

**DEGREE OF BACHELOR OF ARCHITECTURE  
CREDIT SYSTEM  
2006 – 2007**

**SEMESTER - I**

SL.NO.	CODE	COURSE OF STUDY	L	T	P	C
1.	AR101	ARCHITECTURAL GRAPHICS – I	1	-	4	3
2.	AR103	WORLD ARCHITECTURE	3	-	-	3
3.	AR105	PRINCIPLES OF ARCHITECTURE – I	3	-	-	3
4.	AR107	COMMUNICATIVE ENGLISH	2	-	2	3
5.	AR109	BASIC & ARCHITECTURAL DESIGN - I *	-	-	8	4
6.	AR111	VISUAL ARTS - I	-	-	6	3
7.	AR113	ENVIRONMENTAL SCIENCE	3	-	-	3
8.		N.C.C., N.S.S., N.S.O.	-	-	-	-
			12	-	20	22

**SEMESTER - II**

SL.NO.	CODE	COURSE OF STUDY	L	T	P	C
1.	AR102	BUILDING CONSTRUCTION & MATERIALS - I	1	-	4	3
2.	AR104	MECHANICS OF SOLIDS	3	-	-	3
3.	AR106	HINDU & BUDDHIST ARCHITECTURE	3	-	-	3
4.	AR108	PRINCIPLES OF ARCHITECTURE – II	3	-	-	3
5.	AR110	ARCHITECTURAL GRAPHICS - II	1	-	4	3
6.	AR112	BASIC & ARCHITECTURAL DESIGN – II *	-	-	8	4
7.	AR114	VISUAL ARTS – II	-	-	6	3
8.		N.C.C., N.S.S., N.S.O.	-	-	-	-
			11	-	22	22

LEGEND L - Lecture, T - Tutorial, P - Practical/Studio/Laboratory, C - Credit

\* - A Minimum of **E GRADE** is required in this subject for moving to the next higher semester

### SEMESTER - III

SL.NO.	CODE	COURSE OF STUDY	L	T	P	C
1.	AR201	BUILDING CONSTRUCTION & MATERIALS - II	1	-	4	3
2.	AR203	STRUCTURAL ANALYSIS	3	-	-	3
3.	AR205	EUROPEAN ARCHITECTURE	3	-	-	3
4.	AR207	ARCHITECTURAL GRAPHICS – III	1	-	2	2
5.	AR209	SITE PLANNING	3	-	-	3
6.	AR211	ARCHITECTURAL DESIGN – III *	-	-	10	5
7.	AR213	APPLIED VISUAL ARTS	-	-	5	3
			11	-	21	22

### SEMESTER - IV

SL.NO.	CODE	COURSE OF STUDY	L	T	P	C
1.	AR202	BUILDING CONSTRUCTION & MATERIALS - III	1	-	4	3
2.	AR204	CONCRETE TECHNOLOGY	3	-	-	3
3.	AR206	INDO - ISLAMIC ARCHITECTURE	3	-	-	3
4.	AR208	MODEL MAKING	-	-	3	2
5.	AR210	COMPUTER APPLICATIONS IN ARCHITECTURE - I	1	-	4	3
6.	AR212	CLIMATICALLY RESPONSIVE ARCHITECTURE	2	1	-	3
7.	AR214	ARCHITECTURAL DESIGN – IV *	-	-	10	5
			10	1	21	22

LEGEND L - Lecture, T - Tutorial, P - Practical/Studio/Laboratory  
C - Credit

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## SEMESTER - V

SL.NO.	CODE	COURSE OF STUDY	L	T	P	C
1.	AR301	BUILDING CONSTRUCTION & MATERIALS - IV	1	-	4	3
2.	AR303	DESIGN OF R.C.C. STRUCTURES	2	1	-	3
3.	AR305	CONTEMPORARY ARCHITECTURE - I	3	-	-	3
4.	AR307	WATER SUPPLY & DRAINAGE	3	-	-	3
5.	AR309	COMPUTER APPLICATIONS IN ARCHITECTURE - II	1	-	4	3
6.	AR311	ARCHITECTURAL DESIGN – V *	-	-	10	5
7.		ELECTIVE - I	-	-	4	2
			10	1	22	22

## SEMESTER - VI

SL.NO.	CODE	COURSE OF STUDY	L	T	P	C
1.	AR302	BUILDING CONSTRUCTION & MATERIALS - V	1	-	4	3
2.	AR304	ADVANCED STRUCTURES	3	-	-	3
3.	AR306	CONTEMPORARY ARCHITECTURE - II	3	-	-	3
4.	AR308	ARTIFICIAL LIGHTING & ELECTRICAL SERVICES	3	-	-	3
5.	AR310	LANDSCAPE ARCHITECTURE	3	-	-	3
6.	AR312	ARCHITECTURAL DESIGN – VI *	-	-	10	5
7.		ELECTIVE – II	-	-	4	2
			13	-	18	22

LEGEND L - Lecture, T - Tutorial, P - Practical/Studio/Laboratory  
C - Credit

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**SEMESTER – VII**

AR401	PROFESSIONAL TRAINING (ONE SEMESTER)	-	-	-	12
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**SEMESTER – VIII**

SL.NO.	CODE	COURSE OF STUDY	L	T	P	C
1.	AR402	BUILDING CONSTRUCTION & MATERIALS - VI	2	-	2	3
2.	AR404	BUILDING STRUCTURAL SYSTEMS	2	-	-	2
3.	AR406	ARCHITECTURAL ACOUSTICS	3	-	-	3
4.	AR408	ESTIMATION & SPECIFICATION	1	-	2	2
5.	AR410	HUMAN SETTLEMENT SCIENCE - I	3	-	-	3
6.	AR412	AIR CONDITIONING & MECHANICAL SERVICES	3	-	-	3
7.	AR414	ARCHITECTURAL DESIGN – VII *	-	-	12	6
8.		ELECTIVE – III	-	-	4	2
			14	-	20	24

**SEMESTER - IX**

SL.NO.	CODE	COURSE OF STUDY	L	T	P	C
1.	AR501	PROFESSIONAL PRACTICE – I	3	-	-	3
2.	AR503	HUMAN SETTLEMENT SCIENCE – II	3	-	-	3
3.	AR505	ARCHITECTURAL DESIGN – VIII *	-	-	14	7
4.	AR507	ENVIRONMENT & BEHAVIOR	3	-	-	3
5.	AR509	URBAN DESIGN	3	-	-	3
6.		ELECTIVE - IV	2	-	2	3
7.		ELECTIVE - V	2	-	-	2
			16	-	16	24

**SEMESTER – X**

SL.NO.	CODE	COURSE OF STUDY	L	T	P	C
1.	AR502	PROFESSIONAL PRACTICE – II	3	-	-	3
2.	AR504	CONSTRUCTION MANAGEMENT	3	-	-	3
3.	AR506	DISSERTATION	-	-	32	16
			6	-	32	22

LEGEND L - Lecture, T - Tutorial, P - Practical/Studio/Laboratory, C – Credit

\* - A Minimum of **E GRADE** is required in this subject for moving to the next higher semester

## LIST OF ELECTIVES

SL. No.	SEM.	ELECT.	CODE	ELECTIVES	L	T	P	C
1	V	I	AR351	VERNACULAR ARCHITECTURE	-	-	4	2
2			AR353	PAINTING	-	-	4	2
3	VI	II	AR352	ADVANCED COMPUTER APPLICATIONS	-	-	4	2
4			AR354	GRAPHIC DESIGN	-	-	4	2
5				ANY ONE ELECTIVE COURSE FROM OTHER DEPARTMENTS	3	-	-	3
6	VIII	III	AR452	INTERIOR DESIGN	-	-	4	2
7			AR454	ENVIRONMENTAL CONTROL & DESIGN WORKSHOP	-	-	4	2
8				ANY ONE ELECTIVE COURSE FROM OTHER DEPARTMENTS	3	-	-	3
9	IX	IV	AR551	ENERGY EFFICIENT BUILDINGS	2	-	2	3
10			AR553	HOUSING	3	-	-	3
11	IX	V	AR557	ARCHITECTURE CRITICISM	2	-	-	2
12			AR559	LANDSCAPE DESIGN	-	-	4	2

**Note : The minimum prescribed credits for the award of B.Arch. Degree in 214.**

## **AR101 – ARCHITECTURAL GRAPHICS - I**

Introduction to the concept of scale, Plane Geometry – Construction of Planes, Circles, Curves, Tangent and Regular Polygons, Introduction to orthographic projection – First angle projection. Orthographic projection of objects & methods of drawing them. Introduction to projectional drawing.

Projectional drawings of solids – right prism, right pyramid, right cylinder, right cone. Section lines in different angles & drawing of true section.

Introduction to methods of development; parallel line development, Radial line development and approximate development. Development of oblique solids.

Classification, line of intersection, line or generator method and section plane method.  
Exercises related to intersection of simple solids such as prisms, pyramids, cylinders and cone.

Learning to observe, measure and draw to scale the plans, elevations of simple objects such as table, stool, desk and simple chair. Drawing elevations from a given plan drawing of object / objects.

### **TEXT BOOKS**

1. K.L.Narayana & P.Kanniah, "Engineering Graphics- 1<sup>st</sup> angle projection", Tata McGraw Hill publishing company, New York, 1992.
2. Prof.Vee Ess, " Step by Step Engineering Drawing (1<sup>st</sup> angle projection)", V.K.publishers, Bangalore, 1990.

### **REFERENCES**

1. George A. Dinsmore, "Analytical Graphics", Van Nostrand Company Inc., Canada, 1968.
2. Thomas E French, Charles J.Vierck & Robert J.Foster, "Graphic Science & Design", International Edition, McGraw Hill Co., New York, 1986.

## **AR103 – WORLD ARCHITECTURE**

Introduction to Ancient World Architecture. A brief outline of the Neolithic revolution and its impact on built forms – brief study of a few ancient settlements – Jericho, Catal Huyuk, Hassuna, Koln-Lindenthal & Skara Brae. Egyptian Architecture: Evolution of Pyramids & cult temples.

Early Mesopotamian Architecture: Eg. Ziggurat of Urnammu, Ur. Mayan Architecture: Eg. Step Pyramid Complex, Tikal. Assyrian Architecture: Eg. Palace of Sargon, Khorsabad. Persian Architecture: Eg. Palace at Persepolis. A comparative study of all the styles of the ancient world.

