**Total**
AR 22-81	Architectural Design-V *	I	PC	12	0	1	11	0		200	300	500
AR 22-82	Urban Design	III	PC	3	3	0	0	3	100		50	150
AR 22-83	Elective-I	III	EC	3	3	0	0	3	100		50	150
AR 22-84	Building Economics & Sociology	III	PC	3	3	0	0	3	100		50	150
AR 22-85	Research Methodology	III	PC	3	3	0	0	3	100		50	150
AR 22-86	Environment Science in Architecture	III	PC	3	3	0	0	3	100		50	150
AR 22-87	Building Information Modelling	IV	PC	2	0	0	2				100	100
TOTAL				**29**	15	1	13		500	200	650	1350

* 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, C.A. - Continuous Assessment.

** One hour per week allotted to Library

Elective I

AR 22-83-1	Barrier Free Architecture
AR 22-83-2	Graphic and Product Design
AR 22-83-3	Sustainable Cities and Communities
AR 22-83-4	Cost-effective Architecture
AR 22-83-5	Road Safety and Civic Sense

Semester: Eighth				
Course No.	**Course Name**	**L-T-P/D**	**Credits**	**Year of Introduction**
AR 22-81	**ARCHITECTURAL DESIGN-V**	**0-1-11**	**12**	**2022**

COURSE OBJECTIVES

- To enable the student to design multifunctional campuses or buildings with complex spatial organizations for a large user group across a section of a society.
- To introduce the campus planning principles through a comprehensive planning framework for the campus including its buildings, infrastructure, landscape, transportation network, microclimate etc.
- To understand circulation patterns in site and buildings having multiple entries and exits.
- To study and integrate building services in the planning and design of campus /housing projects.
- To understand the application of acoustics in Architecture design.
- To introduce concepts of inclusive design in public buildings.

COURSE OUTCOME

After the completion of this course, the students will be able to

- Create a master plan for a campus project, demonstrating and understanding of campus planning principles.
- Analyze the challenges of campus planning and develop design solutions that effectively integrate landscape and building services.
- Evaluate and apply sustainable design principles and strategies to campus building design.

REFERENCE BOOKS

- KMBR
- National Building Code
- Time Saver Standard for building types, McGraw Hill Co.
- Lee, K. E. (1984). Time Saver Standards for Site Planning. McGraw-Hill Ryerson.
- Jonathan Coulson, Paul Roberts, “University planning and architecture, the search for perfection”
- Tom Avermaete & Anne Massey “Hotel Lobbies and Lounges, The Architecture of Professional Hospitality”
- Saxena A. K., “Sociological Dimensions of Urban Housing and

Development “, Common wealth Publications, 2004
- Sally Lewis , “Front to Back ,a design agenda for urban housing”
- Richard Kintermann and Robert small, “Site planning for Cluster Housing”, Van Nostrand and Reinhold company, London/New York 1977.
- Correa, C. (2010). A Place in the Shade: The New Landscape and Other Essays. New Delhi: Penguin Books.
- Brooks, R. G. (1988). Site Planning: Environment, Process and Development. Michigan.
- Clapham, D., Clark, W. A. V. and Gibbs, K. (2012). The Sage Handbook of Housing Studies. London: Sage Publications.
- HUDCO publications – Housing for low income, sector model.
- Greater London Council. (1978). An Introduction to Housing Layout: A GLC Study.

Projects: Two projects - one minor and one major - shall be completed during this semester

Major Project: Projects may be on campus design, housing precinct, or convention cum exhibition center, addressing building efficiency, ecological issues through planning and design.

The minimum extend of land area for the project should be 5 acres.

Design should address the following

- Efficiency of a design space to conserve energy and resources.
- Use of different materials in design.
- Waste management in the overall operation of the campus/building.

Minor Project: Detailing of an auditorium / prototype housing unit/ banks/ restaurants/ plazas/ squares or detailing of any part of major project that address energy efficiency.

Process and deliverables

- Data collection from various reference books and relevant case studies (literature and live) and comparison drawn on different design aspects.
- Architectural programming to be deliberated on after prototype studies and analysis.
- Primary data collected on site, to be analysed with respect to the project requirements to derive a design concept and sketch master plan.
- Development of master plan integrating circulation paths, built forms, landscape and building services along with design development of built forms.
- Efficiency enhancing measures integrated into design could be listed and presented with appropriate calculations along with the

design.

- Deliverables shall be computer generated study, design presentation and detailed drawings. Scaled physical models etc.

TOTAL HOURS: 190

CONTINUOUS INTERNAL EVALUATION PATTERN:

Design exercises, projects, tests, and internal reviews**:** 270 Marks
Attendance: 30 Marks

Semester: Eighth

Course No.	Course Name	L-T-P/S	Credits	Year of Introduction
AR 22-82	URBAN DESIGN	3-0-0	3	2022

COURSE OBJECTIVES

- To create an understanding of urbanism and urban morphology as rising from various forces through history,
- To introduce key theories associated with urbanism and cities,
- To create awareness of contemporary urban issues and how they are addressed,
- To give exposure to ways of perceiving, documenting, and analyzing cities,
- To foster design sensitivity through contextual responses to nature and culture.

COURSE OUTCOME

By the end of this course, students will be able to:

- Analyze and explain the evolution and characteristics of urban forms, including their components and interdependencies.
- Compare and contrast key theories and concepts related to urbanism and apply them to contemporary urban issues and solutions.
- Evaluate different perspectives and methods for analyzing and interpreting contemporary urbanism.

TEXT BOOKS

- A.E.J. Morris (1996), 'History of Urban Form before the Industrial Revolution', Prentice Hall,
- Gordon Cullen (1978) 'The Concise Townscape', The Architectural Press,
- Michelle Provoost et al., (1999) 'Dutch town', NAI Publishers, Rotterdam,
- Donald Natson (2003), 'Time Saver Standards for Urban Design', McGraw Hill,
- Kevin Lynch (1960) 'The Image of the City' MIT Press,
- Rithchie. A, (2000) ‘Sustainable Urban Design: An Environmental Approach', Taylor & Francis,
- Tridib Banerjee, Anastasia Loukaitou-Sideris, Editors, (2014) 'Companion to Urban Design', Routledge,
- Paul D.Spreiregen, (1965) Architecture of Towns and Cities,

- Spiro Kostof ,(1991) The City Shaped: Urban Patterns and Meanings Through History
- Jan Gehl, (1987) Life Between Buildings: Using Public Space,
- Ian Bentley (1985), Responsive Environments,
- Alexander Christopher (1987), The New Theory of Urban Design

REFERENCE BOOKS / RECOMMENDED READINGS

- Sitte, Camillo (1945), The Art of Building Cities: City Building According to Its Artistic Fundamentals,
- Aldo Rossi, (1984), Architecture of the city, MIT Press,
- Anthony J. Catanese, James C. Snyder (1979), Introduction to Urban Planning, McGraw–Hill,
- Anuradha Mathu (2006), 'Deccan Traverses', Rupa,
- Arthur B. Gallion, Simon Eisner (2003), The Urban pattern, CBS Publishers,
- Charles Correa (2000), Housing and Urbanization, Urban Design Research Institute, Bombay,
- Cliff Moughtin, Rafael Cuesta, Christine Sarris and Paola Signoretta (2012), Urban Design: Method And Techniques, Routledge,
- Cliff Moughtin (2003), Urban Design: Street and Square, Routledge,
- Edmund Bacon (1976), 'Design of Cities', Penguin,
- Forbes Davidson, Geoffrey Payne (2000), Urban Projects Manual, Liverpool University Press,
- Geoffrey Broadbent (2003), 'Emerging Concepts in Urban Space Design', Taylor & Francis,
- Gosling and Maitland (1984), 'Concepts of Urban Design', St. Martin’s Press,
- Ian Bently, Alan Alcock, Paul Murrain, Sue McGlynn, Graham Smith (1985), Responsive environments A manual for designers, Architectural Press,
- Jane Jacobs (1992), The death and life of great American cities, Vintage,
- Jonathan Barnett (1982), 'An Introduction to Urban Design', Harper Row,
- Lawrence Halprin (1964), 'Cities', Reinhold Publishing Corporation, New York,
- Malcolm Moor (2006), 'Urban Design Futures', Routledge,
- Matthew Carmona, Tim Heath, Toner Oc and Steven Tiesdell (2010), PUBLIC PLACES - URBAN SPACES - The Dimensions of Urban Design, Architectural Press,
- Paul D.Spreiregen (1965), Urban Design: The architecture of Town

and Cities, McGraw – Hill,
- Shilpa Phadke, Shilpa Ranade, Sameera Khan (2011), Why Loiter? Women and Risk on Mumbai Streets, Penguin India,
- Sigfried Giedion (2008), Space, Time and Architecture, Harvard University Press,

MODULE I (12 hours)

Introduction to Urban Design, its definition, evolution, as a discipline interfaced between Architecture and Town Planning, Outline of forces shaping Urbanism - Urbanism of river valley civilizations, Morphology of pre-industrial European cities to include Greek and Roman cities, Medieval European towns, Renaissance urbanism and ideal cities, Outline of historic cities in India - Temple town urbanism - Mughal city form, Medieval cities of India, Colonial Urbanism in India

MODULE II (12 hours)

Introduction to and discussion of key texts and theories of cities and urbanism - Imageability and Lynch - Townscape and Cullen - Genius Loci and Schulz, Historic City and Rossi, Social Aspects of Urbanism and the Works of Jane Jacobs, William Whyte and Jan Gehl, Collage City and Colin Rowe,

Ian Bentley's Responsive Environments, John Lang, Camillo Sitte, Denise Scott Brown and Robert Venturi, Allan B Jacobs and Donald Appleyard, S, M,L,XL and Delirius New York by Rem Koolhaas, Christopher Alexander, Edmund Bacon, Peter Calthorpe, Rob Krier, Richard Rogers, etc., Discussions on Urbanism in South East Asia.

