



UNIVERSITY OF CALICUT

Abstract

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

G & A - IV - E

U.O.No. 8825/2018/Admn

Dated, Calicut University.P.O, 24.07.2018

*Read:-*1.U.O.No.11016/2017/Admn dated 31.08.2017

2.Item No.1 of Minutes of the meeting of the Board of Studies in Architecture held on 19-04-2018.

3.Item No. 2(i) of Minutes of Faculty of engineering meeting held on 03-07-2018

4.Item No.II (J) of minutes of academic council meeting held on 18-07-2018

ORDER

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

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

The following orders are therefore issued:

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

Ajitha P.P

Joint Registrar

To

1.The Controller of Examinations

2.Principals of affiliated B.Arch Colleges

Copy to:PA to VC/PA to PVC/PA to Registrar/PA to CE/DR, B.Tech/EX&EG
sections/SF/DF/FC

Forwarded / By Order

Section Officer

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-31	ARCHITECTURAL DESIGN I	0-0-10	10	2017
<p>Course Objectives</p> <p>The Architectural Design I course for students of architecture would,</p> <ul style="list-style-type: none"> • 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. 				
<p>Course Outcome</p> <ul style="list-style-type: none"> • To develop a basic understanding of space, form, structure and the built environment 				
<p>Reference Books</p> <ul style="list-style-type: none"> • De Chiara and Callender, Time Saver Standard for building types, McGraw Hill Co. • Neufert Architect's data, Bousmaha Baiche & Nicholas Walliman, Blackwell science ltd. • KMBR • Simon Unwin, "Analyzing Architecture", Routledge 2003 • Francis D.K.Ching, "Architecture, Form, Space and Order"; III Edition, John Wiley, 2007 • Leland M.- Roth, "Understanding Architecture: Its Elements- History, and Meaning", Icon Editions, 1993 • Steen Eiler Rasmussen, "Experiencing Architecture", MIT Press 1964 • Peter von Meiss, "Elements of Architecture - From Form to Place", Span Press, 1992 • Bryan Lawson, "How Designers Think", Architectural Press Ltd" London, 1980. 				

Projects:

Two projects - one minor and one major - shall be completed during this semester and these shall have minimum complexity in terms of design and site challenges.

Minor Project: Design of small span, single space, single use spaces with simple movement, predominantly horizontal, as well as simple function public buildings of small scale like bus shelter/ fast food kiosks/ entrance gateways/ park Shelters etc.

Major Project: Design of a residence within a set of limited specific requirements

Process & Deliverables:

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

TOTAL HOURS: 120

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

Course Objectives

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

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

Course Outcome

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

Text books

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

Reference Books

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

MODULE I (12 HRS)

Architectural theory in historical perspective:

Types of Design: Pragmatic design, Iconic Design, Analogical Design, Canonic Design Advantages and Disadvantages and outstanding examples

Architectural Criticism:

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

MODULE II (6 HRS)

Society and design:

Role of designer in the society. Design for performance, Behavioral Aspects of Design.

Design generation process: Role of logic and intuition in concept generation.

Step by step development of design from problem definition, site analysis to post occupancy evaluation as the last stage of design.

MODULE III (10 HRS)

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

MODULE IV (12 HRS)

Contemporary movements in architecture

Role of individual architects in the generation of architectural form, through study of exemplary works, architectural inspirations, philosophies, ideologies and theories of architects.

Modern Movement Theory including Organic Architecture - Le Corbuiser and Frank Llyod Wright

Post Modern Theory -Robert Venturi, Louis Sullivan

Deconstructivism - Zaha Hadid, Frank Gehry

TOTAL HOURS: 40

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

Course Objectives

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

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

Course Outcome

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

Text books

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

Reference Books

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

MODULE I

CONCRETE (12hrs)

Ingredients of Concrete: Cement, Fine aggregate, Coarse aggregate, Water, Reinforcement.

Concrete: PCC and RCC, Grades, Properties, Water cement ratio.

Process of concreting : Formwork for concrete, Mixing of concrete, Cutting, bending and placing of reinforcement, Placing of concrete, Scaffolding, Curing

Properties of concrete: fresh concrete, workability, segregation and bleeding, factors affecting workability & strength. Various types of concrete.

Exercise: site visit & field observations of onsite concreting work

MODULE II

DEEP FOUNDATION (16 hrs.)

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

Timbering and trenching of foundations

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

MODULE III

IRON, STEEL, ALUMINIUM, (12 hrs.)

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

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

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

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

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

MODULE IV

JOINERY, DOORS&WINDOWS (16 hrs.)