Greek Architecture: Important construction techniques, Visual refinement (Optical correction), The Greek Orders, Brief description of the urban spaces, temples & other public buildings, Greek houses etc.. Eg: Agora, Acropolis, Parthenon, Erechtheion & Theatre at Epidaurus - all in Athens.

Roman Architecture: A brief account of materials, structural systems adopted and construction techniques - The Roman Orders - a short description of Roman urban spaces, temples, thermae, basilicas, theatres, amphitheatres, circuses & houses.

Early Christian Architecture: Evolution of church form, surface treatment and materials of construction. Eg.: St. Clement, Rome. Byzantine Architecture: Technique adopted to construct domes over rooms which are square in plan. General structural systems, surface treatment and materials of construction.

### **REFERENCES**

1. Sir Banister Fletcher's, "A History of Architecture", Butterworth Heinmann 19th Edition, 1987.
2. "History of World Architecture (series): Vols. Titled Ancient Architecture, Primitive architecture, Greek architecture, Roman architecture & Byzantine architecture", 1980.

## **AR105 – PRINCIPLES OF ARCHITECTURE – I**

A brief description of architecture. Architecture as an occupation. Architecture compared to visual and temporal arts. Architecture and science and technology: Architecture and social science. The work of an architect compared to that of an artist, technologist and a designer/craftsman, scope of architecture.

The concept of beauty: Philosophical and psychological view. Subjective and objective aspect of it. Difference in the concept of beauty due to social, regional and temporal variations. Basic principles of visual perception. Form and its visual properties. Visual qualities of five Basic geometric forms. Additive forms and subtractive forms.

Indoor space, outdoor space, the concept of space in buildings. The relationship between man and space. Defining spaces and the degree of enclosure. Organisation of spaces, fenestration, and character of facade, enclosure and internal spaces. Articulation of form.

Proportion, its application and advantages in architecture. Application of order, golden section, modular with examples from history of architecture. Scale, its application in architecture and advantages. Application of human scale and generic scale in architecture.

Ordering principles, their need and application in architecture. Various ordering principles available and their application in buildings with examples from history of architecture. The use of colours in architecture, principles of colours and their application and advantages in buildings.

### **REFERENCES**

1. ARG Isaac, " Approach to architectural Design", Butter worth & Co. Ltd., London, 1977.
2. Anthony J.Catanese & James C. Snyder, "Introduction to architecture," McGraw Hill Books Co., Newyork, 1988.

## **AR107 – COMMUNICATIVE ENGLISH**

Skimming, scanning, inferring, predicting and responding to content - Guessing the meaning of words from contexts - Note making and vocabulary extension.

Listening and understanding recorded, structured talks and classroom lectures - Comprehending the matter - understanding the links between different parts of speech - practice in note taking.

Features of an effective speech-Practice in speaking fluently - Dialogue practice- simple social exchanges - short extempore talks.

Effective sentences-cohesive paragraphs - clear and concise writing - Introduction to technical writing - Definition, Description, Instruction - Summary Writing practice.

Use of library - Role of Bibliography, Table of contents, Index etc. - use of Dictionary.

### **REFERENCES**

1. Eric H. Glendinning & Beverly Holmstrom, "Study reading - A course in reading Skills for academic purposes", Cambridge University Press,1992.
2. John Kirkman, "Good style - writing for science and technology", E&FN Spon, an Imprint of Chapman & Hall, 1992.

## **AR109 – BASIC & ARCHITECTURAL DESIGN - I**

Exercises in Points & Lines. Organisation of a large number of identical geometric shapes to obtain symmetrical and asymmetrical patterns. Family of shapes: developing various shapes from a given geometric shape - working out composition with such developed shapes.

Organising a large number of identical geometric shapes to express a given theme. Combining different geometric shapes and making a unit of bigger/larger shape and using many such units and expressing a design/pattern. To give emphasis in the expression of design - introducing value & colour.

To achieve focus and center of interest in design using different textural elements. Development of geometric pattern by division, subtraction, and addition or overlapping & to express them with the use of colours. Expressing a given theme in a geometric pattern.

Models / Sculptures to understand the evolution of three dimensional forms from two dimensional shapes. Additive model with similar forms and dissimilar forms made out of various mediums/materials. Subtractive model out of a given geometric form.

Models with linear members such as match sticks, reeds, etc. to understand geometric form and structure. Posters with a given theme. Collage with a given theme.

## **REFERENCES**

1. Marjore Elliott Bevin, "Design through Discovery", Holt Rinehart and Winton, New York, 1977.
2. George A Covington & Bruce Hannah, "Access by Design", Van Nostrand Reinhold, 1996.

## **AR111 - VISUAL ARTS - I**

Line, shapes, form, space, colour, value & texture - exercises given to meet the elements of art.

Balance, unity, pattern, emphasis, movement, rhythm & contrast are introduced and exercises to explain this conditions.

Free hand drawing exercises to be introduced to develop visual perception & thinking by drawing still life objects, furniture, equipment.

Out door exercises like sketching - buildings, streets, rows of buildings and human figures.

Exercises in different mediums for drawing/sketching - to provide sufficient training and practice in using various qualities of pencils, pen & ink. (Pencil, Charcoal, Lumograph Pencil)

## **REFERENCES**

1. Wayne Enstice, Melody Peters, "Drawing space, Form, Expression", Prentice hall, Englewood Cliffs, New Jersey, 1990.
2. Palmer John, "Drawing & Sketching", Brockhampton Press, London, 1993.

## **AR113 – ENVIRONMENTAL SCIENCE**

Natural resources and associated problems. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. Concept, Structure and function of an ecosystem. Energy flow in the ecosystem. Introduction, types, characteristic features, structure and function of various ecosystems.

Biodiversity: Genetic, species and ecosystem diversity. Bio-geographical classification of India. Value of biodiversity: Biodiversity at global, national and local levels. Hot spots of biodiversity. Threats to biodiversity: Endangered and endemic species of India. Conservation of biodiversity.

Environmental Pollution: Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution. Role of an individual in prevention of pollution. Disaster management: Floods, earthquake, cyclone and landslides.

Social Issues: Sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people. Environmental ethics. Climate



changes and global warming. Environmental protection Act. Public awareness.

Human Population: Population growth, Population explosion, Environment and human health. Human rights. Value education. HIV / AIDS, Women and Child Welfare. Role of information Technology in Environment and human health.

#### **REFERENCES:**

1. Miller T.G Jr., Environmental Sciences, Wadsworth Pub Co. (TB)
2. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, MT. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.

### **AR102 – BUILDING CONSTRUCTION & MATERIALS - I**

The properties and uses of materials for simple construction such as mud, bamboo, timber, brick, stone, cement, lime, mortars, thatch tiles, asbestos, galvanised, iron and reinforced concrete.

Principles of construction of simple foundation for load bearing wall in stone and brick, Plinth fillings, steps.

Standard terms in brick and stone masonry. English, Flemish and Rat trap bond, types of stone walls, Composite wall and piers.

Principles of construction of various types of arches, lintels and brick jallies.

Panelled door in timber, flush doors, Joints in frame, styles, rails, panels, fixture and fastenings.

#### **REFERENCES**

1. Arora, S.P. & Bindra, S.P. "A Text Book of Building Construction", Dhanpat Rai & Sons, New Delhi, 1994.
2. Jha, J. & Sinha, S.K., "Building Construction", Khanna Publishers, New Delhi, 1977.

### **AR104 – MECHANICS OF SOLIDS**

Elasticity - stress & strain - Types of stresses - elastic limit - Hooke's law - modulus of elasticity (Young's modulus)- deformation of a body due to force acting on it - stresses in composite bars - relation between elastic constants. Introduction to strain energy.

Centroid - center of gravity of simple figures - C.G. by geometrical considerations - solid bodies - C.G. with cut out holes. Moment of inertia - theorems of M.I. of parallel & perpendicular axes - M.I. of a circular section, hollow section - M.I. of composite sections - modulus of section.

Beams & support conditions - types of supports, shear force and bending moment diagrams for simply supported beams, cantilevers, and overhanging beams with concentrated, uniformly distributed and uniformly varying loads.

Theory of simple bending - stress distribution at a cross section due to bending moment and shear force - moment of resistance - bending stresses in sections.

Statically determinate plane trusses, perfect and Imperfect frames - Deficient & Redundant frames - analytical methods for finding out the forces - method of joints.

#### **TEXT BOOKS**

1. S.S. Bhavikatti, "Strength of Materials", VIKAS Publishing House Pvt. Ltd., Chennai, 1997.
2. Vazirani & Ratwani, "Analysis of Structures", Khanna Publishers, New Delhi, 1996.

#### **REFERENCES**

1. Khurumi, "Strength of Materials & Mechanics of Structures", Standard Publishing co. Ltd., New Delhi, 1996.
2. Srinath, "Advanced Mechanics of Solids", Tata McGraw Hill Co., New Delhi, 1996.

## **AR106 – HINDU & BUDDHIST ARCHITECTURE**

Ancient Indian Architecture: The Indus valley civilization - city planning, one typical residence, granary, great bath. Evolution of early Aryan architectural forms – impact on architecture of later days. Buddhist Architecture- Early Buddhist, Later Buddhist, The Mahayana phase.

The Hindu Temple : Evolution of form. Eg. Early Gupta temples, Ladhkhan & Durga temple, Aihole, temple at Deogarh, temple at Bitergaon. Chalukyan Architecture : A brief outline . Eg. Pattadakal. South Indian Secular Architecture : A brief outline .

Pallava Architecture: Rock-cut rathas & mandapas, Shore Temple, Mahabalipuram, Kailasanathar temple & Vaikunthaperumal temple, Kanchipuram. Chola Architecture: Eg.: Brihadeswara temple, Thanjavur.

South Indian Architecture – II: Pandya & Madura Styles- Evolution of the Gopuram, City planning. eg. Meenakshi temple, Madurai & Temple at Srirangam. Hoysala Style- Eg. Temple at Belur. A comparative study of all the South Indian styles.

Hindu - Other Regions, Orissa Style: Eg.: Lingaraja temple, Bhubaneshwar. Indo-Aryan Style- Eg.: Khandharia Mahadev temple, Khajuraho. Gujarat Style.(Hindu & Jain) - Eg.: Dhilwara temple, Mt. Abu. A comparative study of the Dravidian and Indo-Aryan styles. A comparative study of the Buddhist and Hindu styles.

