

SYLLABUS

B. ARCHITECTURE

(Annual Scheme)

(FIVE YEAR DEGREE COURSE)

First B. Arch. 2013, 2014, 2015

Second B. Arch. 2013, 2014, 2015, 2016

Third B. Arch. 2013, 2014, 2015, 2016, 2017

Fourth B. Arch. 2013, 2014, 2015, 2016, 2017, 2018

Final B. Arch. 2013, 2014, 2015, 2016, 2017, 2018, 2019

JAI NARAIN VYAS UNIVERSITY

JODHPUR

DEPARTMENT OF ARCHITECTURE

Faculty Members

Shri Rajesh Sharma

Shri Harendra Bohra

Smt. Anshu Agrawal

Smt. Priyanka Mehta

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Shri Kamlesh Kumhar

Head of the Department

Assistant Professor

Assistant Professor

Assistant Professor

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**BACHELOR OF ARCHITECTURE
(ANNUAL SCHEME)
FIVE YEAR INTEGRATED COURSE**

GENERAL INFORMATION FOR STUDENTS

1. The course of study shall extend over a period of five years as an integrated course of which a period as mentioned below shall be devoted to practical training in an architectural firm/office/site or Architectural design office approved by the Dean of the Faculty.

Compulsory Professional Practical Training of duration 16 weeks including:

Architectural Office Training

Site Supervision Training

Field Observation Studies

Critical Appraisal of Built Projects.

Field Documentation of Architectural Details.

2. There shall be an examination (known as Main Examination) at the end of each session in Architecture branch of study.

At the end of First Year

First B.Arch Examination for B.Arch Degree.

At the end of Second Year

Second B.Arch Examination for Arch. Degree.

At the end of Third Year

Third B.Arch Examination for B.Arch Degree.

At the end of Fourth Year.

Fourth B.Arch Examination for B.Arch Degree.

At the end of Fifth Year.

Final B.Arch Examination for B.Arch Degree.

3. The examination shall be conducted by means by written papers and practicals, write ups and viva-voce examination including Sessional works done in college, laboratories, work-shops, architectural firms/ offices.
4. The attendance requirements in the Faculty of Engineering shall be same as per Ordinance as follows :
O. 78-A.
 1. For all regular candidates in the Faculties of Arts, Education and Social Sciences, Science, Law, Commerce and Engineering, the minimum attendance requirement shall be that a candidate should have attended atleast 70% of the lectures delivered and the tutorials held taken together as well as 70% of the practicals and sessionals from the date of her/ his admission.

2. *Condonation of shortage of attendance*: The shortage of attendance upto the limits specified below may be condoned on valid reasons:
- (i) Up to 6% in each subject plus 5 attendance in all aggregate of the subject/papers may be condoned by the Vice-Chancellor on the recommendation of the Dean/Director/ Principal for undergraduate students and on the recommendation of the Head of Department for the post-graduate classes.
 - (ii) The N.C.C / N.S.S. Cadets sent out to parades and camps and such students who are deputed by the University to take part in games, athletics or cultural activities may for purposes of attendance, be treated as present for the days of their absence in connection with the aforesaid activities and that period shall be added to their subjectwise attendance.
5. (a) A candidate who after passing the (10+2) H.S. of a Board or I Year T.D.C. Examination with English, Mathematics, Physics and Chemistry of the Universities situated in the State of Rajasthan or other examination recognised as equivalent or higher thereto and has attended a regular course of study in the Faculty of Engineering for the First B.Arch. shall be eligible for appearing at the First Examination for the B. Arch Degree.
- (b) Every candidate appearing for the First B. Arch. Examination shall be required to show a competent knowledge of subjects as per examination and teaching scheme.
- 6 (a) A candidate, who after passing the First B.Arch. Examination has attended a regular course of study in architecture for whole academic year in the Faculty of Engineering, shall be eligible to appear at the Second B.Arch. Examination of study.
- (b) Every candidate appearing for the Second B.Arch. Examination in a particular branch shall be required to show competent knowledge of the subjects in that branch as per examination and teaching scheme.
- 7 (a) A candidate who after passing the Second B.Arch. Examination has attended a regular course of study in Architecture branch for the whole academic session of the Third B.Arch in the Faculty of Engineering shall be eligible for appearing in the Third B.Arch. Examination of study.
- (b) Every candidate appearing for the Third B.Arch. Examination in Architecture branch shall be required to show competent knowledge of the subjects in that branch as per examination and teaching scheme.
- 8 (a) A candidate who after passing the Third B.Arch. Examination in architecture branch has attended a regular course of study in that branch for whole academic session of the Fourth B.Arch. in the Faculty of Engineering shall be eligible for appearing at the Fourth B. Arch. Examination of study.
- (b) Every candidate for the Fourth B.Arch. Examination in architecture branch

shall be required to show competent knowledge of the subject in that branch as per examination and teaching scheme.

- 9 (a) A candidate who after passing the Fourth B.Arch. in architecture branch has attended a regular course of study in architecture branch for the whole academic session of the Final B.Arch. in the Faculty of Engineering shall be eligible for appearing at the Final B.Arch. Examination of study.
 - (b) Every candidate for the Final B.Arch. examination in architecture branch shall be required to show competent knowledge of the subjects in architecture branch as per examination and teaching scheme.
- 10 (a) If a candidate fails in not more than four Units in the Main Examination, he shall be allowed to keep term in the next higher class. For the purpose of this clause each Theory paper and each Practical and Sessional shall be counted as one unit. (A.C.Res.No. 13/92 dated 21-1-92)

Note: A candidate, who is unable to appear at the Main Examination in some papers, Practicals and Sessionals due to any reason whatsoever shall be considered as having failed in those paper(s) and Practical(s) and Sessional(s) provided the number of units in which he has failed inclusive of those in the Main Examination does not exceed four.

- (b) There shall be First Makeup Examination held each year at suitable interval of time after the declaration of the result of the Main Examination.
 - (c) There shall be a Second Makeup Examination held each year along with the immediate subsequent Main Examination. Only those candidates, who fail in the First Makeup Examination, shall be permitted to take up the Second Makeup Examination.
 - (d) Those candidates who appear and pass in the units at the First/ Second Makeup Examination shall be awarded the actual marks obtained. But in no case he will be awarded more than 60 percent of maximum marks in the unit(s) irrespective of the marks secured by him in the unit(s).
- 11 (a) No candidate shall be permitted to pursue a regular course of study in Final B.Arch. unless he/she has passed in all the units of first and second B.Arch. examination.

12. Ex-Student

- (a) If a candidate fails in Theory papers of the Main Examination but passes in all the Practicals and Sessionals in that examination, he shall be allowed to appear

as an ex-student. The marks secured in the Practicals and Sessionals of the last examination shall be carried over to the next examination.

- (b) If a candidate fails in Theory/ Practicals and Sessionals at the Main Examination, he shall appear as an ex-student at the next examination in all Theory papers, Practicals and Sessionals.
- (c) The candidates who are permitted to appear as Ex-students shall be required to pay a fee of Rs. 30/- for doing practical and sessional work for three month during the academic session.

13. Award of Division

- (a) First B.Arch to Fourth B.Arch.

First Class	:	If he/she secures a minimum of 60 per cent
Second Class	:	If he/she secures a minimum of 50 per cent
Pass Class	:	If he/she secures a minimum of 45 per cent.

- (b) Final B.Arch. :

For the declaration of Final B.Arch. result, marks shall be totaled up as follows :

First B.Arch.	:	10 percent of the marks secured
Second B.Arch.	:	20 per cent of the marks secured.
Third B.Arch.	:	40 per cent of the marks secured
Fourth B.Arch.	:	60 per cent of the marks secured
Final B.Arch	:	100 per cent of the marks secured

- (c) For determining merit position of the candidates at the Final Year level the marks obtained by them in the I, II, III, IV and Final year as described above shall only be considered.
- (d) A candidate shall be awarded a degree with Honours if he/she secures a minimum of 70 percent of aggregate marks.
A candidate shall be awarded a degree with First Class if he/she secures a minimum of 60 percent of aggregate marks.
A candidate shall be awarded degree with Second Class if he/ she secures a minimum of 50 percent of aggregate marks.
The rest of the successful candidates will be awarded pass class.

14. *The Medium of Instructions and Examination in all Architecture Examinations, Theory / Practicals and Sessionals, shall continued to be English as hitherto.*

Supplementary Examination for Final B.Arch.

- 15 (a) There shall be Supplementary Examination for the Final B.Arch. held at suitable internal of time after declaration of the result of the Main Examination. Candidate who fail or are unable to appear at this Examination, may appear in the immediate subsequent Main Examination.
- (b) Candidates who have failed in the Final B.Arch. Exam. but have passed in the practical training and tour reports and obtained 45 percent in grand total, shall be exempted from re-examination in the subjects viz., Theory, Practicals and Sessionals and Project in which they have passed and shall be required to pass the examination in the rest of the subjects only.
- (c) A candidate who passes the Final B.Arch. Examination in a limited number of Theory papers / Practicals and Sessionals/ Project shall be awarded division with a mention of “Passed in more than one attempt” on the marksheet with asterisks on the respective Theory papers / Practicals and Sessionals / Project.

FIRST B. ARCH.

TEACHING AND EXAMINATION SCHEME 2013- 14

		L	T	P	Exam. Hours	Marks
A.	Written Papers					
AR 101A	History of Architecture - I	2	-	-	3	100
AR 102A	Building Material and Construction - I	2	-	-	3	100
AR 103A	Environmental Design - I	1	-	-	3	50
AR 104A	Theory of Design	1	-	-	3	100
SE 105A	Theory of Structures - I	2	-	-	3	100
HA 106A	English	1	-	-	2	50
	Total	09				500
B.	Practicals & Sessionals					
AR 101B	Architectural Design - I	-	9	-		300
AR 102B	Building Material and Construction - I	-	2	-		100
AR 103B	Architectural Graphics - I	-	6	-		200
AR 104B	Computer Applications -I	-	-	2		100
AR 105B	Workshop (Carpentry & Model Making)	-	-	2		100
SE 106B	Theory o Structure -I	-	-	2		50
CE 107B	Surveying & Field Work	-	-	3		100
		-	17	9		950
	Grand Total: 09+17+9 =35 Periods					1500

* Educational Tour for a period of one week.

AR 101 A HISTORY OF ARCHITECTURE

2L

3 Hours, 100 Marks

INTENT :

- To expose the students to a wide spectrum of architectural styles ranging from pre-historic to modern times.
- To explain the students the evolution of architecture in relation to time with special emphasis to social, religious and environmental factors.
- To make the students understand the developments in the construction technology in different periods.

CONTENT :

MODULE - I Indian Subcontinent

Indus valley civilization , Aryan/Vedic civilization , Buddhist civilization, Indo Aryan Temple Architecture, Early and late Chalukyan architecture, Dravidian Temple Architecture.

MODULE- II Western world

Egyptian civilization, Greek Architecture, Roman Architecture, Early Christian Architecture, Romanesque Architecture and Early Gothic Architecture.

References :

1. Indian Architecture (Hindu & Buddhist) - Percy Brown.
2. The Architecture of India - Satish Grover
3. The history of Architecture in India - Christopher Tadgell.
4. A History of Architecture - Sir Banister Fletcher
5. Introduction to architecture - Stephen Gardner.
6. A chronology of western architecture - Doreen Yarwood
7. Meaning of western architecture - Christian Noberg Schulz

AR 102 A BUILDING MATERIALS AND CONSTRUCTION-I

2L/2T

3 Hours, 100 Marks

INTENT :

To introduce the students to the dynamics of Building Construction an appreciation of the use of Building Materials in architecture as an integral component of the conversion of Architectural Concepts into tangible reality. To make the students aware with the basic components of building envelope and to familiarize them with elementary and basic building material like brick and stone and with the principle of construction using these material.

CONTENT :

MODULE I

Introduction to Vernacular and conventional Building Materials

Brick: Raw materials and manufacture – Properties – Uses - Classification – BIS Specification - Tests – Suitability for construction.

Stone: Classification – Properties – Suitability for Construction – Various Stones used for Construction – Dressing and various finishes in stone masonry.

Clay Products and Ceramics: Tiles – terra cotta – stoneware, ceramic materials, properties, raw material for manufacture and uses.

Timber: Various kinds of Timber – properties – suitability for construction – defects in timber – seasoning of timber – BIS specification.

Cement: Composition, Manufacture, Properties and uses.

Concrete-Plain Cement concrete and Reinforced cement concrete: Composition, Properties and Uses.

MODULE II

Introduction to all types of foundations : Shallow foundation-wall footing, column footing.

Functions of foundation : Materials used for construction of foundations, Damp Proofing.

Shallow Foundations : Types- Pad, Strip, Raft-Method of construction.

Deep Foundations : Types- Piles, Piers, Caissons-Materials and method of construction.

Execution problems in loose and clayey soil, Shoring, Timbering.

MODULE III

Introduction to masonry : Superstructure – brick masonry – general principles – construction bonds – type of bonds – relative merits and demerits of different bonds. English and Flemish bond in detail 1, 1½, 2, 2½ brick walls – corners, junctions and cross junctions – special bonds like rat trap, herring-borne bonds, decorative brick work – brick jallies.

MODULE IV

Introduction to carpentry : General principles, Details of joints in timber –Doors – types- panelled, battened, glazed & sliding. Windows –types- panelled, battened, glazed, top hung, pivoted - gable window, dormer window, bay window, French window.

Terms for various members, fasteners and fixtures used in joinery.

References

1. Harry Parker, 'Materials and Methods of Architectural Construction', John Wiley & Sons Canada, Limited, 1958
2. W.B.Mckay, 'Building Construction', Orient Longman 21
3. Robin Barry,'The Construction of Buildings (Vol. I-V)', Blackwell Publishing, 2000
4. Olin,Harold & Schmidt, 'Building Construction – Principles, Material & Methods', American Savings and Loan Institute Press,1970
5. Francis Ching, 'Building Construction & Illustrated', John Wiley, 1991
6. Relevant BIS Codes

AR 103 A ENVIRONMENTAL DESIGN - I

1L

3 Hours, 100 Marks

INTENT :

Understand the relationship between Natural environment and Built environment. Understanding Natural resources. Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources.