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

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

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

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

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

TOTAL HOURS: 56

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-34	BUILDING CLIMATOLOGY	3-0-0	3	2017
<p>Course Objectives The Building Climatology course for students of architecture would,</p> <ul style="list-style-type: none"> • 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. 				
<p>Course Outcome</p> <ul style="list-style-type: none"> • An understanding of the relation of climate to human comfort. • Awareness about various types of climate and the corresponding design strategies for climate-responsive buildings and spaces. 				
<p>Text books</p> <ul style="list-style-type: none"> • 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. 				
<p>Reference Books</p> <ul style="list-style-type: none"> • 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. • Giovani, B., Man, Climate and Architecture, Van Nostrand Reinhold, 1981. • Kukreja, C.P.,Tropical Architecture, Tata McGraw Hill Pub. Co. Ltd New Delhi, 1978. • Olgyay, A. and Olgyay, V., Solar Control and Shading Devices, Princeton University Press, New Jersey, 1976. 				

MODULE I

CLIMATE AND HUMAN COMFORT (12 Hours)

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

MODULE II

PRINCIPLES OF THERMAL DESIGN (10 Hours)

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

MODULE III

MEANS OF THERMAL CONTROL (12 Hours)

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

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

MODULE IV

CLIMATE-RESPONSIVE ARCHITECTURAL DESIGN (8 Hours)

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

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

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

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

SEMESTER III Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR17-35	BUILDING SCIENCE LAB	0-0-3	3	2017
<p>Course Objectives</p> <ul style="list-style-type: none"> • Building Science laboratory practical sessions are to introduce use of various equipment and materials used for understanding a building's performance in terms of structural strength, illumination levels of spaces, acoustical qualities, thermal properties of materials etc. 				
<p>Course Outcome</p> <ul style="list-style-type: none"> • A practical experience of the properties and behaviour of various building materials. • Hands-on experience of calculating climatic data using various climatic instruments. 				
<p>Course Content:</p> <ol style="list-style-type: none"> 1. Tests on Cement <ol style="list-style-type: none"> a) Fineness of cement b) Normal Consistency c) Initial Setting time of Cement d) Final Setting time of Cement 2. Tests on aggregate for Concrete <ol style="list-style-type: none"> a) Bulking of Sand b) Particle size distribution of coarse aggregate 3. Tests on building materials <ol style="list-style-type: none"> a) Compressive strength of country burnt bricks b) Tensile strength of steel rods 4. Properties of Fresh Concrete <ol style="list-style-type: none"> a) Workability tests b) Slump Test 5. Measurement of illumination levels from a point source by using lux meter 6. Wet and dry bulb thermometer 7. Determination of air circulation of room by using anemometer 8. Finding the maximum and minimum temperature of a particular location by using maximum and minimum thermometer <p>TOTAL HOURS: 30</p>				
<p>Sessional Requirements: Laboratory work Marks: 50 marks Record: 10 marks Tests: 30 marks</p>				

Regularity: 10 marks

Total: 100 marks

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

Course Objectives

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

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

Course Outcome

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

Reference Books

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

MODULE I (12 hrs)

Types of external loads, self-weight internal stresses, normal and shear stresses, strain, Hooke's law, Poisson's ratio, relationship between elastic constants, stress-strain diagrams, working stress, elongation of bars of constant and varying cross sections, thermal stresses.

Stress on inclined planes for axial and bi-axial stress fields, principal stresses, Mohr's circle of stress, principal stresses. (Concept only).

MODULE II (10 hrs)

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

MODULE III (10 hrs)

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

MODULE IV (10 hrs)

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

TOTAL HOURS: 42**UNIVERSITY EXAMINATION PATTERN**

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

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

Course Objectives

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

Reference Books

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

MODULE I - (12 Hours)

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

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

Persia - The Masjid-i Shah, Isfahan

Spain - The great mosque at Cordoba. The Alhambra

Morocco -King Hassan II Mosque, Casablanca

MODULE II - (10 Hours)

Beginning of Islamic Architecture in India

Islamic Architecture in Delhi (Imperial Style)

Slave dynasty -Quwat-ul-Islam mosque, Qutb Minar, Mosque at Ajmer, Sultan Ghari, Tomb of Iltumish, Tomb of Balban.

Khilji Dynasty -Alai Darwaza, Jamat Khana masjid

Tughlaq dynasty -Tomb of Ghias-Ud-din, City of Tughlaqabad, City of Firoz Shah Kotla, Khirki Masjid.

Sayyid and Lodi dynasty-Tomb of Mubarak Shah, tomb of Mohamed Sayyid, Garden tomb of Sikander Lodi , Bara Khan ka Gumbad, Chota Khan ka Gumbad, Shish Gumbad, Bara Gumbad.

MODULE III - (10 Hours)

Provincial styles:

Punjab -Tomb of Shah Rukhn-I-Alam.

Jaunpur -Atala Masjid, Jami Masjid

Bengal -Dakhil Darwaza, Firoze Minar, and Adina Masjid.

