

**UNIVERSITY OF KERALA**

**B. ARCH. DEGREE COURSE  
(2013 SCHEME)**

**SYLLABUS FOR  
VIII SEMESTER**

## SCHEME -2013

### VIII SEMESTER

Course No	Course Title	Credits	Hours/ week			Duration of Exam	Marks			Total
			L	T	P		W	J	S	
13AR1801	Architectural Design VI	5			10		250	250	500	
13AR1802	Professional Practice	3	2	1		3	100	50	150	
13AR1803	Urban Design	3	2	1		3	100	50	150	
13AR1804	Disaster Preparedness and Management	3	2	1		3	100	50	150	
13AR1805	Elective III	3	2	1		3	100	50	150	
13AR1806	Elective IV	3	2	1		3	100	50	150	
13AR1807	Construction Management	3	2	1			100	50	150	
13AR1808	Dissertation	3		1			100	100	200	
<b>Total</b>		<b>26</b>	<b>12</b>	<b>7</b>	<b>10</b>				<b>1600</b>	

#### Elective III

13AR1805.1	Urban and Regional Planning
13AR1805.2	Transportation Planning
13AR1805.3	Advanced structural systems
13AR1805.4	Services in High-rise Buildings

#### Elective IV

13AR1806.1	Architectural Conservation
13AR1806.2	Environment Behaviour studies
13AR1806.3	Energy Efficient Buildings
13AR1806.4	Building Information Systems

## 13AR1801 ARCHITECTURAL DESIGN – VI

Teaching Scheme: 0(L) - 0(T) - 10(P)

Credits: 5

### Course Objective:

- *To introduce the students the analysis, planning, design with the understanding of a wide range of related issues in urban or rural context.*

The students are required to do one major project and one minor project.

**Major Project** -- Projects involving Architectural Design solutions in Urban Areas. Development/redevelopment of markets, plazas, city square; transport and public areas, etc.

**Short Project** – Design of related areas of Major project.

### References:

1. BIS, Various Codes of Practice and National Building Code of India.
2. Kerala Municipal Building Rules
3. Callendaret *al*, "Time Saver Standards", McGraw Hill
4. Paul D. Spreiregen "Urban Design, the Architecture of Towns and Cities", New York, NY : McGraw-Hill, 1965.
5. Gordon Cullen, 'The Concise Townscape' The Architectural Press N.Y 1971
6. Edmund N. Bacon, "Design of Cities" Thames and Hudson, 1974
7. Mills, Edward D, Planning: the architects' handbook ,London: Butterworths, 1985
8. Panero, Julius; Zelnik, Martin ,Human dimension & interior space: a source book of design reference standards, Whitney Library of Design, The Architectural Press, 1979.

### Internal Continuous Assessment (Maximum Marks - 250) (Group 1 Subject)

*20% - Tests (minimum 2)*

*70% - Class work*

*10% - Regularity in the class*

### University Examination Pattern:

*Course work will be assessed by a panel of Jury as per manual for conducting Jury.  
(Maximum Marks - 250)*

### Course Outcome:

*The students shall have an exposure in dealing issues related to urban context.*

## 13AR1802 PROFESSIONAL PRACTICE

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

Credits: 3

### Course Objectives:

- *To familiarize the students about Council of Architecture, tenders, valuation and management*
- *To understand the logics of sequences and procedure of tenders*
- *To understand the importance and procedure of management in the execution of a project.*

### Module – I

**Architects Act 1972** – Council of Architecture – Functions and powers of Council of Architecture – Architects (Professional conduct) Regulations – Standard terms for comprehensive architectural services, landscape and for urban design works – Guidelines for architectural competition, rules and regulations of copyrights.

**Indian Institute of Architects** – Function of Indian Institute of Architects – Election of members, students and subscribers, privilege to members.

### Module – II

**Tenders** – Inviting, opening and acceptance of Tenders – Tender notice – Work order letter – Tender document – Special notice and Tender acceptance letter – Public, private and negotiated tenders – Types of tenders–

**Day work** – Piece work – Daily labour – Earnest money deposit – security deposit – Retention amount.

**Contract** – Definition and general principles – Types of contract –Discharge of contract – Contract document – Schedule of quantities – Contract drawings – Contract Sum – Contract bills – Architects instructions.

**Duties and liabilities of contractor** – architect and employer under the contract – Clerk of works – Engineer in charge – Resident engineer – Nominated sub contractor – consultants – liquidated damages – Variation and extras prime cost and provisional sum – Determination of contract. – Certificates of Payments.

**Arbitration** – Advantages of arbitration – Appointment of Arbitrators and Umpire – Powers and duties of arbitrators – role of umpire – Arbitration agreement – Conduct of arbitration proceedings – Publications of the award - Filing of award – Kinds of arbitration –Arbitration and building contract.

### Module – III

**Valuation** – Definition – Purpose of valuation – Value, price and cost - Market value – Factors affecting value – Value classification – Classification of ownership – Freehold and leasehold –Different methods of valuation – Rental method – Land and building basis method, development method, profit basis method – Illustrated examples and problems.

