

AR1501 ARCHITECTURAL DESIGN – IV

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

Credits: 7

Course Objective:

- To provide an opportunity to analyze, understand the project brief, site and the cultural context of the design problems.
- To introduce the students the design of multi-functional with complex features incorporating built and unbuilt spaces.

Major Project – Projects may be of the following categories
Recreational, Assembly, Educational etc.
Example: Library, Gymnasium, Auditorium

Short project- Preparation of working drawings of buildings or selected areas of buildings.

Course Outcome

At the end of the course, the students shall have acquired knowledge of the process involved in addressing a design problem.

References:

1. Edward D. Mills, 'Planning the Architects handbook'; Butterworth-Heinemann Ltd, 1985.
2. D. Chiara & Callender, 'Time saver standards for building types'; McGraw-Hill Inc. US; 1990

AR1502 BUILDING MATERIALS AND CONSTRUCTION – IV

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

Credits: 4

Objectives

- To create an understanding about the properties, uses and application of coating materials.
- To create an understanding about the finishing materials in building constructions.
- To introduce the basic knowledge about materials and construction details of roof structures.
- To make the students understand the various types of mass vertical movement in high rise buildings, in terms of their verities, installations in planning, contextual application with certain details for making them barrier free, through construction and detail drawings.

Module I

Protective and decorative coatings.

Properties uses and application of paints, enamels, distempers, plastic emulsions and cement based paints. Painting of different surfaces, defects in painting, Clear coatings and stains: Varnish, Lacquers, Shellac, Wax, Polish, Stains.
Special purpose paints: Bituminous, Luminous, Fire retardant and resisting paints.

Module II

Materials for Finishes-Wall, floor and roof finishes - properties – application - maintenance –Study of advances in field of materials- Finishes in plasters, cement, timber etc. – epoxy, polyurethane products. Natural Floor Finishes – wood, Shahabad, Kotah- different types of Marbles, Granite etc. Artificial Floor Finishes –Vinyl, Vitrified, Ceramic tiles, Mosaic tiles, Cement tiles, etc.

Module III

Study of Roof structure – Terminology- Wood, steel – trusses – King post truss, queen post truss with details of joints - fixing – detail of eaves projection with soft boarding, north light details, girders, space frames.

Roofing Tiles –Types, properties and method of fixing.

Light roofing materials - Galvanised iron sheets, asbestos cement sheets, corrugated aluminium sheets, PVC sheets and other light roofs like glass fibre reinforced plastic sheets, Poly carbonate, Acrylic sheets, bituminous sheets with accessories shingles etc. and method of their fixing.

Detail drawing – Steel – King post truss, Queen post truss-angular and tubular truss, details of covering and gutter-fixing and joinery details.

Module IV

Circulatory equipments in buildings.

Elevators- Planning considerations –number, size, arrangement, Types of elevators- Electric, Hydraulic-passenger, hospital, capsule, freight etc. Dumb waiters, details of lift shaft and other mechanism, detailing and fitting for physically handicapped.

Escalators and conveyors.

Parallel and criss-cross escalators, horizontal belt conveyors, horizontal moving walkways-concern for physically handicapped, mechanical safety systems and automatic controls.

Detailed drawing of Structural provisions– *Elevators, Escalators, Dumb waiters and conveyors*

Course Outcome:

Students should be familiar with the different types of coating and finishing material and their applications in building construction. The students should have the idea about roof structures and their construction. The students will also gain knowledge on Mechanical circulatory equipment in buildings, the various mechanisms and devices, their installations, working so as to integrate them in the process of design.

References:

1. Arthur Lyons – 'Materials for Architects and Builders - An Introduction' -Arnold, London, 1997.
2. Don A.Watson, 'Construction Materials and processes', McGraw Hill Co., 1972.
3. W.B.Mckay, 'Building Construction', Longmans, U.K. 1981.
4. S.C.Rangwala, 'Engineering Materials', Charotar Publishing House, India, 1997.
5. B.C.Punmia, 'Building Construction', Laxmi Publications Pvt.Ltd., New Delhi, 1993.
6. Relevant BIS Codes.

University Examination Pattern:

Examination duration: 3 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.

AR1503 HISTORY OF ARCHITECTURE – IV

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

Credits: 3

Course Objective:

- *To induce an appreciation to the importance of history of architecture and its relationship to the development of any place.*
- *To develop awareness about the precious architectural past.*

Module I

Indian Colonial Architecture-Portuguese

Introduction to Portuguese colonial architecture in India. The styles and trends of architecture brought by Portuguese to India and their evolution – The Impact of Portuguese architecture in India – The characteristics of Portuguese Colonial Architecture with examples from Goa-Bom Jesus Cathedral Complex-Old Goa-Fountainahs

Module II

Indian Colonial architecture-British

The styles and trends of architecture brought by British to India and their evolution – The impact of Indo-Saracenic style on the British Architecture in India – The characteristics of British Colonial Architecture with examples from work of Edwin Lutyens.

Module III

Post Renaissance Architecture in Europe – Industrial revolution – Causes, consequence and impact in Architecture – Its influences in building, technology and modern building materials Steel, glass, RCC etc.