Gujarat -Jami Masjid, Teen Darwaza, Well retreats of Ahmedabad.

Malwa -Hindola Mahal, Jami Masjid at Mandu, Jahaz Mahal, Hawa Mahal

Deccan - Charminar at Hyderabad, Tomb of Golconda.

Bijapur - Jami Masjid, Golgumbaz.

MODULE I V- (10 Hours)

Evolution of Mughal style and the different eras of rule:

Early period -Babar, Humayun, Sher Shah

Akbar - Tomb of Humayun, Jahangir Mahal, Agra,

Fatehpur Sikri - city planning & the various structures inside.

Jahangir -Akbar's tomb.

Shah Jahan -Red fort at Agra, Taj Mahal, City of Shahjahanabad(Delhi fort), Jami Masjid at Delhi.

Aurangazeb -Tomb of Rabi Durrani at Aurangabad, Moti Masjid at Delhi fort.

TOTAL HOURS: 42**UNIVERSITY EXAMINATION PATTERN**

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

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

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

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

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

SEMESTER III Course No.	Course Name	L-T- P/S	Credits	Year of introduction
AR 17-38	COMPUTER-AIDED VISUALIZATION - I	0-0-2	2	2017
<p>Course Objectives</p> <p>The C A A D Laboratory -I course for students of architecture would,</p> <ul style="list-style-type: none"> • 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. 				
<p>Course Outcome</p> <ul style="list-style-type: none"> • An understanding of CAD software for preparing two-dimensional drawings. 				
<p>Reference Books</p> <ul style="list-style-type: none"> • 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 				
<p>Projects: Suggested Projects for the lab:</p> <ol style="list-style-type: none"> 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. <p>Exercises:</p> <ol style="list-style-type: none"> 1. Starting up - Drawing I- Measured drawing (plan and section) of a room. 2. Architectural Drawing II- Drawing Plans, sections and elevations of Residence design project 3. Starting up- Preparing drawing with layer system, CTB & Creating hatch patterns, Importing /exporting files 4. Architectural Drawing III- Preparing drawings for approval of Apartment Design Project <p>TOTAL HOURS: 30</p>				
<p>SESSIONAL REQUIREMENTS:</p> <p>Class work Exercises = 60 marks Lab Series test = 2X15 = 30 marks Attendance = 10 marks Total = 100 marks</p>				

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

Course Objectives

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

- To create a holistic understanding of the socio-cultural, geographic and economic aspects that shapes the built environment
- To expose students to the methodology of conducting various surveys covering physical, visual characteristics and demographic aspects.
- To introduce concept to the process of design.
- To understand the climatic and topographic aspects related to the site and how they influence the design.
- To undertake a comprehensive study of a building/settlement/ or part of an urban area that is an example of design evolved organically over a period of time.
- To emphasis the importance of designing built form and open spaces that meet the aspirations of the community.

Course Outcome

The Course creates an understanding of design as a response to context and program and develops a holistic approach to design.
Students develop skills to create architectural solutions for simple problems with a thrust on evolution of concepts and response to site and climatic challenges.

Reference Books

Julius Panero, Martin Zelnik, "Human Dimension and Interior Space", Whitney Library of Design, 1975
 Ramsey et al, "Architectural Graphic Standards", Wiley, 2000
 Kevin Lynch, "Site planning", MIT Press, Cambridge, 1984
 Sam F. Miller, "Design Process: A Primer for Architectural and Interior Design", Van Nostrand Reinhold, 1995
 Francis D. K. Ching, 'Architectural Graphics', Wiley, 2009
 Francis D. K. Ching, 'Architecture: Form, Space and Order', John Wiley & Sons, 2007
 Simon Unwin, 'Experiencing Architecture', Routledge, 2003
 Simon Unwin, 'An Architecture Notebook' Routledge, 2000
 Geoffrey Broadbent, 'Design in Architecture' John Wiley and Sons, 1973
 Simon Unwin, 'Doorway', Routledge, 2007

Projects:

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

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

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

Process and deliverables:

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

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

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

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

TOTAL HOURS: 120

UNIVERSITY EXAMINATION PATTERN

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

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

Course Objectives

To understand the fundamental concepts and methods of surveying using basic & advanced instruments for surveying and levelling.
To appreciate the importance of the site and context in the architectural design process.

Course Outcome

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

Text Books

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

Reference Books

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

MODULE I (12 Hours)

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

MODULE II (12 Hours)

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

measurement of vertical angles.

Introduction to Total Station Surveying - Advantages and disadvantages of Total Station Surveying.

MODULE III (8 Hours)

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

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

MODULE IV (10 Hours)

Context of the site: Impact of proposed developments on the surroundings especially with reference to large scale projects - Aspects such as increase in traffic, noise and pollution to surroundings - Study through notable examples.