### Module – IV

**Management** – Principles of management – Practice of management – Levels of management – Scientific management – Personal Management – Role of Management –

Leadership, motivation and co-ordination. Office management – System approach for pre-construction stage – Drawing sizes and sheet title – Forwarding letters – Payment bills - Registers for dispatch and documents – Work output charts Stampings – Preparation of minutes – Accounting – Double entry, single entry and book keeping. Supervision – Quality control, daily report system, visual recording, site records and appurtenances – Bench mark – Supervision of large projects. Profession – Options on centering the profession – short comings while running own office – Duties and responsibilities of the principal architect – Secure clientage – Disciplines – environment of the office.

## References

1. Roshan H. Namavati, 'Professional Practice: With Elements of Estimating, Valuation, Contract and Arbitration, Lakhani Book Depot,2016
2. Roshan H. Namavati - 'Theory and Practice of Valuation', Lakhani Book Depot,2010
3. V.N. Vazirani & S.P. Chandola- 'Construction Management & Accounts', Khanna Publishers, 2011.
4. Hand book of Professional Documents – Council of Architecture.
5. Architects Reference Manual – Workshops professional practice for Architects by IIA Kerala Chapter and Trivandrum Centre, November 1996.

## Internal Continuous Assessment (*Maximum Marks - 50*) (*Group 2 Subject*)

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

## University Examination Pattern:

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

## Course outcome:

*Upon completion of the course,*

- *the students shall have understood the importance of tenders, valuation and management*
- *the students shall acquire the ability to do valuation and management in architecture.*

## 13AR1803 URBAN DESIGN

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

Credits: 3

### Course Objective:

- *This course in urban design covers the fundamentals of urban design as a theory subject, introducing the students to basic definitions and terminology. Urban design as a subject is defined and explored differentiating the same from architecture and urban planning.*
- *The course describes major historical and contemporary trends in urban design theory and practice. The course discusses urban design as a collaborative, interactive, applied and community based effort and elaborates development of spatial thinking, behavioral aspects and basic urban design literacy.*
- *The course intends to establish the fact that Architects, as the primary professionals who give form to the city, have a major responsibility to develop buildings that strengthen the city and its ability to support a critical public discussion that is important to our culture. It is intended to treat buildings and the city as a text to be read critically, and to be used to understand the important cultural role of urban architecture as a comparative measure of our culture and ideas.*

### Module – I

#### Introduction to urban design

Definitions of urban design, Urban Design and Its Evolution

The scope and objectives of urban design

Need for urban design and roles of an Urban Designer in contemporary India-

The relation between Architecture, Urban design and urban planning.

### Module – II

#### Urban Spaces and Urban Image

Behavior studies in urban design - Principles of urban spatial organization, urban scale, urban spaces,

Urban massing, quality of urban enclosure

Social life of small urban spaces

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 an urban design survey

Introduction to basic theories in Urban design (Kevin Lynch, Christopher Alexander, Clarence Perry, Gordon Cullen, Bill Hillier, Peter Calathorpe),

Urban design policies – Formulation of policies for various components like landscape, infrastructure and built forms – 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 – Indian and International Contexts

Road form and hierarchy-Road pattern, Pedestrian areas, malls, Urban elements, open spaces, and Water front developments.

Project Preparation – Agencies involved in the execution – coordination, role of planning authorities-

Role of Urban Arts Commission, Urban project financing agencies and their functions.

##### **References:**

1. Paul.D.Spreiregen, 'Urban Design, the Architecture of towns and cities', NY: Mc Graw-Hill, 1965.
2. Bill Hillier and Hanson Julienne, 'The social logic of space', Cambridge University Press, 2014.
3. Christopher Alexander, Hajo Neis, Artemis Anninou, Ingrid F King, 'A new theory of urban design', New York : Oxford University Press, 1987.
4. Kevin Lynch, 'The image of the city', Cambridge, Mass. : MIT Press, 1960.
5. Charles Correa, 'The new landscape : urbanisation in the Third World', Guildford, Angleterre : Butterworth Architecture, 1989
6. Aldo Rossi, Peter Eisenman, 'The architecture of city', Cambridge : MIT Press, 1982.
7. Gordon Cullen, 'The Concise Townscape' The Architectural Press, 1961.
8. Roger Trancik, 'Finding lost spaces: Theories of Urban Design', New York : John Wiley & Sons, 1986.
9. Camillo Sitte, 'The Art of Building cities: City Building According to Its Artistic Fundamentals', Reinhold Publishing Corporation, 1945.
10. Time Saver standards, 'Urban Design', Tata McGraw Hill Education Private Limited, New Delhi, 2011.
11. Andres Duany, Elizabeth Plater-Zyberk, Robert Alminana, 'The new civic art: Elements of Town Planning', Rizzoli, 2003.
12. William Hollingsworth Whyte, 'The Social Life of Small Urban Spaces', New York : Project for Public Spaces, 2001.
13. Edmund N Bacon, 'Design of Cities', New York : Viking Press, 1967.
14. Michael Larice and Elizabeth Macdonald, 'The Urban Design Reader', Abingdon, Oxon, New York : Routledge, 2013