### **REFERENCES**

1. Brown, Percy. "Indian Architecture: Buddhist & Hindu periods", Taraporewala & Sons, 1978.
2. "History of World Architecture series", Oriental/Faber & Faber Ltd., London,1980.

## **AR108 – PRINCIPLES OF ARCHITECTURE – II**

Human activities. The need for appropriate space and environment for performing the activities efficiently. The impact of the built environment on the activity. The architects role in the creation of built environment. The relationship between form and function in nature and man made objects with examples.

Anthropometrics and the information available in standards & their application in architecture Circulation: Pattern and space taken by circulation routes. Five different types of circulation pattern, path space relationship, access to buildings and types of entrances.

Climate basic principles of climatic comfort, means of achieving them in buildings examples to be quoted from history of architecture. Site planning. The relationship between site and its surroundings. Site analysis and optimum use of site.

Building Materials: The relationship between building materials, form of the building, construction techniques and structural system . Structures: Structural systems and the relationship between forms, materials and aesthetics. Examples to be cited from history of architecture.

Culture : Relationship between the believes, values and aspirations of the user and his built environment - with examples from history of architecture. Personal space and territory, Styles of Architecture : Styles and trends in architecture and the factors that cause them.

### **REFERENCES**

1. Amos Rapoport, "House form and culture", Prentice hall Inc., N.J., USA, 1969.
2. Anthony J. Catanese & James C. Snyder, " Introduction to Architecture McGraw Hill Books Co.NewYork,1988.

## **AR110 – ARCHITECTURAL GRAPHICS - II**

Introduction to building terminology of various parts of a structure. Learning to observe, measure, record and draw to scale the plan of simple built environment, visualizing the section plane (vertical) and developing wall sections through openings.

Drawing elevations, sections & sectional elevations from a given plan drawing of adequate complexity.

Introduction to isometric and axonometric projections: Isometric scale- construction of isometric scale. Projection of plane figures, objects, methods of drawing isometric views. Exercises to draw axonometric views.

Introduction to Sciography, Shadow of points, lines and shapes. Shades and shadows of simple 2D – Planes. Shades and shadows of cube, pyramid, prism, cone, cylindrical forms and combination of these forms.

Shades and Shadows of Complex built forms, Building Plans and Elevations.

#### **TEXT BOOKS**

1. K.L.Narayana & P.Kanniah, "Engineering Graphics- 1<sup>st</sup> angle projection", Tata McGraw Hill publishing company, New York, 1992.
2. Prof.Vee Ess, " Step by Step Engineering Drawing (1<sup>st</sup> angle projection)", V.K.publishers, Bangalore, 1990.

#### **REFERENCES**

1. George A. Dinsmore, "Analytical Graphics", Van Nostrand Company Inc., Canada, 1968.
2. Thomas E French, Charles J.Vierck & Robert J.Foster, " Graphic Science & Design", International Edition, McGraw Hill Co., New York, 1986.

### **AR112 – BASIC & ARCHITECTURAL DESIGN - II**

Exercises to understand the relationship between form and function.

Study and analysis of a few common household articles.

Study and design of a few utility sculptures: Exercises on the study and application of anthropometrics information.

Detail study of a single room with activity -space analysis, circulation pattern and furniture layout. Detail study of a small building with activity - space analysis, circulation pattern and furniture layout

Reorganisation of an existing space / room for a given activity (which is different from the existing use). Design of space meant for single or multiple function

#### **REFERENCES**

1. Maitland Graves, " The art of colour and design", McGraw Hill Inc., 2nd Edition, 1951.
2. De. Chiara and Callender, "Time Saver Standards for Building Types", McGraw Hill Co., New York, 1973.

### **AR114 – VISUAL ARTS - II**

Hue, Intensity & Value - other qualities of colours - Primary, Secondary & Complementary colours. Shades & Tints - Warm & Cool Colours.

The various functions of colour in creating Designs. Use of various colour harmonies in Design / Art.

Water colours - Transparent and Opaque (Tempera / Poster Colours), Pastels, Colour Pencils and Oils and their uses in expression of a composition / design.

All exercises to be conducted so as to develop observation and skill of expressing graphically - for understanding objects three dimensionally and to have effective visual thinking.

#### **REFERENCES**

1. "Learn to Paint and Draw", Victoria House Publishing Ltd., Bath, UK, 1981.
2. Goodman Sue & Porter Tom., "Designer Primer", Butter Worth Architecture, London, 1988.

## **AR201 – BUILDING CONSTRUCTION AND MATERIALS - II**

Study the properties and characteristics of different materials used for roof of coverings R.C.C. and composite roof slab flooring materials timber and glass.

Joinery and detailing of various types of wooden doors fully glazed, partially glazed, sliding and folding door, etc. fully glazed window in timber fixing of glass, fixtures and fastenings.

Developmental reference to traditional trusses, different forms, lean-to, double lean-to collar, couple roof, fixing of Mangalore tiles, A.C. & G.I. sheets and gutters.

Flat roof construction in R.C.C. and composite materials, steels trusses and details of roof coverings and gutters.

Principles of flooring and terracing – floors – brick, stone, concrete and timber floors with timber floors with floor finishes.

### **REFERENCES**

1. Arora, S.P. & Bindra, S.P., "A Text Book of Building Construction", Dhanpat Rai & Sons, New Delhi, 1994.
2. Jha, J. & Sinha, S.K., "Building Construction", Khanna Publishers, New Delhi, 1997.

## **AR203 – STRUCTURAL ANALYSIS**

Slope, curvature of the bending beam - relation between slope, deflection & radius of curvatures, simple problems to find out slope and deflection for different loads on beams - Double integration method, macaulay's method, moment area method, Conjugate beam method.

Propped cantilever beams - Reaction of prop. - Propped cantilever beams with different types of loads - sinking of the prop. Fixed beams - bending moment diagram for fixed beams - continuous beams - moment distribution method - sinking of the supports.

Moving loads and influence lines for statically determinate structures - Types of loads - combination of loads - Influence lines – Introduction.

Theory of arches - classification of arches - Analysis of three hinged arches - Bending moment diagram for given loads - Normal thrust and radial shear - Introduction to cables - Types - Bending moments & force analysis.

Theory of columns - Types of end conditions of columns - Equivalent length of a column - Axial loads, combined bending & axial loads, Indian Standard Code recommendations - Euler's formula for long columns - Rankine's formula - Practical applications.

### **TEXT BOOKS**

1. Punmia, B.C., "Structural Analysis", Standard Publishers Distributors, NewDelhi,1995.
2. Bari, S.A. "Elements of Structural Analysis", S.Chand & Company Ltd.,NewDelhi,1997.

### **REFERENCES**

1. Negi, L.S., "Theory and Problems in Structural Analysis", Tata McGraw Hill Publishing Co. Ltd., NewDelhi,1997.
2. Junnarkar 'Analysis of Structures', Charotar Publishing House, Anand,1994.

## **AR205 – EUROPEAN ARCHITECTURE**

Italian Romanesque Architecture: Architectural characteristics of the churches of Northern Italy, Central Italy and South Italy. eg. Pisa Cathedral (Central Italy). French Romanesque - eg. Abbey - Aux - Hommes at Caen. British Romanesque - eg. Durham's Cathedral.

Introduction to Gothic architecture, its evolution of structural systems, arches, vaults and cross vault, decoration, characteristic of French architecture. eg. Notre - Dame, Paris.

Understanding the general influences and characteristics of British & Italian gothic architecture and its structural developments and decorative motives. Characteristics of British gothic Architecture. Characteristics of Italian gothic Architecture - eg. Milan Cathedral.

Birth of Renaissance and its impact Architectural style of Early Renaissance: Characteristics and works of Brunelleschi. High Renaissance and Mannerism : Study of the works of Bramante and Michelangelo. Baroque and Rococo: Architectural style of Palladio & Bernini , Basilica, Vicenza.

French Renaissance: Characteristics and style of French Renaissance example The Louvre, Paris. British Renaissance: Tudor, Elizabethan and Jacobean Styles: Characteristics and work of Inigo Jones. Christopher Wren's contribution towards Renaissance Architecture with St. Paul's, London as an example.

### **REFERENCES**

1. Sir Banister Fletcher's, "A History of Architecture", Butterworth Heinemann 19th Edition, 1987.
2. Cyril Mango, "Byzantine Architecture", Harry N. Abrams Inc. Publishers, New York, 1976.

## **AR207 – ARCHITECTURAL GRAPHICS – III**

Perspective projection concepts, Types of Perspective views, Picture plane, vanishing points , station point, horizon , cone of vision , line of vision ,etc.

Perspective Projection of simple & complex geometrical forms.

Perspective projection of interior views of buildings using two point and one point perspective views . shades and shadows on the perspective view of interior of buildings.

Perspective projection of exterior views of buildings using two point and one point perspective views . shades and shadows on the perspective view of exterior of buildings.

Rendering of building exterior & interior perspective views using various techniques and medium.

### **TEXT BOOKS**

1. Mulik, Shankar., "A Text Book of Perspective & Sciography", Allied Publishers Ltd., Mumbai, 1994.

### **REFERENCES**

1. McGoodwin, Henry., "Architectural Shades and Shadows", The American Institute of Architectural Press, Washington, D.C., 1989.
2. Russell D. Light, "On Perspective", Butterworth- Heinemann, Oxford, 1995.

## **AR209 – SITE PLANNING**

Definition of plot, site, land and region. Units of measurements. Reconnaissance and need for surveying – chain survey, compass survey, plane table & theodolite surveys – various equipments used – theory only

Importance of site analysis – factors involved. Accessibility, size and shape of sites. Confirming and non-conforming uses. Climate and topography, infrastructures available, sources of water supply and means of disposal system, architectural and visual aspects. Preparation of site analysis diagram

Lie of the land, contours, watershed, surface drainage, ayacuts and irrigation lands.

Water, vegetation, soils, climate, land forms. Sewage disposal, irrigation systems and ecology. Preparation of maps of matrix analysis, composite analysis, locality plans, topographical analysis

Man-made structures, sensuous qualities, cultural data, images and data correlation. Vegetation, plant associations, types and distribution. Preparation of ecological profile of an area.