CONTENT :

MODULE I

Built Environment – History of Built Environment - Passive Environmental control mechanism – Influence of industrial revolution on Built Environment – Modern/ International architecture & its influence – Factors influencing thermal comfort – Passive design of building: Design considerations for shelter in the tropics – Basic needs of shelter in different climates

MODULE II

Principles of passive design – Heat flow to built environment – Conduction, Convection, Radiation – Thermo physical properties of building materials – Thermal properties of roof, wall, window etc. – Time lag – Solar gain factor – Ventilation and air movement – Functions of Ventilation – Air movement in and around the building – Building elements that effect ventilation – Control by orientation – Size and proportion of windows – Stack effect

MODULE III

Shelter for warm-humid climate – Basic climatic conditions – Orientation, openings and ventilation – Requirements in form, planning, layout – Specification for walls and roofs – Effect of special characteristics of site like water body, vegetation etc.

MODULE IV

Rainfall data –Elements of thermal comfort – Design and planning aspects – Climatic functions and impacts of spaces like courtyard, attic, verandah, etc. – Choice of materials for construction- Transition of built form.

References

1. Watson Donald, 'Climatic Design : Energy Efficient Building Principles & Practices', Mc Graw Hill Book company, New York, 1983.
2. Givonji B., "Man, Climate and Architecture", Elsevier, Amsterdam, 1986.
3. Bansal Naveendra K., Hauser Gerd and Minke Gernot, "Passive Buildings Designs : Handbook of Natural Climatic Control", Elsevier Science, Amsterdam 1997.
4. Baker Nick and Steemers Koen, "Energy and Environment in Architecture", E& FN, Spon. London, 1999.

AR 104 A THEORY OF DESIGN

1L

3 Hours, 100 Marks

Part 1

INTENT- To generate and appreciate background aspects of thinking required in Architectural Design. Basic Design provides the foundation to principles, process and vocabularies of architecture and to equip the students to understand the conceptual, visual and perceptual issues involved in the design process. To understand the architectural elements as determining factor to perceive and articulate space, to stimulate form - space relation and to understand the principles of composition in the organization of space, shape, form. To introduce visual design principles which form the basis of the architectural design through a set of exercise on visual composition in 2D and 3D. The exercises are oriented to develop awareness of relationship between space, function and architecture. The course will have emphasis on relationship between function, form, materials and structural systems.

CONTENT:

MODULE I ORGANISATION OF FORMS AND SPACES

Definition of architecture, Primary elements of architecture –Point, Line, Plane, Volume. Primary forms, properties of form, transformation of forms - dimensional transformation, subtractive, additive forms, organization of additive forms - Articulation of forms. Space defining elements-horizontal, vertical, openings in space defining elements, spatial relationship, spatial organization.

MODULE II PRINCIPLES OF DESIGN

Exploration of the basic principles of composition such as Proportion, Scale, Balance, Rhythm, Unity, Contrast, Character with building examples. Ordering Principles such as Axis, Symmetry, Hierarchy, Datum, Rhythm & Repetition. Visual Perception-proximity, Repetition, simplest and largest figure, continuity and closure, figure/ground relationship.

MODULE III WORKS OF MASTER ARCHITECTS

Works of following Master architects and their ideologies and philosophies in brief – Louis Sullivan, , Frank Lloyd Wright, Le Corbusier, Mies Vander Rohe, Walter Gropius, Achyut P.Kanvinde Laurie Baker, Charles Correa, B.V.Doshi.

MODULE-IV ANTHROPOMETRIC STUDIES

Average measurements of human body in different postures, its proportion and graphic representation, application in design of simple household and street furniture. Basic human functions and their implications for space requirements. Minimum and optimum areas for various functions.

References

1. Francis D. K. Ching, 'Architecture - Form, Space and Order', Van Nostrand Reinhold Company 1979
2. K.W.Smithies, 'Principles of Design in Architecture', Van Nostrand Reinhold Company , 1981
3. V.S.Pramar, 'Design Fundamentals in Architecture', Somaiya Publications, New Delhi, 1973
4. Leland M.Roth, 'Understanding Architecture', Craftsman house company, 1994

PART -2

ART STUDIO

INTENT :

To develop presentation skills, visual expression and representation, imaginative thinking and creativity through a hands on working with various mediums and materials. To familiarize the students with the various mediums and techniques of art through which artistic expression can be achieved To familiarize students with the grammar of art by Involving them in a series of free hand exercises both indoor and outdoor to understand form, proportion, scale, etc Involving them in a series of exercises which will help them experiment with form and volume. To involve students in a series of exercises this will look at graphic and abstract representations of art.

CONTENT:

MODULE I DRAWING

Introduction to art – Elements and principles of drawing – Types of drawing – Visual effects of drawing – Scale drawing – Composition – Approach to sketching – Study of light, shade and shadow. Exercise involving Indoor and out door sketching – Spot sketching - Drawing from imagination Study of 3 D effects through light and shade from nature – Tools and materials – Illustration – Study of human being and mobiles.

MODULE II PAINTING-I

Introduction of painting – Colour – Properties of colour – Colour schemes – Types of colours -Application and visual effects of colour. Exercise involving Study of colour – Properties of paper, brush and other tools – Basic washes – 3D effects from still-life, nature and built environment using mono chromatic and multi colour.

MODULE III PAINTING II

Indoor and out door painting – Rendering techniques
Exercise involving Water colour – Water soluble colour pencil – Tempra – Acarali – Water soluble oil colour – Oil colour – Pen and ink – Brush – Air brush – Mixed mediums – Study of multi colour and 3D effects from nature and built environment.

MODULE IV SCULPTURE

Introduction of sculpture –Sculpture using various materials such as clay, plaster of Paris, paper mache, and wire.

MODULE V APPLIED ART

Graphic representations – Visual composition and Abstraction- Exercises involving Logo design, collage, calligraphy and printing.

REQUIRED READINGS

1. Webb, Frank, “The Artist guide to Composition”, David & Charles, U.K., 1994.
2. Drawing a Creative Process”, Ching Francis, Van Nostrand Reinhold, New York, 1990.
3. Alan Swann, Graphic Design School, Harper Collins, 1991.

REFERENCES

1. Moivahuntly, “The artist drawing book”, David & Charles, U.K., 1994.
2. Arundell (Jan) Exploring sculpture, Mills and Boon, London/Charles, T. Brand Ford Company, U.S.A.
3. The art of drawing trees, heads, colours, mixing, drawing, landscape and painting, water colour, oil colour, etc. – The Grumbacher Library Books, New York – 1996.
4. Caldwell peter, “Pen and Ink Sketching”, B.T. Bats ford Ltd., London, 1995.

SE 105 A THEORY OF STRUCTURE - I

2L
2 T/P

3 Hours, 100 Marks
50 Marks

INTENT :

To give an introduction to the basic principles governing structural systems.

CONTENT :

MODULE - I

Concept of direct force mechanism in structure, tension and compression, equilibrium of forces, concept of strut and tie, composition and resolution of forces. Concept of loads as forces response as deformation, stress and strain, Hooke's Law. Concept of Builders load, phenomena of buckling, short and long columns, masonry walls and piers, and design using slenderness ratio and monogram method.

MODULE - II

Concept of direct force and bending mechanism. Concept of force applied as displaced from the point of support, Bending moment and sheer force. Behaviour of homogeneous material in response of direct and bending forces. Theory of simple bending and principles of superimposition, distribution of sheer and bending stress. Beam as a structural element. Design of steel and timber beams. Concept of compound stresses as a material response to a set of applied forces. Analysis and design of masonry structure subject to direct and bending forces.

HA 106 A ENGLISH

1L

2 Hours, 50 Marks

INTENT :

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Content:

MODULE I: VOCABULARY

Use of Dictionary

Use of Words: Diminutives, Homonyms & Homophones

MODULE II: ESSENTIALS OF GRAMMAR - I

Articles

Parts of Speech

Tenses

MODULE III: ESSENTIALS OF GRAMMAR - II

Sentence Structure

Subject -Verb agreement

Punctuation

MODULE IV: COMMUNICATION

The process and importance

Principles & benefits of Effective Communication

MODULE V: SPOKEN ENGLISH COMMUNICATION

Speech Drills

Pronunciation and accent

Stress and Intonation

MODULE VI: COMMUNICATION SKILLS-I

Developing listening skills

Developing speaking skills

MODULE VII: COMMUNICATION SKILLS-II

Developing Reading Skills

Developing writing Skills

MODULE VIII: WRITTEN ENGLISH COMMUNICATION

Progression of Thought/ideas

Structure of Paragraph

Structure of Essays

MODULE IX: SHORT STORIES

Of Studies, by Francis Bacon

Dream Children, by Charles Lamb

The Necklace, by Guy de Maupassant

A Shadow, by R.K.Narayan

SESSIONALS

AR 101 B ARCHITECTURAL DESIGN - I

9T

3 Hours, 100 Marks

INTENT

Introduce in to the mathematical mind set of the students from the science stream an aesthetic line of thinking. Inculcating a sense of joy in 'design' and its process.

CONTENT :

MODULE-I

□ Introduction to Architecture - meaning - importance – relevance. Fundamental elements of design and their definitions – point, line, shape, form, structure, space, texture, Use of patterns, composition, abstracts etc in design Introduction of other basic forms like circles and triangles along with squares for composition like formal and informal followed by the use of colors and textures in the selected composition. (2 formal & 2 informal). The emphasis is given towards achieving certain basic aspects of composition like unity, continuity, harmony, and balance etc. they are required to experiment with various colors and textures within a few related composition (2 formal & 2 informal).

MODULE-II

Anthropometric studies – average measurements of human body in different postures, its proportion and graphic representation, application in design of simple household and street furniture. Basic human functions and their implications for space requirements. Minimum and optimum areas for various functions.

MODULE-III

Detailed study of spaces such as living, dining, bedroom, kitchen, toilet etc. including furniture layout, Integration of form and function in the design of single room spaces (bus shelter, phone kiosk, snack corner, ATM Center, milk booth, security cabin, flower kiosk, temporary shelter, viewing gallery etc.) stressing on concept generation and development of rich design process.

Sessional work

Assignments and drawing on the above topics. Viva Voce by external examiner at the end of Semester.

AR 102 B Building Construction and Material - I

2T

3 Hours, 100 Marks

Drawings of :

- (1) English bond 1, 1 ½, 2, 2 ½ brick walls , Flemish bond 1, 1 ½, 2, 2 ½ brick walls
Bond in column, cross walls , Jallies ½ & 1 brick jallies.
- (2) Timber joints , Panelled doors, sliding doors, Panelled windows, glazed windows
- (3) Wall Footing, column footing – Raft Foundation, Pile Foundation, Well Foundation

AR 103 B ARCHITECTURAL GRAPHICS - I

6T

3 Hours, 200 Marks

INTENT :

Introduce an aesthetic line of thinking. Inculcating a sense of joy in 'design' and its process. To familiarize the students with basic knowledge of good drafting and lettering techniques and visualizing Develop the skill of using the pencil in free hand drawing Indoor sketching Develop the originality, expression, skill and creative thinking.

CONTENT :

Potential of a line, composition using lines. Compositions of simple geometric shapes

Application of form and color

Introduction to Architectural Design through Basic Design – Elements of Design : Properties, qualities and characteristics of point, line, direction shape, form, colour and texture – Principles of Design: Scale, Proportion, Balance, Harmony, Rhythm and Contrast. Application of Basic design in Architectural Design through the manipulation of line, plane, solid and voids and application of texture colour, proportion etc.

Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.

Colour theory, color wheel, primary, secondary, tertiary colors, color schemes, color value and intensity. Theoretical inputs to be followed by exercises to develop the ability to translate abstract principles into two and three dimensional compositions.

Concepts of geometry –different three dimensional forms, primitive forms and understanding the behavior when combined- Transformations to three dimensional forms; Explorative exercises in three dimensional compositions.

Sciography: Simple and composite forms, shadows on horizontal, vertical planes and on their own surfaces.

OBJECTIVE :

To introduce the students to the fundamental techniques of architectural drawings and to enhance their visualization and presentation skills.

References Books :

Wucius, Wong. Principles of two Dimensional Design. Van Nostrand Reinhold 1972.

Ching, Francis D.K. Architecture: Form, Space, and Order, 2nd ed. Van Nostrand Reinhold, New York, 1996.

Meiss, Pierre Von. Elements of Architecture: From form to place, E and FN Spon, London, 1992.

Smithies, K.W. Principles of Design in Architecture. Chapman and Hall, 1983.

Francis D.K. Ching, 'Drawing, Space, Form, Expression',

Robert W Gill : Thames & Hudson. Rendering with pen & link by

Neufert's Architect's data

AR 104 B Computer Applications - I

2P

3 Hours, 100 Marks

INTENT :

The lecture program and practical engage students with understanding of the Software, Visual languages, Design fundamentals and Visual literacy which provide the fundamental understandings required for the Medium.

To introduce Computer operation principles and explore image editing through a visual composition using graphics.

To impart training in Computer aided 2D drafting.

CONTENT :

MODULE - I INTRODUCTION TO COMPUTER AND IMAGE EDITING

Project: Visual Composition using Graphics (Pixels /Vector)

Tools: Technology of small computer system, computer terminology operation principles of P.C., introduction to application software, and graphic system, and use of printers, scanner, plotter, File management, etc. Understanding Bitmap images and Vector Graphics, Image size and Resolution. Basic Tools for Editing and Creating Graphics in adobe Photoshop.

MODULE II INTRODUCTION TO VISUAL COMPOSITION USING COMPUTER TOOLS

Project: Visual Composition using various elements of Design (lines, shapes, colour, texture etc.)

Tools: Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, and text, dimensioning in ACAD. Transparent overlays, hatching utilities, line type, line weight and colour. Multiline, Polyline, etc. Styles, blocks and symbol library in ACAD.

References:

1. Auto CAD architectural user guide - Autodesk Inc., 1998

CE 107 B SURVEYING AND FIELD WORK

3P

3 Hours, 100 Marks

INTENT :

To develop the knowledge and skills related to surveying and leveling principles and practice.

