

B. ARCH. DEGREE COURSE
(10 SEMESTERS)
(2014 SCHEME)

Syllabus

(Semester 5 - Semester 10)

COMBINED FIRST AND SECOND SEMESTER (S1S2)

Course No	Course Title	Credits	Hours/ week			Duration of Exam	Marks			Total
			L	T	P/D		W	J	S	
AR1101	Architectural Design I	4	0		3	4	100		100	200
AR1102	Building Materials and Construction - I	4	2		0	4	100		50	150
AR1103	History of Architecture - I	4	2			3	100		50	150
AR1104	Basic Design & Visual arts	6			6			150	150	300
AR1105	Architectural Graphics - I	4	1		3	4	100		100	200
AR1106	Mathematics	4	2			3	100		50	150
AR1107	Geometrical Drawing	4	1		3	4	100		100	200
AR1108	Mechanics of Structures	4	2			3	100		50	150
AR1109	Surveying and Levelling	4	2			3	100		50	150
AR1110	Workshop practice & Site exposure	2			3				100	100
	Total	40	12	0	18					1750

THIRD SEMESTER (S3)

Course No	Course Title	Credits	Hours/ week			Duration of Exam	Marks			Total
			L	T	P/D		W	J	S	
AR1301	Architectural Design II	5			10		250	250	500	
AR1302	Building Materials and Construction - II	4	1		3	4	100	100	200	
AR1303	History of Architecture - II	2	2			3	100	50	150	
AR1304	Building Climatology	2	2			3	100	50	150	
AR1305	Architectural Graphics - II	4			4	4	100	100	200	
AR1306	Humanities	2	2			3	100	50	150	
AR1307	Computer Applications in Architecture	2			2			50	50	
AR1308	Structural Analysis - I	3	2	1		3	100	50	150	
Total		24	9	1	19				1550	

FOURTH SEMESTER (S4)

Course No	Course Title	Credits	Hours/ week			Duration of Exam	Marks			Total
			L	T	P/D		W	J	S	
AR1401	Architectural Design III	5			10		250	250	500	
AR1402	Building Materials and Construction III	4	1		3	4	100	100	200	
AR1403	History of Architecture -III	2	2			3	100	50	150	
AR1404	Landscape Architecture	4	1		3	4	100	100	200	
AR1405	Architectural Acoustics	3	2	1		3	100	50	150	
AR1406	Estimation and Specification	2	2			3	100	50	150	
AR1407	Building Services I Water supply and Sanitation	2	2			3	100	50	150	
AR1408	Structural Analysis II	2	2			3	100	50	150	
Total		24	12	1	16				1650	

FIFTH SEMESTER (S5)

Course no:	Course Title	Credits	Hours /week			Duration of exam	Marks			Total
			L	T	P/D		W	J	S	
AR 1501	Architectural Design IV	7			11		250	250	500	
AR 1502	Building Materials & Construction IV	4	1		3	4	100	100	200	
AR 1503	History of Architecture IV	3	2			3	100	50	150	
AR 1504	Ecology and Environmental Studies	2	2			3	100	50	150	
AR 1505	Building Services II – Electrical Design & Illumination	2	2			3	100	50	150	
AR 1506	Architectural Detailing	4	2		3	3	100	100	200	
AR 1507	Structural Analysis III	2	3	1		3	100	50	150	
TOTAL		24	12	1	17				1500	

SIXTH SEMESTER (S6)

Course no:	Course Title	Credits	Hours /week			Duration of exam	Marks			Total
			L	T	P/D		W	J	S	
AR 1601	Architectural Design V	7			11		250	250	500	
AR 1602	Building Materials & Construction V	4	1		3	4	100	100	200	
AR 1603	History of Architecture V	3	3			3	100	50	150	
AR 1604	Town Planning	3	3			3	100	50	150	
AR 1605	Building Services III – Fire Protection & HVAC	3	3			3	100	50	150	
AR 1606	Structural Design	3	3	1		3	100	50	150	
AR 1607	Building Science Lab	1			2			50	50	
TOTAL		24	13	1	16				1350	