Organization of vehicular and pedestrian circulation: types of roads, hierarchy of roads, networks, road widths and parking regulations.

Principles of positive drainage and grading for drainage - location of sewage treatment plants - methods to control soil erosion - Location of utility lines to simplify maintenance planning for rain water harvesting - Incorporation of services such as drinking water pipelines, fire hydrants, communication and networking facilities at site.

Improving climatological conditions on site through landscaping.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

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

Familiarize students with market study of building components and details.

Course Outcome

Comprehend the application of various building components and their construction.

Exposure to the common construction techniques used for constructing various components of a building.

Text books

Arora S.P. and Bindra S.P., “Text book of Building Construction”, 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

WALL SYSTEMS (15hrs)

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

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

Steel System: Structural steel framing, steel columns, light gauge steel studs, balloon framing.

Wooden System: Wood stud framing, stud wall sheathing, wood columns, wood post and beam framing.

Partition wall systems.

Drawings: Types of arches , RCC lintel and sunshade

MODULE II

FLOOR SYSTEMS (15 hrs.)

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

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

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

Drawings : RCC column, slab and beam

MODULE III

ROOF SYSTEMS (15hrs.)

Flat roof, Sloping roof and Curved roof. Deciding the slope or curvature of roof, Roof terminology

Wood trusses: Different types of trusses, King post truss, Queen post truss, Fink Truss, North light truss

Structural Steel roof framing: Different types of Steel trusses and their construction details.

Roof covering - thatching, tiling, AC sheets, GI and Aluminium sheets, FRP and RMP sheets and modern roofing. Roof drainage systems

Introduction to Space frames and Composite roof Systems

Drawings: Types of Arches, Truss - King post truss, Queen post truss, Steel-angular and tubular truss, details of roof covering and gutter details.

MODULE IV

VERTICAL TRANSPORTATION SYSTEMS (15 hrs)

Planning of vertical transportation systems - design parameters.

Ramps: Planning of ramps, slope, finishes, safety precautions.

Stairs: Planning staircases - Standards, rules and regulations. Components of stairs, Support conditions like inclined slab, cranked slab, cantilever. Stair plans- stairs with straight, circular and curved flights.

Construction details of Wood stair, fire escape stairs, Concrete stair, Steel stair and Composite stair.

Elevators: Planning and grouping of elevators. Elevator design parameters.

Different types of elevators - passenger elevators, observation elevators, hospital elevators and freight elevators. Construction details - lift shaft, lift pit, machine room etc.

Escalators: Planning and details of escalators and travelators.

Drawings: Wooden stair, RCC stair, Steel Stair, Composite stair, Passenger lift, Capsule lift, Escalator.

TOTAL HOURS: 60

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

SEMESTER IV Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
AR 17-44	BUILDING SERVICES - I (WATER SUPPLY AND SANITATION)	3-0-0	3	2017
<p>Course Objectives</p> <p>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.</p>				
<p>Course Outcome</p> <p>An understanding of demand, consumption, sources, treatment and distribution of water. Awareness about treatment and disposal of wastewater, and solid-waste management.</p>				
<p>Text books</p> <p>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.</p>				
<p>Reference Books</p> <p>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.</p>				

MODULE I (8 hrs)

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

MODULE II (16 hrs)

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

MODULE III (12 hrs)

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

MODULE IV (12 hrs)

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

TOTAL HOURS: 48**UNIVERSITY EXAMINATION PATTERN**

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

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

Course Objectives

The Theory of Structures III course for students of architecture would help them to understand the concept of indeterminate structures and the various methods of analysis of such structures.

Course Outcome

An understanding of shear force, bending moment in beams and frames. Exposure to various methods involved in analysis of indeterminate structures.

Reference Books

R Junarkar S. B. and Shah S. J., Mechanics of Structures (Vol. I), 30/e, Charotar Publishing House Pvt. Ltd., New Delhi, 2012
 Junnarkar S. B. and H. J. Shah, Mechanics of Structures, Vol - II, 23/e, Charotar Publishing House, 2013.
 Punmia B. C., A. K. Jain and A. K Jain, Theory of Structures (SMTS- II), Laxmi Publications Pvt. Ltd., 2004.
 Ramamrutham S. And R. Narayan, Theory of Structures, Dhanpat Rai Publishing Co., 2012
 M.M. Ratwani & V.N. Vazirani, Analysis of Structures, Vol. 1, Khanna Publishers - Delhi, 1987.
 Timoshenko, S.P. and D.H. Young, Elements of Strength of Materials, Fifth edition, East West Press, 1993.