CONTENT:

MODULE I: Surveying - Definition, classification, principles of surveying, character of work, shrunk scale. Chain Survey - Instruments used. Types of chain. Instruments for ranging. Setting out angles, Erecting perpendiculars & other geometrical figures.

MODULE II: Compass surveying: Prismatic compass and accessories , open and closed traverses.

Definitions: Fore bearing and Back bearing .Construction of geometrical figures. Plane table survey - Plane table and accessories. Methods of plane table survey. Radiation, Intersection.

MODULE III: Leveling - Principles and basic definitions. Dumpy level, Temporary adjustment, simple leveling, profile leveling. fly leveling booking and reduction of levels- Rise and fall method & Height of instrument method, arithmetic checks..

MODULE IV: Theodolite - Study of instruments, definition of different terms, temporary Adjustments, uses, measuring horizontal and vertical angles & methods prolonging a straight line

MODULE IV: Contouring - Characteristics of contours, direct and indirect methods of contouring, interpolation, uses of contours, setting out works such as center lines of a building, grade for sewer.

Total stations: Brief introduction and uses.

Practicals:

1. Setting and checking Right Angles using chain.
2. Setting out of building by chain traverse and by Campass traverse.
3. Traverse (Plain Table) by Intersection and Radiation.
4. Conducting Fly leveling, Differential leveling and Fixing Plinth level, Profile leveling and cross sectioning.

REFERENCE BOOKS:

1. "Surveying Vol I" by DR PC Punmia
2. "Surveying and Levelling (Part-1)" by Kanetkar TP and Kulkarni SV

SECOND B. ARCH.

TEACHING AND EXAMINATION SCHEME 2013- 14, 2015-16

		L	T	P	Exam. Hours	Marks
A.	Written Papers					
AR 201A	History of Architecture II	2	-	-	3	100
AR 202A	Building Material and Construction II	2	-	-	3	100
AR 203A	Environmental Design - II	1	-	-	3	50
AR 204A	Building Services - I (Water Supply and Sanitation)	2	-	-	3	100
AR 205A	Climatology	1	-	-	3	50
AR 206A	Elective - I	2	-	-	3	50
SE 207A	Theory of Structures II	2	-	-	3	100
	Total	12				550
B.	Practicals & Sessionals					
AR 201B	Architectural Design -II	-	9	-		300
AR 202B	Building Material and Construction - II	-	2	-		100
AR 203B	Architectural Graphics -II	-	6	-		200
AR 204B	Elective - I	-	2	-		100
AR 205B	Photography Workshop	-	-	1		100
AR 206B	Computer Applications - II	-	-	2		100
SE 207B	Theory o Structure - II	-	-	2		50
		-	19	5		950
	Grand Total: 12+19+5= 36 Periods					1500

* Educational Tour for a period of one week.

AR 201 A HISTORY OF ARCHITECTURE II

2L

3 Hours, 100 Marks

INTENT :

History of architecture to be studied as development of building forms in response to social, religious , aesthetics and environmental factors. The study should focus on the three dimensional forms, plan forms, facade organization, structural solution, construction methods and ornamentation.

CONTENT :

MODULE - I Islamic Architecture :

- Delhi or imperial style : Slave, Khilji, Tughlaq, Sayyed, Lodhi.
- Provincial Style : Bengal, Jaunpur, Deccan, Malwa, Bijapur.
- Moghul Architecture in North India under : Humayun, Jehangir, Akbar, Shahjehan

MODULE - II

Architecture of the Industrial Revolution in Europe and the Revival styles. Colonial architecture, Lutyens New Delhi. Introduction to modern architecture. Post-Independence Indian architecture upto contemporary times.

References:

1. Indian Architecture (Islamic) - Percy Brown.
2. A History of Architecture - Sir Banister Fletcher
3. The Architecture of India - Satish Grover
4. Meaning in western Architecture - Doreen Yarwood

AR 202 A - BUILDING MATERIALS AND CONSTRUCTION – II

2L

3 Hours, 100 Marks

CONTENT :

MODULE I

Introduction to Specialized elements such as staircase, built in furniture, show windows, sliding and folding doors, paneling and external paving, gates, grills, etc. Timber/Metal windows, partition, mezzanines and cabinets.

MODULE II METALS AND METAL PRODUCTS AS BUILDING MATERIAL :

Steel – Composition, Properties, anticorrosive measures, mechanical and heat treatment of steel - Market forms of steel : Steel for Reinforcement - Hot rolled bars, CTD Bars, TMT bars , Welded wire fabrics; Steel for Pre stressed concrete; Structural steel; Stainless steel, steel alloys, current developments. **Iron**-Brief study on manufacture, composition, properties and uses of cast iron, wrought iron, pig iron.

Other metals : Aluminium and its alloys, copper and its alloys

MODULE III

Steel doors and windows – Standard sections – Channel, box, extruded etc. – Connections – Specifications

Aluminium doors and windows – Standard sections – Connections and specifications.

Door and window fittings – Door and window hinges like butt hinges, pin hinges, parliament hinges, garnet hinges, counter flap hinges, strap hinges, piano hinges, auto-closing hinges - Door and window bolts like sliding door bolt, tower bolt, flush bolt – door handles- door locks-other fastenings to door and windows like hook and eyes, window stays, door stoppers, door closers, caster wheels, floor springs, pivots, magnetic catchers for wooden cupboards etc.

MODULE IV

Paints, distempers & varnishes – types –composition – properties - application– Uses – BIS specifications- Covering capacity, method of distempering wall surfaces, and painting of timber and iron work.

MODULE -V

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 VI

Industrial Timber products :

Timber board – Veneers, Plywood, Block Boards, Particle Boards, Hard Boards , Fibre board, Block board and Lamin board .Wooden flush door shutters, Glulam, Laminates-decorative laminates.

Timber Floors – Single, double and framed floors with joints between joist with wall plate, joist with beam and sub beam with main beam, strutting of joists.

MODULE - VII

Investigation of materials, techniques and details related to vernacular architecture, exploration of alternative building materials.

References:

1. W.B.Mckay, 'Building Construction', Longmans, UK, 1981.
2. S.C.Rangwala, 'Engineering Materials', Charotar Publishing House, India, 1997.
3. Dr.B.C.Punmia, 'Building Construction', Laxmi Publications Pvt.Ltd., New Delhi, 1993.
4. P.C. Varghese, 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi, 2005. .
6. Francis D.K.Ching, 'Building Construction Illustrated' VNR.1975.

AR 203 A ENVIRONMENTAL DESIGN - II

1L

3 Hours, 50 Marks

CONTENT :

Study the effect of architectural development on natural resources

Effects of architectural development on natural resources

Concepts of sustainable development

Renewable resources Water cycle and its management

Conservation and generation of energy

INTENT :

MODULE I

Space Ship Earth Concept – Environmental problems like Ozone depletion, Global warming, Carbon dioxide concentration, etc., – Sustainable Development – Brundtland Commission's report (1983) – Earth Summit & Rio Declaration (1992) – Kyoto Protocol (1997) – Recent developments – Sustainable & Green building constructions

MODULE II

Energy and buildings - Relation between Energy Efficiency and Sustainable development – Sustainability & Architecture - Sustainable Buildings - Different Green rating systems – EAM (UK), CASBEE (Japan), LEED (US), Green Star (Australia), etc. – Indian systems – TERI GRIHA rating, LEED India rating– Examples of Sustainable buildings.

MODULE III

Global Water scenario – Local water scenario – Reasons for scarcity – Needs of water conservation – Ground water depletion – Water efficient landscaping – Xeriscape – Gray water – Black water – water recycling– Water conservation – Rain Water Harvesting – Capacity calculations for water harvesting tanks – water collection from roof – filtering rain water – Conservation of other natural resources

MODULE IV

Waste recycling – Solid Waste Management – House hold waste – Recycling techniques – Composting at home – Town/ city level recycling – Construction waste – State-of-the art of Vilappilshala waste recycling plant of Thiruvananthapuram

References

1. Smith R.J., Philips, G.M., Sweeney, 'Environmental Science', Longman Scientific & Technical, Essex, England, 1982.
2. Goulding, John, R, Lewis, Owen J and Steemers, Theo C., "Energy in Architecture", Bastford Ltd., London, 1986.
3. TEDDY (TERI's year books), TERI, New Delhi.
4. Annual Reports, Ministry of Non-Conventional Energy Sources, Government of India, New Delhi.
5. Energy Conservation Building Code 2006.
6. Sustainable Building Design Manual Vol 1 & 2, TERI, New Delhi.

**AR 204 A BUILDING SERVICES - I
(WATER SUPPLY AND SANITATION)**

2L

3 Hours, 100 Marks

INTENT :

The course is designed to familiarize the students with building services that support the functioning of a building in the area of water supply and sewerage.

To study water quality control and treatment and its distribution within a building

To expose the students to water management concepts 16

To understand the fundamentals of waste disposal from a building and the guidelines for planning a sewerage system.

To expose the students to waste management concepts.

To familiarize the students with equipment for management of usable water and waste water

CONTENT:

I. WATER SUPPLY AND WATER DISTRIBUTION SYSTEM

MODULE I WATER QUALITY CONTROL AND DISTRIBUTION SYSTEM

Water quality, purification and treatment – surface and ground water sources, water/quality- nature of impurities, treatments - sedimentation, Rapid sand filters, pressure filters – sterilization and disinfection.

Water distribution systems Distribution systems in small towns, layouts – cold water lines, hot water lines, Design criteria for daily water requirements based on occupancy, various kinds of meters, Tank capacity - Pumping plant capacity, Testing of water hardness - calculation of water consumption for Residential/Multistoried buildings. Piping systems/piping materials/plumbing fixtures/selection –Domestic hot water systems. Solar water heating systems, application and installation.

MODULE II WATER MANAGEMENT CONCEPTS

Different methods of Harvesting rain water from roofs and paved areas Waste water treatment – conventional, modern systems. Mandatory provision with respect to plumbing arrangements in apartment buildings.

II. SANITARY WASTE AND SEWERAGE SYSTEM

MODULE III FUNDAMENTALS, SANITARY WASTE AND SEWERAGE SYSTEM

Basic Principles of sanitation and disposal of waste matter from buildings, various systems of sewerage disposal and their principles. Model bye-Laws in regard to sanitation of buildings specifications of various sanitary fittings for buildings. Planning of bathrooms, Toilets in domestic and multistoried buildings. Standard type of sanitary fittings, Caulking compounds, traps, joints. Flushing cisterns, manholes, septic tanks in relation to buildings. Intercepting Chambers, inspection Chambers and their location and ventilation of sewers. Layout of simple drainage system for small buildings, apartments, commercial buildings – gradient used in laying of drains and sewers, size of drain pipes and materials used

MODULE IV WASTE MANAGEMENT CONCEPT

Sewerage disposal :

Primary, secondary treatment, activated sludge, intermittent and trickling sand filters, sewage treatment plant – layout for residential/commercial buildings

Solid waste disposal :

Refuse disposal, collection, and conveyance disposal of town refuse. Sanitary land fills, incineration, vermiculture, aerobic digestion for compost, anaerobic digestion for energy and organic filler (Bio gas) and rural energy systems

MODULE V EQUIPMENT'S USED FOR MANAGEMENT OF USABLE WATER AND WASTE WATER

Space requirements, Configuration and Sizing of motors and deep well, centrifugal, +submersible, reciprocating pumps and their location in building types 17

REQUIRED READINGS:

1. Manual of water supply and treatment, Second edition, CPHEEO, Ministry of works and housing, New Delhi 1977
2. AFE Wise, JA Swaffied Water, Sanitary & Waste Services in buildings – Mitchell Publishing Co. Ltd. – 2002, V Edition.

REFERENCES:

1. G.M. Fair, J.C. Geyer and D.Okin, Water and Waste water engineering Volume II, John Wiley & Sons, Inc. New York, 1968
2. Manual on sewerage and sewerage treatment, CPHEEO – Ministry of works and housing, New Delhi, 1980
3. S.C.Rangwala, Water supply and sanitary engineering, Chartar publishing house, Anand 3888601, 1989, Lecture notes compiled by Chaman.L.Gupta
4. Renewable energy, basics and technology, supplement volume on integrated energy systems) Solar Agni systems, Sri Aurobindo Ashram, Pondicherry 605002 India.

INTENT :

To enable the understanding of the technical basis of the environment which exists in or around a building and to integrate the requirements of climate in building and in relation to building functions? To study human heat balance and comfort.

To familiarize students with the design and settings for buildings for daylight and factors that influence temperature. To inform about the air pattern around buildings and the effect of wind on design and siting of buildings. To expose the students to the various design strategies for building in different types of climatic zones.

CONTENT:**MODULE - I CLIMATE AND HUMAN COMFORT**

Factors that determine climate of a place – Components of Climate – Climate classifications for building designers in tropics – Climate characteristics. Human body heat balance – Human body heat loss – Effects of climatic factors on human body heat loss – Effective temperature – Human thermal comfort – Use of C. Mahony's tables.

MODULE II DESIGN OF SOLAR SHADING DEVICES

Movement of sun – Locating the position of sun – Sun path diagram – Overhead period– Solar shading–Shadow angles – Design of appropriate shading devices

MODULE III HEAT FLOW THROUGH BUILDING ENVELOPE CONCEPTS

The transfer of heat through solids – Definitions – Conductivity, Resistivity, Specific heat, Conductance, Resistance and Thermal capacity – Surface resistance and air cavities– Air to air transmittance (U value) – Time lag and decrement

MODULE IV IMPACT OF AIR MOVEMENT DUE TO NATURAL AND BUILT FORMS

The wind – The effects of topography on wind patterns – Air currents around the building – Air movement through the buildings – The use of fans – Thermally induced air currents – Stack effect, Venturi effect – Use of court yard.

