

AR1601 ARCHITECTURAL DESIGN –V

Teaching Scheme: 0(L) - 0(T) -11(P)

Credits:7

Objective

- To introduce the students the design of multifunctional multistoried buildings.
- Projects shall have enough emphasis on technology and the application of various building services and circulation systems.

Major Project – Projects may be of the following categories multi-functional, multistoried housing, commercial, public, semi-public buildings etc.
Eg. Commercial/ Office complexes, Theatre complexes.

Short project- Documentation Camp – Documentation camp consists of preparation of measured drawings of selected buildings / historic places inside and around the state of Kerala.

Course Outcome

At the end of the course, the students shall have acquired knowledge of the process involved in addressing a design problem with emphasis on technology and building services.

References:

1. Edward d. Mills, 'Planning the architect's handbook'; Butterworth-Heinemann Ltd, 1985.
2. Joseph De Chiara 'Time saver standards for Building types'; ; McGraw-Hill Inc., US; 1990
3. Ernst Neufert & Peter Neufert ; Neufert's Architects Data; Wiley; 4th Edition edition, 2012
4. Ramsey/Sleeper, 'Architectural Graphic Standards' ; John Wiley & Sons, 2008
5. BIS, various codes of practice and National Building code of India; Bureau of Indian Standards, Govt. of India; Reprint edition (2013)

AR1602 BUILDING MATERIALS AND CONSTRUCTION – V

Teaching Scheme: 1(L) - 0(T) - 3(P)

Credits: 4

Objectives

- To make students gain first-hand knowledge of innovative construction techniques adopted for floor, wall and roofing by research organization through visits to some of them. (Theory only with site visit)
- To understand the properties, types and applications of plastic and glass in building construction.
- To create an understanding about the construction details of false ceiling wall paneling etc.
- To enable students to understand the importance of disaster resilient structures and their construction techniques.

Module I

Construction system developed by Research Organizations.

Study of construction systems innovated through research organizations like CBRI, SERC, etc., Floor wall and Roofing systems.

Ferro cement its properties, uses and application in building construction including the techniques of preparation, casting, curing etc.

Module II

Study of Glass and glass products – composition, types of glass – wired glass, fiber glass, laminated glass, glass building blocks, their properties and uses in buildings – Application of glass in construction – Structural glazing, curtain wall glazing-toughening-Insulation, applications in the building Industry -current developments.

Study of plastics –thermosetting and thermoplastics, resins, fabrication of plastics, polymerization and condensation - Application of plastic in building construction.

Thermoplastics and thermosets - properties and architectural uses of plastics - structural plastics – reinforced plastics and decorative laminates - plastic coatings, adhesives and sealants - modifiers and plasticizers – fillers and stabilizers - fabrications of plastics.

Module III

False ceiling : False ceiling using aluminium, timber and steel sections with asbestos sheets, soft boards, acoustic boards, plaster of paris etc. - details of fixing concealed lighting and air conditioning fixtures- case studies.

Wall panelling – Construction details using different materials, materials available in local market.- Case studies.

Drawing: *False ceiling details, Wall paneling details.*

Module IV

Introduction to earthquake resistant structures – Concepts of stability, prevention of collapse –

Study of shear wall and diagonal framing – Architectural details of earthquake resistant buildings.

Drawings –*Reinforcement and bending detail in R.C. Band, Details of providing Vertical steel bars in Brick masonry*

Course Outcome:

Students should have gained information on the recent construction technology developed by leading research organization in India with a thrust on materials that are developed in the context, the knowledge on the earthquake resistant structures and their construction details, alternate building materials and their application in construction as well as in finishing.

References:

1. S.C.Rangwala, 'Engineering Materials', Charotar Publishing House, India, 1997.
2. B.C.Punmia, 'Building Construction', Laxmi Publications Pvt.Ltd., New Delhi, 1993.
3. Arthur Lyons – 'Materials for Architects and Builders - An Introduction' - Arnold, London, 1997.
4. Don A.Watson, 'Construction Materials and processes', McGraw Hill Co., 1972.

