

AR1701 ARCHITECTURAL DESIGN – VI
Teaching Scheme: 0(L) - 0(T) -11(P)

Credits: 7

Course Objective

To introduce the students the planning and design of large-scale buildings with high degree of complexity by understanding architectural, socio-cultural, and economic issues connected with architecture. Integrated approach to design encompassing site planning, building design, environment and services.

Major Project –Housing projects, Institutional building projects involving Campus planning etc...

Short project - Design of related areas of Major project.

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 site planning.

References

1. BIS , IS Codes
2. BIS,National Building Code 2005,New Delhi,2005
3. Kerala Municipality Building Rules
4. Joseph De Chiara "Time Saver Standards" ; McGraw-Hill Inc.,US; 1990
5. Paul D. Spreiregen, "Urban Design, the Architecture of Towns and Cities", Krieger Pub Co 1982
6. Gordon Cullen, "Concise Townscape". Reprint Edition Routledge 1995
7. Edmund Bacon, "Design of Cities"; Penguin USA; Revised edition 1976
8. Edward D. Mills, "Planning the Architects Handbook"; Butterworth-Heinemann Ltd, 1985
9. Julius Panero & Zelnik, "Human Dimension and Interior Space", Watson-Guption Publications, 2015

AR1702 URBAN DESIGN

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

Credits: 3

Objectives:

- To gain exposure about the field of urban design
- To understand the fundamental concepts and theories of urban design and their application in design projects

Module I

Introduction to urban design

Definitions of urban design, Urban Design History and Its Evolution
The scope and objectives of urban design-Need for urban design in contemporary India-
The relation between Architecture, Urban design and urban planning

Module II

Urban Spaces and Urban Image

Behavioral issues in urban design - Principles of urban spatial organization, urban scale, urban spaces, urban massing, quality of urban enclosure
Image of the city and its elements - Perceptions of urban environment: Kevin Lynch's principles.

Module III

Basic theories and techniques in Urban Design

Surveying methods and techniques: conducting and urban design survey
Introduction to basic theories in Urban design(Kevin Lynch, Christopher Alexander), – Urban design Principles – scale and mass, Skyline studies – Urban spaces and their characteristics space linkage

Module IV

Urban renewal, scope need and procedure – Urban conservation and economic considerations-
Urban design projects in various scales: National, metropolitan city and project levels, case studies –
Road form and hierarchy-Road pattern, Pedestrian areas, malls, Urban elements, open spaces, and water front developments.

Course outcome:

The students would have understood the fundamental concepts and theories of urban design and their application in design projects

References

1. Paul D. Speiregen, 'Urban Design: Architecture of towns and cities', Krieger Pub Co 1982
2. Bill Hillier and B.J Hanson, 'The social logic of space', Cambridge University Press; 1989
3. Alexander Christopher, 'The new theory of urban design' OUP USA; 1999
4. Kevin Lynch, 'The image of the city'; The MIT Press, 1960
5. Charles Correa, 'A Place in the Shade: The New Landscape & Other Essays'; Hatje Cantz 2012
6. Rossi, Aldo, 'The architecture of cities'; MIT Press; Reprint edition 1984
7. Gordon Cullen, "Concise Townscape". Reprint Edition Routledge 1995
8. Roger Trancik, 'Finding lost spaces: Theories of Urban Design'; Van Nostrand Reinhold
9. Sitte, Camillo, 'The Art of Building cities' Martino Fine Books 2013
10. Time saver standards, 'Urban Design'; McGraw Hill Education, India; 2011
11. Andres Duany, Elizabeth Plater-Zyberk, Robert Alminana, 'The new civic art'; Rizzoli 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

AR1703 HOUSING

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

Credits: 3

Course Objective

To introduce the students into the field of housing-to make them understand its significance in the context of both global and national scenario, and thereby to make them sensitive to the critical social and economic issues related to housing especially in developing countries like India and Kerala in particular, with emphasis on the analytical study of relevant housing initiatives.

Module I

Introduction to housing.

Nature and magnitude of the housing problem in India-Housing Shortage as a result of Population Explosion. Urbanisation and Poverty issues in the Indian context. Role of Housing in the National level with a study on the changing priorities in the housing policies and the major housing programmes carried out in the various five year plans.

Module II

Study of Urban and Rural Housing - Housing design and standards conforming to the local climatic and socioeconomic conditions.

Important earlier Housing Schemes in India for various categories like HIG, MIG, LIG, EWS etc. Study of Slums as a consequence of rapid urbanization and industrialization, and its impact on the urban housing scenario. Examples of the major Slum clearance and Slum Improvement Schemes and initiatives.