MODULE V CLIMATE AND DESIGN OF BUILDINGS

Design strategies in warm humid climates, hot humid climates, hot and dry climates and cold climates – Climate responsive design exercises

REQUIRED READINGS:

1. O.H. Koenigsberger and others (1993), Manual of Tropical Housing and Building – Part I - Climate design, Orient Longman, Madras, India.
2. Bureau of Indian Standards IS 3792 (1987), Hand book on Functional requirements of buildings other than industrial buildings, (Part I – IV), Manakhavan, 9, Bahadur Shah Zafar Marg, New Delhi – 110002

REFERENCES:

1. Martin Evans (1980), Housing Climate and Comfort – Architectural Press, London
2. B. Givoni (1981), Man, Climate and Architecture, Architectural Sciences Series - Applied Science Publishers Ltd., London
3. B. Givoni (1994) Passive and Low Energy Cooling of building, Van Nortrand Reinhold New York, USA..
4. Galloe, Salam and Sayigh A.M.M. (1998) “Architecture, Comfort and Energy”, Elsevier Science Ltd. , Oxford, U.K.

COURSE TITLE :

1. Vernacular Architecture
2. Interior Design
3. Structure and Architecture

VERNACULAR ARCHITECTURE

MODULE – 1

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

MODULE - II

Building materials and traditions, Vernacular building materials- Recognize the different ways in

which these materials were used at different times and in different parts of the country, Documenting 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

Recording vernacular buildings- Why record buildings? Recording basics (measuring and recording historic buildings) Drawing up; conventions and equipment Documentary sources and what they can tell us Briefing for recording day(s) Recording the chosen building(s) Reviewing the results; and role of photography in documenting vernacular buildings.

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.

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

INTERIOR DESIGN

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, colour, 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 : Plantscaping of private and public interior spaces

References

1. Shrish Vasant Bapat, 'Basic Design & Anthropometry'
2. Shirish Vasat Bapat, 'Living Areas – Internal Spaces'
3. Halse, 'Use of Colours in Interiors'
4. Ching, 'Interior Design Illustrated', Wiley
5. Yoshinoku Ashihara, 'Exterior Design', Van Nostrand Reinhold Inc.,U.S.
6. Earnest Pickering, 'Architectural Design', New York : Wile
7. Ching, 'Form, Space & order', Wiley
8. Krome Barnet, 'Logic in Design'

STRUCTURE AND ARCHITECTURE

CONTENT :

This course is geared towards the integration of contemporary structural design in the form making process of architectural design. It will encourage the student to exercise judgement in areas of structure, form and process.

To study evolution of structural systems through history.

To familiarise the students with concepts of structural design through works of architects/ engineers.

To study architectural expression through relevant case studied.

To evaluate the understanding of the relationship between form & structure through a seminar.

MODULE I

HISTORY OF STRUCTURAL DESIGN IN THE PRE INDUSTRIAL ERA

Development of monolithic and rock cut structures- trabeated construction-arcuate construction- vaults and flying buttresses- tents and masted structures and bridges through ancient and medieval history.

MODULE II

HISTORY OF STRUCTURAL DESIGN IN THE POST INDUSTRIAL

Post Industrial modular construction of large span and suspension structures in steel and concrete- projects of Pier Luigi Nervi, Maillart, Candella, Buckminster Fuller and Eero Saarinen.

MODULE III

CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – I

The select case studies could include KCR Terminal at Hung Hom, Hong Kong, B3 Offices in Stockley Park , Sainsbury Centre for Visual Art, Renault Centre and Swindon UK by Norman Foster and Standsted Airport Terminal, London, UK by Fosters/Arup British Pavilion EXPO 1992, Seville, Spain and Waterloo International Terminal by Nicholas Grimshaw

MODULE -III

CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – II

The select case studies could include Inmos Microchip Factory, Centre Commercial St. Herbtain, PA Technology, Princeton and Fleetguard, Quimper UK by Richard Rogers Athens Olympic Stadium and Village, Bridges and Public Bus Stop in St. Gallen , Railway Station, Lyon, France and Stadelhofen Railway station, Zurich Schweiz by Santiago Calatrava Kansai International Airport, UNESCO Workshop, the Jean-Marie Tjibaou Cultural Center, Menil Museum, Thomson Optronics Factory, IBM Traveling Exhibition Pavilion, Columbus International Exposition, Genoa Italy and Lowara Officers, Montecchio Maggiore Italia by Renzo Piano Building Workshop

MODULE V SEMINAR

Seminar to present a study of architectural form and structural expression through select cases which will aid understanding of structural philosophy and analysis, building envelope and services and construction sequence.

REFERENCES

1. "Paper Arch" and Japan Pavilion at Expo 2000 in Hannover by Shigeru Ban
2. Greene King Draught Beer Dept and Schlumberger Cambridge Research Centre, UK by Michael Hopkins
3. Design Center, Linz, Austria and Two Family House in Pullach Thomas Herzog
4. King Abdul Aziz International Airport, Haj Terminal by SOM
5. Pavilion of the Future, Expo 92, Seville by Martorell, Bohigas & Mackay (MBM)
6. Darling Harbour Expo Center, Sydney Australia by P. COX
7. Olympic Archery Building by Enric Miralle & Carme Pinos
8. Eagle Rock House by Ian Ritchie
9. Le Grande Arche de La Defense by J O Spreckelsen

SE 207 A – THEORY OF STRUCTURES - II

2L

3 Hours, 100 Marks

2 T/P

50 Marks

CONTENT :

MODULE - I

Concept of arch. vault, dome and direct stress members eliminating bending. Development of advanced arches that take direct forces and bending also. Design of simple trusses in Steel and timber, riveted, welded and bolted joints.

MODULE - II

Concept of behaviour of heterogeneous materials in direct force and bending. Elastic theory, Ultimate load theory. Limit State Theory. Design of RCC beams, column, slabs. Introduction to pre-stressed concrete structures.

SESSIONALS

AR 201 B ARCHITECTURAL DESIGN – II

9T

3 Hours, 300 Marks

INTENT :

To enhance the students understanding regarding inter-relation of various simple functions and circulation and movement of vehicles with clear concepts of connectivity.

Introduction to the commercial activity spaces with multiple functions, forms and movement.

CONTENT :

MODULE I: SITE PLANNING

Introduction to Site Planning concept and techniques, Understanding the parameters and process of development of Site Planning.

MODULE II: CIRCULATION AND MOVEMENT OF VEHICLES/ PARKING SPACES

Horizontal and Vertical, Pedestrian and vehicular with Parking facilities as well as to develop a semi built form as per their aesthetic sense.

MODULE III: BUILDING FORMS (SEMI AND FULLY BUILT STRUCTURES)

Basic building forms have to be studied through drawings, sketches and model. Multi user based design exercise to be developed to introduce the various complexities in design. Space frames and simple structural based buildings to be designed in confined space.

MODULE IV: DESIGN EXERCISE -I

The suggested design exercise - I for the semester would be -

- (a) Health Clinic
- (b) Residential Building
- (c) Institutional Building
- (d) Commercial Complex

MODULE V Measured Drawing

Objective: To understand & draw the technical representation of materials & construction, furniture arrangement within the spaces, existing electrical layout, etc.

Measured drawings of gate, entrance porch, small temples, small rooms, toilet & kitchen, furniture etc.

AR 202 B BUILDING MATERIALS AND CONSTRUCTION - II

2T

3 Hours, 100 Marks

Drawings for :

1. Various types of staircase.
2. Built in furniture
3. Show windows
4. Sliding and folding doors
5. Paneling
6. External paving
7. Gates and grills
8. Timber/Metal doors and windows
9. Cabinets etc.

AR 203 B ARCHITECTURAL GRAPHICS - II

6T

3 Hours, 200 Marks

INTENT :

To introduce the students to the fundamental techniques of architectural drawings and to enhance their visualization and presentation skills.

CONTENT :

MODULE - I:

Principles of perspective drawings and varying visual effects of three-dimensional objects. Introduction to one-point, two-point and three-point perspectives. Study and understanding of picture plane, cone of vision, center of vision, station point, ground level, horizon level or eye level, vanishing points, their variations and resultant effects. Methods of constructing perspective drawings. Construction of perspective drawings of building elements and Building forms. Sketching of freehand perspective drawing of any buildings, corridors, interiors etc.,. Out door sketching of interesting buildings with sloped roofs against suitable background or fore ground with trees & other street furniture to be depicted in the exercises.

MODULE - II:

Principles of Sciography - study and understanding of light, shade and shadow. Graphical representations. Standardization of direction of light and graphical representation methods. Space of light and shadow, shadow patterns. Construction of shadow patterns of planes and solids in different positions, different shapes and their combinations. Construction of shadow patterns for perspective views and free hand perspective sketches.

Reference Books :

1. Basic Perspective
2. Creative Perspective
3. Perspective and Sciography by Mullik.

AR 204 B ELECTIVE - I

2T

3 Hours, 100 Marks

Assignment to be given to the student by their concerned teacher.

AR 205 B PHOTOGRAPHY WORKSHOP

1P

3 Hours, 100 Marks

CONTENT :

MODULE - I

The Camera, Rangefinder. Single lens reflex, twin lens reflex, the view camera. . . .
Camera controls: shutter, aperture, light meter, depth of field control, how shutter and aperture work together. "

MODULE - II

Lences

Focal length

Filters for Black and white films

Film ISO and grain size, developing the film properly, reciprocity failure. "

MODULE - III

Technical:

-To learn to properly expose and develop B and W film to high crafts manlike levels.

-To learn how to craft a fine print using traditional b and w paper in the darkroom.

This will include extensive practice in dodging and burning, contrast control, archival processing methods and final print finishing including spotting and matting your final exhibition quality prints.

-To fully understand the workings of your camera in particular and broad concepts in general such as reciprocity in aperture and shutter.

MODULE - IV

Aesthetic:

-To learn how to "see photographically" That includes developing a fine appreciation for seeing light and the way light works on photo sensitive materials to produce expressive, elegant prints.

-To learn how space works in the frame to create intentional, elegant design.

-To come to understand the metaphoric possibilities in the images we create that transcend the literalness of the object(s) photographed.

1) Framing the Subject - Learn to be aware of the edge of the frame, visible in the viewfinder. Think of it as a picture frame that you hang in the world. Is it filled with a coherent, expressive design? Does the essential subject fill the frame?

2) Light and Form - The shape of the object(s) in the frame usually is the photograph's major organizing element. We isolate the form from its surroundings by closing in and by seeing the light. Light shapes the appearance of objects. Light and its absence (shadow) can separate those objects from its surroundings. Light can be a magnet, drawing the viewer into the picture. Usually we make the area of light the focal point of the picture, leaving the edge of the frame a bit darker.

MODULE - V

INTRODUCTION TO ADOBE PHOTOSHOP

Getting Started with Photoshop , Resizing & cropping images, Getting started with layers , Photo retouching , Using quick mask mode, Creating special effects, Working with Images Working with basic selections, Painting in Photoshop, Introduction to color correction Working with the pen tool, Exporting your work.

AR 206 B COMPUTER APPLICATIONS - II

2P

3 Hours, 100 Marks

MODULE - I INTRODUCTION TO COMPUTER AIDED 2D DRAFTING

Project: 2D Drafting of a simple building

Tools: Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, and text, dimensioning in ACAD. Transparent overlays, hatching utilities, line type, line weight and colour. Multiline, Polyline, etc. Styles, blocks and symbol library in ACAD.

MODULE - II INTRODUCTION TO 3D MODELLING

Project: Visualize a building. Explore the potential of lights and camera in 3DMAX and use the same in the model created for the final submission.

Tools: Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filling in sketch up Exercise to identify and visualize a building using the above said utilities.

References :

1. A Watt, Fundamentals of Three-Dimensional Computer Graphics, Addis, Wesley, Massachusetts, 1989.

THIRD B. ARCH
TEACHING AND EXAMINATION SCHEME-2014-15, 2016-17

		L	T	P	Exam. Hours	Marks
A.	Written Papers					
AR 301A	History of Architecture - III	2	-	-	3	100
AR 302A	Building Material and Construction - III	2	-	-	3	100
AR 303A	Landscape Architecture	2	-	-	3	100
AR 304A	Building Services - II (Acoustics, Lighting & Vertical Comm.)	2	-	-	3	100
AR 305A	Housing	2	-	-	3	100
AR 306A	Elective - II	2	-	-	3	50
SE 307A	Theory of Structures - III	2	-	-	3	100
	Total	<hr/>			14	650
B.	Practicals & Sessionals					
AR 301B	Architectural Design - III	-	9	-		300
AR 302B	Building Material and Construction - III	-	2	-		100
AR 303B	Architectural Detailing	-	4	-		100
AR 304 B	Elective - II	-	2	-		100
AR 305B	Computer Applications - III	-	-	2		100
SE 306B	Theory o Structure -III	-	-	2		50
		<hr/>			17	4
						750

Grand Total: 14 + 17 + 4 = 35

* Educational Tour for a period of one week.

AR 301 A HISTORY OF ARCHITECTURE - III

2L

3 Hours, 100 Marks

INTENT:

To introduce the condition of modernity and bring out its impact in the realm of architecture. To study modern architecture as evolving from specific aspects of modernity- industrialization, urbanization, material development, modern art as well as society's reaction to them. To study the further trajectories of modern architecture in the post WWII period. To create an overall understanding of the architectural developments in India influenced by colonial rule.

CONTENT:

MODULE I Leading to a new architecture

Beginnings of modernity – Origin and development of Neo Classicism- Structural Neo classicists: Laugier, Soufflot, Schinkel, Labrouste - Romantic Neo classicists: Ledoux, Boullée, Durand, Jefferson- Industrialization and its impact- Urbanization in Europe and America- split of design education into architecture and engineering streams- Emergent new building / space types - Growing need for mass housing- Development of Industrial material and construction technologies- concrete, glass and steel- structural engineering, standardization-Industrial exhibitions- Chicago School and skyscraper development.

Reviewing Industrialisation

Opposition to industrial arts and production - Arts and Crafts in Europe and America : Morris, Webb- Art Nouveau: Horta, Van De Velde, Gaudí, Guimard, Mackintosh - Vienna secession: Hoffman, Olbrich- Wright's early works

MODULE II Modern architecture: development and institutionalisation

Adolf Loos and critique of ornamentation- Raumplan: Peter Behrens- Werkbund – Modern architecture and art -Expressionism: Mendelsohn, Taut, Polzeig- Futurism- Constructivism, Cubism-Suprematism- De-Stijl Bauhaus- Gropius, Meyer and Mies - CIAM I to X and its role in canonizing architecture- growth of International Style Ideas and works of Gropius, Le Corbusier, Aalto, Mies, later works of Wright

Modern Architecture : Later directions

Post WW II developments and spread of international style – Later works of Corbusier: Brasilia, Unicef- Works of later modernists: Louis Kahn, Paul Rudolph, Eero Saarinen

MODULE III Colonial architecture in India

Colonialism and its impact- early colonial architecture : forts, bungalows, cantonments – Stylistic transformations: Neo- classicism, Gothic Revival and Indo Saracenic - PWD and institutionalization of architecture - Building of New Delhi showcasing imperial power.