**Internal Continuous Assessment (Maximum Marks - 50) (Group 2 Subject)**

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

**University Examination Pattern:**

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

**Course Outcome:**

*By the end of the course students will have gained the following:*

- 1. Direct experience in understanding, interpreting and applying theories of urban design;*
- 2. A basic capacity to critique urban design and the normative doctrines that produce them;*
- 3. An understanding of urban design as a dynamic force integral to the evolution of cities;*
- 4. An introduction to a range of methodological approaches to the spatial analysis of cities.*
- 5. An introduction to the language and terminology of land use and urban design;*
- 6. A heightened awareness of the details of the built environment to foster lifelong design learning.*



## 13AR1804 DISASTER PREPAREDNESS AND MANAGEMENT

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

Credits: 3

### Course Objective:

- *To familiarize the students about the types of hazards and their magnitude*
- *To understand the preparedness and mitigation for each hazard based on their characteristics*
- *To understand the importance of disaster preparedness and management.*

### Module – I

Hazard, Disaster, Risk, Vulnerability. Disaster – an over view; Disaster – the Indian Perspective; Typology of disasters and increased understanding.

### Module – II

Natural hazards and Disasters -Earthquake, cyclone, floods, droughts, landslides, lightning. – Causes, hazardous effects, mitigation measures. Man induced hazards & disasters:- soil erosion-causes, conservation measures; nuclear explosion-environmental problems, corrective measures; fire mitigation measures; terrorism.

### Module – III

Preparedness and mitigation - Preparing hazard zonation maps, Predictability/ forecasting & warning, Community preparedness, retrofitting, Population reduction in vulnerable areas, Awareness, Capacity building.

### Module – IV

Disaster Management; Community health and casualty management; Disaster Management – role of various agencies; Relief measures; Post disaster- Recovery ,Reconstruction and Rehabilitation. Remote- sensing and GIS applications in real time disaster monitoring.

### References:

1. Goel.S.L, 'Encyclopaedia of Disaster Management', New Delhi : Deep & Deep Publications, 2006.
2. Government of India, (2004), 'Disaster Management in India' – A Status Report, Ministry of Home Affairs (Disaster Management Division), New Delhi.
3. Zebrowski, Ernest Jr, 'Perils of a Restless Planet: Scientific Perspectives on Natural Disasters', Cambridge [u.a.] Cambridge Univ. Press, 1998.
4. Guha-Sapir D., Hargitt, D and Hoyois P , 'Thirty Years of Natural Disasters: 1974-2003', The Numbers, UCL Presses, De Lou vain, 2004.

5. Ministry of Home Affairs (MHA), (2004)-, 'National Programme for Capacity Building of Architects in Earthquake Risk Management (NPCBAERM)', National Disaster Management Division (Government of India), New Delhi.
6. Hewitt, K , 'Interpretations of Calamity from the Viewpoint of Human Ecology', Boston u.a : Allen & Unwin, 1983.
7. Heide, Auf der E , 'Disaster Response: Principles of Preparation and Coordination', St. Louis : Mosby, 1989.
8. Amarnath Chakrabarti, Devdas Menon, Amlan K. Sengupta, 'Handbook on Seismic retrofit of buildings', New Delhi : Narosa Publishing House, 2008.

**Internal Continuous Assessment** (*Maximum Marks - 50*) (*Group 2 Subject*)

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

**University Examination Pattern:**

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

**Course Outcome:**

*Upon completion of the course, the students of architecture shall have acquired the importance of disaster preparedness and management. The student shall acquire the ability to design buildings responsive to various disasters.*

## 13AR1805.1 URBAN AND REGIONAL PLANNING (Elective III)

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

Credits: 3

### Course Objectives:

- *To understand the concept of Urban and regional planning and to appraise the challenges associated in sustainable urban and regional planning*
- *To develop awareness about the impacts of urbanizations and its importance in urban and regional planning*
- *To familiarize the various Concepts, Programmes, Policies and strategies involved in various stages of Urban and regional planning*

### Module – I

Definitions of a city, rural area, urban planning, regional planning  
History of Cities, History of Urban and Regional Planning,  
Concept of region, types and classification of regions, delineation of planning regions by various techniques.

### Module – II

Classification of towns, city, metropolis, megalopolis, their interaction and interdependence. Urbanization process: definition, character, function, growth, size, migration, increase in complexities of Urban areas, role of social, economic and demographic aspects on urbanization, Major urban problems and their solutions for sustainable development.

### Module – III

City, fringe and periphery-physical and functional linkages, peri-urban development  
Human settlement planning and urban development- Concepts, strategies and tools  
Urban policies and programmes- Policies and programmes at various levels, impact on metro and mega city development.

### Module – IV

Regional planning in India – Multi level planning District planning, special area Development Programme and schemes. Regional planning as a tool to integrate rural and urban areas. Regional Planning case studies – India and abroad.

### References:

1. John Glasson – ‘An Introduction to regional Planning 2<sup>nd</sup> Edition’, Hatchinson – London (The Britt Environment Series)
2. Branch, Melville, Urban Planning Theory, Dewden, Hutchinson & Ross Inc, Stroudsburg Pennsylvania, 1975.
3. Allen G. Noble, et.al, (eds), ‘Regional Development and Planning for the 21<sup>st</sup> Century: New priorities New Philosophies’, Aldershot, USA, 1998.