#### **REFERENCES**

1. John Ormsbee Simonds, "Landscape Architecture: A manual of site planning & design", McGraw Hill, 1961.
2. Kevin Lynch, "Site Planning", MIT Press, Cambridge, MA. 1957.
3. Joseph De Chiara and Lee Copleman, "Planning Design Criteria", Van Nostrand Reinhold Co., New York, 1968
4. Thomas H. Russ, "Site Planning and Design Handbook" Pearson Education, 2002
5. Diane Y. Carstens, "Site Planning & Design for the Elderly", Van Nostrand Reinhold, New York, 1993
6. James B. Root, "Fundamentals of Landscaping & Site Planning", AVI Pub. Co., Westport, 1985
7. William M. Marsh, "Environmental Analysis for Land Use and Site Planning", McGraw-Hill, 1978
8. R. Gene Brooks, "Site Planning - Environment, Process and Development", Prentice Hall, 1988

### **AR211 – ARCHITECTURAL DESIGN - III**

Developing designs for simple buildings like a small residence and medium sized buildings like community hall, health centre etc. in rural setting using locally available materials and appropriate construction techniques.

The designs should reflect the application of knowledge gained from courses on materials, structures & building construction and Theory of Architecture. Students should be able to communicate their ideas and design effectively with appropriate medium.

#### **REFERENCES**

1. Maitland Graves, "The Art of Color and Design", McGraw Hill Inc., 2nd Edition, 1951.
2. Edward. D. Mills, "Planning the Architects Hand Book - Butterworth, London, 1985.

### **AR213 - APPLIED VISUAL ARTS**

Outdoor Sketching - Buildings, building elements, group of buildings, buildings in landscapes, trees in pencils and pen & ink. Painting in water colour medium in outdoor to learn more of foliage for using effectively in Architectural drawings. Brief knowledge of Anatomy for learning human proportions and scale.

Rendering - Rendering techniques for architectural drawings - building perspectives, interior & exteriors in various mediums like pencil, ink, pastels, water colours - opaque and transparent.

Photography – Learning photographic techniques for architectural studies, and learning basic dark room techniques & using camera to enhance visual perception for expressing volume, depth, positive and negative spaces.

Through photography to learn the art of composition, colour balance, aesthetic, light control, proportion, scaling and perspective.

#### **REFERENCES**

1. Ranson Ron, "Water Colour Fast & Loose", Newtonn Abbot, London, 1987.
2. Calbo Angrill Muntsa & Plana Sicilia Manel, "How to Paint Buildings", Waston Guptill publications, New York, 1991.

## **AR202 - BUILDING CONSTRUCTION & MATERIALS - III**

The use and properties of glass, timber products, laminates, paints, terracotta, terrazo, ceramic and glazed tiles. Use of alternative details and specifications pertaining to the application/fixing of the same under various circumstances.

Basic rule of relationship and design of riser and tread. Different types of stair way design. Construction details of concrete stairs of composite construction. Design of handrail and balusters using different materials. Various methods of fixing them.

Definition of partition and the role of partitions in buildings. Different types of partitions, and their properties. Joinery details and constructional techniques involved in timber partitions, single and double skinned partitions, partially glazed partitions.

Wall finishes - external facing and veneers - stone facing, wall facing, wall tiling, and cement concrete facing - methods of construction and details pertaining to the same. Introduction to fixing devices in walls, ceilings and floors of solid construction.

### **REFERENCES**

1. Arora, S.P. & Bindra, S.P., "A Text Book of Building Construction", Dhanpat Rai & sons, New Delhi, 1994.
2. Jha, J.& Sinha, S.K., "Building Construction", Khana Publishers, New Delhi, 1977.

## **AR204 – CONCRETE TECHNOLOGY**

Introduction - classification of concrete mixes - Grades of concrete - Advantages and disadvantages of concrete. Concrete Making Materials - Cement-Method of Manufacturing of Cement - properties and specific uses of various types of cement. Test on cement - fineness - setting time - consistency - soundness - compressive strength.

General classification of aggregate - properties of aggregate - shape, texture, porosity and absorption, soundness - test on aggregates. Grading of Aggregates. Water - Quality of Water for mixing and curing - use of sea water for mixing concrete.

Basic consideration - factors influencing mix proportion - Mix Design by ACI method and I.S. code method - Design of high strength concrete - test on concrete. Information on Admixtures Plasticizers.

Introduction - Batching of materials - Mixing of Concrete materials - Transportation of concrete - Placing of concrete - curing of Concrete. Properties of Concrete - Introduction - strength of Concrete - stress and strain characteristics of concrete. Thermal properties of concrete - Micro cracking of concrete- RMC.

Introduction - light weight concrete - Fibre reinforced concrete - Polymer composites concrete - Air entraining concrete - Ferrocement - sulphur concrete - Mass concrete - Guniting. Quality control in Concrete - Sampling and testing of concrete - Factors causing variations in the quality of concrete.

### **TEXT BOOKS**

1. Shetty. M.S., Concrete Technology, S.Chand and Co, 1984.
2. Gambhir, M.L., Concrete Technology, Tata McGraw Hill, 1996.

## **AR206 - INDO - ISLAMIC ARCHITECTURE**

Introduction to Islamic culture in India. Study on the salient features of Islam, Islamic culture compared to other religions - Muslim invasion of India - their establishment and physical expression, Islamic cultural settings in India, mosques compared to temples & churches, Tombs.

Slave kings - eg.: Qutub mosque, Qutub minar, Tomb of Nasir - ud - din - Mohammed shah, Khilji dynasty - eg.: Alai Darwaya, Tughlaq Dynasty - eg. Tomb of Ghiyas - ud - din Tughlaq, Kirki mosque, Delhi. Sayyid and Lodi Dynasty - Development of Octagonal & Square tombs, eg.: Mothi - Ki - Masjid.

An outline idea of all provincial style Architectural characteristics of Jaunpur Mosques Eg. Jami Masjid of Jaunpur general characteristics of malva style & royal complex at Mandu.

Gujarat - Earlier period - Eg - Mosque at Broach, Jami Masjid at Ahmedabad, middle period - eg. Mosque at Champanir, Teen Darwaza, Evolution of Tombs. Later period - eg. Siddi sayad mosque, sha Alam Rauza, Adalaj - step well , Rani Rupavatis Mosque. Outline idea of Bijapur style.

Babur - eg. Humayuns Tomb - Delhi; Akbar - eg. Agra fort and Fathepur sikri - site planning Jodhbais palace, Birbal palace, Diwane - khas, Salim Chisti's Tomb & Buland Darwaza; Jahangir - Eg. Akbar's mausoleum at Sikandra; Shah - Jahan - Eg. Red fort, Jami Masjid at Delhi, Taj - Mahal - Agra.

#### **REFERENCES**

1. Brown, Percy, "Indian Architecture (Islamic period)", DB Taraporevala Sons & Co, Mumbai, 1983.
2. Croness & Haywoods, "The Gardens of Mughal India", Vikas Delhi, 1973.

### **AR208 – MODEL MAKING**

Materials for Model Making: Paper, Handmade paper / Handmade board, Cardboard, Mount boards, Balsa wood, soft wood, Plywood, cork sheets, plaster of paris, Perspex sheets, expanded polystyrene (Thermacole), Plastic sheets, etc.

Exercises in straight and curved cutting and preparation of simple geometrical objects. Exercises in preparing block models of groups of buildings including roads and landscaped open spaces.

Exercises in preparing detailed models of buildings from given set of drawings.

The subject teacher shall co-ordinate with the Architectural Design Studio in-charge while working out / Setting out the various exercises in model making.

### **AR210 – COMPUTER APPLICATIONS IN ARCHITECTURE - I**

Introduction to personal computers – hardware / software – operating system – important DOS commands – Windows basics introduction to CAD packages.

Setting up & controlling the AutoCAD drawing environment – Creating & Editing Commands.

Organizing a drawing with layers – Advanced geometry editing – Creating & using Blocks – Inquiry Tools – AutoCAD Design Center.

Text annotation – Creating & Customizing Hatch patterns – Productive Dimensioning – Defining Text & Dimension Styles

Printing & plotting - creating a slide presentation – Drawing utilities – importing / exporting files.

#### **REFERENCES**

1. Omura George, "Mastering AutoCAD (Release 14)", BPB Publications, New Delhi, 1997.
2. Omura George, " AutoCAD 2000", BPB Publications, New Delhi, 1997.



## **AR212 - CLIMATICALLY RESPONSIVE ARCHITECTURE**

Climate & Weather. Scales of climate - macro-climate, meso-climate and micro climate. Climatic variables: temperature, humidity, precipitation, cooler radiation, wind, etc. Tropical Climate. Climatic Zones of India & their characteristics.

Geometry of solar movement. Altitude & azimuth angles. Sunpath diagram/Solar chart. Horizontal and vertical shadow angles. Use of shadow angle protractor. Design of shading devices. Performance evaluation of shading devices.

Air flow/wind movement around and through buildings. Natural ventilation. Mahoney Tables and their application. Climatic design recommendations for various climatic zones in India.

Thermal comfort. Indices of thermal comfort - Tropical Summer Index & Effective Temperature. Thermal effects in buildings. Basic concepts of heat transfer in buildings, units & terminology.

The sky as a source of light, Daylight factor, Lighting - Windows, Room proportions and other building elements, Daylight penetration, Calculation of daylight factor.

### **TEXT BOOK**

1. Koenigsberger, et al., "Manual of Tropical Housing & Building: Part I - Climatic Design", Orient Longman, Chennai, 1984.

### **REFERENCE**

1. Evans, Martin, "Housing, Climate and Comfort", The Architectural Press, London, 1980.
2. Konya, Alan, "Design Primer for Hot Climates", The Architectural Press, London, 1984.

## **AR214 – ARCHITECTURAL DESIGN - IV**

Projects – Developing designs and details for buildings, which are multi-room, single use, small span, multiple bay such as market, clinic, elementary school, art gallery and bank.

In addition to the design of a single or a small group of buildings, the students should be able to take into consideration the context in which the buildings are located and design the outdoor spaces appropriately.

Understanding design forces, significance of various factors like privacy, convenience, comfort, circulation pattern, furniture arrangement, texture, colour etc. in the built environment.

The design should reflect the application of knowledge gained from courses on materials, structures, construction and theory of architecture.

### **REFERENCES**

1. Edward. D., Mills, "Planning the Architects Hand Book - Butterworth, London, 1985.
2. De. Chiara and Callender, Time Saver Standards for Building types, McGraw - Hill Co., N.Y., 1973.