Post independent architecture in India

Architectural debates associated with nation formation– early modernist architecture- post independence city planning: Chandigarh and Bhubaneswar- influences on post independence architects- Architecture of Kanvinde, Raje, Doshi, Correa, Nari Gandhi, Raj Rewal- PWD architecture – new directions after 1960s- post- independent architecture of Chennai

References :

1. Kenneth Frampton, Modern Architecture: A Critical History, Thames & Hudson, London, 1994
2. Manfredo Tafuri., Modern Architecture, Harry N. Abrams Inc.
3. Leonardo Benevolo, History of Modern Architecture, 2 Vols., Routledge & Kegan Paul, London, 1971

AR 302 A BUILDING MATERIAL AND CONSTRUCTION - III

2L

3 Hours, 100 Marks

CONTENT :

MODULE - I

Introduction to the problems of large scale industrial commercial and institutional buildings such as basements, large span roofs, roof lights, false ceilings and floors, Cavity walls.

MODULE - II

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 –Clay Mangalore, Allahabad and country type tiles, their properties and method of fixing.

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

MODULE III

Introduction to framed structures. - Concrete floors, walls, beams and columns. Reinforced cement concrete-Reinforcements used in RCC – Suitability & performance - Reinforcement details of RCC elements like column, beam, lintel, slab, waist slab etc. BIS Specification. Details of construction joints, expansion joints in buildings – Method of construction – Filling of joints – Water proofing.

MODULE - IV

Materials for Finishes-Wall 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 – Shahabad, Kotah- different types of Marble, Granite etc.

Artificial Floor Finishes – Ceramic tiles, Mosaic tiles, Cement tiles, etc.

MODULE - V

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- case studies.

Wall paneling – construction details using different materials, materials available in local market.- case studies

References :

1. M.S.Shetty, 'Concrete Technology', S.Chand & Co.ltd,New Delhi,1986.
2. S.C.Rangwala, 'Engineering Materials', Charotar Publishing House, India, 1997.
3. Dr.B.C.Punmia, 'Building Construction', Laxmi Publications Pvt.Ltd., New Delhi, 1993.
4. P.C. Varghese, 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi, 2005.
5. Don A.Watson, 'Construction Materials and Process', McGraw Hill Co.,1972.
6. Jack M.Launders, 'Construction Materials and Methods' , Careers, South Holland, Illinois, Wilcox Co.Ltd.,1986

CONTENT :

MODULE I

Man and landscape development in Historical Perspective – Garden of ancient world – Babylon, Egypt, Persia, Greece, Rome.

Islamic tradition and Mughal in India – Japanese – Renaissance in Europe – English styles

MODULE II

Elements of landscape – major and minor elements, natural and man made elements and tangible and intangible elements – Water – Land forms – vegetation – space – sculpture – Furniture – Lamp posts, dust bins and display boards etc. Aesthetics principles – scale – proportion – unity – rhythm – angle of vision and approach – views – avenue planting – Scientific and local names of plants – Classification of plants according to size, types, form, colour and texture.

MODULE III

Site planning considerations – Selection of site – Location of structures – Ecological value of site – Identification of site features – Functional suitability of site – Movement of pedestrian and vehicles – Parking.

Landscape engineering – Cutting and filling – Grading – retaining walls – Drainage – Constructions of verticals, walls, fencing, pools etc – pavements – ponds – fountains – sculpture – steps – ramps – underwater construction – precautions to riverbank and coastal constructions – Lighting in garden and ponds – Avenue lighting – terrace gardens – Terrace pool – Rock garden.

MODULE IV

Horticulture aspects – planting and transplanting – planting techniques – techniques of propagation – cutting, pruning, grafting training etc – Lawn – Preparations- mowing, maintenance etc. – Hydroponics – Bonsai.

Landscape indoors – Functions and behavior of plants on interiors, light, air and water requirements – Drainage – Indoor plant materials – Potting and repotting – Lighting – raising of interior plants.

References

1. Kevin Lynch and Gary hach, 'Site Planning'
2. Jellicoe & Jellicoe, 'Landscape of man'
3. Motloch J.C, 'Introduction to landscape'
4. Bring M, 'Japanese Gardens'
5. Simonds, 'Landscape architecture'
6. Hackett, 'Planting design'

AR 304 A BUILDING SERVICES - II
(ACOUSTICS, LIGHTING AND VERTICAL COMMUNICATION)

2L

3 Hours, 100 Marks

ACOUSTICS :

INTENT :

MODULE I

The nature of sound - propagation of sound-velocity, frequency and wavelength of sound. Sound pressure - Sound intensity and loudness- Decibel and Phons- The human ear and hearing characteristics.

MODULE II

Room acoustics - Behavior of sound in enclosures - sound reflection, diffusion and diffraction room resource Sound absorption coefficient - Reverberation Reverberation time - Calculation of reverberation time - Sabine's formula - Eyring's formula - Acoustical defects in the enclosed spaces.

MODULE III

Effect of noise in human being - Noise sources - air borne and structure borne sound transmission - Noise criteria - Transmission loss - permissible noise levels for different types of building. Noise control in specific type of buildings - auditorium - Hotels -Schools - Hospitals - Residences and Industrial buildings. Noise control in specific buildings - Auditoriums, Schools, Hospitals, Residences, Offices.

MODULE IV

Sound absorptive materials and construction - Porous material - membrane absorbers - cavity resonators - space absorbers - variable absorbers - their absorptive characteristics - mounting and distribution of absorptive materials - measurements of sound absorption Acoustical design of auditoriums - Room for music, multipurpose rooms - Recording and broad casting studios.

References

1. Kinsler and Fry, 'Fundamental of acoustics', Wiley
2. Knudson and Harris, 'Acoustical Designing to Architecture'
3. Ducan Templantation, 'Acoustics in the built environment'
4. Acentec, 'Architecture acoustics - building guide'
5. Cavanaugh, 'Architectural acoustics' Joseph A. Wilkes - 1998

LIGHTING

MODULE I FUNDAMENTALS OF LIGHTING

Principles of light – Electromagnetic radiation, waves, nature of vision, measurement of lighting. Principles of illumination: definitions, Visual tasks, Factors affecting visual tasks MODULEs of light, definitions of flux, solid angle, luminous intensity –utilization factor – depreciation factor- MSCP – MHCP, brightness, glare.

MODULE II ILLUMINATION AND LIGHTING

Electric light sources: brief description, characteristics and application of different types of lamps, methods of mounting and lighting control. Luminaries classification/Lumen method for design – Room reflectance/ Glare – manufacturer's data on luminaries / luminaries cost

MODULE III LIGHTING DESIGN: INSTALLATION AND APPLICATION IN BUILDINGS

Artificial light sources, spectral energy distribution, Luminous efficiency-color temperature – color rendering, Additive, subtractive color and their application areas and outdoor lighting . Lighting for Office, Schools, Libraries, Residential, Hospital, Parking, Outdoor. Elementary ideas of special features required and minimum level of illumination for the physically handicapped and elderly in building types . Solar energy systems for lighting – Photovoltaic systems for Residential/Commercial buildings. Reducing electric loads, installation and maintenance.

MODULE IV LIGHTING DESIGN: CONVEYING SYSTEMS

Basic design Principles, criteria for planning sizing, selection and layout of vertical distribution systems – (lifts, Escalators and moving walkways) along with mechanical, dimensional details .

Elevators- types of elevators - design criteria, capacity, frequency, car size, speed, number and size of elevators, layout of banks of elevators, planning and locating service cores in buildings, types of elevators – pit, machine room details – NBC code 27

Escalators and Conveyors parallel and criss cross escalators, horizontal belt conveyors, horizontal moving walkways – design criteria, speed size, capacity, number

Detailing for comfort, convenience of users- special features for physically handicapped and elderly

VERTICAL COMMUNICATION

MODULE - I

Basic Design principles regarding Lifts, escalators and conveyors, inter-communication etc.

REQUIRED READINGS:

1. E.P.Ambrose, Electric Heating, John Weley & Sons Inc., New York, 1968
2. Philips Lighting in Architectural Design, McGraw Hill. New York, 1964
3. R.G.Hopkenson & J.D.Kay, The lighting of Buildings, Faber & Faber, London, 1969

Conveying systems

1. Elevators, Escalators , Moving Walkways – Manufactures catalogues
2. National Building Code.

REFERENCES

Electrical Systems:

1. Handbook of building Engineers in metric systems, New Delhi 1968
2. National Building Code

AR 305 A HOUSING

2L

3 Hours, 100 Marks

CONTENT :

MODULE I

Introduction to housing in early settlements.

Nature and magnitude of the housing problem in India-Housing Shortage as a result of Population Explosion. Urbanization 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

References

1. K. Thomas Poulse- '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 Poulse for ITPI students
6. Five Year Plans- Government of India Publications

AR 306 A ELECTIVE - II

2L

3 Hours, 50 Marks

COURSE TITLE

1. Sustainable Architecture
2. Building Codes and Byelaws
3. Green Building and Infrastructure

SUSTAINABLE ARCHITECTURE

Content :

MODULE -I

Concepts of sustainability : Energy and Global environment, Energy use and Climate change – Its impact, Types of Energy systems, Concept of Sustainability - Principles of conservation -synergy with nature, Bioregionalism - community basis shelter technology within bioregional patterns and scales, Ethical- environmental degradation.

MODULE -II

Sustainable planning & Design: Sustainable Development -Sustainable approach to site planning and design - site inventories- relationships between site factors - development impacts from one area of the site on the other areas - Model ecosystem of the site, environmental monitoring and testing during construction- phasing of development - limits of change - Design facility within social and environmental thresholds

MODULE -III

Sustainable Building Materials and Construction : Properties, Uses and Examples of - Primary, secondary and Tertiary Sustainable Materials, Principles to improve the energy efficiency - siting and vernacular design, shade, ventilation, earth shelter, thermal inertia and air lock entrances. Techniques of sustainable construction - technologies, methods of effectiveness, and design synthesis – alternative materials and construction methods: solar water heating panels; photovoltaic electricity generation; use of local materials and on site growth of food, fuel and building materials.

MODULE -IV

Recycling and Reuse : Pre building, Building, Post building stages - Architectural Reuse, Waste prevention, Construction and Demolition recycling- Conservation of natural and building resources- Energy and material savings – types of wastes - Elimination of waste and minimize pollution- various Decomposing methods – Innovative reuse of various wastes Case Studies and Rating systems : Sustainable Development Case Studies: illustrated examples of the planning, development, and construction. Green architecture and various international rating systems for sustainability- EAM (UK), CASBEE (Japan), LEED (US), Green Star (Australia), etc. – Indian systems – TERI GRIHA rating, LEED India rating, IGBC

References:

1. B.C.Bose, “Integrated approach to sustainable Development”, Rajat Publications, Delhi
2. Laurie Baker’s, “Chamoli Earthquake hand book”, Costford, Centre of science and technology for rural development.
3. Fuller Moore, “Environmental control systems Heating, Cooling, Lighting”. McGraw Hill, Newyork.
4. Caring A.Langston, Grace K.C.Ding, “Sustainable practices in built environment”, second edition, Butterworth-Heinmann Linacre House Jordanhill Oxford.
5. R.N.Trivedi, “Environmental Sciences”, Anmol Publications Pvt Ltd, New Delhi

BUILDING CODES AND BYELAWS

INTENT :

Deals with codes and regulations to be applied to building Projects.

Objectives of the Course: To provide an introduction to the codes and bye laws applicable to building projects

CONTENT :

MODULE-I

Introduction to building codes and norms. Need and nature of building codes, standards and regulations, overview of basic terminologies, nature of building codes in special regions like heritage zones, air funnels, environmentally sensitive zones, disaster prone regions, coastal zones, hilly areas, etc.

MODULE-II

Study of building regulations. Overview of administrative processes for obtaining building permits at various.

Stages; General Land-use, building classifications and permissible uses; Norms for exterior and interior open spaces, Setbacks and margins, norms for building projections in open spaces, considerations in FAR, guidelines for open green areas.

MODULE – III

Norms for Vehicular Areas. Means of access, norms for access widths for various types of buildings, requirements of parking spaces, standards for turning radius, access to service areas.

MODULE-IV

Norms for Fire Protection. Overview of fire protection norms for various building classifications, norms for fire- exit ways and building materials, concept of fire zoning, doorways, stairways, passages and corridors, fire escapes etc.

MODULE-V

Norms for building services. Norms for lighting and ventilation, introduction to basic terminologies, components of daylight factor, general principles of opening for good lighting, considerations in artificial lighting; general principles for natural and mechanical ventilation, overview of norms for acoustical and electrical installations.

MODULE – VI

Requirements for parts of buildings. Plinth, Habitable rooms, kitchen, wet areas, mezzanine, store rooms, elevated parts like chimneys, parapets etc.

MODULE - VII

Introduction to local building byelaws. Study of local administrative provisions for obtaining building permits, architectural control and provision of building services, regulations for super structures, building height regulations, regulations for multi-storied buildings etc.

Reference books:

1. Building codes and byelaws obtain from local development authorities.

GREEN BUILDING AND INFRASTRUCTURE

INTENT :

The course focuses on developing an understanding regarding environmental sustainability and environmentally responsible green buildings.

Develop skills to promote eco friendly characteristics in the area of architecture and buildings and identify crucial technologies, facilities and applications that help in developing green buildings.

CONTENT :

MODULE - I

Introduction to Macro Environment: Elements of climate, weather, Water cycle, Carbon cycle, Environmental quality, Deforestation, climatic change, Ozone depletion and implications.