MODULE III (12 hours)

Introduction to terminologies related to the physical structure, interdependencies and movement networks of the city, Theories of urban spatial organizations, Aspects, and issues related to urbanism today through the study of literature and best practices/international case studies in urban design. Topics to include Urban decay, Change and renewal, Place-making, Heritage, Conservation, Identity, Suburban sprawl, etc.

MODULE IV (12 hours)

Introduction to study and interpretation of Indian Cities through an understanding from published studies/analysis, - Understanding, Analysis and Interpretation of the dynamic nature of cultural values in urban landscapes through urban layering studies that include Historical, Ecological, Morphological, Socio-cultural, Movement and Activity pattern. Tools and methods to include different types of maps/mapping, drawings,

sketches, photo documentation, reading, data collection, and analysis, using the latest technologies

TOTAL HOURS:48

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two Internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

Q1 - 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: Eighth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of introduction**
AR 22-83-1	**BARRIER-FREE ARCHITECTURE**	**3-0-0**	**3**	**2022**

Course Objectives

- To provide a well-rounded understanding of barrier-free design principles, practical considerations, and the legal and regulatory aspects involved in creating inclusive environments.

Course Outcome

By the end of this course, students will be able to

- Explain the fundamental principles of a barrier-free built environment and their application in design.
- Apply barrier-free design considerations and strategies to various building types.
- Analyze and implement standards and regulations stipulated by authorities for barrier-free design.

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)

Introduction to Barrier-Free Design

Background of the Subject-Historical context and evolution of barrier-free design principles, Understanding Types of Disabilities: Temporary, characteristic, and long-established conditions. Importance of a Barrier-Free Environment-Social, ethical, and legal aspects, Goals of Barrier-Free Design

Fundamental Principles for Designing Barrier-Free Built Environment-Universal design principles- Accessibility guidelines and standards.

MODULE II

Identifying and Addressing Barriers:
Typical Barri(12 hours)er Problems of the Disabled, Listing Common Barriers-Physical, sensory, and cognitive barriers.
Parking and Approaches-Design considerations for accessible parking and entry points, Travel Within Buildings-Navigating corridors, stairs, and elevators, Services and Hazards-Accessibility in service areas and addressing potential hazards.
Special Design Considerations for Various Building Types: Housing, Institutions, Public buildings, Transportation terminals, Outdoor spaces.

MODULE III (12 hours)
Construction and Maintenance Standards: Standards Considering Types of Disabilities-Tailoring design and construction standards to various disabilities, Mobility Devices-Designing spaces accommodating different mobility aids, Material Study-Choosing materials that enhance accessibility and safety, Techniques and Details for Design Elements-Detailed examination of ramps, handrails, signage, etc.
Case Studies-Analysing successful examples of barrier-free design.

MODULE IV (10 hours)
Regulatory Framework and Compliance
Objectives of Barrier-Free Standards-Understanding the goals and benefits of adherence to standards, Existing Standards-Global and local standards for accessibility.
Study of Norms and Bye-Laws by Central Government-Comprehensive review of regulations applicable to public buildings.
Implementation Challenges and Solutions-Addressing challenges in achieving compliance.
Emerging Trends in Barrier-Free Design-Technological advancements and innovations in accessibility.

TOTAL HOURS-42

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments / Viva based on assignments	- 20 marks
Two internal tests each of equal weightage	- 25 marks
Attendance	- 5 marks

UNIVERSITY EXAMINATION PATTERN
Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.

Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Eighth

Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 22-83-2	GRAPHICS AND PRODUCT DESIGN	3 - 0 - 0	3	2022

Course Objectives

- Enhance visual literacy and develop an appreciation for the aesthetic components of design
- Understanding users, defining their needs and defining the problem
- Generate possibilities for experiential and explorative learning in order to comprehend and attain a high degree of creative innovation and excellence

Course Outcome

By the end of this course, students will be able to

- Evaluate the impact of contextual and historical factors on the evolution of design.
- Analyze real-world problems in graphic and product design and apply design thinking principles to generate solutions.
- Create and evaluate products using a comprehensive understanding of the product development process.

Reference Books

- Tondreau, B. (2009). Layout Essentials: 100 Design Principles for Using Grids.
- Müller-Brockmann, J. (1996). Grid Systems in Graphic Design.
- Asimov Morris: Introduction to Design, Prentice hall, Englewood Cliffs, NJ, 1962
- Gail Greet Hannah, Elements of Design, Princeton Architectural Press, 2002
- Ulrich, Karl T., Eppinger, Steven D.; Product Design and Development, McGraw-Hill 1995, 2000, 2004
- Risatti, H. (2009). A theory of craft: function and aesthetic expression. University of North Carolina Press.
- Aaker, D. & Joachimsthaler, E. Chap. 2. Brand identity the
- cornerstone of the brand strategy.
- Baker, M. & Hart, S. (2007). Chap. 4. The product lifecycle in theory and practice.
- Roozenburg and Eekels, Product Design: Fundamentals and Methods, Publisher: John Wiley & Sons Inc; New Ed edition, 1995
- Wheeler, A. (2009). Designing Brand Identity. John Wiley & Sons.

MODULE I (8 hours)

GRAPHIC DESIGN

Overview of graphic design, historical perspective and evolution of design, design thinking approach, elements of design, principles of design, and principles of layout design

MODULE II (12 hours)

VISUAL LANGUAGE & VISUAL LITERACY

Introduction to the meaning, context, and significance of the elements and outcomes of designs in graphics, painting, and printing as related to design. Comprehending the relevance of symbols and images in design. Language of pictures and graphics. Basic psychological aspects of lines, forms, and colors; Unity of Forms: Gestalt Theory and Fundamentals of Composition

MODULE III (12 hours)

PRODUCT DESIGN

Introduction to product design, historical perspective and evolution of design, importance of new products, needs and desires, usage habits, and attitude study. brand management, brand identity, and brand image

MODULE IV (10 hours)

DESIGN PROCESS

Design thinking approach, product development lifecycle/ product lifestyle model, user experience design (UX), fundamentals of product design, product development process.

TOTAL HOURS-42

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments / Viva based on assignments - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any

one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Eighth

Course No.	Course Name	L-T-P/S	Credits	Year of Introduction
AR 22-83-3	SUSTAINABLE CITIES AND COMMUNITIES	3-0-0	3	2022

Course Objectives

- To provide students with a comprehensive understanding of the principles underpinning sustainable urban development and critically analyze the concepts to real-world urban challenges.
- To instill a sense of social responsibility, encouraging students to understand public participation.

Course Outcome

Upon completing this course, students will be able to:

- Explain the SDG goals, concepts, and theories related to sustainable cities and communities.
- Analyze the role of environmental considerations, such as energy efficiency, water management, and green spaces, in urban design projects.
- Evaluate the effectiveness of various green design strategies, such as passive solar design, green roofs, and sustainable materials, and apply them to the development of urban spaces and architectural projects.
- Create and evaluate strategies for community engagement and participatory design to effectively integrate community voices into urban plans.

References

- Sustainable Urban Development Reader by Stephen M. Wheeler and Timothy Beatley
- Sustainable Transportation Planning: Tools for Creating Vibrant, Healthy, and Resilient Communities by Jeffrey Tumlin
- Barry Dalal Clayton and Stephen Bass, Sustainable Development Strategies- a resource book, Earthscan Publications Ltd, London, 2002.
- Karel Mulder, Sustainable Development for Engineers - A Handbook and Resource Guide, Green Leaf Publishing, 2006.
- MoEF, Sustainable Development in India –stocktaking in the Run up to Rio plus 20, Ministry of Environment and Forests, Government of India, New Delhi. 2012,
- UNEP, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication, www.unep.org/greeneconomy, ISBN: 978-92-807-3143-9, 2011

Recommended Reading

- World Bank “Inclusive Green Growth – The pathway to Sustainable development, World Bank- Washington DC, 2012Issues and trends in Education for Sustainable Development: UNESCO Publication
- Digital Pedagogy for Building Peaceful & Sustainable Societies: Blue Dot Publication
- https://www.mdpi.com/journal/sustainability/special_issues/Entrepreneurship_Education

MODULE I (10 hours)

Fundamentals of sustainable urban development

Introduction to Sustainable Urban Development: Definition of sustainability in urban contexts, historical context of urbanization, United Nations Sustainable Development Goals (SDGs) related to cities, measuring sustainability in urban areas.

Urban Planning and Design: Urbanization trends and challenges, key principles of sustainable urban planning, smart city concepts and urban design, case studies in sustainable urban planning.