## **AR301 – BUILDING CONSTRUCTION & MATERIALS - IV**

Understanding the concepts of foundations, its principles & construction of different types of foundations, materials of construction & details of R.C.C. footings, Raft foundations, Pile foundations.

Purpose and functions of joints in Building construction, types of joints that occur in Buildings. Expansion joints in Brick walls and R.C.C. framed structures and its construction details and materials involved in the construction. Study of relevant IS codes.

Principles of temporary works such as shuttering, centering and scaffolding, Form work, Centering and scaffolding materials used for these temporary structures - timber & steel, literature survey on temporary structures.

Study of casement windows, steel casement windows side hung, its components, study of relevant IS codes specifications, steel ventilators - Top hung - Staggered.

Methods of fixing the steel window, Ventilator frames to walls, fixing of glass, fixtures & fastenings study of different types of putty & glass.

#### **REFERENCES**

1. Arora, S.P. & Bindra, S.P., "A Text Book of Building Construction", Dhanpat Rai & Sons, New Delhi, 1994.
2. Jha, J. & Sinha, S.K., "Building Construction", Khanna Publishers, New Delhi, 1977.

### **AR303 – DESIGN OF R.C.C. STRUCTURES**

Permissible stresses - limit states - characteristic strength and load - partial safety factor - deflection - modification factors.

Design principles of limit state methods - design of singly reinforced, doubly reinforced, T & L beams by LSD method with IS code specifications - design for shear.

One way and two way slabs for different edge conditions - continuous slabs - IS code specifications.

Columns - reduction factors - compression members and slender columns - Design of columns - columns with helical reinforcement IS code specifications. Staircases - types - design as per IS code specifications.

Footings - design of isolated footings - square, rectangular and circular footings - strip footings - combined footings.

#### **TEXT BOOKS**

1. Ramamrutham, S. "Design of Reinforced concrete structures", Dhanpat Rai & Sons, New Delhi, 1996.
2. Sinha, N.C. & Roy, S.K., "Reinforced Concrete Structures", S. Chand & Company Ltd., New Delhi, 1983.

#### **REFERENCES**

1. Ashok. K. Jain, "Reinforced concrete structures", New Chand & Bros Roorkee, 1992.
2. H.J. Shah, "Reinforced concrete - Vol I", Charotor Publishing House, Annand, 1994,

### **AR305 – CONTEMPORARY ARCHITECTURE – I**

Post- Renaissance architecture of Europe in general and England in particular. Industrial revolution and its impact on architecture and urban settlement in particular. Arts and crafts and Art – Nouveau movements and their impact on architecture. The principles and works of Mackintosh and Antonio Gaudi.

Developments in Germany: Deutshers work bund, principles and works of Peter Behrens, German expressionism and the works of Walter Gropius and Erich Mendelsohn. The Bauhaus Institute and its impact. Russian Architecture after revolution (1917 – 1934)

The futurism of Antonio Saint Elia, Outline idea of cubism and its impact on architecture, De stijl movement of Netherlands.

Rapid Urban growth in Europe and USA. The emergence of International style of architecture. Principles and works of Frank Lloyd Wright and Le Corbusier.

The styles and trends of architecture brought by Britishers to India and their evolution. The impact of Hindu and Indo-Sarsanic style on the British architecture in India. The characteristics of British colonial architecture with examples form the works of Edwin Lutyen

#### **TEXT BOOKS**

1. Nikolaus Pevsener, "Sources of modern architecture and design", Themes and Hudson, 1989.
2. William J.R., Curtis, "Modern architecture since 1900", Prentice hall, New Jercey USA, 1983.

#### **REFERENCES**

1. Editor in Chief: Adolf K Placrek, Macmillan, "Encyclopedia of Architecture (Vol I to IV)", Free press, Newyork, 1990.
2. Manfern Tofuri & Frences Dal Co. "Modern Architecture -I & II (World architecture series), Faber and Faber / elector, Newyork, 1989.

### **AR307 – WATER SUPPLY & DRAINAGE**

Surface and underground sources of water supply, rate of demand, water requirement for various buildings, suitability of water for domestic and trade purposes, methods of distribution systems of supply of water, methods of layout of distribution pipes.

House service connections, systems of supply, storage tanks, water services to multistory buildings, design of pipelines, Materials etc., systems of hot water supply.

Sanitary appliances, Basic requirements of Drainage and Sanitation, Selection and Installation of Sanitary Appliances, Sanitary pipe work within the premises, Drainage system for multi storied buildings.

Individual disposal systems- cess pool, Septic tank etc., Public Drainage system – Types of system, Materials, details of Construction etc., Refuse disposal: - Refuse bins, Refuse chutes etc.

Storm water drainage : Roof drainage – Pitched roofs, flat roofs, Surface Water drainage, storm water drains. Rain water harvesting:- Rainwater harvesting techniques, methods of recharging ground water, construction details.

#### **REFERENCES**

1. Wise, A.F.E., & Swaffield, J.A., “ Water Sanitary Services for Buildings”, Longman Scientific and Technical, Harlow, 1995.
2. Greeno, Roger, “Building Services Technology and Design”, Longman Scientific and Technical, Harlow, 1997.
3. Chatterjee, A.K., “water Supply and Sanitary Engineering”, Khanna publishers, New Delhi, 1986.
4. “Hand Book on water Supply and Drainage (with special emphasis on plumbing)”, Bureau of Indian standards, New delhi.

### **AR309 – COMPUTER APPLICATIONS IN ARCHITECTURE - II**

Attributes – understanding object linking and embedding – Importing objects into AutoCAD using OLE working with OLE objects.

Understanding 3D coordinate system - Using View ports – 3D drawing & Editing commands – Interactive Viewing in 3D.

Surfacing in 3D, working with advanced surfacing commands – Solid modeling – Advanced solid modeling commands – Editing Solids

Introduction to rendering in 3D – Rendering process – Enhancing digital images from CAD application using Adobe Photoshop, Paint Shop Pro & other graphic programs.

Creating command aliases – customizing AutoCAD toolbars – Adding a command to the cursor menu Introduction to AutoLISP

#### **REFERENCES**

1. Ron House "AutoCAD 2000"
2. Omura George, "Mastering AutoCAD 2000", BPB Publications, New Delhi, 1988.

### **AR311 – ARCHITECTURAL DESIGN - V**

Projects emphasizing detailed studies and drawings of one or more of the following aspects - space analysis, climatic consideration, services and environmental issues, and site planning.

Analytical work on various issues specific to the project introduced will be carried out for the development of link / connection between studio work and lecture courses. A high standard of graphical representation and verbal skills are expected from the students to present their design ideas.

Projects to include buildings with single or multi - use, multi-span & multiple activities such as Library, Institutional buildings (eg. High School), Shopping Center, Nursing Home & Apartments etc.

Display of competence in the application of knowledge gained from the following will be an essential requirement for all the design projects:

Materials, Construction & Structures, Theory of Architecture, Environmental / Architectural Science & Behavioural science.

#### **REFERENCES**

1. Edward. D., Mills, "Planning the Architects Hand Book - Butterworth, London, 1985.
2. De. Chiara and Callender, Time Saver Standards for Building types, McGraw - Hill Co., N.Y., 1973.

### **AR302 – BUILDING CONSTRUCTION & MATERIALS - V**

Properties of aluminium and its uses in buildings, aluminium extrusions, aluminium doors and windows fixing details using extruded sections. Fixing details of neoprene rubber beading, glass panels, fixtures and fastenings.

Study of various types of Aluminum partitions, its extrusions & details of components for partitions, Different types of aluminum panels for partitions, cladding component for various structures, aluminum grill modules, roofing of industrial buildings.

Suspended ceilings and false ceiling using aluminum sections, construction details for providing thermal insulation and insulation of cold storages and study of insulation materials like glass wool, insulating boards, gypsum boards, plaster of paris, and various kinds of perforated boards.

Concrete shell roofs of various types and folded plates construction techniques, - its strength and durability. Study on different forms & shapes of shell structures - its construction details and materials.

Fixing details of sound absorbing materials, its properties and uses, Study of relevant IS codes, Study of damp - proofing materials like Bitumen felts, etc. Relevant construction chemicals for W.P.C. & O.P.C. Study of construction chemical products.

#### **REFERENCES**

1. Arora, S.P. & Bindra, S.P., "A Text Book of Building Construction", Dhanpat Rai & Sons, New Delhi, 1994
2. Jha, J. & Sinha, S.K., "Building Construction", Khanna Publishers, New Delhi, 1977.

## **AR304 – ADVANCED STRUCTURES**

Definition - Principles of prestressing - Pretensioning and post - tensioning - materials of prestressing - systems of prestressing - applications and uses - losses of prestressed concrete members – Approximate design of simple prestressed beams.

Multistoried building frames – Substitute frame analysis for gravity loads – Frames with horizontal loads – Analysis by portal & cantilever methods.

Definitions - various forms & classification of shells - Advantages and disadvantages - Folded plate roofs – Applications – Types of folded plates – Structural action of plates – Introduction to flat slabs and grid systems.

The concept – Principles – Prefabrication Systems for Buildings – Preformed shells – Floor Systems & Walls – Limit states of stability & collapse – Prefabrication in Developing Countries.

Introduction – Properties of Indian standard rolled steel sections – Types of loads – Permissible stresses in tension, compression and shear as per IS code.

### **TEXT BOOKS**

1. Krishna Raju, "Advanced Reinforced Concrete Design" CBS Publishers & Distributors, New Delhi, 1998.
2. Ramamruthan "Prestressed Concrete" Dhanpat Rai & Sons, New Delhi, 1996.

### **REFERENCES**

1. Krishna Raju, "Prestressed Concrete", Tata McGraw - Hill Publishing Co. Ltd., New Delhi, 1997.
2. Orton, Andrew "The way we Build Now, Form, Scale & Technique," E & FN SPON, London, 1994.

## **AR306 – CONTEMPORARY ARCHITECTURE – II**

Principles and works of Mies Van der Rohe, Louis Khan, Paul Rudolf and Kenzo Tange. The factors that contributed to their style of Architecture and their impact.

Critics of modern movement: Roberty Ventury, Christopher Alexander, Aldo Rossi and Jane Jacob. Emergence of later trends in modern architecture.