Module III

Concept of Aided Self Help- Housing the poor through the NGO's and through mass involvement of the beneficiaries through studies of relevant and innovative housing schemes or projects. National Housing Policy and its need, objectives and role in housing in the present day context.

Module IV

Housing Finance, Sources of Housing Finance and its essential characteristics. Major Housing Finance agencies at the National and State level like the NHB, HDFC, LICHL, GIC, UTI, Commercial Banks etc.

Course Outcome

On the completion of the course the student must be aware of the significance of housing in the context of both global and national scenario, and would have understood the critical social and economic issues related to housing especially in developing countries like India. They should familiarize themselves to the various housing schemes.

References

1. K. Thomas Poullose- 'Innovative Approaches to Housing for the poor'; C. Mathews, 1988
2. Dr. Misra and Dr.B.S. Bhooshan- 'Habitat Asia' ; Concept Publishing Company 1979
3. Arthur Gallion , Simon Eisner- 'Urban Pattern'; John Wiley & Sons; 6th Edition edition, 1993
4. Reading Material in Housing -Compiled by K. Thomas Poullose for ITPI students
5. Government of India Planning Commission 'Twelfth Five Year Plan, 2012-2017: Vol. 1 - 3'; SAGE India,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

AR1704 INTERIOR DESIGN

Teaching Scheme: 1(L) - 0(T) - 2(P)

Credits: 4

Objective

To introduce Interior Architecture as the essence of Architecture which is primarily about organizing effective and aesthetic spaces for human beings.

Module I

Space : Space as raw material – Qualitative and quantitative study – Organization of space – Order, growth, division, sequence and scale.

Surfaces : Functions of surfaces – Ratio, proportion, color, material, texture, dimensions of 2 D surfaces like walls, ceiling, floors, dividers etc.

Project : Design of murals / floor pattern / ceiling patterns for reception areas / Lounges for hotels – apartments, showroom etc.

Module II

Principles of visual composition – Colour in interiors, Building elements in interiors

Human Perception of interiors- Views

Project: Detailed case study of specific room in residences / hotels / offices etc., Preparation of interior view

Module III

Furniture – furnishings – Styles, materials, functions.

Design of interior spaces – Bedrooms, kitchen, living rooms, dining rooms, toilets, show windows, sales counters, toilets, reception desks, lobbies (Hotels, offices, hospitals) –

Models showing interior spaces with colour scheme – furniture, accessories of any one space mentioned above.

Project : Design of interior spaces of hotels, offices, hospitals, show rooms etc.

Module IV

Interior plantscaping – Plant materials, growth condition, maintenance, importance of plantscaping – Aesthetics, functional etc. Exhibits in interiors – private and public interiors. Latest trends in the choice of materials, finishes, etc. in interiors – Market surveys, field visits etc.

Project : Plant scaping of private and public interior spaces

Course Outcome

The students should have developed a good understanding about the important aspects of interior design and should develop the confidence to address enquiries of small and medium scale projects independently or in connection with general architectural projects.

References

1. Shrish Vasant Bapat, 'Basic Design & Anthropometry' Pratima Bapat 1993
2. Shirish Vasat Bapat, 'Living Areas – Internal Spaces'; Pratima Bapat 1993
3. Halse, 'Use of Colours in Interiors'; McGraw-Hill; 2nd edition, 1978
4. Francis D. K. Ching, Corky Binggeli, 'Interior Design Illustrated', Wiley, 2012
5. Yoshinoku Ashihara, 'Exterior Design', Van Nostrand Reinhold Inc., U.S; 1981
6. Earnest Pickering, 'Architectural Design', New York : Wiley; 1947
7. Ching, 'Form, Space & order', Wiley; 2014
8. Krome Barnet, 'Logic in Design'; Lyons Pr, 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) –One Question of 60 mark covering the syllabus of all the four modules.

AR1705 DESIGN ASPECTS OF EARTH QUAKE RESISTANT STRUCTURES

Teaching Scheme: 3(L) – 1(T) – 0 (P)

Credits: 3

Objectives

- To give an introduction to the design concepts of seismic resistant structures
- To equip the students to understand Earth quake resistant design of R C C structures.
- Numerical design examples are not intended.