MODULE I (12 hrs)

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

MODULE II (12 hrs)

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

MODULE III (12 hrs)

Introduction to slope deflection method-simple beams only (settlement case not required.)
 Moment distribution methods - shear force and bending moment diagrams of beams (Simple cases)

MODULE IV (12 hrs)

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

TOTAL HOURS: 48

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

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

Course Outcome

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

Reference Books

Sir Banister Fletcher's - "A History of Architecture", Architectural Press, 1996
Louis Grodecki- "Gothic Architecture", Rizzoli, 1991
History of World Architecture (Series), Vols. Titled "Ancient Architecture, Primitive Architecture, Greek Architecture, Roman Architecture and Byzantine Architecture", 1980.
Kenneth Frampton : Modern 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 Modern 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 and Squinch arch construction, e.g., Hagia Sophia, St.Marks Venice.

MODULE II (10 Hours)

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

Types:

Italian Romanesque architecture (Pisa Cathedral Complex),

French Romanesque (Abbey-Aux-Hommes at Cane)

British Romanesque (Durham's Cathedral).

Module III (12 hours)

Introduction to society and culture of 1150 -1350 AD in Europe

Gothic Architecture: Evolution of structural systems in Gothic Architecture -pointed arches, ribbed vaults, flying buttress, pinnacles etc;

Types:

French Gothic Architecture (Notre Dame (Reims Cathedral), Paris)

British Gothic Architecture (West Minister Abbey, Salisbury Cathedral)

Italian Gothic Architecture (Milan Cathedral)

Module IV (12 hours)

Renaissance Architecture:

Introduction of different styles existed in renaissance period, to society and culture of 1400 -1800 AD. The Idea of rebirth and revival of Art, Architectural character during Renaissance period. Division of Renaissance architecture into Early, Mature and Late periods. Structural contributions - Ribbed dome, Lantern dome.

Italian renaissance -St.Peters Rome, Florence Cathedral. Works of Brunelleschi, Alberti, Bramante and Michael Angelo, Palaces and Villas, Palladio's contribution - Villa Rotunda

French renaissance: Palace of Louvres, Paris de Versailles.

British renaissance: St. Paul's Cathedral, London -White Hall Palace, London.

Contributions of Inigo Jones and Christopher Wren

Revival of classical orders and principles - Neo-Classicism

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

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

QII - 2 questions of 15 marks from module I with choice to answer anyone

QIII -2 questions of 15 marks from module II with choice to answer anyone

QIV- 2 questions of 15 marks from module III with choice to answer anyone

QV- 2 questions of 15 marks from module IV with choice to answer anyone

SEMESTER IV Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17 - 47	ENVIRONMENTAL STUDIES	2-0-0	3	2017
<p>Course Objectives</p> <p>The Environmental Studies course for students of architecture would, Help them to understand the problems of pollution, loss of forest, solid waste disposal, degradation of environment, loss of biodiversity and other environmental issues and create awareness among them to address these issues and conserve the environment in a better way.</p>				
<p>Course Outcome</p> <p>An understanding of the importance of environmental issues. Awareness about sustainable development. An understanding of the importance of waste and water management.</p>				
<p>Text Books</p> <p>Daniels & Krishnaswamy, Environmental studies, Wiley India pvt ltd, 2009 Raman Sivakumar, Introduction to environmental science and engineering, 2nd edn, Tata McGraw Hill, 2010 Anindita Basak, Environmental Studies, Pearson Education, 2009 Suresh K.D, Environmental Engineering and Management, Katson Books, 2007 Benny Joseph, Environmental studies, 2nd edn, McGraw Hill, 2009</p>				
<p>Reference Books</p> <p>Raghavan Nambiar, K Text book of Environmental Studies, Scitech Publishers(India) Pvt. Ltd S.P Misra, S.N Pandey, Essential Environmental studies, Ane books, Pvt Ltd, 2009 P N Palanisamy, P Manikandan, A Geetha, Manjula Rani, Environmental Science, Pearson Education, 2012 D.L. Manjunath, Environmental Studies, Pearson Education, 2011</p>				

Module I (12 hours)

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

Module II (10 hours)

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

Module III (10 hours)

Environmental pollution Definition-Causes, effects and control measures of Air pollution- Water pollution -soil pollution-Marine pollution-Noise pollution-Thermal pollution-Nuclear hazards-Solid waste management: Causes, effects and control measures of urban and industrial wastes-Role of an individual in prevention of pollution. Pollution case studies-Disaster management: floods , earth quake, cyclone and landslides- Environmental impact assessment

Module IV (10 hours)

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

TOTAL HOURS: 42

Sessional Requirements

Assignments = 15 marks

2 Tests 2 x 15 = 30 marks

Regularity = 5 marks

Total = 50 marks

UNIVERSITY EXAMINATION PATTERN

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

QII - 2 questions of 15 marks from module I with choice to answer anyone

QIII - 2 questions of 15 marks from module II with choice to answer anyone

QIV - 2 questions of 15 marks from module III with choice to answer anyone

QV - 2 questions of 15 marks from module IV with choice to answer anyone

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

Course Objectives

The C A A D Laboratory -II course for students of architecture would, equip the students with skills required in using computer as a digital media for design and preparation of 3D images of Architectural drawings. provide an introduction to various Graphics Software.