Brutalism, Archigram, Metabolism in architecture, Deconstruction in architecture and the emergence of regionalistic architecture.

The impact of International style of architecture in India, Early public buildings such as vigyan Bhawan Supreme Court building etc. The works of Le corbusier and Louis Kahn in India with examples. Their impact on architecture of fifties and sixties

The trend in Indian architecture after 1970 Principles and works of the following architects: Balakrishna Doshi, Charles Correa, Anant Raje and Laurie Baker with suitable examples.

### **TEXT BOOKS**

1. Vikram Bhatt & Servier Peter, "Contemporary Indian Architecture after the masters," Mopin Publishing Ltd., Ahmedabad, 1996.
2. Jenles Charles, "Architecture Today", Academy edition, London, 1988.

### **REFERENCES**

1. Editor - in Chief: Adolf K. Placsek, Mackmillan, "Encyclopedia of Architecture Vol I to IV" Free Press, New York 1990.
2. Kulterman Udo, "Architecture of the 20th Century", Van Nostrand Reinhold, London, 1993.

## **AR308 - ARTIFICIAL LIGHTING AND ELECTRICAL SERVICES**

Light - Electromagnetic radiation, Visual task requirements, Units of Light, Light, Vision and Buildings, Standards of Lighting and Visual comfort. Artificial lighting - requirements. Types of electrical lamps. Electrical fittings / equipment used in buildings.

Design of general lighting schemes. Study of lighting systems used in different types of buildings. Preparation of lighting layout for different types of spaces / buildings.

Supplementary artificial lighting for buildings. Out door lighting, Flood lighting and lighting of thorough fares.

Principles of electrical installation in buildings. Distribution, Circuits and elements of building wiring systems. Safety methods and measures to be adopted, study of relevant I.S. Codes.

Electrical load estimation, branch circuit design and electrical wiring design for different types of buildings.

### **TEXT BOOK**

1. Pritchard, D.C., "Lighting", Longman Scientific & Technical, Harlow, 1995.

### **REFERENCES**

1. Hopkinson, R.G., "Architectural Physics - Lighting", London, 1963.
2. Benjamin Evans, "Daylight in Architecture", McGraw - Hill Book Company, Newyork, 1981.

## **AR310 – LANDSCAPE ARCHITECTURE**

Introduction to ecology - Interdependence of various systems in the biosphere. Study of ecosystems in urban & rural habitats. Introduction to Architecture and Environment related issues. Introduction to Landscape Architecture. Introduction to landscape assessment & planning.

Introduction to major and minor landscape elements. Role of landscape elements in landscape design Plant material - Characteristic features. Introduction to planting design. Basic principles and elements of urban landscape. Introduction to street furniture.

Modification of site topography, grading, methods of estimating earth volumes / Layout of drainage & other utilities / Layout of roads & pedestrian paths / Materials & construction of paving / Creation & maintenance of water bodies / Selection of plant materials & their care, method of planting.

Basic principles of landscape design: factors to be considered, components involved and study of contemporary landscape architecture.

Japanese gardens: History, development, features elements and types of Japanese gardens.

Mughal gardens of India: History, influences, development features and elements of Mughal gardens.

### **REFERENCES**

1. Motloch, J.L., "Introduction to Landscape Design", Van Nostrand Reinhold Publishing Co., New York, 1991.
2. Bring, M, "Japanese Gardens: "design & Meaning", McGraw Hill Book Co., New York, 1981.

## **AR312 – ARCHITECTURAL DESIGN - VI**

Projects – Projects will emphasis on physical context and the exploration of an architectural vocabulary for given situations.

Technology to be integrated in the design process. To consider aspects such as external detailing, interior design, use of materials and arrive at a coherent language for the building. Special study offers an opportunity to students to research, organise and produce an extended piece of written and graphical work.

Projects to include buildings or building complexes with single or multi - use public activities, Multistoreyed type in sub - urban/urban settlement such as Courts, College, commercial complex, Hospitals etc.

Display of competence in the application of knowledge gained from the following will be an essential requirement for all the design projects:

Materials, Construction, Structures, Theory of Architecture, Environmental science / Architectural Science & Behavioural Science.

### **REFERENCES**

1. Edward. D., Mills, "Planning the Architects Hand Book - Butterworth, London, 1985.
2. De. Chiara and Callender, Time Saver Standards for Building types, McGraw - Hill Co., N.Y., 1973.

## **AR401 - PROFESSIONAL TRAINING**

The students are required to undergo Practical Training in a qualified, registered and competent Architect's Office. Students will be trained in the various practical aspects of Architecture, Construction & Professional practice.

Maintenance of personal diary, recording important observations, architectural detail, technical data, site visit particulars, presentation of drawings and reports done during the training period are the essential submission requirements. Marks will be awarded on the basis of student's monthly progress reports, work diary, drawings & reports done during the training period and the Architect's certificate.

## **AR402 – BUILDING CONSTRUCTION & MATERIALS - VI**

Modular Co-ordination Module - basic module - multimodules - horizontal & vertical multimodules and submodules. Modular space grid. Modular dimensioning and modular drawing.

Preferred sizes for horizontal and vertical co-ordinating and controlling dimensions. Controlling dimensions for widths of building components & controlling zones. Controlling dimensions for heights of building components & controlling zones. Storey heights & room heights.

Space structures. Skeleton frame works (space frames) - single layer grids (two way, three way & four way) and double layer grids (lattice grids & true space grids). Offset grids and differential grids.

Study of prefabricated commercially available systems - Space Deck System, Triodetic System, Mero System & Nodus System. Geodesic Domes.

Introduction to System Building / Method Building. Closed System & Open System. Analysis of building elements / components for introduction of prefabrication in India context. Classification of prefabricated components.

### **REFERENCES**

1. Makowski, "Analysis, Design and Construction of Double - Layer Grids", Applied Science, London, 1981.
2. Heki,K., (ed.), "Shells, Membranes and Space Frames", Elsevier, New York, 1986.

## **AR404 – BUILDING STRUCTURAL SYSTEMS**

Masonry – Masonry piers – Stability of masonry walls – Principles – Design of walls – Reinforced masonry – Examples

Types of trusses for different spans – Materials used – Load distributions– IS Code specifications – Types of connections.

Introduction to the effect of earthquake on structures – Basic principles of construction and materials used – Code recommendations.

Types of building structural elements – Load calculations for different structural elements – Load distribution methods – Code recommendations.

Structural System Design – Fixing up of structural elements for the given plan – sizes and positions of the same – use of modular coordination – exercises with different building plans.

### **REFERENCES**

1. IS 1893 : 1984 – Criteria for Earthquake Design of Structures, Bureau of Indian Standards, New Delhi, 1984
2. IS 4236:1976 – Code of practice for Earthquake Resistant Design and construction of Buildings, Bureau of Indian Standards, New Delhi, 1976.

## **AR406 – ARCHITECTURAL ACOUSTICS**

Acoustical / Sonic Environment and acoustical comfort. Sound, Nature of sound. Behavior of sound in enclosed spaces. Concept of Geometric Acoustics. Reflection of sound and their applications. Absorption of sound. Sound absorption coefficient. Reverberation & Reverberation Time Calculation.

Sound absorbing materials - Porous materials, Panel / Membrane absorbers & Cavity / Helmholtz Resonators. Absorption coefficients of indigenous acoustical materials. Space / Functional absorbers. Mounting conditions and its impact on sound absorption.

Acoustical design of Auditoriums - adequate loudness, uniform distribution of sound energy, optimum reverberation time & elimination of acoustical defects. Methods of raking the auditorium floor and the balcony. Acoustical Design of seminar rooms, Conference halls, Cinema Theatres etc.

Outdoor & indoor noise, airborne noise & structure borne noise / impact noise, community noise, & industrial noise. Transmission of noise & transmission Loss. Maximum acceptable noise levels. Means of noise control & sound insulation. Sources of industrial noise.

Sources of outdoor noise - Traffic noise - air traffic, rail traffic, road traffic and sea shore & inland water traffic. Planning & Design against Outdoor Noise - for air traffic, road traffic and rail traffic.

### **REFERENCES**

1. Templeton, Duncan & Saunders, David, "Acoustic Design", The Architectural Press, London, 1987.
2. Templeton (ed.), "Acoustics in the Built Environment", Butterworth, London, 1993.

## **AR408 - ESTIMATION & SPECIFICATION**

Introduction, Main items of work, Importance of specification, Types of specifications - General and detailed specifications - Method of preparation of specifications.

Introduction, Types of Estimate, Detailed Estimate - Units of Measurements, Details of measurement and calculation of quantities of various items of work, Methods of Building Estimate - separate or individual wall method, Centre line method.



Analysis of rates for main items of work in buildings, considering current market rates for building materials, labour wages, plants and tools, transportation, handling, storage and contractor's profit.

Preparation of Detailed estimate (Details of Measurements and Calculation of quantities & Abstract of - Estimated cost) for different types of buildings including R.C.C. framed buildings.

Cost price and value. Factors controlling the cost of Urban real properties, Valuation, Depreciation, Rent and its implications.

#### **TEXT BOOKS**

1. Dutta, B.N., "Estimating & Costing in Civil Engineering Theory & Practice", UBS Publishers' Distributors Ltd., New Delhi, 1995.
2. Rangawala, K.S., & Rangawala, K.K., "Elements of Estimating & Costing", Charotar Publishing House, Anand, 1984.

### **AR410 - HUMAN SETTLEMENT SCIENCE - I**

Human Settlement Science - objective, scope & relations with architecture. Urban & Rural settlements, their differences. Origin, evolution and growth of settlements: site and situation, major function of a city, city forming and city serving functions. The relationship between urban and rural areas. Problems faced by a typical city.

Activity pattern and landuse, Traffic and road network, Density of population. Central Business District of a city. Urban nodes, fringe area and suburbs. The problem caused due to this including slums. Internal spatial structure: Concentric theory, Sector theory, Multi nuclei theory, Inverse concentric theory.

Pattern of settlements in a region and their major function. The relationship between geographic characteristics of a region, economic activity and culture of the inhabitants Basic principles of regional planning. Satellite towns.

World - Ancient river valley cities, city state. Classical European city. Medieval European city. European renaissance city. India - Indus valley city, Typical Hindu Aryan city, Typical Dravidian temple city, Typical muslim city in India, Bazaar based traditional city. British colonial city.