5. W.B.Mckay, 'Building Construction', Longmans, U.K. 1981.
6. R. Chudler, 'Construction Technology' – Vol I to IV; Heinemann, 2011
7. J.K. Mc Kay, 'Building Construction Vol I to IV'; Pearson Education, 2012
8. Sharma S.K. & Kaul, B.K., 'Text book of Building Construction'; IndiaWise ;1980
9. Arora S.P. & Bindra, 'A text book of Building Construction'; Dhanpat Rai & Co, 2010
- 10.. Relevant BIS Code Pertaining to Construction of Materials

University Examination Pattern:

Examination duration: 4 hours Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A : Question 1. (40 marks) - Eight Short answer questions of 5 marks each. All questions are compulsory. There should be two questions from each module.

Question 2. (10 marks) – Questions for 10 marks from module I and II. Candidates have to answer any one out of the two.

Question 3. (10 marks) – Questions for 10 marks from module III and IV. Candidates have to answer any one out of the two.

Part B (40 Marks) – Drawing: Candidates have to answer any one full question out of the two each from modules III and IV. Each question carries 20 marks.

AR1603 HISTORY OF ARCHITECTURE – V

Teaching Scheme: 3(L) - 0(T) - 0(P)

Credits: 3

Objectives

To introduce architectural vocabulary and provide an understanding of various works of world famous Architects.

Modern Architecture

Module I

Introduction to Modern Architecture-Chicago School of Architecture, Bauhaus School, and Taliesin School of Architecture – Great masters like Louis Sullivan, Frank Lloyd Wright – Le Corbusier –Walter Gropius – Mies Vander Rohe.

Module II

Impressionism –Expressionism – Cubism – Neoclassicism – Neo plasticism- Suprematicism– Constructivism – Futurism – Post modernism- Post- Post Modernism– Deconstructivism–Critical regionalism

Work and philosophy of following architects – Eric Mendelson, Eero Saarinen, Alvar Alto, Louis Khan, Marcel Breuer, Kenzo Tange, Kisho Kurokawa, Philip Johnson, PL Nervi, Christopher Alexander, Frei Otto, Geoffrey Bawa, Hassan Fathy.

Module III

Innovation and ideas of Archigram – post modern architects like Peter Cook, Paolo Soleri, Robert Venturi

Contemporary architects: Norman Foster, Richard Rogers, James Sterling, Peter Eisenman, Renzo Piano, Daniel Libeskind, Zaha Hadid, Frank O Gehry, Santiago Calatrava, Rem Koolhaas

Module IV

Works of Foreign Architects in India and their influence – Edwin Lutyens, Le Corbusier, Louis Khan, Philip Johnson.

Works of Indian Architects – Laurie Baker, Charles Correa, B.V. Doshi, A.P. Kanvinde, Raj Rewal, Joseph Allen Stein

Course Outcome:

Upon completion of the course, the student will be able to develop a keen appreciation of the various works of renowned architects, the styles they adopted and the context, the buildings were built.

References

1. Fred, S. Kleiner, 'Gardener's Art through Ages'; Harcourt College Publishers, 2001
2. H.H. Arnason, 'History of Modern Art', Thames and Hudson, 1977.
3. Leland M. Roth., 'Understanding Architecture: Its Elements, History, and Meaning.'; Craftsman House, 1994
4. Raeburn Micheal, 'Architecture of the Western World'; Popular Press, 1988.
5. R. Mehrotra / K. Frampton, 'World Architecture 1900-2000: South Asia'; Springer, 2000
6. Kazi Khaleed Ashraf/James Belluardo, 'An Architecture of Independence: The making of Modern South Asia'; Princeton Architectural Press, 2000
7. M. Fazio/ M. Moffett, 'A World History of Architecture'; Laurence King- 2013

University Examination Pattern

Part A (40 marks) - Eight Short answer questions of 5 marks each. All questions are compulsory. There should be two questions from each module.