SEVENTH SEMESTER (S7)

Course no:	Course Title	Credits	Hours /week			Duration of exam	Marks			Total
			L	T	P/D		W	J	S	
AR 1701	Architectural Design VI	7			11		250	250	500	
AR 1702	Urban Design	3	3			3	100		50	150
AR 1703	Housing	3	3			3	100		50	150
AR 1704	Interior Design	4	1		2	4	100		100	200
AR 1705	Design Aspects of Earth Quake Resistant Structures	3	3	1		3	100		50	150
AR 1706	Elective I	2	3			3	100		50	150
AR 1707	Elective II	2	3			3	100		50	150
	TOTAL	24	16	1	13					1450

EIGHTH SEMESTER (S8)

Course no:	Course Title	Credits	Hours /week			Duration of exam	Marks			Total
			L	T	P/D		W	J	S	
AR 1801	Architectural Design VII	7			11		250	250	500	
AR 1802	Professional Practice	3	4			3	100		50	150
AR 1803	Disaster preparedness and Management	3	3			3	100		50	150
AR 1804	Construction Management	3	3	1		3	100		50	150
AR 1805	Elective III	3	3			3	100		50	150
AR 1806	Elective IV	3	3			3	100		50	150
AR 1807	Dissertation	2		2				100	100	200
	TOTAL	24	16	3	11					1450

NINTH SEMESTER (S9)

Course no:	Course Title	Credits	Hours /week			Duration of exam	Marks			Total
			L	T	P/D		W	J	S	
AR 1901	Practical Training	10					300	200	500	
	TOTAL	10					300	200	500	

TENTH SEMESTER (S10)

Course no:	Course Title	Credits	Hours /week			Duration of exam	Marks			Total
			L	T	P/D		W	J	S	
AR 11001	Architectural thesis and Viva Voce	16			30		250	250	500	
	TOTAL	16							500	

Total Credits :210

Elective I

AR1706a	Sustainable Architecture
AR1706b	Cost Effective Technology
AR1706c	Digital Process in Architecture

Elective II

AR1707a	Research Methodology & statistics
AR1707b	Architectural Criticism
AR1707c	Modular coordination
AR1707d	Vernacular Architecture

Elective III

AR1805a	Energy Efficient Architecture
AR1805b	Advanced Structural Systems
AR1805c	Services in High-Rise Buildings

Elective IV

AR1806a	Architectural Conservation
AR1806b	Environmental Impact Assessment
AR1806c	Building Information Systems

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'.
2. D. Chiara & Callender, 'Time saver standards for building types'

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 varieties, 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. Sir Banister Fletcher's – "A History of Architecture".
2. History of World Architecture series
3. Pehnt, Wolfgang, 'Encyclopedia of Modern Architecture', Thames & Hudson. 1963
4. Moritz Herrmann , Colonial architecture of India, 2010.

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 luminaires 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'
2. Uppal, 'Electrical wiring, Estimating and costing'
3. J. B. Gupta, 'Electrical wiring'
4. National electrical Code (NEC)
5. Bureau of Indian Standards – IS 732, IS 742, IS 3043
6. Krider J.F, Handbook of Heating ,ventilation and Airconditioning, 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 lay outs 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, 2nd edition- constructability-aesthetics" Wiley India.
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 Vol– 2*, Laxmi Publications.
3. Aslam Kasimali, *Analysis of Structures*, 4th Edition.
4. Harry H West, *Fundamentals of Structural Analysis*. Wiley Publications, 2nd Edition.
5. Ramamrutham, *Theory of Structures*, Dhanpat Rai & Co (P) Ltd.

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.

AR1601 ARCHITECTURAL DESIGN –V

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

Credits:7

Objective

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

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

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

Course Outcome

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

References:

1. Edward d. Mills, 'Planning the architect's handbook'
2. D. Chiara & Callender, 'Time saver standards for Building types'
3. Neufert's Architects Data
4. Ramsey/Sleeper, 'Architectural Graphic Standards'
5. BIS, various codes of practice and National Building code of India

AR1602 BUILDING MATERIALS AND CONSTRUCTION – V

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

Credits: 4

Objectives

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

Module I

Construction system developed by Research Organizations.