Module IV

Art – Nouveau and Art and crafts movement – Advances in Engineering –Joseph Paxton Eiffel tower, Paris – Antonio Gaudi, VictorHorta, Louis Sullivans, Frank Lloyd Wright, Organic Architecture

Course Outcome:

Knowledge about the history of Indian culture, its building art and construction techniques course, the student will be able to develop a keen appreciation of the evolution of different styles in architecture.

References:

1. T. R. Metcalf, 'An Imperial Vision: Indian Architecture and Britain's Raj'; Faber & Faber, 1989
2. Jon T. Lang, Madhavi Desai, Miki Desai, 'Architecture and Independence'; Oxford University Press, 1997 –
3. C. Norburg-Schulz, 'Meaning in Western Architecture'; Rizzoli, Revised edition, 1993.
4. K Frampton, 'Modern Architecture: A Critical History'; Thames & Hudson, London, 1994.
5. Francis D K Ching, Mark M. Jarzombek, Vikramaditya Prakash, 'Global History of Architecture'; John Wiley & Sons, 2011

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

AR1504 ECOLOGY AND ENVIRONMENTAL STUDIES

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

Credits: 2

Course Objective:

To introduce the students to the multi-disciplinary nature of environment.

Module I

Concept of environment, scope of Environmental Science, environmental components, scope and subdivisions of ecology, ecological principles pertaining to population, community, ecosystem and biome.

Module II

Population dynamics and population regulations, concept of carrying capacity, population fluctuations, population dispersion, r and k selection, ecotypes and ecophene, habitats and niches.

Module III

Energy in ecosystem, Primary and secondary production, Biomass, Methods of measuring productivity, Pattern of primary production in the major ecosystems of the world, Energy flow in ecosystems, Feedback and control mechanism, Pathways of energy transfer- grazing and detritus food chain, Ecological efficiency and ecological pyramids.

Module IV

Biogeochemical cycles: nutrient cycling in the ecosystems, Gaseous cycles (Carbon and Nitrogen) and sedimentary cycles (Phosphorus and Sulphur), Impact of man on nutrient cycles; Major ecosystems of the world: A general idea of forest, grassland, desert, wetland, freshwater and marine ecosystems.

COURSE OUTCOME:

By the end of the course, the students are oriented about the concepts of ecosystem carrying capacity, ecological footprint, sustainability and sustainable development.

Reference

1. Botkin, Daniel B. *Environmental Science: Earth as a Living Planet*, John Wiley and Sons, New Delhi, 2011.
2. Miller, G. Tyler and Scott Spoolman. *Essentials of Ecology*, Brooks/Cole Learning, USA, 2011.
3. Odum, E. P. *Fundamentals of Ecology*, Nataraj Publisher, Dehra Dun, 1996.
4. Dakshini, K.M.M. *Principle and Practices in Plant Ecology*, CRC, Boston, 1999.
5. Dash, M.C. *Fundamentals of Ecology*, Tata McGraw Hill, New Delhi, 1994.
6. Molles Jr, M. C. *Ecology- Concepts and Application*, McGraw Hill, New Delhi, 1999
7. Ingegnoli, V. *Landscape Ecology: a widening foundation*, Springer, Bonn, 2002.
8. Kormondi, E.J. *Concepts of Ecology*, Prentice Hall of India, New Delhi, 1999.
9. Chapman, J. L. and Reiss M. J. *Ecology Principles and Applications*, Cambridge University Press, London, 2005.
10. Odum, E.P. and G. W. Barrett. *Fundamentals of Ecology*, Thomson Asia Pvt. Ltd., Singapore, 2005.
11. Rana, S.V.S. *Essentials of Ecology and Environmental Science*, Prentice Hall of India, New Delhi, 2005.
12. Chapin, III, F. Stuart, Matson, Pamela A., Vitousek, *Principles of Terrestrial Ecosystem Ecology*, Springer, 2012.
13. Reddy, Anji M. *Textbook of Environmental Science and Technology*, BSP Books Pvt.Ltd., Hyderabad, 2005.
14. Anjaneyulu, Y. *Introduction to Environmental Science*, BSP Books Pvt. Ltd., Hyderabad, 2009.

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

AR1505 BUILDING SERVICES II-ELECTRICAL DESIGN AND ILLUMINATION

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

Credits: 2

Objective:

To provide the basic knowledge of electrical services and basic concept of illumination in Architectural design

Module I

DC/ AC System-electrical load and emergency power stand-by and alternate power supply system, Three phase systems: Representation- star and delta connection, concept of balanced and unbalanced loads in three phase systems.

Module II

Classification of voltages, electrical services in buildings, general aspects of design of electrical domestic installations, Electrical distribution in buildings, sub stations/ Transformer/ Panel Board/MCB, MCCB, SFU, ELCB.

Module III

Electrical installation in commercial and high rise buildings, concept of rising mains, principles of lighting in buildings, definitions and units, types of luminaries and fittings, design of illumination scheme in halls and auditoriums. Integration of services-Electrical power monitoring-IBMS systems

Module IV

Electrical safety: pipe and plate earthing, lighting protection in buildings, safety regulation in domestic, commercial and high rise buildings.