4. Levy, John M. "Contemporary Urban Planning" Upper Saddle River, NJ, Pearson Prentice Hall
5. Andrews, Richard. B- "Urban Growth and Development- A problem approach"- New York, Simmons-Boardman,1962
6. David Mosse, et.al, 'Development Process; concepts and Methods for working with complexity', Routledge, London, 1998
7. Hamilton F,(eds) 'Industrialisation in Developing and Peripheral Regions', Croom Helm,1983
8. Chand Mahesh and U.K. Puri, 'Regional Planning in India', Allied Publishers, New Delhi, 1983
9. Isward Walter, 'Methods of Regional Analysis – An Introduction to Regional Science', MIT Press, Cambridge, 1960
10. R. P. Misra, Sundaram. 'Regional Planning in India'.

**Internal Continuous Assessment** (*Maximum Marks - 50*) (*Group 2 Subject*)

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

**University Examination Pattern:**

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

**Course Outcome:**

- *Upon completion of the course the students have acquired the knowledge of Urban and regional planning and they will develop a keen appreciation of various urban areas and regions.*
- *Students will be able to appraise the impacts of urbanizations in cities and regions and in developing various solutions for sustainable urban and regional planning.*
- *Students should acquire the knowledge on various Concepts, Policies, Programmes associated with the planning process and its relevance and role in Urban and regional planning.*

## 13AR1805.2 TRAFFIC AND TRANSPORTATION PLANNING (Elective III)

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

Credits: 3

### Course Objectives:

- *To expose students to the importance of traffic and transportation planning in urban and regional planning*
- *To enable students to understand the short term and long term effects of traffic and transportation planning*
- *To help students understand the influence of urban activities on traffic and transportation planning and vice versa.*

### Module – I

Introduction to Traffic and Transportation planning-its Scope and Need, Human factors governing road user behaviour; Characteristics of Indian Traffic; Nature of Traffic problem in cities; Traffic and the Environment; Modes of transport – air, surface and water; Public Transport and its Importance, Mass transportation.

### Module – II

Classification of roads; Types of parking, Problems due to parking, Parking standards; Traffic controls-Traffic signs, Signals and Road markings and their importance; Traffic safety, Pedestrian behaviour, Design for Pedestrian facilities; Road accidents- Causes and Prevention, Traffic calming Geometric design of roads; Intersections, Grade separated intersections; Bus bay design.

### Module – III

Interdependence of land use and traffic; Stages in Transportation planning; Modal split; Transportation system management-Traffic demand management and traffic management; Operating, Time and Accident costs; Computer application in Traffic and Transportation Planning; Transit oriented Development.

### Module – IV

Need for traffic and transportation surveys; Survey and analysis of existing conditions; Origin-destination surveys; Parking surveys; Need for vehicle-volume counts, classification and occupancy surveys; Photographic techniques in traffic surveys; Transportation surveys.

### References:

1. Kadiyali L.R. "Traffic Engineering and Transport Planning", Khanna Publishers, New Delhi, 1991.
2. Subhash C. Saxena, "A Course in Traffic Planning and Design", New Delhi : Dhanpati Rai, 1989.

3. Dalvi M.Q. and Sharma R.C., "National Transport Policy for Urban Settlements – Seminar on Transportation Systems in Urban Settlements – TCPO, New Delhi – 1982.
4. Kadiyali L.R., "Principles and Practice of Highway Engineering", Delhi : Khanna Tech. Pub., 1984.
5. The Royal Commission on Environmental Pollution Report – The Transport and Environment, Oxford University Press, 1995.
6. William W. Hay, "An Introduction to Transportation Engineering", John Wiley & Sons Inc., NY, 1961.

**Internal Continuous Assessment** (*Maximum Marks - 50*) (*Group 2 Subject*)

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

**University Examination Pattern:**

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

**Course Outcome:**

- *The students will be able to analyse and understand the consequences of traffic and transportation planning - socially, economically and spatially*
- *They will be equipped to plan better built environments due to their enhanced understanding of the behavioural dimensions of traffic and transportation planning.*

## 13AR1805.3 ADVANCED STRUCTURAL SYSTEMS (Elective III)

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

Credits: 3

### Course Objectives:

- *To familiarize the students about different structural systems in architecture*
- *To understand various structural materials and their behavior in building systems*
- *To understand different structural elements and their reinforcement details.*

### Module – I

Structures in Architecture, Loads on structures – Different types – load characteristics – use of occupancy loads – Earth and water loads, Dynamic loads, earthquake loads etc. Structural requirements – basic requirements like strength, equilibrium, stability, functionality, economy and aesthetic.

### Module – II

Structural elements – behaviour and application of tension, compression, flexural and torsional elements and trusses, frames, plates, arches, cables and grid construction. Structural systems, different types – behaviour of different structural systems under loads.

### Module – III

Discussion on optimization of structural elements and systems. Reinforcement detailing of structural elements like beams, columns, slabs, footings, continuous beams and slabs. Structural safety, quality control aspects of structural elements and structural systems. Durability criteria and fire safety as per IS provisions.