Planning principles of: Ebenezer Howard - Garden city movement, Patrick Geddes, Dr.C.A.Doxiades, LeCorbusier, Soria Y Mata - Linear city Clarence, A. Perry - The neighbourhood concept.

#### **REFERENCES**

1. Burn, Stanly & Williams, Jack, "Cities of the World, - World Regional Urban Development", Harper & Row, New York, 1983.
2. Keeble, Lewis, "Principles and Practice of Town and Country Planning", The Estates Gazette Ltd. London, 1972.

### **AR412 – AIR CONDITIONING & MECHANICAL SERVICES**

Air conditioning - introduction. Comfort conditions within built environment. Basic refrigeration systems. Refrigeration system components. Vapour compression cycle. Concept of cooling load. Introduction to calculation of cooling load. Concept of zoning.

Unit type equipment: (i) room A.C. & (ii) split A.C.: Package Units: (i) fully self contained (factory made) & (ii) split type units: Central DX Plants and Central Chilled Water Plants. Schematic details of various systems. Comparison of various systems. Space data of A.C. equipment rooms.

Lifts: types of lifts - Dimension of lifts. Traffic analysis, calculation of round trip time and selection of lifts. Hoistway/shaft/well, machine room & pit. Arrangement of lifts. Escalators - characteristics, dimensions and arrangements of escalators.

Causes of fire, Mechanism of fire spread in buildings, classification of fire. Grades of fire hazard – Personal hazard, internal hazard & exposure hazard classification of building based on occupancy. High temperature effects and combustibility of building materials and structure. Fire resistance of buildings.

Passive and Active fire precautions: Site planning, Heat sensitive detectors, Fire alarm system, means of escape. Fire fighting installations: hose reel, internal hydrant system, CO<sub>2</sub> system, wet risers, etc.

#### **REFERENCES**

1. Jain. V.K., "Design and Installation of Services in Building complexes & High Rise Buildings", Khanna Tech. Publishers, New Delhi, 1986.
2. Croome, D.J., & Roberts, B.M., "Airconditioning and Ventilation of Buildings", Pergamon Press, Oxford, 1981.

### **AR414 - ARCHITECTURAL DESIGN - VII**

Projects introduced should provide opportunities to understand and learn how to solve the built environmental needs for multi-faceted public activities in an urban context. Examples of projects include air port, bus terminal, railway station, cinema complex, exhibition hall, indoor sports complex and campus planning. Design problems involving high density and / or large scale housing.

Complete set of Working Drawings are to be prepared for one of the Architectural Design Projects.

Display of competence in the application of knowledge gained from the following will be an essential requirement for all the design projects: Materials & Structures, Theory of Architecture, Environmental Science and Behavioural Science.

#### **REFERENCES**

1. Edward. D., Mills, "Planning the Architects Hand Book - Butterworth, London, 1985.
2. De. Chiara and Callender, Time Saver Standards for Building types, McGraw - Hill Co., N.Y., 1973.

### **AR501 - PROFESSIONAL PRACTICE I**

Architects ACT 1972 and its implications. Council of Architecture and its role. The Indian Institute of Architects and its role. Code of Professional conduct as laid down by Council of Architecture and Indian Institute of Architects.

Comprehensive Architectural services. Conditions of Agreement. Scope of work and schedule of services - as per the Council of Architecture. Standard Terms for Urban Design work – Scope of work, Schedule of services – Preliminary evaluation stage, Concept design stage, detailed design stage and Implementation stage.

Conditions of Engagements – Normal Services – Construction Stage & Supervision Stage. Additional Services, Special Services and Partial Services. Total construction cost. An overview of the calculation of fees and professional charges. The underlying basis for the calculation of fees.

Tender - its meaning & significance. Invitation to tender – Private invitation, Public Notice and Negotiation. Tender Notice and its characteristics. Opening of Tender. Acceptance of Tender. Types of Tender. Characteristics, advantages & disadvantages of various types of tenders.

National Building Code of India and its significance. Building Bye - Laws & Regulations, Development Control Rules, Municipal Acts, Corporation Acts, Consumer Act & its implications. Heritage Act.

#### **TEXT BOOKS**

1. Namavathi Roshan, "Professional Practice", Lakhani Book Depot, Mumbai, 1984.
2. Indian Institute of Architects, "Handbook on Professional Practice", Architects Publishing Corporation of India, Mumbai.

## **AR503 – HUMAN SETTLEMENT SCIENCE – II**

Industrial development, Regulation of land and allocation of resources. Professions in planning: Surveyor, Landscape architect, Economist, sociologist and Architect.

Planning process. Various stages of the planning process with relevant examples. Surveys in planning, Physical characteristics, utilities, population, employment and industry, Housing, commercial and transportation, land use.

Plans: Regional plan, Master plan, Zonal development plan, Structure plan and Transportation plan. Regional plan types and delineation of regions. Land use plan, local development plans and their components.

Urban Planning agencies and their functions. Implications of 74<sup>th</sup> amendment and its objectives and implications. Public participation in Planning, Relevance, methods and criteria for public participation.

Development control: Issues, Aims, Form, and Contents. Planning Standards: and other standards such as sunlight, Noise, Parking etc. Planning in Pre and post-Independent India, British legacy. Major milestones in urban planning in post independent India.

### **REFERENCES:**

1. Burn, Stanly & Williams, Jack, “ Cities of the world – World Regional Urban development”, Harper & Row, New Delhi, 1983.
2. Keeble, Lewis, “ Principles of Town and Country Planning”, The Estates Gazette Ltd., London, 1972.

## **AR505 - ARCHITECTURAL DESIGN - VIII**

Design problems at urban or metropolitan scales and environment, multi-use complexes including functions such as residential, public services, industrial, commercial, transportation, cultural and civic.

The focus should essentially be on an urban design exercise with emphasis on design to suit the surrounding environment in relation to both traffic and planning control.

The design output should clearly indicate the application of theory of architecture, materials & structural systems, environmental sciences and behavioural sciences.

### **REFERENCES**

1. Edward. D., Mills, "Planning the Architects Hand Book," - utterworth, London, 1985.
2. De. Chiara and Callender, "Time Saver Standards for Building types", McGraw - Hill Co., N.Y., 1973.

## **AR507 – ENVIRONMENT AND BEHAVIOR**

Introduction to the discipline environmental psychology, its importance in the field of architecture, understanding the principles of psychology, the roots and Edges of environmental psychology- Theories and approaches in Environmental Psychology.

Process of creativity, Visual and creative thinking. Types of thinking. Memory and built environment- theories on different types of memories, articulation of masses and spaces, sense and sensation modalities- language of architecture and its role in creativity.

Concept of perception, visual perception, theories on environmental perception- environmental perception and design. Concepts of cognition. Environmental cognition and design. Environment and human response in relation to different environmental variables.

Concept of personal spaces, personal space and human behavior. Personal space and environmental design. Concept of territoriality, territoriality and human behavior & territoriality and environmental design.

Residential environment- Concept of Home. Neighborhood concept & Neighborhood satisfaction. Place attachment theory, Work place environment and behavior. Application of the knowledge in design of a residence, community neighborhood and other built environments.

**REFERENCES:**

1. Morgan, T., & Clifford, "Introduction to Psychology", Tata McGraw-Hill Publications New York, 1983.
2. Gifford, Robert. Environmental Psychology: Principles and Practice, Optimal books, 2002.

**AR509 - URBAN DESIGN**

Need for urban design. The scope and objectives of urban design. The relationship between Architecture, Urban Design and City Planning. Brief history of urban design.

Urban landuse population density and transportation and their relationship between urban build and urban environment. The causes and consequences of chaotic and disorderly urban environment of today with special emphasise to CBD.

Visualisation of image of the city and its elements. Perception of urban environment: Kevin Lynch's Principles.

Understanding the organisation and articulation of urban spaces. Urban spaces and urban activities. Elements of townscape.

Techniques of urban design. Urban renewal - the scope, need and procedure. Urban conservation.

**REFERENCES**

1. Lynch, Kevin, "The Image of the City", MIT Press, Cambridge, Mass, 1960.
2. Krier, Rob, "Urban Space", Academy Editions, London, 1967.

**AR502 - PROFESSIONAL PRACTICE - II**

Social Role / Social Responsibilities of Architects, Architect and Office- Office and its management, Architects duties to his employees under labour welfare provisions. Duties and Liabilities of an Architect – Latent Defects & Patent defects, Legal responsibilities of architects towards Statutory Bodies.

Purpose of architectural competitions. Council of Architecture's Guidelines on Architectural Competitions. Types of competitions. Classification of competitions –Competition Organization – Single Stage Competition & Two Stage Competition. Regional Special Category Competition. Advisers – Technical and Professional.

General Conditions of the Contract as put forward by the Indian Institute of Architects. Prime cost. Materials & workmanship, Inspection. Defects. Damages for non-completion, Virtual completion and defects liability period, Determination by the owner and determination by the contractor.

Arbitration and its significance. Advantages of settling the disputes & differences by arbitration, Arbitrator – qualifications of arbitrator, appointment, powers and duties. Award, publication of award, Interim award, the Arbitration Agreement, Order of Reference. Kinds of arbitration.

Meaning of Easements. Dominant Heritage and Servient Heritage. Characteristics of easement. Natural Rights & Customary Rights. Continuous & Discontinuous Easements. Easement of Supports and Easements of Drainage.

#### **TEXT BOOKS**

1. Namavathi Roshan, "Professional Practice", Lakhani Book Depot, Mumbai, 1984.
2. Indian Institute of Architects, "Hand book on Professional Practice", Architects Publishing Corporation of India, Mumbai.

### **AR504 - CONSTRUCTION MANAGEMENT**

Project management functions, Planning process. Project work breakdown, Modelling and analyzing networks and work scheduling process. Bar charts and Mile stone charts.

Network analysis fundamentals, CPM Network analysis procedure.

PERT - Network, Time estimates, Probability Distribution, Critical Path, Slack and Probability of achieving completion date.

Project cost analysis - Cost versus time, Contracting the Network etc.  
Resource Allocation - Resource Smoothing and Resource Leveling.

Updating the network based on the project progress. Computer applications in construction management – using MS Projects software for project planning, scheduling and control.