Course Outcome

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

Reference Books

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

Projects:

Suggested Projects for the lab:

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

Exercises:

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

TOTAL HOURS: 30

SESSIONAL REQUIREMENTS:

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

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

Course Objectives

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

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

Course Outcome

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

Reference Books

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

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

Projects:

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

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

Process and deliverables:

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

TOTAL HOURS: 120

UNIVERSITY EXAMINATION PATTERN

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

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

Course Objectives

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

Course Outcome

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

Text books

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

Reference Books

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

MODULE I (10 Hours)

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

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

MODULE II (10 Hours)

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

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

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

MODULE III (8 Hours)

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

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

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

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

MODULE IV (14 Hours)

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

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

Landscape grading, land form design & drainage design.

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

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

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

Course Outcome

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

Text books

- Arora S.P. and Bindra S.P., “Text book of Building Construction”, 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

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

MODULE I

WALL FINISHES (12 hrs)

Plaster: Lime plaster and gypsum plaster. Fire resistant plaster, X-Ray shielding plaster and acoustic plaster. Plaster over masonry and ceiling.

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

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

Sketches : Stone cladding, Metal cladding

MODULE II**FLOOR FINISHES (12 hrs)**

Types of flooring, methods of laying, furnishing of floors with different floor finishes like cement, colored cement, mosaic, terrazzo, tiles, wood, parquet flooring, stone, brick etc.

Classification & properties of tiles used in flooring. Selection criteria & Methods of fixing various types of tiles.

Different type of resilient and vibration resistive floor like rubber, Linoleum and PVC flooring.

Sketches : Tile flooring, wooden flooring

MODULE III**WOOD SUBSTITUTES (15 hrs)**

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

MODULE IV**GLASS AND GLAZING (15 hrs.)**

Glass products : Types of glass - wired glass, fiber glass, laminated glass, glass building blocks, Heat strengthened glass- toughened glass, laminated glass Special purpose glasses- Low emissivity glass, Solar control glasses and variable transmission glass, Fire resistant glass, Self cleaning glass their properties and uses in buildings

Glazing: Single, double and triple glazing Glazed curtain walls & sky lights.

Sketches : Structural glazing

TOTAL HOURS: 54

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

Course Outcome

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

Reference Books

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

MODULE I (12 Hours)

Introduction to electrical services, commonly used terminology.

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

MODULE II (12 Hours)

Distribution systems, underground and overhead - Cabling systems, surface and concealed wiring systems, PVC and metal conduits, casing and capping system. Panel boards, switches, distribution boards.

Earthing systems and protective devices such as fuses, MCB's, MCCB's, ELCB's etc. -lightning protection - safety standards and IS codes. Cinema Act - Electrical installation in a cinema theatre.

Introduction to Indian Electricity Rules.

Introductory exercise in electrical load calculations and estimation.

MODULE III (10 Hours)

Commonly used terminology in illumination - laws of illumination - measurement

of luminous flux and lux meter.

Ambient, task and accent lighting - direct and indirect luminary systems.

Natural lighting - use of daylight - concept of day light factor.

Atrium lighting - methods and uses.

Energy efficient lighting system.

MODULE IV (8 Hours)

Sources of illumination - point source - row lighting, area illumination - evaluation of total flux

- colouring aspects of lamps - linear and surface sources of illumination - common luminaries - incandescent, fluorescent/CFL, HID's, MV, SV lamps etc.

Criteria and standards for different purpose/activity illumination - flood lighting, functional buildings like hospitals, sports stadia, swimming pools and underwater luminaries - street lighting, commercial display lighting.

Design considerations, estimation exercise, preparation of a lighting and electrical scheme.