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

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

Module II

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

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

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

Module III

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

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

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

Module IV

Introduction to earthquake resistant structures – Concepts of stability, prevention of collapse – Study of shear wall and diagonal framing – Architectural details of earthquake resistant buildings. Drawings –*Reinforcement and bending detail in R.C. Band, Details of providing Vertical steel bars in Brick masonry*

Course Outcome:

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

References:

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

5. *W.B.Mckay, 'Building Construction' ,Longmans,U.K.1981.*
6. *R. Chudler, 'Construction Technology' – Vol I to IV*
7. *J.K. Mc Kay, 'Building ConstrctionVol I to IV'*
8. *Sharma S.K. &Kaul, B.K., 'Text book of Building Construction'*
9. *Arora S.P. &Bindra, 'A text book of Building Construction'*
10. *Vazrani V.N. &Chandola S.P, 'Building Construction'*
11. *Relevant BIS Code Pertaining to Construction of Materials*

University Examination Pattern:

Examination duration: 4 hours Maximum Total Marks: 100

The question paper shall consist of 2 parts.

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

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

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

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

AR1603 HISTORY OF ARCHITECTURE – V

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

Credits: 3

Objectives

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

Module I

Modern Architecture

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

Module II

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

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

Module III

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

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

Module IV

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

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

Course Outcome:

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

References

1. Sir Banister Fletcher, 'A History of Architecture'
2. History of World Architecture series
3. Encyclopedia of Modern Architecture
4. Contemporary Indian architecture

University Examination Pattern

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

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

AR1604 TOWN PLANNING

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

Credits: 3

Course Objective

To expose the students

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

Module I

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

Module II

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

Module III

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

Module IV

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

Course Outcome

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

References:

1. Arthur .P. Gallion- 'Urban Pattern'
2. AEJ Morris- 'History of Urban Form from Pre-history to Renaissance'
3. Peter Hall- 'Urban & Regional Planning'
4. C.A. Dioxidis- 'An Introduction to Science of Human Settlements'

University Examination Pattern

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

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

AR1605 BUILDING SERVICES –III (FIRE PROTECTION & HVAC)

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

Credits: 3

Objective:

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

Module I

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

Module II

Air conditioning – Definition – Comfort and industrial air conditioning. Reversed carnot cycle, COP.(simple problem to find COP based on Carnot cycle) Difference between heat pump and refrigerator.

Principles of vapour compression system – Simple cycle – Representation of TS and PH diagrams – COP – Refrigerants and their properties – Mixture refrigerants – Refrigeration systems components – Compressors – Condensers – Evaporators – Expansion devices – Cooling towers. Simple vapour absorption system. Solar energy for refrigeration.

Module III

Psychrometry – Psychrometric properties – dry bulb temperature, wet bulb temperature, humidity ratio, relative humidity, dew point temperature, degree of saturation, Factors affecting human body comfort – Comfort chart – Air distribution systems – duct systems – sizes, Layout and mountings – Effects of bends of ducts.

Air conditioning systems –Central Plant, Room air conditioners – Split system – Packaged system – all air system –chilled water system – zoning – Market survey – Noise and noise control in Air conditioning.

Module IV

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

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

Course Outcome:

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

References

1. Manohar Prasad, 'Refrigeration & Air conditioning'
2. C.P. Arora, 'Refrigeration & Air conditioning'
3. W.F. Stocker, 'Refrigeration & Air conditioning'
4. P.L. Ballaney, 'Refrigeration & Air conditioning'
5. S.C. Arora and Domkundwaranes, 'Refrigeration & Air conditioning'
6. Jane I Lataille'Fire Protection Engineering in Building Design'Butter Worth Heinemann, 2003.

University Examination Pattern

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

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

AR1606 STRUCTURAL DESIGN

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

Credits: 3

Course Objective:

- To understand concepts of reinforced cement concrete.