Part B (60 Marks) – Two Questions from each module. Candidates have to answer any one full question out of the two from each module. Each question carries 15 marks

AR1604 TOWN PLANNING

Teaching Scheme: 3(L) - 0(T) - 0(P)

Credits: 3

Course Objective

To expose the students

- *To the field and profession of Town Planning,*
- *To the history, development and concepts of planning in India and abroad and its relevance and application along with an understanding of settlements.*
- *To modern day planning process and issues with special focus on planning in developing countries.*

Module I

Origin & evolution of human settlements – Relevance of study of evolution of human settlements – Human settlements as an expression of civilization – Town planning in ancient- Mesopotamia , Greece, Rome, Renaissance and Industrial and Post industrial period.

Module II

Contribution of Ebenezer Howard, Le Corbusier, Clarence Stein, Patric Geddes, C.A. Doxiadis
Impact of urbanization on cities, Urban environmental problems –land use, traffic and road network, Urban land use – CBD, urban nodes, fringe area and suburbs.

Module III

Master plans – Development plans – Town planning schemes – Neighbourhood planning – Area planning – Regional planning – The planning components / elements like land use, zoning, floor area ratio, land development techniques, surveys.

Module IV

Urban Development Authorities, its setup and functions, Land Acquisition Act, 74th Amendment, Coastal Regulation Zone Act, SEZ, JNNURM

Course Outcome

On the completion of the course the student will be exposed to the basics of town planning and to the history, development and concepts of planning in India and abroad and its relevance and application along with an understanding of settlements.

References:

1. A .P. Gallion/ Simon Eisner / Stanley Eisner - 'Urban Pattern'; John Wiley & Sons, 1993
2. AEJ Morris- 'History of Urban Form before industrial revolution; Longman, 1994
3. Peter Hall- 'Urban & Regional Planning'; Routledge 2010
4. C.A. Doxiadis- 'An Introduction to Science of Human Settlements; Oxford University Press 1968

University Examination Pattern

Part A (40 marks) - Eight Short answer questions of 5 marks each. All questions are compulsory. There should be two questions from each module.

Part B (60 Marks) – Two Questions from each module. Candidates have to answer any one full question out of the two from each module. Each question carries 15 marks

AR1605 BUILDING SERVICES –III (FIRE PROTECTION & HVAC)

Teaching Scheme: 3(L) - 0(T) - 0(P)

Credits: 3

Objective:

To provide the basic knowledge of heating, ventilation, air conditioning and fire protection in buildings.

Module I

General introduction – Objectives – Principles of heat transfer – Conduction – Convection – Radiation – Fourier Law of heat conduction – Thermal conductivity – Heat transfer coefficient – Conduction through plane wall – Overall heat transfer coefficient – Simple problems – Insulation – Properties of Insulation – Critical thickness of insulation(only description).

Module II

Air conditioning – Definition – Comfort and industrial air conditioning. Reversed carnot cycle, COP.(simple problem to find COP based on Carnot cycle) Difference between heat pump and refrigerator.
Principles of vapour compression system – Simple cycle – Representation of TS and PH diagrams – COP – Refrigerants and their properties – Mixture refrigerants – Refrigeration systems components – Compressors – Condensers – Evaporators – Expansion devices – Cooling towers. Simple vapour absorption system. Solar energy for refrigeration.

Module III

Psychrometry – Psychrometric properties – dry bulb temperature, wet bulb temperature, humidity ratio, relative humidity, dew point temperature, degree of saturation, Factors affecting human body comfort – Comfort chart – Air distribution systems – duct systems – sizes, Layout and mountings – Effects of bends of ducts.
Air conditioning systems –Central Plant, Room air conditioners – Split system – Packaged system – all air system –chilled water system – zoning – Market survey – Noise and noise control in Air conditioning.

Module IV

Fire safety of buildings– Classification of fires and principles of fire protection for various cases of fires ,Fire resistance of building elements, fire rating and assessment, Fire lifts, fire ducts –position and size, and means of escape and their design, study of building byelaws related to fire safety ,control of fire spread – firefighting equipment – Automatic sprinklers.

Project work – Drawing should be prepared showing all details of the system of a building / part of building (to be combined with design project).