Module I

Seismic-resistant building architecture: Introduction; Lateral load resisting systems- moment resisting frame, Building with shear wall or bearing wall system, building with dual system; Building configuration – Problems and solutions; Building characteristics – Base-excited dynamic system- formulation of basic equation, fundamental frequency, mode shape and fundamental period, damping, ductility, seismic weight, non-structural elements, foundation soil/ liquefaction. Foundations; Quality of construction and materials – quality of concrete, construction joints, general detailing requirements.

Module II

Design forces for buildings: Introduction; Equivalent static method; Mode superposition technique; Response spectrum method; Dynamic time history analysis; Advantages and disadvantages of these methods; Lateral forces as per IS 1893(Part 1)

Module III

Ductility considerations in earthquake resistant design of RCC buildings: Introduction; Impact of ductility; Requirements for ductility; Assessment of ductility– Member/element ductility, Structural ductility; Factor affecting ductility; Ductility factors; Ductility considerations as per IS 13920.

Module IV

Base isolation of structures: Introduction; Considerations for seismic isolation; Basic elements of seismic isolation; seismic- isolation design principle; Feasibility of seismic isolation; Seismic- isolation configurations.

References

1. Agarwal / Shrikhande, 'Earthquake resistant design of structures', Prentice-Hall, 2006
2. T. Paulay and M.J.N. Priestley 'Seismic design of reinforced concrete and masonry buildings' ; John Wiley & Sons, 1991.
3. The seismic design handbook, Edited by F. Naeim, Kluwer Academic publishers, 2001.

Course Outcome

The students should have developed a good understanding about the important aspects of Earth quake resistant design.

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

AR1706:ELECTIVE I

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

Credits: 2

AR1706a: SUSTAINABLE ARCHITECTURE

OBJECTIVES:

- To understand the concept of sustainability and sustainable development
- To inform the various issues like climate change, ecological footprint, etc.
- To understand low impact construction practices, life cycle costs and alternative energy resources.

Module I

Concept of Sustainability – Carrying capacity, sustainable development – Bruntland report – Ethics and Visions of sustainability. Climate change and Sustainability.

Module II

Concept of Eco Architecture - Selection of materials - Eco building materials and construction – Biomimicry, Low impact construction, and recyclable products and embodied energy. Life cycle analysis. Energy sources –Renewable and non-renewable energy.

Module III

Concept of Green buildings-Green building design – Rating system – LEED, GRIHA, BREEAM etc.- case studies.

Module IV

Urban ecology, social and economic dimensions of sustainability, urban heat Island effects, sustainable communities – Case studies.

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.
The students are aware of the emerging vulnerabilities of global warming and climate change and understand the contribution of building industry to the same.
The students are familiar with the various approaches to achieving sustainable buildings and communities.
The students understand the various incentives and evaluation systems for green buildings.

REFERENCES:

1. Dominique Gauzin – Muller "Sustainable Architecture and Urbanism: Concepts, Technologies and examples", Birkhauser, 2002.
2. Slessor, Eco-Tech : "Sustainable Architecture and High Technology", Thames and Hudson 1997.
3. Ken Yeang, "Ecodesign : A manual for Ecological Design", Wiley Academy, 2006.
4. Arian Mostaedi , "Sustainable Architecture : Low tech houses", CarlesBroto, 2002.
5. Sandra F.Mendler& Willian Odell, "HOK Guidebook to Sustainable Design", John willey and sons, 2000.
6. Richard Hyder, "Environmental brief:Pathways for green design", Taylor and Francis, 2007.
7. Brenda Vale and Robert Vale, "Green Architecture: Design for a sustainable future", Thames and Hudson 1996.

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.

AR1706 b : COST EFFECTIVE TECHNOLOGY

OBJECTIVES

- To familiarize students to the materials and techniques in cost effective construction.

Module I

Cost effective techniques: Need, Planning aspects, construction aspects, maintenance and longevity aspects

Module II

Choice of materials in Indian/Kerala conditions, indigenous building materials, organic and inorganic building materials, alternative building materials, use of industrial and agricultural wastes - Survey of such materials development by research organizations like CBRI, SERC etc.

Module III

Significance of construction technology: Relevance of improving of traditional technology, relevance of innovative technology/alternate technology, survey of such technologies by various research institutes.

Module IV

Critical analysis (in terms of initial investment, maintenance cost and longevity of buildings) of the local adaptation of the innovative technologies by various agencies .

COURSE OUTCOME:

Upon completion of the course the student shall be able to incorporate cost effective techniques in design.

References

1. G.C. Mathur, 'Low cost housing in development countries'; South Asia Books 1993
2. A K Lal, 'Hand book of low cost housing'; New Age Publishers 2003
3. Publication of CBRI, SERC, RRL, NBO, COSTFORD.