### 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.

### References:

1. Salvadori & Heller- 'Structures in Architecture', Englewood Cliffs, N.J., Prentice-Hall , 1963.
2. Salvadori & Leany- 'Structural design in Architecture', Englewood Cliffs, N.J., Prentice-Hall ,[1967.
3. Zuk- 'Concepts of structures', New York, Reinhold , 1963.
4. Cowan, 'Architectural structures: An introduction to structural mechanics, New York : Elsevier, 1976.
5. Engil and Heinrinch- 'Structural systems'
6. Robert A Coliman, 'Structural systems design', Englewood Cliffs, N.J. : Prentice-Hall, 1983.

7. T Y Lin and S D Solesharg, 'Structural concepts and systems for Architects & Engineers', New York : Van Nostrand Reinhold Co., 1988
8. IS 456, 2000

**Internal Continuous Assessment** (*Maximum Marks - 50*) (*Group 2 Subject*)

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

**University Examination Pattern:**

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

**Course Outcome:**

*Upon completion of the course, the students of architecture shall have acquired the importance of appropriate structural systems in architecture*

*The student shall acquire the ability to design appropriate structural systems based on functional requirements of buildings.*



## 13AR1805.4 SERVICES IN HIGH-RISE BUILDINGS (Elective III)

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

Credits: 3

### Course Objectives:

- *To familiarize the students with the importance of services in high rise buildings.*
- *To introduce the concepts of planning services in high rise buildings.*
- *To introduce the concept of optimisation of services.*

### Module – I

Importance of services in High Rise Buildings, Integration of Services, Relative costs of different service systems, Ergonomic aspects of Service Design, Concepts of Intelligent Architecture and Building Automation.

### Module – II

#### **Water Supply, Drainage and Fire safety**

*Water Supply and waste water collection systems*

Water storage and distribution systems – Planning aspects, different types of distribution systems, design consideration.

*Pumps* – Classification, selection criteria.

*Rain water harvesting*

*Sewage treatment* – planning and design consideration, recycling of water.

Passive Fire Safety

*Fire Detection and Fire alarm systems* – Planning and Design criteria's, fire detection and alarm systems, passive fire safety.

### Module – III

#### **Ventilation and Air-Conditioning**

*Natural and Mechanical Ventilation Systems*

*Air-conditioning systems* – Planning and Design criteria's, load estimation, provision in building for air conditioning plants, Automation and energy Management.

### Module – IV

#### **Electrical, Mechanical Security and Surveillance systems**

*Natural lighting systems* – principles of day lighting design.

*Lighting systems* - Planning and Design principles, Energy efficiency in lighting systems, Automation

*Elevator systems and services* - Planning and Design, zoning of floors in elevator design, Elevator lobby area

*Escalators, moving walks and ramps* – safety aspects.

*Security system* – security system components, access control systems, perimeter protection, closed circuit surveillance systems, biometric controls, intruder alarm systems.

**References:**

1. Manual on Water Supply and Treatment (1991) third Edition, Central Public Health and Environmental Engineering Organization, Ministry of Urban Development, New Delhi.
2. 'National Building Code of India' Sep 1983 – Bureau of Indian Standards, 1984.
3. W.G. McGuiness and B. Stein, 'Mechanical and Electrical equipment for buildings, John Wiley and sons Inc., N.Y.
4. Riley Shuttleworth, 'Mechanical and electrical Systems for Construction', McGraw Hill Book Co., U.S.A., 1983.
5. ASHRAE: Handbook–HVAC Systems and Equipment (1992), HVAC Applications (1991) ASHRAE, Inc. Atlanta.
6. Langdon – Thomas G.J., - 'Fire Safety in Buildings, Principles and Practice' – Adam and Charles Blade, London, 1972.
7. V. K. Jain, 'Designing and Installation of Services in High Rise Building Complexes', Khanna Publishers 2013
8. Relevant IS codes

**Internal Continuous Assessment** (*Maximum Marks - 50*) (*Group 2 Subject*)

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

**University Examination Pattern:**

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

**Course Outcome:**

*Upon completion of the course, the students of architecture shall have acquired the knowledge regarding planning services in high rise buildings in an efficient and economic manner.*

## 13AR1806.1 ARCHITECTURAL CONSERVATION (Elective IV)

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

Credits: 3

### Course Objectives:

- *To understand the need for conservation*
- *To learn about physical & chemical changes occurring in building materials due to the action of time and climate.*
- *To conduct a primary assessment of old buildings and structures that would require conservation efforts.*
- *To learn the techniques of conservation.*

### Module – I

#### Introduction to Conservation

Definition, Need, Objectives and Scope of Architectural Conservation.

Beginning of the Conservation movement - Contributions of John Ruskin & William Morris

Definitions: Cultural heritage, Natural heritage, Built heritage - Ancient Monument.

Agencies involved in conservation - ICCROM, ICOMOS, ASI, State departments of Archaeology,

Town Planning departments, State Art and Heritage Commission & INTACH.

Venice charter (1964), Burra charter (1979).

### Module – II

#### Traditional Building Construction

Historic building materials and construction techniques with special reference to Kerala.

- Lime Mortar, Laterite wall, Wooden wall and Roof in Kerala's traditional Architecture.

**Causes of decay in materials and structure** - Climatic causes – Thermal movements, rain, frost, snow, moisture, wind.

Botanical, biological and micro biological causes – Animals, birds, insects, fungi, moulds, lichens

Natural disasters – Fire, earthquakes, flood, lightning

Manmade causes – Wars, pollution, vibration, vandalism and neglect.