E’s of Sustainability - environmental, economic, social and cultural dimensions and its correlation to population growth. **“Three R’s**” of sustainability -Global, national & local relevance.

MODULE II (10 hours)

Sustainable services and mobility infrastructure

Sustainable Transportation: Role of transportation, public transportation systems and accessibility, active transportation (walking and cycling), sustainable urban mobility planning.

Green Transportation Technologies and policy: electric and hybrid vehicles, sustainable fuels and propulsion, transportation electrification, transportation policies and regulations for sustainability.

Sustainable Water Management and Resilience: Urban water challenges and the importance of sustainable water management, storm water management techniques, sustainable water supply systems, wastewater treatment and reuse in urban settings, building environmental resilience in cities

MODULE III (12 hours)

Social Sustainability: community engagement and environmental resilience

Community engagement and participation: The role of community engagement in sustainable urban development, participatory urban planning and decision-making, building community resilience in the face of urban challenges. Case studies in successful community engagement initiatives.

Social inclusion and equity: Social sustainability and inclusion in urban development, affordable housing, homelessness, and social equity

issues; strategies for promoting social equity in cities.

Green spaces and biodiversity: The importance of green spaces in urban areas, urban parks, greenways, and their role in sustainability, biodiversity conservation in urban environments, innovative green infrastructure solutions, including green roofs and walls.

MODULE IV (10 hours)

City Governance: resilience and adaptation in urban contexts, and smart cities

Introduction to City governance- understanding urban systems in municipal, regional and national governance. Governance for sustainability and its challenges.

Resilience and Adaptation: Understanding urban resilience and its significance in the face of climate change and natural disasters. Importance of resilient infrastructure, water management, and waste reduction systems. Strategies for enhancing urban resilience, including disaster preparedness and adaptive design.

Smart City - Introduction to smart city concepts, AI & IoT technologies, and data-driven urban management. Role of technology in improving urban sustainability and efficiency.

TOTAL HOURS: 42

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Eighth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-83-4	**COST EFFECTIVE ARCHITECTURE**	**3-0-0**	**3**	**2022**

Course Objectives

- To equip students with the knowledge and skills to design and develop cost-effective buildings and spaces that meet the needs of users while minimizing environmental impact and construction costs.
- To develop an understanding of different issues, types and techniques involved .

- Course Outcome
- Upon completing this course, students will be able to:
- Explain the principles of cost-effective design and construction
- Analyze building designs for cost-effectiveness
- Evaluate and select appropriate materials and technologies for cost-effective construction
- Create a cost-effective building or space that meets user needs and environmental sustainability goals

References

- "Cost-Effective Architecture" by Ashraf Salama
- "Sustainable Architecture: A Critical History" by James Steele
- "Building for a Sustainable Future" by Brian Edwards
- "The Cost-Effective Home" by Michael Tamblyn
- Low cost housing in developing countries by G. C. Mathur
- How to reduce building costs by Laurie Baker

Recommended Reading

- How the other half builds – Vol 1, 2 & 3 by Vikram Bhatt et al.
- National Building Code of India, 2005 – PART 3 – ANNEX C, E & F
- Laurie Baker – Life, work, writings by Gautam Bhatia
- CBRI Publications – Book 1-9
- Low Cost Housing competitions 1974 – 96 by HUDCO
- "The Power of Pro Bono: 40 Stories About Design for the Public Good by Architects and Their Clients"Editor: John Cary

MODULE I (10 hours)

Introduction to Cost-Effective Architecture

Overview of cost-effective design and construction principles - Need for cost effective construction – Low cost vs. Quality - Factors affecting construction costs and environmental impact– land, space, materials, design, construction techniques, construction time & labour - Case studies of cost-effective buildings and spaces

MODULE II (10 hours)
Design Strategies for Cost-Effectiveness - Building orientation and layout for energy efficiency - Site planning and Architectural Design as tools for Cost Effective Architecture –norms for economically weaker sections--effectiveness - Space planning and optimization techniques

MODULE III (12 hours)
Cost-Effective Building Systems and Materials - Overview of building systems and materials- Cost-effective options for walls, floors, roofs, and window - Material selection and specification for cost- Sustainable materials and technologies - Ways to cut down the use of unwanted building materials.

MODULE IV (10 hours)
Case Studies and Design Project- comparative cost analysis with conventional projects. In-depth analysis of cost-effective building case studies- Design project: Students will design a cost-effective building or space that meets user needs and environmental sustainability goals.

TOTAL HOURS: 42

CONTINUOUS INTERNAL EVALUATION PATTERN:
Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN
Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Eighth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of introduction**
AR 22-83-5	**ROAD SAFETY AND CIVIC SENSE**	**3-0-0**	**3**	**2022**

Course Objectives

- To introduce the concepts, principles, tools and aids of Road Safety and Civic sense
- To acquaint them with the design and safety standards for roads.
- To inculcate the practice of safe road behaviour and civic sense among them.

Course Outcome

By the end of this course students will be able to

- Apply principles of civic sense and road safety measures in real world situations
- Analyse the design standard of roads, traffic signs and traffic control aids to evaluate their effectiveness in promoting road safety.

Reference Books

- R Srinivasa Kumar, Introduction to Traffic Engineering
- LR Kadiyali, Traffic engineering and Transport Planning
- Book on Road Safety Signage and Signs, Ministry of Road Transport and Highways, Government of India
- MORT&H Pocketbook for Highway Engineers, 2019 (Third Revision)
- Publications by UTTIPEC namely, Street Design Guidelines, UTTIPEC Guideline for Road Markings, UTTIPEC Guideline and Specification for Crash Barriers, Pedestrian Railing and dividers, UTTIPEC Standard Typical Crossing Design
- Street Design Standards as provided in TimeSavers, Neuferts etc.
- Publications by Indian Road Congress

MODULE I (11 hours)

Introduction to Road Safety

Road as an active space, Types of Users, User Behaviour, Sensory Factors like Vision and Hearing in User behaviour.

Types of Vehicles: Heavy vehicles, Light motor Vehicle, Two Wheelers, Auto Rickshaw, Bicycles and Cycle Rickshaw, Non-motorized vehicles

Vehicle characteristics: Dimensions, weight, turning radii, braking distance, lighting system, Tyres etc. Types of Hazards: Conflicts and Accidents.

Typology of Roads: Components of Design

Road classification: National Highways, State Highways, District Roads (MDR and ODR), Village roads, Urban Road classification: Expressways, Arterial,

Sub-Arterial, Collector, Local, Service Roads, One-way, Two-way etc. Mountainous Roads, Speed limits of the Road types.
Design of Roads: Cross-sectional Elements- Right of Way, Carriageway, Median, Shoulders, Sidewalk, Lanes, Cycling Track, Green Strip, Curbs, Camber etc. Spatial Standards for the Cross- section Design, Relationship between road design and road safety.

MODULE II (11 hours)

Intersections

Types of Road Intersections: Basic Forms of at-grade Junctions (T, Y, Staggered, Skewed, Cross, Scissors, Rotary etc. Grade Separated Junctions (with or without interchange): Three-Leg, Four-leg, Multi-leg etc.
Design of Intersections: Design and Spatial Standards for Traffic Islands, Turns, Turning Radii, Directional Lanes, Pedestrian Crossings, Median Openings, Traffic Claiming Components like speed brakers and table-top Crossings etc.
Design Considerations for Diverging, Merging and Weaving Traffic.
Location and Design for Traffic Signals.

Pedestrian Circulation and Barrier Free Design

Requirement of Pedestrian Infrastructure: Sidewalks and Footpaths, Recommended Sidewalk widths, pedestrian crossings, pedestrian bridges, subways, cycle tracks etc.
Barrier free design: Location and Design standards for ramps for wheel chair access, other provisions like Tactile for Visually Challenged etc.
Safety provisions: Pedestrian Railings, Anti-skid Flooring, Pedestrian Signal, Walk Button etc.

MODULE III (11 hours)

Traffic Signs and Road Markings:

Type of Traffic Signs:
Standards for Traffic Signs: Location, Height and Maintenance of Traffic Signs
Types of Road Markings: Centre Lines, Traffic Lane lines, Pavement Edge lines, no overtaking zone markings, Speed markings, Hazard markings, Stop lines, Pedestrian Crossings, Cyclist crossings, Route Material, Colour and Typography of the markings.

Traffic Signals, Traffic Control Aids, Street Lighting

Traffic Signals: Introduction, Advantages and Disadvantages
Signal indications: Vehicular, Pedestrian and Location of the Signals
Signal Face, Illustration of the signals. Red, Amber, Green Signals and its significance, Flashing signals, Warrant of Signals, Co-ordinated control of signals.
Traffic Control Aids: Roadway Delineators (Curved and Straight Sections), Hazard markers, Object Markers, Speed Breakers, Table Top Crossings,

Rumble Strips, Guard Rails, Crash Barriers etc.