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

AR1706 c: DIGITAL PROCESS IN ARCHITECTURE

OBJECTIVES

- To familiarize students to the evolving design practices that use and exploit the potential of new computing technologies in formulating, presenting, analyzing and implement ideas.

MODULE I

Introduction to Digital Representation of Architecture - Comparison between Vector and Raster Graphics; Concepts of CAD and BIM; Overview and workflow of 3d modelling and its visual representation.

MODULE II

Introduction to Building Performance Analysis - Objectives, Concepts and Workflow for Design Analysis of Lighting & Daylighting, Sun & Shadow Studies, Solar Radiation, Climate influence, Airflow and ventilation, Lifecycle Analysis

MODULE III

Introduction to Parametric Design – Advanced tools, techniques and methods utilized in parametric design and modelling.

MODULE IV

Digital methods in design implementation - Digital fabrication- tessellating, sectioning, folding, contouring; CNC. Digital printing

COURSE OUTCOME:

To learn about the benefits and possibilities of integrating the contemporary architectural practice with the advanced technology and computation tools.

References:

1. Peter Szalapaj, 'Contemporary Architecture and the Digital Design Process'; Architectural Press, 2005
2. Ali Rahim, 'Contemporary Processes in Architecture'; John Wiley & Sons, 2000
3. Prof. Neil Leach, 'Digital Cities AD: Architectural Design'; John Wiley & Sons, 2009
4. Branko Kolarevic, 'Performative Architecture: Beyond Instrumentality'; Routledge 2004
5. Michael Hensel, 'Versatility and Vicissitude: Performance in Morpho-Ecological Design'; John Wiley & Sons, 2008
6. Lisa Iwamoto, 'Digital Fabrications: Architectural and Material Technique'; Princeton Architectural Press; 2009

AR1707 ELECTIVE II

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

Credits: 2

AR1707a: RESEARCH METHODOLOGY AND STATISTICS

OBJECTIVES

- To introduce research concepts to students enabling them to identify research questions and formulate hypothesis.
- To inculcate ethical practices in research, report writing and publishing.

Module I

Research Aims & Literature Search

Research Aims and Philosophy, research paradigms. Literature search and review, the use of libraries and data bases, aim and structure of a literature review, Developing research proposals.

Module II

Statistics for Research

Statistics for research- statistical concepts, probability, the hypothesis and testing it, descriptive statistics, central tendency and dispersion. Inferential statistics. Introduction to parametric and non-parametric methods.

Module III

Scientific Writing

Introduction to scholarly technical writing and publishing a paper, writing a research report, presentation of scientific research, structure of a research report.

Module IV

Physical and Behavioural research

Introduction to behavioural research and physical research. Behavioural research, obtain data, questionnaires, interviews, un-obstructive and obstructive measures, scales such as a semantic differentials, physical research, laboratory, resources available, equipment for laboratory and site measurement. Field survey and its relevance

References

1. Giere R.N. "Understanding Scientific Reasoning", Holt Rinehart & Winston, U.K., 1991.
2. Moroney M.J., "Facts from Figures", Penguin, 1990.
3. Day R.A., "How to Write and Publish a Scientific Paper", Cambridge University Press, R.K. 1991.
4. Seigel S. & Castellan N.J., "Nonparametric Statistics for the Behavioural Sciences", McGraw Hill Book Company, New York, 1988.

Course outcome

- At the end of the course, the students shall be able to apply the theoretical knowledge in small research projects.
- They shall be confident to publish their research reports in journals.

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

AR 1707b: ARCHITECTURAL CRITICISM

OBJECTIVES

- Provide students with knowledge about the vocabulary of architectural criticism, its nature and importance in the architectural appraisal.
- Provide students with knowledge about awareness of definitions, qualities and movements in criticism is sought, as well as understanding techniques in order to compare and evaluate different works of architecture.

Module I

Introduction to Architectural Criticism and its Classification

Introduction and need for architecture criticism in the academy of architects. Criticism in day-to-day transaction. Architecture criticism-a societal perspective. Types and characteristics of Architectural criticism, crux of normative criticism, interpretive criticism, descriptive criticism, peer criticism

Module II

Nature of Sub-Division of Criticism

Sub-divisions of normative criticism, interpretive criticism, descriptive criticism. Understanding the essence and purpose of each type and its contemporary usage, status-quo of Architectural criticism.

Module III

Rhetoric of Architectural Criticism

Theory and grammar and practice of Architecture criticism, its positive and negative impact on the society. Survey of literature, design magazines and journals, search for architecture criticism, etc. collection.