Module I

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

Behavior and Design of Doubly reinforced beams under flexure and shear by limit state method.

Module II

Design of T-beam under flexure and shear.

Design of One Way slab under flexure.

Module III

Design of Two way slab under flexure -conditions of corners free to lift up and corners revented from lifting up.

Design of short columns subjected to axial loads [Use SP 16 Chart]

Module IV

Design of short Column members subjected to combined axial load and uniaxial bending by limit state method.[Use SP 16 Chart] short column subjected to biaxial moment .Long Column-basic introduction of structural behavior.

Design of isolated Footings- Square and Rectangular shapes only (Concentric loads only).

References:

1. Ashok K Jain, *Limit state Design of Reinforced concrete*, 2007.
2. Unnikshnan Pillai &Devdas Menon, *Reinforced Concrete Design*, 2009.
3. RamaChandran, *Limit state Design of Reinforced concrete*.

Course Outcome:

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

University Examination Pattern

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

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

AR1607 BUILDING SCIENCE LAB

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

Credits: 1

Course Objective:

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

Module – I

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

Module – II

Study of relationship between MRT and Solar Radiation, Study on comfort parameters and comfort indices,

Evaluation of thermal comfort using Architectural Evaluation System

Measurement of illumination indoors – natural and artificial, Study of Sun path and shading devices.

Module – III

Measurement of sound indoors and outdoors.

Determination of acoustical properties of materials.

Module – IV

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

Internal Continuous Assessment (Maximum Marks -50)

Laboratory Experiments : 25 marks

Tests (Internal) : 15 marks

Attendance : 10 marks

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 Codes
2. National Building Code
3. Kerala Municipal Building Rules
4. Callendaret al, "Time Saver Standards", Mc Graw Hill
5. Paul D. Spreinegar, "Urban Design, the Architecture of Towns and Cities", Mc Graw Hill.
6. GordenCulen, "Townscape".
7. Edurand Bacon, "Design of Cities".
8. Edward D. Mills, "Planning the Architects Handbook".
9. Julius Panero&Zeluik, "Human Decision and Interior Space", Whitney Library of Design Publication, 1989.

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 an 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.Sperigen, 'Architecture of towns and cities'
2. Bill Hillier and B.J Hudson, 'The social logic of space'
3. Alexander Christopher, 'The new theory of urban design'
4. Kevin Lynch, 'The image of the city'
5. Charles Correa, 'The new landscape'
6. Rossi, Aldo, 'The architecture of cities'
7. Collen, Garden, 'Townscapes'
8. Roger Trancik, 'Finding lost spaces'
9. Sitte, Cammitto, 'The Art of Building cities'
10. Time saver standards, 'Urban Design'
11. Andres Duany, Elizabeth Plater-Zyber and Robert Alminanna, 'The new civic art'

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'
2. Dr. Misra and Dr.B.S. Bhooshan- 'HabitatAsia'
3. Dr. Misra and Dr.B.S. Bhooshan- 'Habitat India'
4. Arthur Gallion- 'Urban Pattern'
5. Reading Material in Housing -Compiled by K. Thomas Poullose for ITPI students
6. Five Year Plans- Government of India Publications

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'
2. ShirishVasatBapat, 'Living Areas – Internal Spaces'
3. Halse, 'Use of Colours in Interiors'
4. Ching, 'Interior Design Illustrated', Wiley
5. YoshinokuAshihara, 'Exterior Design', Van Nostrand Reinhold Inc.,U.S.
6. Earnest Pickering, 'Architectural Design', New York : Wiley
7. Ching , 'Form, Space & order', Wiley
8. Krome Barnet, 'Logic in 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) –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. Earthquake resistant design of structures by Pankaj Agarwal and Manish Shrikhande, Prentice-Hall of India, 2006.
2. Seismic design of reinforced concrete and masonry buildings by T. Paulay and M.J.N. Priestley, 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.