MODULE - II

Micro-environment: Natural environment Vis a vis built environment. living environment Characteristics and components of Urban Ecosystem solar radiation, heat flow, air-movement, Land use, drainage and sanitation.

MODULE - III

Concepts of green field development: Brown field development, environmental impact and ecological balance, FAR, layouts, sustainable Site development, vegetation, landscape elements, alternative services and technologies, rain water harvesting, on site sewerage retention, treatment, recycle and reuse.

MODULE - IV

Building Resources: Passive energy system Design, Building envelope, orientation and components of building fabric and Shading, High rise buildings, modular building Construction, curtain walls, Sourcing and recycling of building materials, alternative Calcareous, metallic and non metallic, materials

MODULE - V

Building Infrastructure: Active Energy Systems in buildings, Utilities and services, building automation. Electro-mechanical systems, lifts and transportation, captive power plant and equipment, operation & maintenance

MODULE - VI

Indoor air quality: fresh air requirements standards, Sick Building Syndrome, VOC and pollutants.

MODULE - VII

Introduction to building rating systems: building auditing, points system, components, and weight age, agencies and institutions, GBC, TERI etc, green buildings in the contexts of Indian sub continent.

Reference books:

Green Building Technologies - Godrej Centre CII a Madhapur, Hyderabad.

Greening Building – Green Congress, US.(web).

HSMI. Sustainable Building Technology – HUDCO, HSMI (Human Settlement Management Institution, New Delhi.

Koenigsberger, O.H. and Others. Manual of Tropical Housing and Building. Orient Longman, Chennai, 2003.

SE 307 A THEORY OF STRUCTURES - III

2L

3 Hours, 100 Marks

2L

100 Marks

2P

50 Marks

CONTENT :

MODULE - I

Concept of structural indeterminacy and its application in structural system development. Soil mechanics, soil bearing capacity. Design of continuous structures in steel and RCC. Foundation Engineering. Design of foundations in RCC, piles and rafts ; retaining walls.

MODULE- II

Principle consideration for structural Methods of analysis. Complex analysis and composite structures. Design of continuous beams in steel and RCC. Design of complex girders and box girders. Behaviour of structures under wind and seismic loads.

SESSIONALS

AR 301 B ARCHITECTURAL DESIGN - III

9T

3 Hours, 300 Marks

INTENT :

The exercise in studio makes the student to get involved in the design process and learn more about designing for any given subject with appropriate methodology at micro level.

CONTENT :

MODULE - I

To make the students to understand about the given designs by visualizing the entire project into 3dimensional spaces in forms of built and the open spaces with proper connections between the blocks/clusters for given design on that particular site after the sufficient site visits to understand the nature of site, neighborhood and also visiting the similar existing project of the same scale to understand the working pattern and space requirement.

MODULE - II

Exercises like:

- (a) Museums/exhibition spaces / art gallery
- (b) Multistory bank building
- (c) Resorts etc.

MODULE - III

1. Emphasis shall be on architectural, services and structural detailing.

References:

1. Crosby lock wood and sons "Neufert, Ernst architect's data"
2. Mc Grawhill. "Time Saver Standards for Architectural Design Data".

AR 302 B BUILDING MATERIAL AND CONSTRUCTION - III

2T

3 Hours, 100 Marks

Drawings of –

- (1) Steel trusses - king post truss, queen post truss with detail of joints - fixing - detail of eaves projection with soft boarding, north light details, girders.
- (2) Details of false ceiling
- (3) Details of cavity walls
- (4) Reinforcement details of column, beam, lintel, slab & waist slab.
- (5) Construction and expansion joint details

AR 303 B ARCHITECTURAL DETAILING

4T

3 Hours, 100 Marks

INTENT :

Learning of building construction will not realize its full objectives unless it is supplemented by a thorough understanding of the methods for achieving sound detailing. It is necessary for the students to understand the principles of detailing as applicable to various structural and non-structural situations in Indian context.

CONTENT :

To enable students to appreciate the challenges in detailing for both the newly designed buildings as well as while carrying out additions and alterations to existing buildings. To enable students to understand the various Fittings, Furniture & Equipment (FFE) that are needed in buildings and their installation methods. To train students towards adopting an integrated approach while dealing with complex buildings incorporating various allied requirements.

MODULE I INTRODUCTION TO CURRENT DEVELOPMENTS IN BUILDING INDUSTRY

Smart Materials: Characteristics, classification, properties, energy behaviour, intelligent environments. Recycled and ecological materials and energy saving materials: Straw-bale, card board, earth-sheltered structures, recycled plastics, recycled tyres, paper-crete, sandbags, photovoltaic, solar collectors, light-pipes, wind catchers.

Exercises of the above through case studies and drawings.

MODULE II DETAILING OF WALLS, ROOFS AND FLOORING FOR INSTITUTIONAL BUILDINGS

- a) Detailing of a residence - selected spaces.
- b) Detailing of classrooms, library (in school, college)
- c) Detailing of lecture hall, auditorium, exhibition spaces

Exercises of the above through case studies and drawings.

MODULE III DETAILING OF WALLS, ROOF, FLOORING FOR COMMERCIAL BUILDINGS

- a) Detailing of shop-fronts, office spaces for commercial buildings including detailing of crucial elements such as entrance porches, main doors, staircases, show-windows, enclosed and air-conditioned atrium spaces.
- b) Detailing of façade and selected spaces for apartment buildings, hotels and hostels.

Exercises of the above through case studies and drawings.

MODULE DETAILING OF BUILT-IN FURNITURE AND FITTINGS

Detailing of built-in elements like kitchen counters, cupboards, cabinets, toilets, toilet fitting. Exercises of the above through case studies and drawings.

MODULE DETAILING OF EXTERIOR AND INTERIOR ARCHITECTURAL ELEMENTS

Detailing of architectural elements like indoor fountains, water walls, transparent floors, street furniture, hard and soft landscape, swimming pools, water bodies and courtyard spaces. Detailing of interior architectural elements in existing buildings (e.g. Staircase in bookshops, restaurants, playpen in restaurants, reception areas in hotel lobbies etc.)

Exercises of the above through case studies and drawings.

REFERENCES

1. Susan Dawson, Architect's Working Details (Volume 1-10), 2004
2. Swimming Pools, Lane Book Company, Menlo Park, California
3. Nelson L Burbank, House Carpentry Simplified, Simmons-Board- Man

AR 304 B ELECTIVE - II

2T

3 Hours, 100 Marks

Assignment to be given to the student by their concerned teacher.

**AR 305 B COMPUTER APPLICATIONS - III
(3D RENDERING AND SETTING)**

2P

3 Hours, 100 Marks

PROJECT:

Visualize a building. Explore the potential of lights and camera in Google sketch up and use the same in the model created for the final submission.

TOOLS:

Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filling in sketch up. Exercise to identify and visualize a building using the above said utilities.

FOURTH B.ARCH.

TEACHING AND EXAMINATION SCHEME- 2012,2013,2014,2015, 2016

		L	T	P	Exam. Hours	Marks
A.	Written Papers					
AR 401A	Building Material and Construction - IV	2	-	-	3	100
AR 402A	Urban Design and Town Planning	2	-	-	3	100
AR 403A	Building Estimating, costing & Specification	2	-	-	3	100
AR 404A	Building Services - III (HVAC and Fire fighting)	2	-	-	3	100
AR 405A	Elective III	2	-	-	3	50
SE 406A	Theory of Structures - IV	2	-	-	3	100
	Total	12				550
B.	Practicals & Sessionals					
AR 401B	Architectural Design - IV	-	9	-		300
AR 402B	Building Material and Construction - III	-	2	-		100
AR 403 B	Urban Design and Town Planning	-	3	-		100
AR 404 B	Building Estimating costing & Specification	-	2	-		50
AR 405 B	Elective III	-	2	-		100
AR 406B	Dissertation	-	3	-		100
SE 407B	Theory o Structure -III	-	-	2		50
		21			2	800
Grand Total: 12+21+2 =35 Periods						1350

* Practical Training for a period of six months in the starting of VIth year.

MODULE - I

Rural - material and construction :

Mud as a building material : Classification and engineering properties – stabilization – details of mud wall construction, adobe construction – Structural aspects – construction details of mud structure.

MODULE - II

Advanced building materials for construction: Geosynthetics - uses in construction, classification and properties, materials for water proofing and damp proofing, adhesives, sealants and joint fillers.

MODULE - III

Study of advanced concrete :

Special concrete and concreting methods: Lightweight, high density, fibre reinforced, polymer concrete - outline of manufacture, properties and uses of the above - ready mixed concrete - guniting - cold weather and underwater concreting - current developments in concrete products and methods of concreting.

MODULE - IV

Prestressed Concrete - Precast prestressed construction for large span structures - Constructional details of various structures in steel, concrete- Portal frame, folded plates, domes, etc. Principles of cellular structures, Space frames, tensile structure, pneumatic structure. Properties and application of materials and method of construction.

MODULE - V

Introduction to earthquake resistant structures – Concepts of stability, prevention of collapse – Study of shear wall and diagonal framing – Architectural details of earthquake resistant buildings.

References

1. P.C. Varghese- 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi, 2005.
2. Hand book of Timber Engineering – BIS
3. Subramanilal N- 'Elementary Space Structure'
4. V.S. Faster- 'Advanced Building Construction'
5. Hiki. K- 'Shells membranes and space frames'
6. IS 4326: 1993

AR 402 A URBAN DESIGN AND TOWN PLANNING

2L

3 Hours, 100 Marks

URBAN DESIGN

CONTENT :

MODULE I

Introduction to urban design

Definitions of urban design, Urban Design and Its Evolution

The scope and objectives of urban design

Need for urban design in contemporary India-

- The relation between Architecture, Urban design and urban planning

MODULE II

Urban Spaces and Urban Image

Behavioral issues in urban design - Principles of urban spatial organization, urban scale, urban spaces, urban massing, quality of urban enclosure Image of the city and its elements

- Perceptions of urban environment: Kevin Lynch's principles

MODULE III

Basic theories and techniques in Urban Design

Surveying methods and techniques: conducting and urban design survey

Introduction to basic theories in Urban design(Kevin Lynch, Christopher Alexander, Bill Hillier, Peter Kalathorpe), Urban design policies – Formulation of policies for various components like landscape, infrastructure and built forms – Urban design Principles – scale and mass, Skyline studies – Urban spaces and their characteristics space linkage

MODULE IV

Urban renewal, scope need and procedure – Urban conservation and economic considerations-

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

Project Preparation – Agencies involved in the execution – coordination, role of planning authorities- Role of urban arts commission, urban project financing agencies and their functions

References

1. Paul.D.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, Canmitto , 'The Art of Building cities'
10. Time saver standards, 'Urban Design'
11. Andres Duany, Elizebeth Pflter- Zyber and Robert Alminanna , 'The new civic art'

TOWN PLANNING

CONTENT :

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 , Industrial and Post industrial age.

Contribution of Ebenezer Howard, Le Corbusier, Clarence Stein, Patric Geddes, C.A. Dioxidis

MODULE II

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

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’

AR 403 A BUILDING ESTIMATING, COSTING AND SPECIFICATIONS

2L

3 Hours, 100 Marks

INTENT :

The course deals with various methods of quantity surveying, rate analysis of building and valuation and specifications for different materials used. Expected Skills / Knowledge Transferred: Techniques of estimating and costing and writing specification related to building construction.

Contents:

MODULE I

Quantity Surveying: Introduction - Definitions and terms used, principles, units of measurements. Methods of preparing approximate estimates (plinth area and cubic content method), basic differences and advantages.

MODULE II

Detailed Building Estimation: Method of obtaining detailed quantities of building items (center line method, long wall and short wall method) PWD System to be followed.

MODULE III

Detailed estimation for load bearing structures framed structure (ground floor only)

MODULE IV

Example and exercise in obtaining all items from excavation to finishes.

MODULE V

Preparing approximate estimates for services like water supply, plumbing, electrical work, mechanical equipment and air conditioning. (for residential building).

MODULE VI

Rate analysis: Cost of materials and labour for various works, data sheet for different items of works, different methods of execution i.e. piece work, daily basis, lump sum, labour rates and percentage etc

MODULE VII

Valuation – Introduction – state the purposes of valuation of building explain the terms, market value, book value, capital cost, capitalized cost, year's of purchase, list out various methods of estimating the depreciation of building properties, calculate the value of the property by different methods.

MODULE VIII

Specifications: Definition, purpose and importance of specifications, General or brief specifications, Detailed specifications, writing of specifications, for items like earthwork excavations, foundation, CRS masonry, DPC, PCC, RCC, brickwork, doors and windows (wooden), mortars, plaster, painting, flooring like terrazzo flooring and tiles, ceramic tiles, marble, granite, distemper, snowem, glazing, specification, writing to include materials, tests pre and post installation, modes of measurements.

Reference books:

Datta, B.N. Estimating and Costing in Civil Engineering: Theory and Practice, 23rd ed. UBS Pub. Distributors Ltd., New Delhi, 1993.

Bride, G.S. Estimating and Costing, 2nd ed. Dhanpat Rai and Sons, Delhi, 1982.

Rangwala, S.C. Valuation of real Properties, 6th ed. Charotar Pub.

6 House, Anand, 2003. Standard Specification and rates, Government of Andhra Pradesh, Government Press, Hyderabad

Indian Standards Institution. National Building Code of India 1983. Indian Standards Institution, New Delhi, 1984.

Lerrs, Jack. Engineering Construction Specification.

**AR 404 A BUILDING SERVICES - III
(HVAC AND FIRE FIGHTING)**

2L

3 Hours, 100 Marks

INTENT :

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).

CONTENT :

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, relative humidity, degree of saturation, Psychrometric chart – Psychrometric process – adiabatic mixing – sensible heating and cooling – humidifying and dehumidifying - bypass factor – Sensible heat factor – Room sensible heat factor – RSHF and GSHF line – Design condition – Apparatus dew point temperature. Air washer. Effect of ventilation. Simple problem using psychrometric chart.

MODULE IV

Summer air conditioning system – winter air conditioning system – heating systems – year round air conditioning – Comfort air conditioning – factors effecting human body comfort – Comfort chart – Air distribution systems – duct systems – sizes, Layout and mountings – Effects of bends of ducts. Air conditioning systems – Room air conditioners – Split system – Packaged system – all air system – chilled water system – zoning – Market survey – Noise and noise control. Project work – Drawing should be prepared showing all details of the system of a building / part of building (to be combined with design project).