### Module – III

#### Technique of Conservation

Preparatory procedures for conservation

Identification of the 'values' in the object, monument or site:-'emotional', 'cultural' and 'use' values.

Inventories, Initial inspections

- Documentation - Research, Analysis and recording (Reports)

#### Seven Degrees of intervention

Prevention of deterioration, Preservation, Consolidation, Restoration, Rehabilitation, Reproduction, Reconstruction.

## Module – IV

Approaches to adaptive re-use, Preparatory works required for adaptive reuse, case studies on adaptive reuse, integrated conservation approaches, case studies.

### References:

1. Bernard M. Fielden- 'Conservation of Historic Buildings' –, Architectural Press, 2003
2. Ashurst, J. and Dimes, F.G. Conservation of Building and Decorative Stone, Butterworth- Heinemann, London. -1990.
3. Jukka Jokilehto,– 'A History of Architectural Conservation' Butterworth - Heinemann , 1999
4. ICOMOS, Earthen Architecture: The conservation of brick and earth structures. A Handbook. 1993
5. Poul Beckmann and Robert Bowles – 'Structural Aspects of Building Conservation', Elsevier Butterworth-Heinemann, 2004

### Internal Continuous Assessment (*Maximum Marks - 50*) (*Group 2 Subject*)

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

### University Examination Pattern:

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

### Course Outcome:

*The learner develops the ability to discern the tangible and in tangible aspects of built heritage. The student is enabled to conduct primary observation of heritage structure in need of conservation. The student can arrive at causes of deterioration of the building with respect to each component parts. The student can provide remedial measures to retro fit the building for a specified requirement.*

## 13AR1806.2 ENVIRONMENT BEHAVIOUR STUDIES (Elective IV)

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

Credits: 3

### Course Objectives:

- *To expose the students to the importance of understanding people and their perception of environment in architectural design and planning*
- *To enable them to understand the various psychological aspects that can be incorporated in the design of built environment*
- *To expose them to research being undertaken in this field*
- *To equip them to apply this knowledge in any built environment to enhance its qualities.*

### Module – I

#### Introduction to Environmental Psychology

Origins, principles and relevance of environment psychology, its difference from other branches of psychology; Basic principles of psychology – changing understanding of man and his mental and emotional processes, corresponding relevance in design of built environment; Elements of design (point, line, shape, etc.), Principles of architecture (rhythm, balance, contrast, etc) and its role in evoking emotions.

### Module – II

#### Environment and Human response

Responses to environment - Individual (environmental perception, spatial cognition, comfort, anthropometrics), Social (proxemics, territoriality, crowding, privacy), and Societal (neighbourhood, community, work). Environmental Appraisal and Environmental Assessment; Personality and Environment, Modifying behaviour through design.

### Module – III

#### Application in different environments

Design for occupants catering for age, gender, health, the differently abled, Different environments - Educational (class room design, ambient noise, attention), Workplace (types of office design), Health care, Commercial, Recreational, Public, Domestic, Urban, etc.; Multi sensory spaces; Case studies.

### Module – IV

#### Research methods

Use of research to enhance the quality of architectural spaces, measure satisfaction levels, direct behaviour in specific environments. Post occupancy evaluation, behavioural mapping, cognitive mapping, Visual methods, Unobtrusive methods, semantic differential techniques, interviews, surveys; Case studies.

**References:**

1. Robert Gifford, 'Environmental Psychology, Principles and Practices', 2002
2. Amos Rapoport, 'The Meaning of the Built Environment - a nonverbal communication approach', Beverly Hills : Sage Publications,1982 (updated edition 1990)
3. Bryan Lawson , 'Language of Space', Oxford ; Boston : Architectural Press, 2001
4. Canter and Lee, ' Psychology and the built environment', New York, Wiley ,1974
5. Linda Groat and David Wang, 'Architectural research methods', Hoboken: Wiley, 2013.
6. ET Hall, ' The Hidden Dimension', Garden City, N.Y., Doubleday, 1966
7. Kevin Lynch, 'The Image of the City', Cambridge, Mass. : MIT Press,1960
8. Oscar Newman, 'Creating Defensible space', : Washington, D.C. : U.S. Dept. of Housing and Urban Development, Office of Policy Development and Research, 1966
9. Christopher Day, 'Spirit and Place', Architectural Press, 2002.

**Internal Continuous Assessment (Maximum Marks - 50) (Group 2 Subject)**

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

**University Examination Pattern:**

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

**Course Outcome:**

*The students will learn how environment and behaviour are intrinsically linked and will be able to consciously apply these aspects to create good designs.*

## 13AR1806.3 ENERGY EFFICIENT BUILDINGS (Elective IV)

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

Credits: 3

### Course Objective:

- *To familiarize the students about the sources of energy and the need of energy conservation*
- *To understand the types of energy involved in buildings and energy efficient techniques in built environment*
- *To understand the role of various agencies in energy efficient buildings.*

### Module – I

Energy Efficiency – Reasons for Energy Crisis - Need for the Energy Conservation – Concept of conventional, non-conventional, renewable, non-renewable energy sources –Global Energy use – Impacts of energy use – Merits and demerits of both conventional and nonconventional Energy sources.