MODULE IV (11 hours)

Road Safety and Civic Sense

Need for Road Safety, Category of Road Users and Road Safety Suggestions
Introduction to Concept of Civic sense and its relationship to Road safety: Importance of Civic sense, Road Etiquettes and Road User Behaviour, Rules of Road, Right of the way, Providing Assistance to Accident Victim, Sensitization against Road Rage

Traffic Regulations, Laws & Legislations

Indian Motor Vehicles Act (Chapter VIII; Control of Traffic to be discussed in detail)
Regulations Concerning Traffic: Cycles, Motor cycles and Scooters, Rules for Pedestrian Traffic, Keep to the Left Rule, Overtaking rules, Turning rules, Priority rules, Hand signals etc.
Speed and Hazard management. Penal provisions
National Road Safety Policy, Central Motor Vehicles Rules, State Motor Vehicle Rules
Introduction to Good Practices.

TOTAL HOURS-44

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN

Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Eighth

Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 22-84	BUILDING ECONOMICS AND SOCIOLOGY	3-0-0	3	2022

Course Objectives

- To enable students to contribute to the economic efficiency of construction through project lifecycle in conjunction with its stakeholders.
- To inculcate concepts of applied economics towards making informed decisions on strategy both for developers and for the construction firms.
- To empower students with basic knowledge on society, culture and its influence on architecture.
- To analyse and evaluate urban and rural communities, their structure and architecture, to be able to situate architecture as a responsible and reflective practice.

Course Outcome

Upon completing this course, students will be able to:

- Apply economic analysis to evaluate the construction property industry.
- Analyze the impact of the economic environment on social and environmental issues related to the architecture and construction industry.
- Analyze the influence of society and culture on architecture.
- Evaluate the role of architects in understanding and responding to the social and cultural contexts of urban and rural communities, including their structure and architecture.

Text books

- Rappaport, Amos (1969) Houses forms and culture, Prentice-Hall, London
- Delanty, Gerard (2010) Community, Routledge, London
- Gisbert, P (2010) Fundamentals of Sociology, Orient Blackswan, Hyderabad
- Rappaport, Amos (2005) Culture, Architecture and Design, Locke Science Publishing Company, Chicago
- Sloman, J., Norris, K. et al (2014), Principles of Economics, 4th Edition, Pearson Australia
- Mann, Thorbjoern (1992). Building Economics for Architects, Wiley & Sons.
- Briscoe, G (1988). The Economics of Construction Industry, Mitchell, London.
- Raftery, J. (1991). Principles of Building Economics, BSP Professional Books, London.
- Ferry, J.D., Brahdon, S.P (1994). Cost Planning of Buildings, BSP Professional Books, London.

Reference Books / Recommended Reading

- Jones, Paul (2011). **The Sociology of Architecture: Constructing Identities**. Liverpool University Press.
- Rao, MSA (1990) **Urban Sociology in India**, Orient Blackswan, Delhi
- Openstacks College (2012) **Introduction to Sociology**. Openstacks College.
- Dharwadker, Vinay (1999) **The collected essays of A.K. Ramanujan**, Oxford India, Delhi
- Eliot,T.S (1962) **Notes towards a definition of culture**, Faber and Faber,London
- Fathy, Hassan (1973) **Architecture for the Poor: An Experiment in Rural Egypt,** The University of Chicago, Chicago.
- Jain, Kulbhushan (undated) **Hill Settlements: Kumaon and Nilgiri, Monograph Four**, School of Architecture, CEPT Ahmedabad.
- Sainath,P (1996) **Everybody loves a good drought, stories from India's poorest districts**, Penguin Books, India.
- Suresh, M (2009) **Negotiating Placeness: Tribal Communities in Western Ghats**, Working Paper:9, Centre for social studies, Surat.
- Desai, Madhavi (2008) **Gender and built environment in India**, Taylor and Francis, Delhi
- Espegel, Carmen (2018) **Women Architects in the Modern Movement**, Taylor and Francis, Portugal
- Myers, D (2013). **Construction Economics: A New Approach,** Taylor & Francis Group.
- Menipaz, E., Menipaz, A. (2011). **International Business.** SAGE London.

MODULE I (14 hours)

Introduction to Building Economics. Nature of Construction Firms and Industry - Micro-economic principles for construction business, Macro-economic concepts and their relevance to construction industry. Environmental Economics – Domestic and International Construction Business, Construction Market Characteristics. Construction Project Supply Chain. Functions of Real Estate Development – Project Formulation, Feasibility Studies. Project Economics – Economics of Basic Inputs to Construction Projects, Labor Intensive vs Capital Intensive Projects.

MODULE II (10 hours)

Building Costs – Initial Costs, Cost and Cost Indices, Lifecycle Costs, Total Cost of Construction, Time Value of Money, Different sources of Financing Buildings. Capital, Interest and Profits – Concepts of interest and capital, IRR, Present Value of Assets and Equipment, Payback, Return on Investments. Economic Analysis of Projects – Cost control, Cash Flow Analysis, Cost Projection, Cost Benefit Analysis. Alternative Real Estate, Real Estate Investment Trust.

MODULE III (14 hours)

Definition of Culture, Nature and Scale of Culture, Importance of Culture and

Architecture, Ethnography-ethnographic mapping, Case examples of Ethnographic studies in architecture, Spatial Ethnography, Basic tools and methods. Reading culture through architectural plans and sections. Cultural mosaic in urban and rural areas.

MODULE IV (10 hours)
Understanding Society and social structure. Relationship between architecture (formal and functional) and social structure. Definition of Communities. Architecture of Rural Communities. Architecture of urban communities such as slums, ghettos, gated. Social exclusions and stratifications. Reading Architecture through caste lens in India. Reading Architecture through class lens in India. Gender and Architecture.

TOTAL HOURS: 48

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN
Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Eighth

Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 22-85	**Research Methodology**	**0-3-0**	**3**	**2022**

Course Objectives

- To empower students to undertake independent research in architecture.
- To facilitate critical thinking among architecture students
- To offer exposure to research tools in architecture, art, social sciences, pure sciences etc.

Course Outcome

By the end of this course students will be able to

- Identify and explain the different stages in architectural research.
- Improve reading, writing and research skills.
- Apply research theory to develop a research proposal.
- Design and conduct independent research on an architectural topic.

Text books

- Luca,Ray. *Research Methods for Architecture*. London: Lawrence King Publishing. 2016.
- Groat, Linda and David Wang. *Architectural Research Methods*. New York: John Wiley&Sons.2002

References:

- Laurel, Brenda. *Design Research: Methods and Perspectives.* Cambridge: The MIT Press. 2003.
- Booth, Wayne C., Gregory G Colomb, Joseph H Williams, Joseph Bizup and William T Fitzgerald. *The Craft of research.* Chicago: University of Chicago Press. 2016.
- Muratovski, Gjoko. *Research for designers: A guide to methods and practice.* California: SAGE Publications Ltd. 2015.

MODULE I (14 hours)

Introduction to Research

Research in Architecture. Systems of Inquiry. Strategies and Tactics. Research Quality. Framing research questions. Ethics and Plagiarism

Activity: Students should submit their Dissertation research topic to the tutor in the form of a initial research proposal (500 words) that includes 1. Proposed title 2. Need for research

MODULE II (10 hours)

Introduction to Literature Review

Literature Review. Annotations and close reading. Facts and Ideas. Primary and Secondary Sources. Organizing Literature Review. Citation and Referencing. Referencing Style. Bibliography.

Activity: Students should submit a list of books, journal, online sources, multimedia and all other sources and write a detailed Literature review pertaining to the dissertation topic to identify the gaps in literature, and to strengthen their argument for need for research.

MODULE III (14 hours)
Introduction to theory, methods and methodology
Theorizing Architecture. Hypothesis. Method and Methodology. Qualitative Methods. Quantitative Methods. Case Methods. Historical Research Methods. Simulation and Modeling. Combined Strategies
Activity: Students should generate an approach diagram clearly indicating proposed methods and overall methodology followed.

MODULE IV (10 hours)
Introduction to Writing
Writing Research in Architecture. Different formats: Reports, Dissertation, Technical paper, Journal article etc. Writing Research Proposal. Role of extended literature review. Writing Aim and Objectives of Research.
Activity: Students must submit a Dissertation Proposal (not less than 10 A4 pages with Title, Need for Study, Aim, Objectives, Research Questions, Approach and Methodology, Literature Review towards the end of this course. The tutor needs to organize a proposal defense which will be considered as 0^{th} review for dissertation course in Semester 09).

TOTAL HOURS: 48

CONTINUOUS INTERNAL EVALUATION PATTERN:
Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN
Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Eighth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of introduction**
AR 22-86	**ENVIRONMENT SCIENCE IN ARCHITECTURE**	**3-0-0**	**3**	**2022**

Course Objectives

- To understand environment, and its interrelationship with living organisms.
- To assess the importance of environment by assessing its impact on humans and to envision the surrounding environment, its functions and its value.
- To evaluate the dynamic processes and features of the earth's interior and surface.
- To understand about integrated themes and biodiversity, natural resources, pollution control and waste management.
- To analyze scientific, technological, economic and political solutions to environmental problems.

Course Outcome

By the end of this course students will be able to

- Demonstrate sensitivity towards the environment by considering environmental impacts in design decisions.
- Explain the role of public awareness and participation in addressing environmental issues.
- Analyze and apply relevant environmental acts, laws and policies to architectural projects.
- Integrate environmental considerations into the design and constructions of buildings.

Text books

- Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
- Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.