Course Outcome:

Students should understand the basics of heating, ventilation and air conditioning in building

References

1. Manohar Prasad, 'Refrigeration & Air conditioning', new age publishers, New Delhi, 2009
2. C. Arora, 'Refrigeration & Air conditioning' McGraw Hill Education India Private Limited, 2008
3. W.F. Stoecker, 'Refrigeration & Air conditioning' McGraw-Hill Higher Education 1983
4. P.L. Ballaney, 'Refrigeration & Air conditioning' Khanna Publishers, Delhi, 2003
5. S.C. Arora and Domkunduwar S , 'Refrigeration & Air conditioning' Dhanpat Rai, 1980
6. Jane I Lataille 'Fire Protection Engineering in Building Design' Butter Worth Heinemann, 2003.

University Examination Pattern

Part A (40 marks) - Eight Short answer questions of 5 marks each. All questions are compulsory. There should be two questions from each module.

Part B (60 Marks) – Two Questions from each module. Candidates have to answer any one full question out of the two from each module. Each question carries 15 marks

AR1606 STRUCTURAL DESIGN
Teaching Scheme: 3(L) - 1(T) - 0(P)

Credits: 3

Course Objective:

- To understand concepts of reinforced cement concrete.

Module I

Basic design philosophy of Limit state method -Deflection criteria- Behavior and Design of singly reinforced beams under flexure and shear by limit state method.
Behavior and Design of Doubly reinforced beams under flexure and shear by limit state method.

Module II

Design of T-beam under flexure and shear.
Design of One Way slab under flexure.

Module III

Design of Two way slab under flexure -conditions of corners free to lift up and corners revented from lifting up.
Design of short columns subjected to axial loads [Use SP 16 Chart]

Module IV

Design of short Column members subjected to combined axial load and uniaxial bending by limit state method.[Use SP 16 Chart] short column subjected to biaxial moment .Long Column-basic introduction of structural behavior.
Design of isolated Footings- Square and Rectangular shapes only (Concentric loads only).

References:

1. Ashok K Jain, *Limit state Design of Reinforced concrete*, 2007.
2. Unnikshnan Pillai & Devdas Menon, *Reinforced Concrete Design*, 2009.
3. Punmia B C, *Limit state Design of Reinforced concrete*; Laxmi Publications - New Delhi, 2007

Course Outcome:

On the completion of the course the student will exposed to the concepts of Reinforced concrete structures.

University Examination Pattern

Part A (40 marks) - Eight Short answer questions of 5 marks each. All questions are compulsory. There should be two questions from each module.

Part B (60 Marks) – Two Questions from each module. Candidates have to answer any one full question out of the two from each module. Each question carries 15 marks

AR1607 BUILDING SCIENCE LAB

Teaching Scheme: 0(L) - 0(T) - 2(P)

Credits: 1

Course Objective:

- To familiarize the students with building science, related parameters and its application in buildings.
- To understand various equipment and their principles for the determination of functional efficiency of buildings.
- To understand prevailing ISO Standards related to the above parameters.

Module – I

Measurements of Air Temperature (indoor and outdoor), Relative Humidity (indoor and outdoor), Mean Radiant Temperature (MRT), Air movement indoors, Wind velocity outdoors, Solar Radiation, Surface Temperature and Thermal Insulation of materials.

Module – II

Study of relationship between MRT and Solar Radiation, Study on comfort parameters and comfort indices,
Evaluation of thermal comfort using Architectural Evaluation System
Measurement of illumination indoors – natural and artificial, Study of Sun path and shading devices.

Module – III

Measurement of sound indoors and outdoors.
Determination of acoustical properties of materials.

Module – IV

Non Destructive Tests for Concrete - Measurement of compressive strength of concrete using Rebound Hammer, Determination of cavities in concrete using Ultra Sound Method, Locating reinforcement bars embedded in concrete using Rebar Locator.

Internal Continuous Assessment (Maximum Marks -50)

Laboratory Experiments : 25 marks
Tests (Internal) : 15 marks
Attendance : 10 marks