REQUIRED READINGS:

1. Arian Mostaedi , “Sustainable Architecture : Low tech houses”, CarlesBroto, 2002.
2. Sandra F.Mendler& Willian Odell, “HOK Guidebook to Sustainable Design”, John willey and sons, 2000.
3. Richard Hyder, “Environmental brief:Pathways for green design”, Taylor and Francis, 2007.
4. 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. Hand book of low cost housing
2. G.C. Mathew, 'Low cost housing in development countries'
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.*
2. Ali Rahim , *Contemporary Processes in Architecture.*
3. Prof. Neil Leach , *Digital Cities AD: Architectural Design .*
4. Branko Kolarevic , *Performative Architecture : Beyond Instrumentality .*
5. Michael Hensel , *Versatility and Vicissitude: Performance in Morpho-Ecological Design.*
6. Lisa Iwamoto , *Digital Fabrications: Architectural and Material Technique.*

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, description 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. Charles 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 London, Thames and Hudson

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.Heki.K (ed) 'Shells, Membranes and space frames' Elsevier,
- 2.Sarja A. 'Open and industrial Buildings'
- 3.Akvert, G.H Dietz Culter Lawrence (ed) 'Industrial Building system for Housing'
- 4.Bauverlag& Wiesbaden 'Manual of Precast Concrete Construction System Buildings with Large panels'
- 5.Gabind , Fracols 'Beyond the Cube The Architecture for Space Frames and Polyhedral'
- 6..National Building Code of India

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

AR1801 ARCHITECTURAL DESIGN – VII

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

Credits: 7

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.

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

Course Outcome

At the end of the course, the students shall have acquired knowledge of the process and understanding of issues related to urban and rural context.

References

1. IS Codes
2. National Building Code
3. Kerala Municipal Building Rules
4. “*Time Saver Standards*”, McGraw Hill
5. Paul D. Spreinegar, “*Urban Design, the Architecture of Towns and Cities*”, McGraw Hill.
6. Gordon Cullen, “*Concise Townscape*”, Routledge.
7. Edurand Bacon, “*Design of Cities*”.

AR1802 PROFESSIONAL PRACTICE

Teaching Scheme: 4(L) - 0(T) - 0(P)

Credits: 3

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

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 and students, privilege to members. Scope of works and schedule of services and Scale of Professional charges as per Council of Architecture guidelines- Guidelines for architectural competition, rules and regulations of copyrights. Code of professional conduct laid by Council of Architecture.

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.

Module III

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 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 - Tax planning for architects.

Supervision – Quality control, daily report system, visual recording, site records

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. Namavathy- 'Professional Practice – Estimation & Valuation'
2. Roshan H. Namavathy- 'Theory and Practice of Valuation'
3. Asok Nair- 'Professional Valuation Practice'
4. V.N. Vazirani & S.P. Chandala- 'Construction Management & Accounts'.
5. Hand book of Professional Documents – Council of Architecture.
6. Architects Reference Manual – Workshops professional practice for Architects by IIA Kerala Chapter and Trivandrum Centre, November 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

AR1803 DISASTER PREPAREDNESS AND MANAGEMENT

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

Credits: 3

Course objective:

- To become familiar with definitions and terms used within the disciplines of disaster preparedness and emergency management.
- To understand planning, mitigation, in-crisis decision making, evacuation, response, and recovery within the leadership during an event

Module I

Hazard, Disaster, Risk, Vulnerability. Disaster – an over view; Disaster – the Indian Perspective; Types of disasters and its 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'
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, (1997)-, 'Perils of a Results Planet: Scientific Perspectives on Natural Disasters', Cambridge University Press, Cambridge.
4. Guha-Sapir D., Hargitt, D and Hoyois P. (2004), 'Thirty Years of Natural Disasters: 1974-2003', The Numbers, UCL Presses, De Lou vain.
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 (1983), 'Interpretation of a Calamity', Allen &Unwin Inc., London.
7. Heide, Auf der E (1989)-, 'Disaster Response: Principles of Preparation and Coordination', C.V.Mosby, Baltimore.
8. Amarnath Chakrabarti, DevdasMenon, Amlan K. Sengupta, 'Handbook on Seismic retrofit of buildings'

Course outcome:

- Upon completion of the course the students shall be able to effectively define and describe the terminology used within disaster planning and emergency management.
- They should be able to formulate an emergency response plan, manage an incident, follow-up and analyze it.