Reference Books

- R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
- Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopaedia', Jaico Publ., House, Mumbai, 2001.
- Dharmendra S. Sengar, 'Environmental Law', Prentice hall of India PVT LTD, New Delhi,2007.
- Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.

MODULE I (12 hours)

Natural Systems, Environment, Ecosystems and Biodiversity

Definition, scope and importance of environment, Understanding environmental issues, Environmental impacts of the construction industry

Use and Exploitation of Natural Resources like Forest resources, Water resources, Mineral Resources, Food Resources, Energy Resources, Land Resources

Concept of an ecosystem. Structure and function of an ecosystem – producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction to biodiversity. Definition and types- genetic, species and ecosystem diversity. Bio geographical classification of India. Value of biodiversity. Biodiversity at global, national and local levels. Hot-spots of biodiversity. Threats to biodiversity - habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity - In-situ and ex-situ conservation of biodiversity.

MODULE II (12 hours)

Environmental Pollution

Impact of Pollution on Natural and man-made environments

Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards.

Soil waste management. Causes, effects and control measures of municipal solid wastes.

Pollution case studies – disaster management: floods, earthquake, cyclone and landslides

Built environment and its relation to environmental pollution, both as a cause and as a response.

Environment Impact Assessment, benefits of EIA

Activity: Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

MODULE III (12 hours)

Urban ecology

Concepts of urban ecology and landscape urbanism- the urban climate, the Urban Temperature, Urban heat island phenomenon- Impacts of Urban Design on Urban Climate- Cities as contributors to climate change- guidelines and strategies on urban climate- ESZ (Eco Sensitive Zone), CRZ (Coastal Regulation Zone), RRZ (River Regulation Zone)

MODULE IV (12 hours)

Environmental considerations in architecture

Strategies to transform the built environment to meet the risks of climate change;

Reduce heat absorption in buildings, increasing vegetation, Integration of Renewable Energy Systems in built environment.
Environmental Buildings: Interactions between buildings and environment, Climate considerations, Energy Conservation, Alternative energy sources. Energy efficiency, Thermal Insulation, Ventilation
ECBC (Energy Conservation in Building Code), Scope, Purpose, Benefits.
Biomimicry - the study of natural structures and processes- in helping to solve man-made problems and enabling design;
Exercise: Case Studies of Buildings for studying environmental considerations in architecture

TOTAL HOURS-48

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN
Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester Eighth

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
AR 22-87	BUILDING INFORMATION MODELING	0-0-2	2	2022

Course Objective

- To understand the role and potential of BIM for the construction industry
- To acquire knowledge to compete in a highly demanding market
- To equip students with comprehensive knowledge and practical skills in Building Information Modelling (BIM)

Course Outcome

At the end of the course students will be able to:

- Explain the principles of Building Information Modelling (BIM) and their applications in the construction industry
- Utilise BIM software, including Rhinoceros + Grasshopper (with BIM plugins), Autodesk BIM 360, and Autodesk Revit, to manage the design process.
- Conduct building performance analysis using BIM-based tools and create visualizations using BIM software.
- Analyse and address legal and ethical considerations related to BIM implementation.
- Evaluate and integrate emerging technologies with BIM to enhance design and construction processes.

Reference Books

- "Building Information Modeling: A Guide to Autodesk Revit" by Autodesk
- "BIM for Architects: A Guide to Building Information Modeling" by Francis D.K. Ching
- "Mastering Autodesk Revit" by Paul Munford
- Building Information Modeling For Dummies. Stefan Mordue, Paul Swaddle, and David Philp
- Practical BIM: A Guide to Implementation for Architecture, Engineering, and Construction. Eilif Hjelseth and Steve Pittard. Routledge, 2021

Module I (10 hours)

Introduction to Building information modeling - Definition, Applications, Various digital software and media, BIM for building energy simulation: BIM enabled energy modeling tools, BIM for cost estimating, project phasing and administration, software/ tools used, BIM vs. Traditional CAD Systems

For Laboratory session:

Demonstrating and familiarizing students with at least one BIM software.

Module II (10 hours)
Applying BIM in the Design Process- exploring different softwares and setting up their plugins-using BIM for project management- visualization

Module III (10 hours)
Design Development and Analysis – Using BIM for design iterations, analyzing building performance using BIM-based tools (e.g. energy analysis, daylighting analysis), Best Practices for Effective Visualization and Analysis

Module IV (10 hours)
Legal, Ethical, and Emerging Technologies in BIM - Ethical Considerations in BIM Implementation - Understanding integrated project delivery (IPD) and BIM's role in it - Future Directions and Innovations in BIM

Final Project and Presentation
Developing a Comprehensive BIM Project incorporating the software learnt.

TOTAL HOURS: 40

CONTINUOUS INTERNAL EVALUATION PATTERN:

- Demonstrations / Presentations / Drawings (Course work) - 50 marks
- Records / Portfolio - 20 marks
- Final test / Viva - 20 marks
- Attendance - 10 marks

NINTH SEMESTER												
Course Code	**Subject**	**Group**	**Category**	**Credits**	**Hours Per Week** **			**Duration of Exam**	**Marks**			
					L	**T**	**P/S**		**W**	**J**	**C.A.**	**Total**
AR 22-91	Architectural Design-VI *	I	PC	12	0	1	11	0		200	300	500
AR 22-92	Human Settlement Planning	III	PC	3	3	0	0	3	100		50	150
AR 22-93	Construction & Project Management	III	PE	3	3	0	0	3	100		50	150
AR 22-94	Professional Practice	III	PE	3	3	0	0	3	100		50	150
AR 22-95	Elective-II	III	EC	3	3	0	0	3	100		50	150
AR 22-96	Dissertation	V	PE	3	0	3	0	3		100	100	200
TOTAL				**27**	12	4	11		400	300	600	1300

* 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, C.A. - Continuous Assessment.
**3 hours shall be allotted to Library/ Pre-Thesis Discussions

Elective II

AR 22-95-1	Disaster Mitigation and Management
AR 22-95-2	Green Buildings and Rating systems
AR 22-95-3	Architectural Conservation
AR 22-95-4	Building Performance and Compliance

AR 22-95-5 Services in High rise Building

Semester: Ninth				
Course No.	**Course Name**	**L-T-P/D**	**Credits**	**Year of Introduction**
AR 22-91	**Architectural Design-VI**	**0-1-11**	**12**	**2022**

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 dimensions such as heritage, gender, class, dynamics of urban growth of the built environments.
- To enable students to understand different types of visual survey at urban level
- To help students to understand the role of Master plan, Demography and administrative setup including Local governing bodies in the process of urban development.
- To enable the students to address issues in urban areas – transportation, sustainability, heritage, sprawl, place making, identity, collective memory and mixed use

COURSE OUTCOME

By the end of this course students will be able to

- Perceive buildings as part of a larger urban fabric emphasizing on the interrelationships between the disciplines of architecture, urban design and town planning.
- Understand structure of a city by studying basic urban parameters.
- Develop urban design interventions respecting existing fabric and identity of the place.
- Develop guidelines and policies for urban development authorities.

REFERENCE BOOKS

- Kerala Municipal Building Rules
- National Building Code of India, Vol. 1-5, 2005.
- Architecture of Towns and Cities – Paul D.Spreiregen
- Community Design and Culture of Cities – Eduardo E. Lozano

- Architecture of Towns and Cities – Paul D.Spreiregen
- Social life of small urban spaces, W H Whyte
- 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
- 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 Architecture of Cities – Rossi, Aldo
- The Concise Townscape – Cullen, Gordon
- Kevin Lynch, Site Planning, MIT Press, Cambridge, 1984.
- 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.

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.

Process and deliverables:

- Projects where there is an exploration of buildings in the urban context with a thrust on understanding inter dependencies 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.

TOTAL HOURS: 190

CONTINUOUS INTERNAL EVALUATION PATTERN:

Design exercises, projects, tests, and internal reviews**:** 270 Marks

Attendance: 30 Marks

Semester: Ninth				
Course No.	**Course Name**	**L-T-P/D**	**Credits**	**Year of introduction**
AR 22-92	**HUMAN SETTLEMENT PLANNING**	**3-0-0**	**3**	**2022**

COURSE OBJECTIVES

Human Settlement Planning course for students of architecture would,

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

COURSE OUTCOME

By the end of this course students will be able to

- Explain the importance of Human Settlement Planning and its key concepts.
- Analyze and compare various planning regulations in India.

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”.
- G. K. Hiraskar, “Fundamentals of Town 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”.
- Kerala Town &Country planning Act 2016

Module I (12 hours)

History & evolution

Origin and evolution of Human settlements: Town planning concepts in ancient, medieval, renaissance, industrial & post-industrial age with case examples, Town planning in India: ancient, medieval, colonial and modern period with case examples

Development of new towns and cities: Chandigarh and Navi Mumbai.

Planning theories of Post-industrial age: Contributions by Patrick Geddes, Ebenezer Howard, C A. Doxiadis, Lewis Mumford, Le Corbusier and

Clarence Stein.

Module II (12 hours)
Need for town planning
Urban planning terminologies: Urban areas, peri-urban areas, CBD, Nodes, Conurbation, sprawl, Ribbon development, fringe areas and suburbs. Impact of Urbanization on cities, Urban Rural Continuum - Contemporary urban problems: growth and changes, overcrowding, slums, Need for sustainable city planning.