### Module – II

Indian Energy scenario – Bureau of Energy Efficiency - ECBC rules – Kerala Energy scenario- Energy efficient buildings in Kerala context – Role of designing according to the climate – Passive, active and hybrid systems of thermal comfort – Relation between climatically responsive buildings and Energy efficient buildings – Concept of human comfort – Factors influencing human comfort.

### Module – III

Built Environment – Passive Environmental control mechanism – Factors influencing thermal comfort – Passive design of building: Design considerations for shelter in the tropics – Basic needs of shelter in different climates – Shelter for hot-dry, warm-humid, composite climates – Form, planning, layout, specification for walls and roofs, effect of special characteristics of site like water body, vegetation etc. – Orientation, openings and ventilation.

### Module – IV

Concept of embodied energy – Transportation energy – Life cycle energy – Total energy assessment in buildings – Energy Audit – Energy efficient lighting – Energy efficient active systems.

### References:-

1. Watson Donald, 'Climatic Design : Energy Efficient Building Principles & Practices", McGraw Hill Book company, New York, 1983.
2. Givonji B., "Man, Climate and Architecture", Elsevier, Amsterdam, 1986.
3. Bansal Naveendra K., Hauser Gerd and Minke Gernot, "Passive Buildings Designs : Handbook of Natural Climatic Control", Elsevier Science, Amsterdam 1997.

4. Baker Nick and Steemers Koen, "Energy and Environment in Architecture", E& FN, Spon. London, 1999.
5. Annual Reports, Ministry of Non-Conventional Energy Sources, Government of India, New Delhi.
6. Energy Conservation Building Code 2006.

**Internal Continuous Assessment** (*Maximum Marks - 50*) (*Group 2 Subject*)

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

**University Examination Pattern:**

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*Part A (40 marks) - Eight Short answer questions of 5 marks each, from modules I, II and III.*

*All questions are compulsory. There should be minimum two questions from each module and not more than three questions from any module.*

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

**Course Outcome:**

*Upon completion of the course, the students of architecture shall have acquired the importance of energy conservation in buildings. The student shall acquire the ability to think logically to design energy efficient solutions in buildings.*



## 13AR1806.4 BUILDING INFORMATION SYSTEMS (Elective IV)

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

Credits: 3

### Course Objective :

*The course aims the students to generate comprehensive, pre-professional architectural documentation and digitally visualize their architectural idea using appropriate digital software and Media. The course aims to provide understanding for linking and maintaining continuity of existing and designed 'Building information modeling' information and other vital information, such as vendors for specific materials, location of details and quantities required for estimation, bidding and scheduling, into the model and to provide understanding of new project delivery systems and technologies.*

### Module – I

Evolution of information technology in architectural design; Key concepts of BIM -Design method using BIM technology; BIM principles and workflow, user interface- navigating within views -selection methods.

Setting up project- Topography modeling, Create and edit a toposurface, add site and parking components - draw label contours - Image references; Datum: project location, grid, elevation.

Basic component modelling- Column, Walls, Openings: window, doors- the importance of levels and grids- creating walls, doors, windows, and components - working with essential modification commands.

Circulation and roof- Circulation: Stairs, ramp, Roof types- Creating floors, ceilings, and stairs - working with type and instance parameters.

### Module – II

Family creation and editing- a custom family, and family types - System families Loadable families, In- place families -Creating curtain walls, schedules, details, - creating rooms and an area plan - tag components - customize existing wall styles- work with phasing - understand groups and links - work with stacked walls - and learn the basics of rendering and create a project template.

### Module – III

Creating custom walls, floors, and roofs - keynoting - working with mass elements – enhancing rendering with lighting - producing customized materials - Using sun and shadow settings - Walkthrough technique - adding decals - working with design options and worksets – and calculating energy analysis - managing revisions.

Model based Cost Estimating - Challenges in cost estimating with BIM- Cad geometrics vs BIM element description- Visual data models - Material substitutions and value engineering- detailed estimates and take-off sheets- XML and automated cost estimate- project phasing and management- 4D modeling -BIM for project lifecycles.

## Module – IV

Energy simulation for conceptual BIM models using massing- Detailed modeling using design elements- Rapid energy modeling and simulation with Autodesk® Revit® Conceptual Energy Analysis features to simulate performance from within Revit Architecture -Use Autodesk® Green Building Studio to produce energy consumption, carbon neutrality and renewable potential reports.

### References:-

1. Eastman, C., Teicholz, P., Sacks, R. and Liston, K., *BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors*. New York: Wiley. 2008.
2. Ray Crotty, *The Impact of Building Information Modelling: Transforming Construction*. Spons Architecture Price Book. 2012.

### Internal Continuous Assessment (Maximum Marks - 50) (Group 2 Subject)

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.