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

AR1804 CONSTRUCTION MANAGEMENT

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

Credits: 3

Course objective:

- To study and understand the concept of planning, scheduling, and the techniques necessary for construction project.

Module I

Introduction to construction economics and finance – Time value of money, Cash flow, Depreciation, Cost benefit analysis. Introduction to project management – Objective of construction management, Types of construction projects, 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 CPM, Network crashing.

Module III

Resource scheduling- resource allocation and resource leveling, other scheduling Methods– PERT and Linear Scheduling Method (LSM)

Project control- Earned value, Cost and Schedule Performance

Module IV

Project monitoring, Claims, Delay Analysis, Expediting the project, Duration cost trade off, Optimization. Introduction to Project management software packages.

References

1. Callaghan, M.T, Quackenbush, D.G. and Rowings-, J.E, 'Construction Project Scheduling', McGraw-Hill (1992)
2. Robert B. Harris-, 'Precedence and Arrow Network Techniques for Construction
3. Stevens James D, 'Techniques or Construction Network Scheduling'
4. Bhattacharjee S.K-, 'Fundamentals of PERT/CPM and Project Management'.
5. N. P. Vohra- 'Quantitative Techniques in Management'

Course outcome:

Upon completion of study the students shall be able to effectively manage a construction project.

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

Elective III

AR1805

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

Credits: 3

AR1805-a: ENERGY EFFICIENT ARCHITECTURE

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

Credits:3

Course Objective:

To introduce the students the recent techniques and concepts in energy efficient architecture through Smart buildings and Biophilic design.

Module I

Introduction to energy efficiency in architecture. Solar passive techniques in building design. Energy efficient lighting and HVAC system. Renewable energy systems-photovoltaic systems, solar water heating etc. Low energy materials methods of construction. Reduction of transportation energy. Design influencing thermal comfort conditions and reduction of energy construction.

Module II

Introduction of smart buildings: Brief history of concept of smart /intelligent buildings, Aims of Smart buildings. Smart buildings and energy efficiency. ICT in smart buildings. The driving factors of smart buildings: Positive financial effects, energy conservation, greater system functionality, increasing needs, continuing evolution of technology.

Module III

Smart building systems: HVAC control, Lighting control, Audiovisual, Video distribution, Access control, Data network, voice network, power management, Video surveillance, and fire alarms. Difference between ordinary buildings and intelligent/smart buildings. Usefulness of smart buildings especially for the aged.

Module IV

Introduction to Biophilic Design. Biophilia and Biophilic design. Principles and benefits of biophilic design. Energy effectiveness of biophilic architecture. Biophilic buildings connect people with nature- Patterns of biophilic design.

References

1. Iannacccone: Smart eco-buildings towards 2020/30-Innovative technologies for Resource efficient Buildings
2. Roberto Gonzalo: Energy Efficient architecture-Basics for Planning and 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

AR1805 b: ADVANCED STRUCTURAL SYSTEMS

Course objective:

- To study and understand the incorporation of different structural elements and materials to enhance the aesthetic value and stability of buildings.

Module I

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

Module II

Structural Materials – Review of traditional materials – properties and uses of modern materials like steel, Aluminum, reinforced concrete, pre-stressed concrete, plywood (different types), structural plastics, glasses, composites such as ferro-cement, fibre reinforced concrete.

Module III

Structural elements – behaviour of structural elements subjected to tension, compression, flexure and torsion; structural behavior of trusses, frames, plates, shells, arches, cables and grid construction. Structural systems, different types – behaviour of different structural systems under loads.

Module IV

Different structural systems for high rise concrete buildings-frame, shear wall, frame-shear wall, framed tube, tube in tube and modular tube; For high rise steel buildings- Rigid Frame, Framed Shear truss, Belt truss, Framed Tube, Truss Tube with interior Column, Bundled tube, Truss tube without interior columns. Reinforcement detailing of structural elements like beams, columns, slabs, footings, continuous beams, frames, staircases and shear walls. Structural safety, quality control aspects of structural elements and structural systems.