Module III (12 hours)
Urban development planning system and process
Regional Plan, Master plan, Development Plan, Local area 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
Environment protection Act, Land Acquisition Act - 74th Amendment Act - Coastal
Regulation Zones and its relevance – SEZ – JNNURM, Kerala Town & Country planning Act
2016 etc.
Land use Plan Tools for land use control - Zoning regulations, building byelaws, Subdivision regulations, Plot reconstitution, Betterment Tax.

TOTAL HOURS: 45

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Ninth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-93	**CONSTRUCTION AND PROJECT MANAGEMENT**	**3-0-0**	**3**	**2022**

Course Objectives

- To impart project management skills with particular reference to construction management.
- Learn to formulate projects while dealing with all organizational, technical, financial, human resource and quality issues.

Course Outcome

By the end of this course students will be able to

- Apply project management principles to select and initiate individual projects and portfolios of projects.
- Develop comprehensive project plans that accurately forecast project costs, timelines, and quality.
- Evaluate and implement effective processes for managing resources, communication, risks, and changes within construction projects.

References

- Dr. S. Seetharaman, 'Construction Engineering and Management', Umesh Publications, Delhi, 2015
- Hajdu M., Network Scheduling Techniques for Construction Project Management, Springer U S 2013.
- Callahan M. T., D. G. Quackenbush and J. E. Rowings, 'Construction Project Scheduling', McGraw-Hill, 1992.
- Robert B. Harris, 'Precedence and Arrow Network Techniques for Construction', University of Michigan, 1973.
- Steven James D,'Techniques or Construction Network Scheduling', McGraw-Hill, 1989.
- Bhattacharjee S. K, 'Fundamentals of PERT/CPM and Project Management', Khanna Publishers, 2004 7. Vohra N. D., 'Quantitative Techniques in Management', Tata McGraw-Hill Publishing Company, 2001.
- Srinath, L.S: PERT and CPM Principles and Application.

Module I (10 Hours)

Introduction to construction management, need and importance, objectives and functions of project or construction management, role of Project or Construction Managers in the building industry, Project feasibility reports, 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 (WBS), Network representation, Principles and application of CPM, Network analysis, development of CPM network, Identification of critical path, Different float computations.

Module III (12 Hours)
Principles and application of PERT Network-Probabilistic time estimates of activities, Analysis of PERT Network, Development of Critical path, Expediting the project, Time cost tradeoff, Optimization, Allocation of resources, Resource leveling and smoothening, Line of Balance method.

Module IV (10 Hours)
Project management information system: PMIS Concept, Information system computerization, Problems in information system management, Benefits of computerized information system, Project management software packages like PRIMAVERA, MS Project, MS office suit.

TOTAL HOURS: 42

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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 : Ninth				
Course No	**Course Name**	**L-T/P-T**	**Credits**	**Year of Introduction**
AR 22-94	**PROFESSIONAL PRACTICE**	**2-1-0**	**3**	**2022**

Course Objectives

- To examine the complexities of architectural practice intertwined with broader global and local economic conditions.
- To expand the scope of influence of the architect towards a better future for policy, culture, technology, humanity and the built environment.
- To familiarize students with administrative functions, ethical and legal responsibilities of the individual architect and architectural firms.
- To reinforce the importance of architect's professional relationships and leadership positions with other business entities within and related to the profession of architecture.

Course Outcome

Upon completing this course, students will be able to:

- Critically examine the historical, practical, ethical, organizational, legal, financial, social contexts of architectural practice.
- Analyse the scope of work and responsibilities of an architect in various project types.
- Explain and apply ethical rules and standards of conduct in the practice of architecture.
- Demonstrate the knowledge and skills required to manage a small architectural practice and contribute to the management of a larger firm.

Text books

- Acts and Regulations of Council of Architecture, New Delhi
- Roshan Namavati (2016) **Professional Practice**, Lakhani Book Depot, Mumbai
- Madhav Deobhakta (2007) **Architectural Practice in India**, Council of Architecture, New Delhi
- Council of Architecture (2022), **Manual of Architectural Practice 2022**, CoA, New Delhi
- James R. Franklin (2000) **Architect's Professional Practice Manual**, McGraw-Hill Professional, Canada.

Reference Books

- J J Scott (1985) **Architectural Practice,** Butterworth, London.
- Apte V S (2008) Architectural Practice and Procedure, Padmaja Bhide, Pune.
- Council of Architecture (2020) Handbook of Professional Documents, CoA, New Delhi.
- Piotrowski A. and Williams, Julia (2001) The Discipline of Architecture,

University of Minnesota Press.

- Meenakshi Raman., Sangeeta Sharma (2015) Technical Communication 3E – Principles and Practice, Oxford University Press.
- AIA Guidelines for Professional Practice
- RIBA Handbook on Practice of Architecture
- WTO and GATT Guidelines

Module 1 (14 hours)

Architecture as a Profession – Importance of architecture as a profession, role of architects in the society; Architects Act 1972 – Amendments, Provisions, Registration of Architects, Relationships with clients and stakeholders; Conditions of engagement between architect and the client; Roles and Responsibilities of Council of Architecture and Indian Institute of Architects – Constitution, Election Procedure, Functions, Rules and Regulations – Code of Professional Conduct and Ethics, Social Responsibility; International Architectural Competitions – Globalization in Architecture - Relevance and Importance of WTO, GATT and GATS to architecture profession in India – Architectural Practices in US, UK, MENA and SAARC – Career prospects for Architects.

Module 2 (10 hours)

Architecture as Practice – Setting up of an Office; Mode of engaging an architect, Terms and Conditions of Engagement, Letter of Appointment, Copyright, Termination of Services, Mode of Payment etc.; Schedule of Services by an architect – Comprehensive Services, Partial Services and Specialized Services; Professional Judgment and Ethics; Architectural Project Agreements; Leadership Roles and Legal Responsibilities; CoA's Norms on Scale of Fees, Domestic and International Architectural Competitions; Preparedness for International Practice - Pre-requisites for Indian architects to work in other countries and vice-versa; Emerging trends in architectural collaborations; Importance of IT, SaaS on architectural practice.

Module 3 (10 hours)

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 – Composition of Contract/agreement – Terms and conditions of contract, Bill of quantities and specifications, Termination of Services/Contract.

New trends in project formulation and different types of execution (BOT, BOOT, BOLT, BOO etc.). Valuation reports – methods of valuation.

Module 4 (8 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.

TOTAL HOURS: 42

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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 : Ninth				
Course No	**Course Name**	**L-T/P-T**	**Credits**	**Year of Introduction**
AR 22-95-1	**DISASTER MITIGATION & MANAGEMENT**	**3-0-0**	**3**	**2022**

Course Objectives

- To provide a general concept on disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities.
- To provide solid understanding to the Students on disaster preparedness and mitigation.
- To understand Rehabilitation, Reconstruction and Recovery in the event of Disaster

Course Outcome

After the completion of this course, the students will be able to

- Explain the need for and significance of studying disaster management.
- Analyze and evaluate various disaster risk reduction measures and risk mitigation methods.

Text books

- Dr. Mrinalini Pandey - Disaster Management- Wiley India Pvt. Ltd. (2014).
- RB Singh -Natural Hazards and Disaster Management: Vulnerability and Mitigation. (2006)
- Tushar Bhattacharya - Disaster Science and Management - McGraw Hill Education (India) Pvt. Ltd. (2012).
- Ravi Kumar Kanda - Introduction to Disaster & Its Management. (2019).
- Ariyabandu, M. and Sahni P. “Disaster Risk Reduction in South Asia”, Prentice-Hall (India), 2003.
- Disaster Management Handbook – Asian Development Bank. (2008)
- J. P. Singhal, Disaster Management- Laxmi Publications.

Reference Books

- National Disaster Management Plan – National Disaster Management Authority. Ministry of Home affairs. Govt of India. (2019).
- Disaster Management in India – Ministry of Home Affairs
- Andrew, S., “Environmental Modeling with GIS and Remote Sensing”, John Willey, 2002
- Bossler, J.D., “Manual of Geospatial Science and Technology”, Taylor and Francis, 2001

Module 1(10 hours)

Introduction on Disaster Different Types of Disaster: A) Natural Disaster:

such as Flood, Cyclone, Earthquakes, Landslides etc B) Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures (Building and Bridge), War & Terrorism etc. Causes, effects and practical examples for all disasters.

Module 2 (12 hours)
SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION. Targets and Indicators, Priorities, Monitoring the framework.
Risk and Vulnerability Analysis
1. Risk: Its concept and analysis 2. Risk Reduction 3. Vulnerability: Its concept and analysis 4. Strategic Development for Vulnerability Reduction

Module 3 (12 hours)
DISASTER PREPAREDNESS
Disaster Preparedness: Concept and Nature - Disaster Preparedness Plan - Prediction, Early Warnings and Safety Measures of Disaster - Introduction to the Emerging technologies in Disaster Management - Role of Architects in Disaster Management.
DISASTER RESPONSE
Disaster Response Plan - Communication, Participation, and Activation of Emergency Preparedness Plan - Role of Multiple Stockholders in Disaster Response.