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

SEMESTER V Course No.	Course Name	L-T-P/S	Credits	Year of introduction
AR 17-55	DESIGN OF STRUCTURES - I	2-1-0	3	2017
<p>Course Objectives</p> <p>The Design of Structures I course for students of architecture would,</p> <ul style="list-style-type: none"> • provide them with the knowledge of the behaviour of reinforced concrete structural elements and enable them to design such elements. 				
<p>Course Outcome</p> <ul style="list-style-type: none"> • Awareness about the analysis and design of reinforced concrete structural elements. • An exposure to the relevant IS codes for structural analysis and design. 				
<p>Reference Books</p> <ul style="list-style-type: none"> • Pillai S. U. and Menon D., Reinforced Concrete Design, Tata McGraw Hill • Sinha S. N., Reinforced Concrete Design, Tata McGraw Hill • Varghese P. C., Limit State Design of Reinforced Concrete, Prentice Hall of India • Punmia B. C., Jain A. K. and Jain A. K., Limit State Design of Reinforced Concrete, Laxmi Publications (P) Ltd., 1st Edition, 2007. • Park and Paulay, Reinforced Concrete • Mallick S. K. and Gupta A. K., Reinforced Concrete, Oxford and IBH. • Jain A. K., Reinforced Concrete- Limit State Design, Standard Book House. • Jain and Jaikrishna, Plain and Reinforced Concrete Vol I, Nemchand • Gambhir M. L., Design of Reinforced Concrete Structures, Prentice Hall of India • IS 456:2000- Code of Practice for Plain and Reinforced Concrete 				
<p>MODULE I (12 hours)</p> <p>Limit State Method of design of RC sections - principles and assumptions - partial safety factors Analysis and design of singly reinforced rectangular sections subjected to flexure, shear and torsion using Limit State Method. Design for shear. Bond-flexural and anchorage bonds, development length.</p> <p>MODULE II (12 hours)</p> <p>Analysis and design of doubly reinforced rectangular sections subjected to flexure, shear and torsion. Effective flange width of flanged beam sections. Analysis of flanged sections. (Simple problems only)</p> <p>MODULE III (12 hours)</p>				

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

MODULE IV (12 hours)

General principles in the design and detailing of various types of stairs - stairs with waist slab, stringer beam stairs, and stairs with cantilever steps. (Concept only)

Design of columns subjected to axial load.

Types of footings. Design of isolated footings for axially loaded columns.

NOTE:

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

TOTAL HOURS: 48

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

Course Outcome

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

Reference Books

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

MODULE I (9 Hours)

SELF CONSCIOUS MODERNITY

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

MODULE II (12 Hours)

EARLY MODERN ARCHITECTURE

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

MODULE III (12 Hours)

LATER MODERN ARCHITECTURE

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

ALTERNATIVE PRACTICES AND IDEAS

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

MODULE V (12 Hours)

21st CENTURY ARCHITECTURE

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

TOTAL HOURS: 45

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

Course Outcome

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

Text Books

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

Reference Books

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

MODULE I (12 Hours)

Preparation of specification for materials of construction and items of work: Detailed specifications of common building materials like cement, sand, brick, stone, timber, tile, steel, concrete, etc. - building components like foundation, flooring: PCC, tile, timber, slabs and beams, door and window: wooden, aluminium, steel, stairs, roofs, etc.

Specification for first class buildings and second class buildings.

Introduction to Estimation, Types of estimates, detailed estimate, revised estimate, supplementary estimate, maintenance estimate, approximate estimate. Explanation of terms-contingencies; work charged establishments, provisional sum, lump sum item.

Introduction to approximate estimate methods-plinth area method, cubic rate method, unit rate method and bay method.

MODULE II (15 Hours)

Quantity Surveying.

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

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

MODULE III (10 Hours)

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

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

MODULE IV (8 Hours)

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

TOTAL HOURS: 45

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

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

Course Outcome

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

Reference Books

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

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

Projects:

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

Process and deliverables:

Institutional buildings -

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

Office buildings -

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

TOTAL HOURS: 120

UNIVERSITY EXAMINATION PATTERN

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

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

Course Objectives

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

Course Outcome

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

Reference Books

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

Module I (12 hours)

Introduction to interior designing.

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

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

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

Module II (12 hours)

Principles and forms in Interior Design.

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

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

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

Module III (18 hours)

Interior lighting and ventilation: Natural and Artificial lighting in interior designing - Different modes of natural lighting and its effect on interior designing - Effect of natural ventilation in interior design - Different type of artificial lighting and its effect in interior designing.

Surface treatments: Elements of furnishing and surface treatment their need and scope- decorative materials for ceiling, walls, floors, drapery and upholstery for openings and furniture.

Introduction to wall finish drawings, electrical and lighting drawing.

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

Module IV (18 hours)

Interior landscaping: Elements and application of interior landscape, interior plant materials, growth condition, maintenance, importance of plantscaping - aesthetics, functional etc.

Exhibits in interiors - private and public.

Water bodies in interiors

Professional practice and material estimation - Study on material estimation and presentation.

Introduction to fixed furniture, detail drawing and material board.

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

TOTAL HOURS: 60

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

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

Course Outcome

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

Text books

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

Reference Books

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

MODULE I

STUDY OF ADVANCED CONCRETE (12 hrs)

Lightweight, high density, fiber reinforced, polymer concrete, outline of manufacture, properties and uses of the above.

Admixtures - Water repellent, waterproofing compounds, accelerators, air entraining agents, hardeners, plasticizer - Their properties and uses.