#### **TEXT BOOKS**

1. Srinath, L.S., "PERT and CPM - Principles and Applications", Affiliated East - West Press Pvt. Ltd., New Delhi, 1989.

#### **REFERENCES**

1. Stevens, James. D., "Techniques for Construction Network Scheduling", McGraw - Hill Publishing Company, New York, 1990.
2. Mukhopadhyay, S.P., "Project Management for Architects and Civil Engineers", Firma KLM Pvt. Ltd., Calcutta, 1981.

### **AR506 - DISSERTATION**

Dissertation is seen as a culmination of the development of the student's knowledge, attitudes and skills over the course of studies of Architecture.

Student is expected to develop a subject of his or her own choice and to demonstrate the ability to use effectively the tools of independent investigations and judgement to evolve design criteria. The application of these may be original design or research oriented work.

Student must carry out the Dissertation under the supervision of the full-time faculty who will be the Guide / Dissertation Adviser. The overall Dissertation work will be monitored and co-ordinated by the Dissertation Committee of the Department of Architecture.

## **ELECTIVES**

### **AR351 – VERNACULAR ARCHITECTURE**

Vernacular architecture - introduction - factors contributed to its evolution with examples. The advantages of studying it and possible application today.

Few examples of vernacular architecture: at world level with factors that contributed to their evolution. Middle East, Africa, Far East. Tribal Settlements.

Vernacular architecture in India - Factors that contributed to its evolution. A few examples of tribal settlements.

Vernacular architecture in Tamilnadu - factors that contributed to its evolution. A few examples of Tribal settlements. Settlement planning strategies, Regional and occupation wise variation.

Influence on modern architecture, examples from the works of Frank Lloyd Wright, Green Broken & Hasan Fathy, Geoffery Bawa. Possible applications of vernacular architectural techniques today.

#### **REFERENCES**

1. Oliver, Paul, "Encyclopedia of vernacular Architecture of the world (3 Vol. Set)", Cambridge University Press, U.K., 1997.

### **AR353 – PAINTING**

Emphasis on Colour Theory - application of different colour harmonies in painting. Learning different colour schemes - monochromatic, analogous & complementary colour schemes.

Painting still life objects in water colour, poster colour, pastels and in oils. To provide knowledge about local colour, tonal colour & atmospheric colour.

Knowledge about brush strokes and textures and effective use of different mediums

painting landscapes, buildings and highlighting the centre of interest and focal points. The need for abstraction and simplicity in paintings - suggestive way of painting.

Knowledge of different styles and different period in paintings and brief knowledge about different artists.

#### **REFERENCES**

1. Webb, Frank, "The Artist's Guide to Composition", David & Charles, U.K., 1994.
2. Lucy, Willis, "Light", Studio Vista, London, 1993.

### **AR352 – ADVANCED COMPUTER APPLICATIONS**

Over view of Archi CAD / Setting up a project, Drawing and editing Wall / window / door / slab / roof etc. , 3D window , Navigation and Editing in the 3D window / Story Concept / section and elevation Settings/ libraries / photo rendering settings / Perspective views and fly-through / VR - concept

Introduction to 3Dstudio Max / Max user interface / Modeling / Applying Materials to geometry / Creating lights / Photo realistic Rendering / Simple Animations / Exporting files from Auto CAD to 3D studio Max

Introduction to Maya / Maya user interface / Modeling - modeling with primitives, NURBS modeling, polygon modeling / Rendering & Animation – hypershade, keyframing, animating the transform node / Dynamics – active and rigid bodies , adding an emitter with forces

Introduction to Adobe Photoshop , Adobe Premiere / Manipulation of digital image and digital video in the context of developing interactive multimedia

Introduction to virtual reality / Immersive visualization / WWW as a tool for the presentation of design information / Introduction to HTML / Overview of Web editors.

## **AR354 – GRAPHIC DESIGN**

Fundamentals of Graphic Design: Introduction to Graphic Design – its history, career options, works of prominent designers & the graphic design process. Overview of design basics – colour, harmony, rhythm, balance, proportion etc. Visual perception & graphical thinking.

Tools of Graphic Expression. Styles of expression – an overview Illustrations - developing manual presentation skills Computer graphics - overview of current packages, their potentials & applications ( packages to include 3DS Max, adobe series , Corel draw & flash)

Introduction to print – making process. Designing for printing. Lettering & Typography. Design of books, posters, promotional materials, stationery etc..

Developing trade marks & Corporate logos. Evolving a comprehensive corporate identity program Developing environmental graphics / signage Brand promotion – including packaging design & admaking for both the print & electronic media

Multimedia design presentation. E books / interior CD Roms. Animation Web design

### **REFERENCES**

1. Anderson, Donald, "The Art of Written Forms", Holtz Rinegart & Winston, New York, 1969.
2. Egg, Ruedi, "Basic Typography", ABC Edition, Zurich, 1972.

## **AR452 - INTERIOR DESIGN**

Designing the size and form of interior spaces using user - activity analysis and anthropometrics. The effect of enclosure, fenestration, colour and lighting on perception of space. Application of scale, proportion to enhance the quality of space. Psychological effect of space.

Design for comfort - climatic comfort, natural and artificial lighting, airconditioning and acoustics, Services - airconditioning ducts, electrical wiring, water supply and removal of waste water. Elements of furnishing and surface treatment. their need and scope.

Applied decoration - colour, texture, plane and fixtures. Emphasizing space through change of levels and structural form. Modulation of interior spaces with art objects. Space modulation through artificial and natural lighting. Emphasis of focal points and unity in Interior Design.

Role of furniture, evolution of furniture style, economic factors of furniture design and materials - its characteristics and application. Functional classification of space. Barrier free design.

Decorative materials for ceiling, walls, floors. Drapery and upholstery for openings and furniture respectively and matching them with overall colour scheme and composition. Sources and collection of information. Elements of Indoor plants and Interior Landscape and use of water.

### **REFERENCES**

1. Ching, Fransis, "Interior Design Illustrated", Van nostrand Reinhold, Lodon, 1987.
2. Helsel, M.B., "Interior Designer's Drapery Sketch File", Watson Guptill Publishing Co., 1969.

## **AR454 – ENVIRONMENTAL CONTROL AND DESIGN WORKSHOP**

To consolidate the theoretical inputs of subjects Climatically Responsive Architecture and Architectural Acoustics through application of the principles learnt from the subjects.

To expose the students to the Climatic, Lighting and Acoustic problems and issues in the Built Environment.

To effectively link the above mentioned subjects to the prevailing Climatic, Lighting and Acoustic issues in the Practice of Architectural Design.

The course intends to take up a small hypothetical or live project and attempts to work out solutions to the same. It may involve one or two project/s from Climatic or Lighting or Acoustic issues from the field.

The projects may also take up previous design problems of the students and consciously apply climatic principles to improve the quality of design.

## **AR551 – ENERGY EFFICIENT BUILDINGS**

The energy crisis and the need for energy efficiency. Passive heating concepts. Passive cooling concepts. Passive heating & cooling concepts.

Evaluation of natural ventilation in buildings. Determining the probable indoor wind speed using mathematical models, software BREEZE and actual field measurement. Ventilation heat transfer. Calculation of sol-air temperature. Calculation of instantaneous heat gain.

Factors that affect energy use in buildings - functional factors, environmental factors, envelope factors, air-conditioning systems factors, energy source factors and electrical systems factors. Fenestration design for optimal daylighting.

Introduction to Energy Management of Buildings and Energy Audit of Buildings. The aims and main aspects of Energy Management of Buildings. Energy Audit & conducting the Energy Audit. Energy Management Matrix. Monitoring and Targetting.

Modification of microclimate through landscape elements for energy conservation. Energy conservation through site selection, siting & orientation. Energy conservation through integration of building and site, site planning & site design.

### **AIMS OF EXPERIMENTS**

1. To evaluate the Thermal Environment of a given space - use of the state-of-the-art equipment "Thermal Comfort Data Logger" along with the appropriate probes. Use of other types of data loggers for monitoring the various environmental parameters.
2. To determine the level of daylighting in a given room / space - using Lux Meters, data loggers and by using the software DAYLIGHT.
3. To prepare, calibrate and use Thermocouples for measurement of temperatures.
4. To evaluate the natural ventilation of a given room/space - using handheld anemometers, appropriate probes & data loggers and the software BREEZE.
5. Studying the Thermal Images of the building and obtaining the surface temperatures & energy flow data.

### **REFERENCES**

1. Bansal, N.K., Hauser, G., & Minke, G., "Passive Building Design", Elsevier, Amsterdam, 1994.
2. Sodha, M.S., Bansal, N.K., Bansal, P.K., Kumar, A., & Malik, M.A.S., "Solar Passive Building", Pergamon Press, Oxford, England, 1986.



## **AR553 - HOUSING**

Qualitative and quantitative needs in the field of housing at the global level. Problem in the field of housing in developing countries (Third world countries) with special emphasis to India.

The peculiarities of urban housing land for urban housing - problems and possible solutions. The relationship between place of work and home.

Assessing the housing deficit of a region projecting the number of houses to be constructed therein, the future plan period, in order to remove deficit. Public sector and private sector housing, the need for housing policy and the role of HUDCO and State Housing Boards.

Slums - Definitions, Causes and consequences. Attempts made to solve the problem of slums.

Low - cost housing: Ways and means of controlling the cost of houses. A few low cost construction techniques and material tried out in India and in developing countries. Current income and economically weaker sections.

### **REFERENCES**

1. Abrams, Charles, "Housing in the Modern World", Faber, London, 1964.
2. Allen, W.A., Hapold, E., Word, A.M., & Courtney (Ed.) "A Global strategy for Housing in the third millennium E & FN Spon, London, 1992.

## **AR557 - ARCHITECTURE CRITICISM**

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,

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.

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

Identifying parameters for 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.

### **REFERENCES**

1. Pevsner Nikolaus, "Canons of Criticism", Penguin, Harmonds worth, 1971.
2. Schuly - Norberg & Christian, "Intentions in Architecture" MIT press, Cambridge, 1965.

## **AR559 - LANDSCAPE DESIGN**

One design exercise where outdoor spaces will be designed and details of various elements & components of the design will be worked out. One study oriented work will be given which will involve study of the use of outdoor spaces by different user groups, landscape elements, street furniture, etc.

### **REFERENCE**

1. Simonds, J.O., "Earthscape: A Manual of Environmental planning", McGraw Hill Book Co., New York, 1978.
2. Motloch, J.L., "Introduction to Landscape Design", Van Nostrand Reinhold Publishing Co., New York, 1991..