Module 4 (12 hours)
REHABILITATION, RECONSTRUCTION AND RECOVERY
Reconstruction and Rehabilitation as a Means of Development - Damage Assessment - Role of Various Agencies in Disaster Management and Development - Development of Physical and Economic Infrastructure - Disaster Resistant House Construction. - Role of Housing/Building Authorities - Long-term Counter Disaster Planning. - Indigenous construction techniques for disaster risk reduction. (Architecture case studies).

TOTAL HOURS: 46

CONTINUOUS INTERNAL EVALUATION PATTERN:
Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Ninth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-95-2	**GREEN BUILDINGS & RATING SYSTEMS**	**3-0-0**	**3**	**2022**

COURSE OBJECTIVES

- To provide students with a comprehensive understanding of green building principles and rating systems.
- To apply sustainable design practices into architectural projects.
- To critically analyze and apply relevant strategies for environmentally responsible construction.

COURSE OUTCOME

By the end of this course, students will be able to:

- Understand the principles and scope of green buildings and rating systems.
- Apply sustainable design strategies in architectural projects.
- Analyze and evaluate the environmental impact of buildings.
- Demonstrate knowledge of major green building rating systems and their application.

TEXT BOOKS

- Kibert, C. J. (2007). Sustainable Construction: Green Building Design and Delivery (3rd ed.). Wiley.
- U.S. Green Building Council. (2020). LEED Reference Guide for Building Design and Construction. USGBC.

REFERENCE BOOKS

- Steinfeld, E., & Manahan, S. E. (2008). Ecological Design of Smart Home Networks: Technologies, Social Impact, and Sustainability. CRC Press.
- Howard, B. (2012). Greening in the Red Zone: Disaster, Resilience and Community Greening. Springer.
- Agarwal, V.K. 2005. Environmental Laws in India: Challenges for Enforcement. Bulletin of the National Institute of Ecology 15: 227-238.
- Leelakrishnan, P. 2008. Environmental Law in India (3rd edition). LexisNexis India. Venkat, A. 2011. Environmental Law and Policy. PHI Learning Private Ltd.

MODULE I (10 hours)

Introduction to Green Building Concepts -

Overview of sustainable architecture, Principles of green building design, Benefits of green buildings for the environment and occupants

Elements and Principles of Sustainable Design -

In-depth study of sustainable design elements and principles, Advanced application of design principles in green buildings

Sustainable Building Materials and Technologies -

Selection and application of eco-friendly materials, Integration of energy-efficient technologies, Passive design strategies for climate-responsive architecture

Exercise: *Analysis of sustainable design elements in selected green buildings.*

MODULE II (10 hours)

Energy Efficiency and Renewable Energy

Understanding energy consumption in buildings, Strategies for energy conservation, Integration of renewable energy sources in architectural design

Water Conservation and Management

Importance of water conservation in buildings, Water-efficient fixtures and systems, Design strategies for rainwater harvesting and wastewater treatment

Indoor Environmental Quality (IEQ)

Factors affecting indoor air quality, Designing for occupant health and well-being, Ventilation and daylighting strategies

Exercise: *Case study analysis of green building projects with a focus on energy, water, and indoor environmental quality.*

MODULE III (10 hours)

Green Building Rating Systems

Overview of major green building rating systems - International Certification Systems - BREEAM, LEED, BEAM, PEARL, EEWH, Green Mark, Green Star, CASBEE. Indian Certification Systems - IGBC, GRIHA, BEE - Criteria and certification process for each rating system - Case studies of green building projects and their certification journeys.

Integrating Sustainable Design in Architectural Practice

- Challenges and opportunities in sustainable architecture - Collaborative approaches for architects, engineers, and other stakeholders - Designing for resiliency and adaptability in the face of climate change

Exercise: *Preparation of a sustainable design proposal incorporating green building principles.*

MODULE IV (10 hours)

Emerging Trends in Green Building

Innovations in sustainable design, Smart building technologies and their role in sustainability, Global initiatives and future directions in green

building practices

Advanced Challenges and Opportunities in Sustainable Architecture

Advanced exploration of challenges and opportunities in sustainable design

Advanced strategies for overcoming obstacles in green building projects

Exercise: *Research paper on an advanced topic related to emerging trends in green building.*

TOTAL HOURS-40

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Ninth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-95-3	**ARCHITECTURAL CONSERVATION**	**3-0-0**	**3**	**2022**

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

By the end of this course students will be able to

- Analyze the processes and procedures involved in architectural conservation
- Understand about the various procedures involved in conservation

Texts

- Feilden, Bernard M. (1982). Conservation of Historic buildings. Butterworth Co. London.
- 'Handbook of Conservation of Heritage Buildings' Published by Directorate General, Central Public Works Dept.

References

- 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
- 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 (8 Hours)

Introduction to Architectural Conservation, need for conservation, Objectives, Values, Ethics and Scope of Architectural Conservation: from material based, value based to living heritage approach. Understanding Heritage: Types - Cultural heritage, Natural heritage, Built heritage -

Ancient Monument, Tangible & Intangible heritage.

MODULE II (12 Hours)

History of the Conservation movement in India & World view : History and Evolution of Conservation, Contributions of John Ruskin, William Morris, Viollet-Le-Duc, formation of SPAB, Scrape and Anti –Scrape Societies; Contribution of Alexander Cunningham

International and National Agencies involved in Conservation: UNESCO, ICCROM, ICOMOS, ASI, State departments of Archaeology, Town Planning departments, State Art and Heritage Commission & INTACH. Charters: Nara Document, Venice charter (1964), Burra charter (1979).

World Heritage Sites, Nomination process & Endangered sites

MODULE III (10 Hours)

Preparatory procedures for conservation- Identification of the 'values/significance': Reconnaissance survey, Listing, Inventories, Preliminary inspections, Documentation- condition and material mapping, Research, Analysis & recording (reports); Techniques of Documentation (measured drawings, photogrammetric techniques); Degrees of intervention: Prevention, Preservation, Consolidation, Restoration, Rehabilitation, Reproduction, Reconstruction.

Case studies of Heritage building conservation and documentation of historic monuments and sites.

MODULE IV (12 Hours)

Factors causing decay and deterioration of Historic structures and materials: Natural and Man made. Natural causes – Gravity, solar radiation, sun, rain, snow, ground water, wind, moisture, dust, fungi, algae, insects etc., disasters such as earthquakes, flood, storm, fire.

Manmade causes – Vandalism, wars, pollution, extensive withdrawal of ground water, vibrations and neglect.

The process of identification of defects – field investigation, Introduction to various types of tests such as Destructive Tests (DT), Minor Destructive Tests (MDT), Non-Destructive Tests (NDT), Monitoring techniques.

Diagnosis and assessment of defects and common problems in historic building and recording of decay

TOTAL HOURS: 42

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

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: Ninth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-95-4	**BUILDING PERFORMANCE & COMPLIANCE**	**3-0-0**	**3**	**2022**

Course Objectives

- To explain to students, the principles of building performance and compliance.
- To explain the role of regulations and codes in architectural design.
- To analyse and evaluate building performance in terms of energy efficiency, safety, and environmental impact.

Course Outcome

By the end of this course, students will be able to:

- Understand the key principles of building performance.
- Apply compliance standards and regulations in architectural design.
- Evaluate building performance in terms of energy efficiency, safety, and environmental impact.
- Develop strategies for designing buildings that meet performance and compliance criteria.

Text books

- Allen, E., Iano, J., & Zunde, P. (2014). Fundamentals of Building Construction: Materials and Methods (6th ed.). Wiley.
- Ching, F. D. K. (2014). Building Codes Illustrated: A Guide to Understanding the 2012 International Building Code. Wiley.

Reference Books

- Nawari, N. O. (2017). Sustainable Buildings and Infrastructure: Paths to the Future (2nd ed.). CRC Press.
- Ambrose, J., & McMullan, R. (2014). Basics Interior Architecture: Form + Structure. AVA Publishing.
- ASHRAE Standard 90.1

Module I (10 hours)

Principles of Building Performance - Understanding building performance criteria - Factors influencing building performance (thermal, acoustic, lighting, etc.)

Introduction to Building Codes and Regulations - Overview of building codes and regulations

- Importance of compliance in architectural design - Building Standards - ASHRAE, International Energy Conservation Code, LEED Certification, etc.