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 Domkunduwaran, 'Refrigeration & Air conditioning'

FIRE FIGHTING

MODULE - I

FIRE SAFETY: DESIGN AND GENERAL GUIDELINES OF EGRESS DESIGN

Principles of fire behavior, Fire safety design principles _ NBC Planning considerations in buildings – Non- Combustible materials, egress systems, Exit Access – Distance between exits, exterior corridors – Maximum travel distance, Doors, Smoke proof enclosures. General guidelines for egress design for Auditoriums, concert halls, theatres, other building types, window egress, accessibility for disabled- NBC guidelines – lifts lobbies, stairways, ramp design, fire escapes and A/C, electrical systems.

MODULE - II

FIRE SAFETY: FIRE DETECTION AND FIRE FIGHTING INSTALLATION

Heat smoke detectors – sprinkler systems

Fire fighting pump and water requirements, storage – wet risers, Dry rises

Fire extinguishers & cabinets

Fire protection system – CO2 & Halon system

Fire alarm system, snorkel ladder

Configuring, sizing and space requirements for fire fighting equipments

Required readings:

1. Fire Safety: national Building Code of India 1983 published by Bureau of Indian Standard.

AR 405 A ELECTIVE - III

2L

3 Hours, 50 Marks

COURSE TITLE

1. Principles of Traditional Indian Architecture
2. Safety systems and building management
3. Cost effective technology in building construction

PRINCIPLES OF TRADITIONAL INDIAN ARCHITECTURE

INTENT :

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

To introduce the principles of Vastu and Vaasthu and relationship between building and site. To familiarize the students with the units of measurement in traditional architecture. To introduce concepts of orientation and cosmogram according to the Vasthu Purusha Mandala. To study the detailing and design of various building components and their material and method of construction.

CONTENT:

MODULE I INTRODUCTION

Vastu and Vaastu - its definition and classification - Relationship to earth.. Features of good building site - good building shapes - macro, micro, enclosed and material spaces - relationship between built space, living organism and universe - impact of built space on human psyche.

MODULE II MEASUREMENT AND RESONANCE TO VIBRATION

Units of measurement - Tala system and Hasta system of measures Theory of vibration - vibration as time, equation of time and space - Time space relationship and measurement of the same.

MODULE III SITE PLANNING AND COSMOGRAM

Orientation of building, site, layout and settlement - positive and negative energies - importance of cardinal and ordinal directions - The celestial grid or mandala and its types. The Vaastu Purusha Mandala and its significance in creation of patterns, and lay-outs, Types of lay-outs. Simple design of residential buildings.

MODULE IV COMPONENTS AND DETAILING

Building heights -Base and basement - wall and roof specifications - column and beam designs - Pitched roof and domical roofs - significance of pyramid.

MODULE V MATERIALS AND CONSTRUCTION

Use of wood, stone, metal, brick and tile - marking technology, corbelling technology, jointing technology - foundations for heavy and light structures - Landscaping in and around buildings - Aesthetics in Indian Architecture.

References :

1. Dr.V.Ganapati Sthapati - :Sthapatya Veda” Dakshina Publishing House, Chennai-41, India, 2001.
2. Stella Kramrisch - The Hindu Temple Vol.I Motilal Banarsidass Publishers Pvt. Ltd., Delhi - 1991.
3. K.S.Subramanya Sastri - Maya Matam - Thanjavur Maharaja Sarjoji Saraswathi Mahal Library - Thanjavur - 1966.
4. Dr.V.Ganapati Sthapati - :Sthapatya Veda” Dakshina Publishing House, Chennai-41, India, 2001

SAFETY SYSTEMS AND BUILDING MANAGEMENT

INTENT :

The course is designed to impart the basic knowledge in Safety, security and building automation and integrated building management systems. To familiarize the student with minimum safety requirements for a high rise building with exposure to NBC. To study fire alarm systems and fire suppression systems and their installation.. To inform students of various types of security systems and their application in building. To outline the importance and objectives of an Integrated building management system.

CONTENT:

MODULE I SAFETY REQUIREMENTS

Minimum safety requirements for a building, particularly for a high rise building as per the National Building Code.

MODULE II FIRE ALARM SYSTEMS

Objectives of a Fire Alarm System, Essential components of a Fire Alarm System, Technology of detection, Type of Statutory Standards followed in direction, Explanation on the essential clauses, various types of technologies employed in the Fire Alarm System, basic knowledge on how a Fire Alarm System is designed and installed

MODULE III FIRE SUPPRESSION SYSTEMS:

Objectives of a Fire Suppression System, Explanation on fire triangle, Essential components of a Fire Suppression System, different types of Fire Suppression Systems, Type of Statutory Standards followed in Suppression, Explanation on the essential clauses and basic knowledge on how a Fire Suppression System is designed and installed.

MODULE IV SECURITY SYSTEMS

Introduction to different types of Security Systems and why they are required. Introduction to Access Control, CCTV, Intruder Alarm and Perimeter protection Systems, Essential components of each system, various types of technologies employed in these Systems, basic knowledge on how they are designed and installed.

MODULE V INTEGRATED BUILDING MANAGEMENT SYSTEM

The objectives of the Integrated Building Management System (IBMS), the list of utility, safety and security systems that are generally monitored and controlled through IBMS, the various components of IBMS, types of integration with the utility, safety and security systems and the basic knowledge on how they are designed and installed.

REQUIRED READING:

1. Building Automation Systems – A Practical Guide to selection and implementation – Author : Maurice Eyke
2. National Building Code of India 1983 (SP 7:1983 Part IV) – Published by Bureau of Indian Standards
3. IS 2189 – Selection, Installation and Maintenance of Automatic fire Detection and Alarm System – Code of Practice (3rd Revision) – Published by Bureau of Indian Standards.

REFERENCES:

1. The Principles and Practice of Closed Circuit Television – Author: Mike Constant and Peter Turnbull
2. Rules of Automatic Sprinkler Installation – 2nd Edition – Published by Tariff Advisory Committee.
3. Fire Suppression Detection System – Author : John L. Bryan
4. Design and Application of Security/Fire Alarm system – Author: John E. Traister.
5. CCTV Surveillance – Author: Herman Kruegle
6. Security Systems and Intruder Alarm Systems – Author: Vivian Capel

COST EFFECTIVE TECHNOLOGY IN BUILDING CONSTRUCTION

CONTENT :

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 .

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.

SE 406 A THEORY OF STRUCTURES - IV

2L

3 Hours, 100 Marks

INTENT :

MODULE - I

Structures system studies. Synthesis of force systems to create structure systems. Vector-active, surface-active and bulk-active systems. Shells and folded plates, Virendal Trusses, space structures, High-rise and large span structures, Prestressing and post-tensioning.

SESSIONAL

AR 401 B ARCHITECTURAL DESIGN - IV

9T

3 Hours, 300 Marks

CONTENT :

Large scale, service oriented projects such as - 5-star hotels, convention centers, multiplex, hospitals, Mixed Land Use, Bus terminus, Railway terminus - where the emphasis is on the detailing of services like, Acoustics, Air conditioning, Water supply and sanitation, lighting, etc. Design problem should be related to the climatic conditions and study models with detailed drawings.

Working drawing:

Objective: is the achievement of a rapid, well-programmed, draw-up, in which the information to be documented are the Detailing of services like:

- Water Supply ,Sanitation & Plumbing
- Air-Conditioning
- Electrical Layout
- Lifts & escalators
- Acoustical details
- Firefighting details

References:

1. Crosby lock wood and sons "Neufert, Ernst architect's data"
2. Mc Grawhill. "Time Saver Standards for Architectural Design Data".

AR 402 B BUILDING MATARIAL AND CONSTRUCTION - III

2T

3 Hours, 100 Marks

Drawings of :

- (1) Folded plates
- (2) Portal frames,
- (3) Space frames.
- (4) Reinforcement and bending detail in R.C. Band, Details of providing Vertical steel bars in Brick masonry.

AR 403 A URBAN DESIGN AND TOWN PLANNING

3T

3 Hours, 100 Marks

Study of urbanscape of a particular town and identifying its elements.

404 A BUILDING ESTIMATING, COSTING AND SPECIFICATION

3T

3 Hours, 50 Marks

Exercises related to actual building estimates based on drawings and specifications. Field exercises related to rate analyses of simple items like bricks masonry etc.

AR 405 A ELECTIVE III

2T

3 Hours, 100 Marks

Assignment to be given to the student by their concerned teacher.

AR 406 B DISSERTATIONS

3T

3 Hours, 100 Marks

Design studio emphasize on explaining and understanding Architecture primarily through the mode of making. Dissertation offers an opportunity to look at architecture, history and design primarily through textual. However, like design, dissertation involves process of observation, reflection and abstraction. Students are encouraged to choose any topic of there interest. They may range from analyzing the works of an architect, history, typological changes, writing, design process and many more. The dissertation should state its objectives, followed by exhaustive documentation and arguments. The emphasis however, could vary according to the topic. The dissertation proposal in about 1500 words stating the topic issues to be explored and the scope must be submitted. After approval the work would be periodically reviewed. A well written report of a minimum 15,000 words must be submitted in the prescribed format, if any provided by the University. The student would subsequently make a presentation of his/her work and defend them.

References :

1. Ian Border, Kurt Rueideu, The Dissertation, An Architectural Students Hand Book, Architectural Press, 2000
2. Linda Grant and David Wang, Architectural Research Methods, John Wiley Sons, 2002

PRACTICAL TRAINING

INTENT :

Internship for a period of not less than 40 weeks in both the semesters put together in one year. To provide experience in Architectural Practice.

Expected Skills / Knowledge Transferred: The skills required for an architect to grow into a complete professional.

INTENT :

Every student must work in an Architect's Office as a full-time trainee for a period of 40 calendar weeks in one year (excluding Viva-voce) from the date of commencement of training. The Chief Architect in the firm should be registered with the Council of Architecture and have a minimum of five years of practical/professional experience after her/his graduation. The student should involve herself/himself in various aspects of work in an office like working drawings, presentation drawings, quantity and cost estimation, site supervision, municipal drawings, etc.

Note: Detailed instructions given by the University regarding the training, the frequency of reporting to the department, etc. will be issued at the end of the Eighth Semester, which the student must strictly follow. After completion of training, every student will have to submit a detailed report with a set of drawings on at least four projects on which she/he has worked during the forty calendar weeks of the practical training period.

Evaluation:

- The internal assessment shall be evaluated at the end of 40 weeks (Tenth Semester) and shall be conducted by the faculty deputed by the department in the institute.
- The detailed report and drawings prepared during practical Training by students will be evaluated at a viva-voce by a jury consisting of one external, one internal and head of the department or his nominee.

After submission of the report the department at its convenience will arrange for the conduct of the viva-voce examination.

FINAL B.ARCH.

TEACHING AND EXAMINATION SCHEME -2012,2013,2014,2015,2016, 2017

		L	T	P	Exam. Hours	Marks
A. Written Papers						
AR 501A	Professional Practice	2	-	-	3	100
AR 502 A	Advanced Building Material and Construction	2	-	-	3	100
AR 503 A	Construction Management	2	-	-	3	100
AR 504 A	Advance Services	1	-	-	3	100
AR 505 A	Elective IV	2	-	-	3	50
AR 506 A	Advance Structural Systems	2	-	-	3	100
	Total	11	-	-	-	550
B. Practicals and Sessionals						
AR 501 B	Thesis	-	9	-		500
AR 502 B	Advanced Building Material and Construction	-	3	-		100
AR 503 B	Elective IV	-	3	-		200
	Total		15			1000
	Grand Total	11 +	15 = 26			1550

AR 501 A PROFESSIONAL PRACTICE

2L

3Hours,100Marks

CONTENT :

MODULE I

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

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

MODULE II

Tenders – Inviting, opening and acceptance of Tenders – Tender notice – Work order letter – Tender document – Special notice and Tender acceptance letter – Public, private and negotiated tenders – Types of tenders– Day work – Piece work – Daily labour – Earnest money deposit – security deposit – Retention amount. Contract – Definition and general principles – Types of contract –Discharge of contract – Contract document – Schedule of quantities – Contract drawings – Contract Sum – Contract bills – Architects instructions. Duties and liabilities of contractor – architect and employer under the contract – Clerk of works – Engineer in charge – Resident engineer – Nominated sub contractor – consultants – liquidated damages – Variation and extras prime cost and provisional sum – Determination of contract. – Certificates of Payments. Arbitration – Advantages of arbitration – Appointment of Arbitrators and Umpire – Powers and duties of arbitrators – role of umpire – Arbitration agreement – Conduct of arbitration proceedings – Publications of the award - Filing of award – Kinds of arbitration –Arbitration and building contract.

MODULE III

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

MODULE IV

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

Reference books:

Banerjee, D.N. Principles and Practice of Valuation, 5t ed. Eastern Law House, Calcutta, 1998.

Dalton, J. Patrick. Land Law, 4th ed. Pitman Pub., London, 1996.

Indian Institute of Architects. H.B. Professional Practice. The Architects Pub. Bombay.

Indian Standards Institution. National Building Code of India 1983. Indian Standards Institution, New Delhi, 1984.

Namavati, H. Roshan. Professional Practice, 8th ed. Lakshani Book Depot, Bombay, 2001.

AR 502 A ADVANCED BUILDING MATERIALS AND CONSTRUCTION
2L **3 Hours, 100 Marks**

INTENT:

The course supplements the previous theory of construction and to introduce the advanced developments in Building Construction. The students are expected to understand the theory and Practical nuance of Advanced Construction Practices. To introduce the students to the latest developments in construction and building materials. Students should be able to grasp the construction Techniques and their adoptability to architectural forms.

CONTENT

MODULE I

Advanced construction methods in RCC , pre-stressed concrete beams slabs frames, lift slab construction post tensioning, multi-storied building frames, circular slabs and beams. uses of rapid-hardening cement, ready mix concrete [RMC} , light weight concrete surface finishes of cement

MODULE II

Folded plates like prismatic, V-type, trough type, pyramidal, prismatic and RCC folded plate and geometrical staircases, Shell structures, cyclonical shells, hyperbolic paraboloids,

MODULE III

Construction techniques for erection of space frames, suspended roofs, membrane structures, cable structures.