Course Outcome:

Students should be able to understand the basics of electrical services and illumination.

References

1. K. B. Raina, S. K. Bhattacharya , 'Electrical Design, Estimating and costing'; New Age, 2010
2. Uppal, 'Electrical wiring, Estimating and costing'; Khanna Publishers New Delhi, 2008
3. J. B. Gupta, 'Electrical Installation Estimating & Costing'; S K Kataria and Sons, 2013
4. BIS ,'National electrical Code (NEC)' Bureau of Indian Standards , Govt. of India; 2011
5. BIS, Bureau of Indian Standards – IS 732, IS 742, IS 3043 New Delhi,2005
6. Krider J.F, Handbook of Heating ,ventilation and Air conditioning, Taylor & Francis 2005.

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

AR1506 ARCHITECTURAL DETAILING

Teaching Scheme: 2(L) - 0(T) - 3(P)

Credits: 4

Objective

- To motivate the students to learn the techniques of preparing drawings which are used for construction of buildings and working details of project execution on site.
- To give them exposure to the actual procedures in building industry.
- Promote site visits as much as possible to ensure that the students are familiarized with nuances of site development, building construction and building services.

Module I

Role of working drawing-intent and content, study of symbols, conventions, line expression in the detailed drawings and cross referencing. Working drawing set check list-site plan landscaping plan and grading plan details, floor plans, Exterior elevations, interior elevations, cross and longitudinal sections, wall sections and details, foundation plan, framing plan, reflected ceiling plan, roof plan, detailed area plans, schedules-room finishes, door window schedules. Practice of Manual drafting, free hand detailing and CADD detailing

Module II

Working drawings of G+1 Residences - floor plans, sections, elevations, foundation details including site planning and landscape details, centre line drawing, roof plans.

Module III

Working drawings of G+1 Residences - Schedule of doors, windows, Hardware, Joinery details, finishes, fixing details, working details of interiors.

Module IV

Working drawings of G+1 Residences - Drainage drawings, water supply, sanitary and plumbing layouts of multistoried and groups of buildings including rain water Harvesting and sewage treatment plants. Electrical Layout drawings and fixing details of electrical fixtures

Note- Case study of architectural detailing of multi-storeyed/complex groups of residential and commercial buildings to be included in the sessional works.

Course Outcome

The students would have achieved a comprehensive knowledge and understanding of technical drawings and detailing.

References

1. Ralph W Liebing, "Architectural working drawings" John Wiley & sons, Inc., New York 1999
2. Fred hall and Goger Greeno, Building Services Handbook, Routledge, 7th Edition, 2013
3. Fredrick S Merrit, Jonathan T. Ricketts, Building design and construction Handbook', McGraw-Hill Inc. 5th edition 1994
4. Edward Allen, South Natick, Massachusetts, Patrick Rand "Architectural Detailing, 3rd edition- constructability-aesthetics" Wiley . 2016
5. BIS, National Building Code 2005, New Delhi, 2005

University Examination Pattern

Part A (40 marks) - 8 short type questions of 5 marks, each, from module I

Part B (60 Marks) – Two Questions each from module II - IV. Candidates have to answer any one full question out of the two from each module. Each question carries 20 marks

AR1507 STRUCTURAL ANALYSIS-III

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

Credits: 2

Objectives

- To give an introduction to the design concepts of structures and different structural elements.

Module I

Three hinged arches –Circular and Parabolic shapes –Diagrams for Normal Thrust, shear and bending moments.

Fundamental concepts of Two Hinged and fixed Arches.

Module II

Analysis of Suspension Cables – under uniform load and self weight.

Analysis by force method - Continuous beams, Single bay frames with and without sway.

Effect of settlement and temperature stress on structures (Analysis not expected).

Module III

Displacement method of analysis – Trusses, Continuous beams, Single bay frames with and without sway.

Direct stiffness method-analysis of trusses.

Module IV

Introduction to any one Structural analysis and design software package like STAAD PRO, ANSYS, NISA CIVIL etc. (one assignment should be given).

References

1. R.C. Hibbeler, *Structural Analysis*, Prentice Hall; 8 edition, 2011.
2. Dr. B C Punmia & Jain, *Strength of materials*, Laxmi Publications.
3. Aslam Kasimali, *Structural Analysis*, 5th Edition; Cengage Learning 2014
4. Harry H West, *Fundamentals of Structural Analysis*. Wiley Publications, 2nd Edition, 2011
5. Ramamrutham, *Theory of Structures*, Dhanpat Rai & Co (P) Ltd. Reprint 1973

Course Outcome

At the end of the course, the students shall have acquired knowledge of different structural elements and evaluate the forces developed in them.

University Examination Pattern

Part A (40 marks) - Eight Short answer questions of 5 marks each from module I to III with minimum 2 questions from each module. All questions are compulsory.

Part B (60 Marks) – Two Questions from each module. Candidates have to answer any one full question out of the two from module I to III. Each question carries 20 marks.