Module IV

Setting for Architectural Criticism

Identifying parameters or positive development in the society, educating people through criticism, understanding the people's need and catering to it, facilitating the people know their future and choices, ends of criticism.

COURSE OUTCOME:

This course is an introduction to the basics and fundamentals of architectural criticism. Particular emphasis is placed on the conceptions and directions of criticism, with a view to develop the student's ability to understand, analyse and interpret architectural works, as well as the meanings and intentions associated with them.

REFERENCES:

1. Pevsner Nikolaus; Penguin, Harmonds worth, 'Canons of Criticism ',1971.
2. Schuly-Norberg & Christian; 'Intentions in Architecture', MIT press, Cambridge, 1965.
3. Huxtable Adaloci; 'Kicked a Building lately', Quadrangle, New York, 1976.
4. C. Jencks; 'Modern movements in Architecture', Anchor garden city, 1973.
5. Atoe Wayne; Architecture and critical imagination, John Wiley & sons, Ltd. 1978.
6. Frampton, K; 'Modern Architecture: A Critical History'; Thames and Hudson, 1992

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

AR1707c: MODULAR COORDINATION

Course Objective:

To understand the importance prefabrication and application of modular coordination in building construction

Module I

Principles of Modular coordination-module-basic module-multimodules-horizontal and vertical modules, sub modules.Modular dimensioning and modular drawings. Code provisions for Modular coordination and Prefabrication.

Module II

Principles of prefabrication in building construction-classification-Partial & full prefabrication. Methods used for Prefabrication, Methods of Prefabrication methods of transportation and hoisting techniques. Equipments used for Prefabrication, Transportation and Hoisting and placing of components

Module III

Components- foundation, walls, roof etc. Details of Pre-cast, prestressed construction for large span structures — Detailing of joints- Water proofing etc.
Construction details of various prefabricated structures in steel, concrete etc.

Module IV

Principles of prefabrication of cellular structures, Space frames, tensile structure, pneumatic structure. Properties and application of materials and method of construction for prefabrication.

Course Outcome:

At the end of course students would have understood the scope of prefabrication and application of modular coordination in building construction.

References

1. Koichiro Heki 'Shells, Membranes and space frames'; Elsevier Science Ltd, 1986
2. Sarja A. 'Open and industrialised Buildings'; Routledge , 2003
3. Laurence S. Cutler, Albert G.H. Dietz 'Industrialized Building Systems for Housing'; MIT Press, Cambridge, MA, 1971
4. Tihamer Koncz, 'Manual of precast concrete construction with large reinforced concrete and prestressed concrete components'; Bauverlag 1967
5. J. François Gabriel 'Beyond the Cube The Architecture for Space Frames and Polyhedral'; Wiley, 2008
- 6.. BIS, National Building Code 2005, New Delhi, 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

AR 1707d: VERNACULAR ARCHITECTURE

Course Objective

To provide theoretical knowledge base on the uniqueness of Indian traditional Architectural principles, the meaning of space, the manifestation of energy, the selection of site and how integration of built form with site happens at meta physical level based on articulation of celestial grid.

Module - I

Etymology, Definitions, Vernacular and the architect, Regional influences on vernacular Architecture, Humanitarian response, Urban and rural vernacular architecture, sustainability in vernacular architecture, Environment & Resource Management

Module - II

Building materials and traditions, Vernacular building materials- Usage of building materials at different times in different parts of the country, Study of vernacular traditions, knowledge systems, Assess the likely sources of stylistic and decorative features of vernacular buildings and employ these to assist in dating analyzing their role and application in the present context.

Module -III

Need for documentation and study of vernacular and historic buildings. Criteria for selection of buildings for documentations. Techniques of documentation; analysis and reviewing of results.

Module - IV

Vernacular Towns – evolution process, character, morphology, growth and decay. Case studies of Vernacular towns within Kerala. Knowledge of vernacular architecture in contemporary regional designs. Traditionalism and Vernacular.

Course Outcome

At the end of the course, the students shall have acquired knowledge on the vernacular architecture.

References

1. Heath, Kingston wm- '*Vernacular Architecture and Regional design*'- Cultural process and environmental response- '*Elsevier science and technology*'- 30 April 2007
2. Henry H. Glassie- '*Vernacular architecture*'- Pan books, London- 1966
3. Lindsay Asquith, Marcel Vellinga, Taylor and Francis- '*Vernacular architecture in the Twenty first century*'- 2006 USA

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