References :

1. Salvadori& Heller- 'Structures in Architecture'
2. Salvadori&Leany- 'Structural design in Architecture'
3. Zuk- 'Concepts of structures'
4. Cowan- 'Architectural structures'
5. Engil and Heirinch- 'Structural systems'
6. Robert A Coliman- 'Structural system design'
7. T Y Lin and S D Solesharg- 'Structural concepts and systems for Architects & Engineers'
8. I S 456, 2000

Course outcome:

Upon completion of study the students shall be familiar within different structural techniques and systems available in the industry.

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

AR1805c: SERVICES IN HIGH RISE BUILDINGS

Course objective:

- To learn how to incorporate different services in a high rise building.

Module -I

Standards of services in High Rise Buildings – Integration of Services – Relative costs – 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 and Design –Selection of pumps – Rain water harvesting – Sewage treatment- Recycling of water.

Passive Fire Safety - Fire Detection and Fire alarm systems – Planning and Design.

Module -III

Ventilation and Air-Conditioning

Natural and Mechanical Ventilation Systems – Air-conditioning systems and load estimation – Planning and Design –Automation and energy Management.

Module -IV

Electrical , Mechanical Security and Surveillance systems

Natural lighting systems – Energy efficiency in lighting systems – Load and Distribution – Planning and Design –Automation – Planning and Design of elevator systems and services – Elevator lobby area– Escalators, moving walls and ramps – safety aspects.

Security system – Access control and Perimeter Protection – CCTV intruder Alarm Safety and Security.

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. McGuinness 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 CharlesBlade,London,1972.

Course outcome:

Upon completion of study the students shall be able to incorporate different services in a high rise building.

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

Elective IV

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

Credits: 3

AR1806a: ARCHITECTURAL CONSERVATION

Course objective:

- To learn how to incorporate different services in a high rise building.

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).

Ethics of Conservation practice.

Authenticity & Integrity in Conservation practice.

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.

Defects in construction techniques / structure :- foundation, wall, wooden roof, Spanning elements –arches, vaults, domes.

Module III

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 IV

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.

References

- Bernard M. Fielden- 'Conservation of Historic Buildings' –, Architectural Press, 2003
- Ashurst, J. and Dimes, F.G. Conservation of Building and Decorative Stone, Butterworth-Heinemann, London. -1990.
- Jukka Jokilehto, Butterworth - Heinemann – 'A History of Architectural Conservation' -,1999
- ICOMOS, Earthen Architecture: The conservation of brick and earth structures. A handbook. (1993)
- Poul Beckmann and Robert Bowles – 'Structural Aspects of Building Conservation', ElsevierButterworth-Heinemann, 200

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

AR1806 b: ENVIRONMENTAL IMPACT ASSESSMENT

COURSE OBJECTIVES:

- To understand the basic principles of Environmental Impact Assessment
- To develop knowledge in various processes involved in EIA with case studies.

Module I

Introduction: Understanding of EIA and approval processes of architectural projects, Concepts of environmental impact analysis, key features of National environmental policy act, Environmental protection acts, EIA methodologies – Screening and scoping - matrix and network methodologies for impact identification, description of the affected environment – environmental indices. Rapid EIA and Comprehensive EIA

Module II

Prediction and Assessment of Impact on Air and Water Environment: Basic information on air quality, sources and effects of air pollutants, key legislations and regulations, impact prediction approaches, assessment of significance of impacts, identification and incorporation of mitigation measures Assessment of impact on water quality (surface and ground water), Vegetation and wildlife.

Module III

Prediction & Assessment of Impact on Noise & Social Environment: Basic information on noise, key legislation and guidelines, impact prediction methods, assessment of significance of impacts, identification and incorporation of mitigation measures, Environmental Risk Analysis, Definition of Risk, Consequence Analysis.

Module IV

Decision Methods for Evaluation of Alternative: Development of decision matrix. Public participation in environmental decision making, techniques for conflict management and dispute resolution, verbal communication in EIA studies.