- Building Performance Assessment Tools - Introduction to software and tools for evaluating building performance ex: Revit plugins - Case studies on

the application of assessment tools
Exercise: *Analysis of a building's performance using assessment tools.*

Module II (10 hours)
Energy Efficiency in Building Design - Principles of energy-efficient design - Integration of renewable energy sources in architectural projects
Safety Regulations and Compliance - Understanding safety codes and regulations - Fire safety, accessibility, and other safety considerations in building design
Environmental Impact and Compliance - Assessing the environmental impact of buildings - Sustainable design practices and compliance standards
Exercise: *Developing a design proposal that meets energy efficiency and safety compliance standards.*

Module III (10 hours)
Building Performance in Different Climate Zones - Climate-responsive design strategies - Case studies of buildings in diverse climatic conditions
Life Cycle Assessment - Understanding the life cycle of a building - Evaluating the environmental impact throughout the building's life cycle
Exercise: *Comparative analysis of building performance in different climate zones.*

Module IV (10 hours)
Building Performance Simulation - Introduction to simulation tools for predicting building performance - Hands-on exercises in building performance simulation
Compliance Documentation and Reporting - Preparation of compliance documentation - Reporting and presenting building performance data
Exercise: *Creation of a compliance document for a hypothetical architectural project.*

TOTAL HOURS-40

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks
Two internal tests each of equal weightage - 25 marks
Attendance - 5 marks

UNIVERSITY EXAMINATION PATTERN
Q1 – 8 Short type questions of 5 marks, 2 from each module
Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them.
Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one

of them.
Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them.
Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Ninth				
Course No.	**Course Name**	**L-T-P/S**	**Credits**	**Year of Introduction**
AR 22-95-5	**SERVICES IN HIGH RISE BUILDING**	**3-0-0**	**3**	**2022**

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 efficient services.

COURSE OUTCOME

- Upon completing this course, students will be able to design and integrate various building services in a high rise building, considering safety, efficiency and sustainability.

TEXT BOOKS

- National Building Code of India 2005– Bureau of Indian Standards, 2005.
- Manual on Water Supply and Treatment (1991) third Edition, Central Public Health and Environmental Engineering Organization, Ministry of Urban Development, New Delhi
- Ken Yeang (2000), Service Cores: Detail in Building, Wiley Academy
- 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.

REFERENCE BOOKS

- Lin Chew Fit, (2001), "Construction Technology for Tall Buildings", Singapore University Press
- Armstrong P, (1995) CTUBH, "Architecture of Tall Building", Mc Graw Hill
- Reddy K.N., (1996) "Urban development: A study of High Rise Building", Concept Publishing company
- Craighead G., (2009) "High Rise Security and Fire Life Safety', Butterworth- Heinemann
- Jain V.K. (2010), "Handbook of Designing and Installation of Services in Building Complex- High Rise Buildings", JBA Pub.
- Energy Conservation building code-2007-Bureau of Energy Efficiency-Govt. of India.
- National Electrical Code of India 2023
- ASHRAE the Hand Book on Green Practices.
- Langdon -Thomas.G.J., -'Fire Safety in Buildings, Principles and

practice'- Adam and Charles Blade, London, 1972

- W.G. McGuiness and B.Stein 'Mechanical and Electrical equipment for buildings, John Wiley and sons Inc., N.Y.

MODULE I (12 hours)

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

Exercise: *Assignment on literature case studies of high-rise buildings with integration of building automation services and intelligent architecture.*

MODULE II (13 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

Exercise: *Refer different national and international building codes with respect to fire safety in high rise buildings and prepare a presentation.*

MODULE III (12 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

Exercise: *Assignment on different artificial ventilation techniques with emphasis on latest technologies in HVAC systems with case examples.*

MODULE IV (13 hours)

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

Exercise: *Site visits during 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.*

TOTAL HOURS-50

CONTINUOUS INTERNAL EVALUATION PATTERN:

Tutorials / Assignments (minimum 2) - 20 marks

Two internal tests each of equal weightage - 25 marks Attendance - 5 marks
UNIVERSITY EXAMINATION PATTERN Q1 – 8 Short type questions of 5 marks, 2 from each module Q2 – 2 Questions of 15 marks from Module 1 with a choice to answer any one of them. Q3 – 2 Questions of 15 marks from Module 2 with a choice to answer any one of them. Q4 – 2 Questions of 15 marks from Module 3 with a choice to answer any one of them. Q5 – 2 Questions of 15 marks from Module 4 with a choice to answer any one of them.

Semester: Ninth

Course No.	Course Name	L-T-P/S	Credits	Year of Introduction
AR 22-96	**Dissertation**	**0-3-0**	**3**	**2022**

Course Objectives

- To empower students to undertake independent research in architecture.
- To facilitate critical thinking in students.
- To apply and synthesize their findings and write research in a comprehensible manner

Course Outcome

By the end of this course, the students will be able to design, conduct and present independent research in Architecture.

Text books

- Luca, Ray. *Research Methods for Architecture*. London: Lawrence King Publishing. 2016.
- 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

Allotment of Guide

A guide has to be allotted to each student for supervising the dissertation work by the head of the institution. The guide should have minimum 3 years of research/academic/field experience.

Area of Research

Area of research has to be identified by the student from architecture and its allied subjects by preparing a 10 page research proposal by the end of Semester 08 Research Methodology course. 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 within the stipulated time and has to be approved by the Department of Architecture. Student is expected to have a critical understanding of the topic, analyze the results on the data collected and present the work in a structured manner.

Students may be encouraged to utilize dissertation as an opportunity to generate a critical inquiry that encourages them to further the research into a design exploration in Semester 10 – Thesis. Selection of topic may be done in such a manner that the study done 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. Guides must be allocated by the end of Semester 08 based on the topic submitted by the students.

A dissertation coordinator is appointed by the head of the department. The coordinator must be a member of the core faculty and must have made substantial research contributions in the past.

A review board shall be constituted by the Head of the Department 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 revised research proposal to the dissertation coordinator 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 publishable paper of maximum 5000 words excluding references and citations. Standard referencing conventions and technical writing norms must be adhered to. The affiliated institution shall compile the publishable papers and keep a copy for general reference in their libraries. All papers must adhere to International standards and must be checked for plagiarism. AI software's can be used ethically for copy editing purposes only.

Final assessment of the students' work shall be based on the paper as well as oral presentation with a greater weightage given for writing and research content of the study.

Evaluation

The entire 200 marks allotted to dissertation will be awarded in the following manner.

Continuous Assessment:

- Approval of topic 10 marks (internal) [review as part of Semester VIII – Research Methodology course]
- Three progress assessment stages 30 marks each (internal)

After the approval of the topic the internal evaluation shall be conducted in 3 progress assessment stages by the review board. Internal marks shall be awarded as given below:

- Preliminary Stage –Research Design including preliminary literature

review and identification of methodology (30 Marks)

- Intermediate Stage– Data collection and representation (30 Marks)
- Final Stage – Results and Interpretation along with a draft paper (30 Marks)

External Evaluation:

The Final evaluation shall constitute 100 marks and shall be conducted by the Dissertation review Board constituted by the Institute.

The dissertation Review board for final evaluation shall consist of three members:

1. An external member either from academic or a research institute but with relevant background in the field of architecture research (COA registered architect with minimum five years' experience) who shall be identified and appointed by the institute and

2. Members: Internal faculty member appointed by the Head of the Department.

3. The Jury Chairman who will be a senior faculty member shall be appointed by the Head of the Department.

The jury members will independently evaluate the final presentation.

Evaluation of the final report- 50 marks.

Evaluation of Presentation of Slides and oral presentation- 50 marks.

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

A candidate has to obtain 50% aggregate marks for dissertation (internal assessment + Jury) for a pass and should have obtained minimum of 40% marks in the Final external review.

SL NO	Evaluation Stage	Marks	Criteria	Evaluation Board	Schedule
Continuous Assessment					
1	Approval of topic	10	Research proposal detailing the aim, objective, methodology and scope of the study	Guide and two faculty members	End of Semester 08
2	Preliminary Stage	30	Review of literature and data collection along with draft report	Guide and two faculty members	Third Week of Semester 09
3	Intermediate stage	30	Data collection, analysis and inferences along with revised draft report	Guide and two faculty members	Sixth Week of Semester 09
4	Final internal evaluation	30	Final Results and Interpretation along with a final report	Guide and two faculty members	Twelfth week of Semester 09
External Evaluation					
5	Final External Review	100	Final presentation and Report (2 copies, bound)	Chairman, Members: An external member and an Internal Member	End of Semester 09

TENTH SEMESTER											
Course Code	**Subject**	**Group**	**Category**	**Credits**	**Hours Per Week**			**Duration of Exam**	**Marks**			
					L	**T**	**P/S**		**W**	**J**	**C.A.**	**Total**
AR 22-101	Thesis *	V	PC	20	N.A.			0		300	300	600
TOTAL				**20**	N.A.			0		300	300	600

* 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, C.A. - Continuous Assessment.

Semester: Tenth			
Course No.	**Course Name**	**Credits**	**Year of Introduction**
AR 22-101	**ARCHITECTURAL THESIS**	**20**	**2022**

Students must complete an Architectural Design Thesis during the final six months of the B.Arch. Degree program. This thesis period begins at the start of the tenth semester and lasts for six months. Each student will work individually on a topic they select, which must be approved by the department. The project can be either a real architectural project or a hypothetical one, allowing students to gain experience in handling projects similar to those they will encounter in their professional careers enabling the exploration of diverse typologies, cultivate project understanding, encourage interdisciplinary innovation, nurture critical thinking, and engage in client interactions and project management. For more information, refer to the Thesis Manual.

COURSE OUTCOME

By the end of this course, students will be able to:

- To apply all the skills acquired in the duration of preceding academic courses.
- To develop self-direct effort by choosing the project of choice, builds capacity to work independently and methodically in a variety of intellectually and professionally demanding contexts.
- Acquire the ability to contribute creatively and independently to the academic discipline and, in certain situations, the professional area.