MODULE II

ADVANCED STRUCTURAL CONCEPTS IN ARCHITECTURE (16 hrs)

Pre stressed concrete structures: Precast pre stressed construction.. Two-way waffle slab, Two-way flat plate, Pre tensioning, Post tensioning, Hollow core slabs, T beam and slab.

Tensile structures: Concept of tensile structures, classification, uses, materials used. Application of cable structures in architecture.

Plate structures: Definition, classification and application, folded plates, flat slab and coffered slab.

Special Structures: Concept, Classification and Application of Pneumatic Structures, Kinetic Structures and Mobile Structures, Portal frames: Definition, and Application.

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

MODULE III

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

Introduction to concepts of Modular Coordination. Definition of Basic Module. Modular controlling dimensions, Planning Modules.

Introduction to concepts of prefabrication. Advantages & disadvantages of onsite & off-site prefabrication. Methods of prefabrication .Process of prefabrication. Various issues related to prefabrication industry & Examples of prefabrication concepts.

MODULE IV

DAMP PROOFING, CONSTRUCTION JOINTS (12 hrs)

Damp proofing: Causes and methods of damp proofing of foundation, walls, floors , roofs. DPC of bathrooms, swimming pools, roof gardens, water tanks.

Construction Joints and Expansion joints: Definition, Methods of construction, filling of joints and waterproofing.

Drawings : Sketches of construction joints, expansion joints.

Sketches of DPC for foundation, walls, roofs.

TOTAL HOURS: 52

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

Course Outcome

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

Reference Books

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

Module I (11 hours)

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

Module II (11 hours)

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

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

Module III (9 hours)

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

Module IV (14 hours)

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

TOTAL HOURS: 45

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

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

Course Objectives

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

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

Course Outcome

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

Reference Books

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

MODULE I (12 hours)

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

MODULE II (12 hours)

Design of tension member - plate, single angled member, Compression Member- Design of Strut-normal sections, single angled section.

MODULE III (12 hours)

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

MODULE IV (12 hours)

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

NOTE:

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

TOTAL HOURS: 48

UNIVERSITY EXAMINATION PATTERN

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

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

Course Objectives

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

Course Outcome

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

Reference Books

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

MODULE I ARCHITECTURE IN COLONIAL INDIA (8 Hours)

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

MODULE II (12 Hours) POST-NEHRUVIAN MODERNIST ARCHITECTURE

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

MODERNISM AFTER CORBUSIER AND KHAN

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

MODULE III

POST INDEPENDENT ARCHITECTURE (12 Hours)

Influences of post-independence Architects - Architecture of Charles Correa - British Council Library Delhi, Kanchenjunga Apartments, Mumbai , Achyut 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 Jain - University of Jodhpur, Jodhpur, Neelam Cinema Theatre, Sanchore, Hasmukh C Patel's - Entrepreneurship Development Institute of India, Gandhinagar, Sabarmathi River-front Development, Ahmedabad.

MODULE IV

WORKS OF CONTEMPORARY ARCHITECTS (10 Hours)

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

TOTAL HOURS: 42

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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

SEMESTER VI Course No.	Course Name	L-T-P/D	Credits	Year of introduction
AR 17-67	TOWN PLANNING	3-0-0	3	2017
<p>Course Objectives</p> <p>Town Planning course for students of architecture would,</p> <ul style="list-style-type: none"> • Introduce the history and evolution of Town Planning and various concepts, also its relevance in present scenario. • Help them to acquire basic knowledge of various legislation and development schemes in Town Planning. 				
<p>Course Outcome</p> <ul style="list-style-type: none"> • Understanding of the importance of Town Planning and various concepts. • Basic awareness about the various Town planning regulations. 				
<p>Text books</p> <p>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”.</p>				
<p>Reference Books</p> <ul style="list-style-type: none"> • 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”. 				
<p>MODULE I (12 HOURS) HISTORY & EVOLUTION</p> <p>Origin and evolution of Human settlements: Development of Town planning in the historical perspective -Town planning in ancient, medieval, renaissance, industrial & post-industrial age - Town planning in India: ancient, medieval, colonial and modern - Development of new towns and cities: Chandigarh and Navi Mumbai. Contributions to modern town planning thoughts: Patrick Geddes, Ebenezer Howard, C A. Doxiadis, Lewis Mumford, Le Corbusier and Clarence Stein.</p>				

**MODULE II (12 HOURS)
NEED FOR TOWN PLANNING**

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

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

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

**MODULE IV(9 HOURS)
NEED FOR TOWN PLANNING LEGISLATION**

Land Acquisition Act - 74th Amendment Act - Coastal Regulation Zones and its relevance - SEZ - JNNURM.

Land use Plan Tools for land use control - Zoning regulations, building byelaws, Subdivision regulations, Plot reconstitution, Betterment Tax.

TOTAL HOURS: 45

UNIVERSITY EXAMINATION PATTERN

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

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

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

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

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