Course Outcome:

Upon completion of this course, students will:

1. Identify the environmental attributes to be considered for the EIA study
2. Formulate objectives of the EIA studies
3. Identify the methodology to prepare rapid EIA
4. Prepare EIA reports and environmental management plans

References:

1. C.J.Barrow , Environmental management for sustainable development, RoutledgePublication, 2006
2. EdesioFernandesEnvironmental strategies for sustainable development in urban area (lessons from Africa and Latin America0, Athenaeum Press Ltd., 2000
3. James K.Lein, Integrated environmental planning, T.J. International Publication, 1998
4. R.KerryTurner , Sustainable environment management, S.K.JainPublisers, 1998
5. R.E.Hester , Risk assessment and risk management, Royal Society of Chemistry Publications, 2000
6. Anand, Rajesh; Jana, N.C.; Sudhir Singh, Disaster management and sustainable development, Pentagon Press, 2009
7. Building Material and Technology Promotion Council, Report of the expert group on natural disaster prevention, preparedness and mitigation having bearing on housing and related infrastructure, Part 3 : Guidelines for improving Hazard resistant construction of buildings and landuse zoning, New Delhi, BMTPC, 1998
8. Carter, W. Nick, Disaster management : A disaster managers handbook, Manila, ADB, 1991
9. HUDCO, Urban environmental management the Indian experience, Hudco 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

AR1806 d: BUILDING INFORMATION SYSTEM

OBJECTIVES

- This course provides a detailed exposure to students regarding the design & application in the field of life safety, electronic security & services automation requirements.
- To expose the students to the mandatory and inevitable integration of building management systems in building construction.

MODULE I

The objective of the Integrated Building Management System (IBMS), the list of utility, safety & security systems that are generally monitored & controlled through IBMS, the various components of IBMS, types of integration with the utility, Safety & security systems, explanation in detail on how each utility, safety & security system is integrated to IBMS, details of various parameters that can be monitored & controlled on each utility, safety & security system and the basic knowledge on how they work, are designed and installed.

MODULE II

Objective of a Fire Alarm System, essential components of a Fire Alarm System, Basic knowledge on how a Fire Alarm system works, designed and installed.

Objective of a Fire Suppression System, Explanation on Fire triangle, Essential Components of a Fire Suppression System, different type of Fire Suppression Systems, detailed design criteria for Hand held extinguishers Wet Riser, Sprinkler Systems and various gas Based Fire Suppression System,

MODULE III

Objective of a Public Address System, essential components of a Public Address System, various types of technologies currently in use and design guidelines to be followed and basic knowledge on how a Public Address System works, is designed and installed.

Introduction to Access Control, Intruder Alarm, Essential Components of each System, and Various types of Technologies employed in the system, Basic knowledge as how they work, are designed and installed.

MODULE IV

Introduction to CCTV, Perimeter protection system, Essential Components of each System, and Various types of Technologies employed in the system, Basic knowledge as how they work, are designed and installed.

COURSE OUTCOME:

To ensure that every architect understands & designs the buildings that facilitates safe, code compliant, secure & comfortable buildings for the occupants

REFERENCES:

1. Building Automation Systems – A Practical Guide to Selection and Implementation, Maurice Eyke
2. The Principles and Practice of Closed Circuit Television, Mike Constant & Peter Turnbull
3. Rules for Automatic sprinkler Installation – second edition – Pub: Tariff Advisory Committee.
4. CCTV Surveillance, Herman Kruegle.
5. National Building Code of India 2005 (Part IV)
6. Bureau of Indian Standards IS2189, IS2190, IS15105, IS13039.
7. Fire Suppression Detection System, John L. Bryan.
8. Security Systems and Intruder Alarm System, Vivian Capel.

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

AR1807 DISSERTATION

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

Credits: 2

AR 1901 Practical Training

Credits: 10

AR 1101 Architectural thesis and Viva Voce

Teaching Scheme: 0(L) - 0(T) - 30(P)

Credits: 16