MODULE IV

Curtain walls: types of curtain walls, components, structural solutions, construction and erection. glass wall system-glass; sheet metal wall systems sheet metal cladding.

MODULE V

Advanced Building Materials plastic, PVC, metals, synthetic boards, fire proof/ resistant boards/tiles, acoustic materials, glass, composite panels and their applications, non- load bearing gypsum blocks

Reference books:

James Ambrose, Building Construction Enclosure System 1990

Andrea deplazes (ED), Constructing Architecture: Materials processes structures-A hand Book Second Extended edition

Robert E Fischer, Engineering for Architecture 1989

R Barry, The construction of Buildings Volume 4 4th Edition

Schall, Rolf. Curtain Walls: Design Manual. Reinhold Pub., New York, 1962.

AR 503 A CONSTRUCTION MANAGEMENT

2L

3 Hours, 100 Marks

INTENT :

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. Project management software packages – MS Project.

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

AR 504 A ADVANCED SERVICES

1L

3 Hours, 100 Marks

INTENT :Study of services and facilities used in special type of buildings. The emphasis is laid on operation of services, working of different equipment employed for carrying out building function in specific different building types.

To develop understanding of special services, definitions and terms used, working of equipment, installation of facility, special provisions to be made in building design. Expected Skills / Knowledge Transferred: Principles and installations of specialized services in buildings and building complexes and NBC standards.

CONTENT :

MODULE - I

Special services in High rise buildings: Types of lifts, Passenger, Capsule, Hospital bed lift; goods lift etc. Working and operation of lifts, parts of lifts; industry standards and capacity calculations. Provision to be made in buildings for installation, Introduction to working and design of escalator.

MODULE - II

Electronic Systems in Buildings: Telephone and communication, networks in buildings EPABX, Security systems, Burglar alarms, video surveillance, access control, design of computer labs, access flooring, server rooms.

MODULE - III

Fire safety in buildings: portable fire fighting equipment, NBC standards, built in wet riser system, sprinkler system, fire hydrant, class of fire and occupancy, cooking gas distribution in buildings, piped gas supply, bottled gas supply, kitchen Stoves, burners

MODULE - IV

Swimming Pools: Pool tank design, patio, finishes, Water circulation, cascades, channels, filtration and water treatment, Water quality and disinfection, balancing tank.

MODULE - V

Hotel services: Specialty services required for hospitality industry, Laundry services, Kitchen services, Channeled Music, Internet,

MODULE - VI

Environmental services: waste generation in Industrial buildings, various types of waste, solid, liquid, gas, treatment and disposal facilities, waste generation in hospital buildings, design provision for its disposal,

MODULE - VII

Alternative energy sources for buildings:, hot water solar energy system, applications of photo voltaic cells, biomass digesters, wind energy.

Reference books:

Faber, Oscar and Kell, J.R. Heating and Air-Conditioning of Building. Architectural Press, Surrey, 1945.

Prasad, Manohar. Refrigeration and air-conditioning, 5t ed. New Age Intl. Pub., New Delhi, 1996.

Tiwari, Satish. Water and Energy resources

COURSE TITLE

1. Earthquake Resistance Structures
2. Architectural Conservation
3. Services in tall building

EARTHQUAKE RESISTANT ARCHITECTURE

INTENT :

To provide basic knowledge of earthquake resistant design concepts to students of Architecture, as it has become evident in recent years that some of the seismically active areas of the world are located within Indian and live lost during past earthquakes due to damage of homes and other buildings are enormous.

CONTENT:

MODULE I

Fundamentals of earthquakes

- a) Earths structure, seismic waves, plate tectonics theory, origin of continents, seismic zones in India.
- b) Predictability, intensity and measurement of earthquake
- c) Basic terms- fault line, focus, epicentre, focal depth etc.

MODULE II

Site planning, performance of ground and buildings

- a) Historical experience, site selection and development
- b) Earthquake effects on ground, soil rupture, liquefaction, landslides.
- c) Behaviour of various types of building structures, equipments, lifelines, collapse patterns
- d) Behaviour of non-structural elements like services, fixtures in earthquake-prone zones

MODULE III

I. Seismic design codes and building configuration

- a) Seismic design code provisions – Introduction to Indian codes
- b) Building configuration- scale of building, size and horizontal and vertical plane, building proportions, symmetry of building- torsion, re-entrant corners, irregularities in buildings- like short stories, short columns etc.

MODULE IV

II. Various types of construction details

- a) Seismic design and detailing of non-engineered construction- masonry structures, wood structures, earthen structures.
- b) Seismic design and detailing of RC and steel buildings
- c) Design of non-structural elements- Architectural elements, water supply, drainage, electrical and mechanical components

MODULE V

III. Urban planning and design

- a) Vulnerability of existing buildings, facilities planning, fires after earthquake, socio-economic impact after earthquakes.
- b) Architectural design assignment- Institutional masonry building with horizontal spread and height restriction, multi-storeyed RC framed apartment or commercial building .

Required reading:

1. Guidelines for earthquake resistant non-engineered construction, National Information centre of earthquake engineering (NICEE, IIT Kanpur, India)
2. C.V.R Murthy, Andrew Charlson. "Earthquake design concepts", NICEE, IIT Kanpur India.

References :

1. Ian Davis (1987) "Safe shelter within unsafe cities" Disaster vulnerability and rapid urbanisation, Open House International, UK
2. Socio-economic developmental record- Vol.12, No.1, Jan-Feb 2005
3. Learning from Practice- A review of Architectural design and construction experience after recent earthquakes- Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto, Italy.

ARCHITECTURAL CONSERVATION

INTENT

This course is designed to address Conservation as an idea that enhances quality of life, as an effective planning strategy, a criticism of universal modernism and a way to address issues of memory and identity. An overview of current status of conservation in India is also provided

To introduce the various issues and practices of Conservation. To familiarise the students with the status of conservation in India and the various agencies involved in the field of conservation worldwide and their policies. To outline the status of conservation practice in the country and the various guidelines for the preservation, conservation and restoration of buildings. To inform the students about the character and issues in our heritage towns through case studies.

CONTENT:

MODULE I INTRODUCTION TO CONSERVATION

Understanding Heritage. Types of Heritage. Heritage conservation- Need, Debate and purpose. Defining Conservation, Preservation and Adaptive reuse. Distinction between Architectural and Urban Conservation. International agencies like ICCROM , UNESCO and their role in Conservation

MODULE II CONSERVATION IN INDIA

Museum conservation – monument conservation and the role of Archeological Survey of India – role of INTACH – Central and state government policies and legislations – inventories and projects- select case studies of sites such as Hampi, Golconda, Mahabalipuram -craft Issues of conservation

MODULE III CONSERVATION PRACTICE

Listing of monuments- documentation of historic structures- assessing architectural character – historic structure report- guidelines for preservation, rehabilitation and adaptive re-use of historic structures- Case studies of Palaces in Rajasthan, Chettinad and Swamimalai dwellings, seismic retrofit and disabled access/ services additions to historic buildings-heritage site management

MODULE IV URBAN CONSERVATION

Over view of urban history of India and Tamil Nadu- understanding the character and issues of historic cities – select case studies of towns like Srirangaram, Kumbakonam and Kanchipuram - historic districts and heritage precincts.

MODULEV CONSERVATION PLANNING

Conservation as a planning tool.- financial incentives and planning tools such as Transferable Development Right(TDR)-urban conservation and heritage tourism-case studies of sites like for Cochin, Pondichery French town.- conservation project management

Required reading

1. Donald Appleyard, The Conservation of European Cities, M.I.T. Press, Massachusetts
2. James M. Fitch, Historic Preservation: Curatorial Management of the Built World by University Press of Virginia; Reprint edition (April 1, 1990)
3. A Richer Heritage: Historic Preservation in the Twenty-First Century by Robert E. Stipe
4. Conservation Manual , Bernard Fielden; INTACH Publication

REFERENCES:

1. B.K. Singh, State and Culture, Oxford, New Delhi
2. A.G. K. Memon ed. Conservation of Immovable Sites, INTACH Publication, N.Delhi.
3. Seminar Issue on Urban Conservation.

SERVICES IN TALL BUILDINGS

INTENT :

MODULE - I

Introduction :

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. McGuiness and B.Stein, 'Mechanical and Electrical equipment for buildings, John Wiley and sons Inc., N.Y.
4. Riley Shuttleworth, 'Mechanical and electrical Systems for Construction', McGraw Hill Book Co., U.S.A., 1983.
5. ASHRAE: Handbook–HVAC Systems and Equipment(1992), HVAC Applications (1991) ASHRAE, Inc. Atlanta.
6. Langdon – Thomas G.J., - 'Fire Safety in Buildings, Principles and Practice' – Adam and CharlesBlade,London,1972.

AR 506 A ADVANCED STRUCTURAL SYSTEMS

2L

3 Hours, 100 Marks

INTENT :

The course supplements the previous courses on theory of structures, while introducing the advanced development in structural form. The students are expected to understand the theory behind these structural forms and not expected to solve numerical problems.

- To inform the students about the recent developments in structural forms.
- To increase the student's ability to identify the structural forms suitable for architectural expression.

Expected Skills / Knowledge Transferred:

- The students are expected to gain knowledge about the recent developments and advanced concepts in the structural forms.
- The students are expected to analyse and understand the nature of stresses that are developed in the major elements of advanced types of structures.

INTENT :

MODULE - I

Construction and form, Structure and Form Equilibrium under simple tension or compression, the catenary and the arch, the simply supported beam, the domical shell.

MODULE - II

Structural elements: Beams and slabs Arches and catenaries; vaults, domes and curved membranes; Trusses, Portal frames and space frames.

MODULE - III

Relation between structure and architecture, Geometry of form and structural function, Aesthetic theories of the expression of structural function in architectural form.

MODULE - IV

Structural Systems: single and double layer grids; braced domes, ribbed domes, plate type domes, Network domes, Lamella domes, Geodesic domes, Grid domes. Braced and folded structures.

MODULE - V

Space frames: Folded plates, shells, cyclonical shells, Hyperbolic paraboloids, free forms. Cable structures: Simply curved suspended roofs, combination of cables and struts.

MODULE - VI

Curtain Walls: Types of Curtain Walls and their Components Structural problems, construction and erection.

Reference books:

Candela, Felix. Architecture and Structuralism. 1963. Lane, Allen. Developments in Structural Form. Penguin Books Ltd, London, 1975.

Macdonald, J. Angus. Structure and Architecture, 2nd ed. Architectural Press, Oxford, 2003.

Michaels, Leonard. Contemporary Structures in Architecture. 1950.

Schall, Rolf. Curtain Walls: Design Manual. Reinhold Pub., New York, 1962.

Siegel, Curt. Structure and Form in Modern Architecture. Crosby Lockwood and son Ltd., London, 1962.

Subramanian, N. Principles of Space structures. Wheeler and Co., Allahabad, 1983.

Zannos, Alexander. Form and Structure in Architecture: The role of statical function. Van Nostrand Reinhold Co., New York, 1987.

SESSIONAL
AR 501 B DESIGN THESIS

9T

3 Hours, 500 Marks

INTENT :

Thesis should reflect the knowledge gained from all the courses undertaken by the student in all the previous semesters.

To develop assimilation, synthesis and application of research in Architecture

Expected Skills / Knowledge Transferred:

Student should be in a position to comprehend the design philosophy, theories, data analysis and application in a chosen area of study.

CONTENT :

Each student is expected to prepare a design thesis based on the preliminary work undertaken in the Pre Thesis Seminar, under an approved guide/adviser by the department. The design Thesis shall comprise of Architectural Design proposals, Structural design for a component of architectural design proposal. The Component of Design for which structural design is to be provided will be chosen with the help of faculty in charge of structural design subject. The student will also be required to produce a project feasibility report for the specific design undertaken for the design thesis. Thesis should reflect the knowledge gained from the course learnt in the previous semesters

The particulars of schedule, content, presentation, format etc., is to be decided by the department, from time to time and shall be strictly followed. At the end of the semester, each student is expected to submit all original drawings prepared as per the department's specifications. Three copies of the report in the specified format along with a model submitted to the department, after obtaining the approval of the respective guides / advisers. The department shall schedule the final viva-voce, at its convenience, only after the receipt of the thesis submission by a student. The performance sheet submitted by the advisor and the thesis committee should be the basis for allowing the student to appear for the final viva-voce. For End exam, viva-voce is to be conducted by a jury comprising of an external examiner, one internal examiner and head of the department or his nominee. For the structural design project and Project Feasibility report a separate External Viva voce will be conducted. A total of 50 internal Marks (30 and 20 respectively) and 50 external marks (30 and 20 respectively) shall be allotted for the same out of total 300 marks.

References:

Mukhi, H.R. Technical Report Writing: Specially prepared for Technical and Competitive Examinations, New Delhi: Satya Prakashan, 2000.

Barrass, Robert. Writing At Work a guide to better writing in administration, business and management, London: Routledge, 2003.

Seely, John. The Oxford guide to effective writing and speaking, 2nd ed., Oxford ; New York : Oxford University Press, 2005.

Jo Ray McCuen, Anthony Winkler. Readings for writers, 9th ed., Fort Worth : Harcourt Brace College Publishers, 1998.

Treece, Malra. Effective reports, 2nd ed., Boston: Allyn and Bacon,

AR 502 B ADVANCE BUILDING MATERIAL AND CONSTRUCTION
3T **3 Hours, 100 Marks**

Drawings of :

1. Pre-stressed concrete beams slabs frames.
2. lift slab construction post tensioning.
3. Multi-storied building frames
4. Circular slabs and beams.
5. Folded plates like prismatic, V-type, trough type, pyramidal, prismatic.
6. RCC folded plate.
7. Geometrical staircase.
8. Suspended roofs.
9. Construction and erection of curtain wall and glass wall

AR 503 B ELECTIVE - IV
3T **3 Hours, 200 Marks**

Assignment to be given to the student by their concerned teacher.