20% - Regularity in the class

### University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

*The question paper shall consist of Two Parts*

*The question paper shall consist of Two Parts*

*Part A (40 marks) - Eight Short answer questions of 5 marks each, from modules I, II and III. All questions are compulsory. There should be minimum two questions from each module.*

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

### Course Outcome:

*This is a project-based course where students gain knowledge on the implementation of BIM concepts throughout the lifecycle of a building, from planning and design, to construction and operations. The students will learn about how to use BIMs for building energy performance simulation, construction administration.*

## 13AR1807 CONSTRUCTION MANAGEMENT

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

Credits: 3

### Course Objective :

- *To familiarize the students with the objectives, functions and techniques of construction management*
- *To understand the logics of sequences and optimization in construction*
- *To understand the importance of a construction manager in the execution of a project.*

### Module – I

Introduction to Construction Management - Objective of construction management, Functions of construction Management, Types of construction projects, Project management cycle - Project Planning, scheduling, monitoring & control.

### Module – II

Introduction to Construction Scheduling techniques- Bar chart, Gantt chart, Work break down structure, Network representation, Network analysis, Principles and application of Critical Path Method (CPM) - Calculation of durations.

### Module – III

Least cost scheduling - network crashing, optimum duration, Resource scheduling- resource allocation and resource levelling, other scheduling Methods – PERT and Linear Scheduling Method (LSM).

### Module – IV

Expediting the project – Time cost trade off – Optimization, Project management software packages Construction economics and finance – Time value of money, Cash flow, Depreciation, Cost benefit analysis.

### References:-

1. Hajdu M., Network Scheduling Techniques for Construction Project Management, Springer U S 2013.
2. Callahan M. T., D. G. Quackenbush and J. E. Rowings, 'Construction Project Scheduling', McGraw-Hill, 1992.
3. Robert B. Harris-, 'Precedence and Arrow Network Techniques for Construction', University of Michigan, 1973.
4. Bhattacharjee S.K-, 'Fundamentals of PERT/CPM and Project Management', Khanna Publishers
5. Vohra N. D., 'Quantitative Techniques in Management', Tata McGraw-Hill Publishing Company, 2001.'

**Internal Continuous Assessment** (*Maximum Marks - 50*) (*Group 2 Subject*)

*50% - Tests (minimum 2)*

*30% - Assignments (minimum 2) such as home work, quiz, seminar, term-project, etc.*

*20% - Regularity in the class*

**University Examination Pattern:**

*Examination duration: 3 hours*

*Maximum Total Marks: 100*

*The question paper shall consist of Two Parts*

*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.*

**Course Outcome:**

*Upon completion of the course, the students of architecture shall have acquired the importance of execution of construction in an efficient and economic manner. The student shall acquire the ability to think logically in both Architecture as well as their life.*

## 13AR1808 DISSERTATION

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

Credits: 3

### 1. Aim of the dissertation

*To provide the students an opportunity to undertake research work on a topic of their choice.*

### 2. Allotment of Guide

The Head of Department of Architecture of the teaching institution will allot a guide to each student for supervising His/ Her dissertation work.

### 3. Area of research

Any topic approved by the Department of Architecture of the teaching institution concerned, related to built environment. It shall involve a compilation of secondary data followed by a study at primary level, to achieve the aim and objectives of the research work.

### 4. Selection of the topic

Students admitted to the 6th semester B.Arch. Degree course shall submit the choices of their topic for dissertation in consultation with the guide within one month after registration to 6th semester. After the approval of the topic by the department of architecture they are required to submit the synopsis and start the literature study in the sixth semester itself.

### 5. Conduct of work

The students with the approval of the guide may continue their dissertation work during their training period. The Schedule / Mode of presentation of their work at Preliminary, Intermediate and Final stage with the split-up of C.A. marks pertaining to each stage shall be published by the Department of Architecture of the teaching institution immediately after the commencement of the 8th semester. However the work done during the training period will be reviewed evaluated at the beginning of the eighth semester

The students under the guidance of the irrespective guides shall independently carry out their dissertation work during the 8th semester degree course period.

### 6. Evaluation

- i) The dissertation will be considered as an individual subject of the VIII semester B.Arch. degree course.
- ii) The entire 200 marks allotted to the dissertation will be awarded in the following manner.

- iii) C.A marks to be awarded by the guide. - 100 marks
  - a) Stage 1 – Literature Study (25 Marks)
  - b) Stage 2 – Case Studies and Analysis (25 Marks)
  - c) Stage 3 – Inference and Conclusion (25 Marks)
  - d) Stage 4 – Draft Report and Presentation of Slides (25 Marks)
- iv) The Head of Dept. of the teaching institution shall constitute a jury of two members for evaluating the final presentation of the dissertation work.
- v) The jury panel shall be constituted from among the faculty of the Dept. of Architecture of the Teaching institution and/or from among the Architects registered with the council of Architecture, incorporated under the Architects Act 1972, with not less than 5 years experience.
- vi) The jury members after consultation among themselves will independently evaluate the final presentation as described below.
  - a) Evaluation of the final report in the form of bound volume - 25 marks.
  - b) Evaluation of Presentation of Slides- 75 marks.
- vii) Head of the Department shall publish the marks of the Dissertation on the next working day after the completion of the Jury.
- viii) A candidate has to obtain a separate minimum of 40% for the jury and 50% aggregate marks for dissertation (C.A marks + Jury) for a pass.
- ix) A candidate who fails for dissertation has to reappear either in full or for the Final Jury only with any regular batch. He/she is required to register with the Head of the Department for the same.