

UNIVERSITY OF PUNE

DETAILED SYLLABUS

For

SECOND YEAR

Of

**BACHELOR OF ARCHITECTURE
(CONSTRUCTION MANAGEMENT)**

(To be implemented from 2012-13)

**SECOND YEAR B.ARCH (C.M) & SECOND YEAR BBS.
SCHEME OF TEACHING & EXAMINATION**

Sr. No.	Subject Code	Name of the Subject	Head	Teaching Scheme			Examination Scheme		
				Load/Week		Total	Term I	Term II	Total
				L	S/P	Load	Marks	Marks	Marks
1	213421	Basic Design -II	SS	1	4	5	150	150	300
2	213422	Architectural Design II	SV	2	5	7	150	150	300
3	213423	Arch. Drawing & Graphics -II	SS	1	4	5	100	100	200
4	213424	Bldg. Tech & Materials - II	SV	2	4	6	150	150	300
5	213425	Bldg. Tech & Materials - II	TH				---	100	100
7	213451	Theory of Structures-II	TH	1	1	2	----	100	100
8	213428	H.A. & H.S.-II	SS	3	0	3	50	50	100
9	213429	H.A. & H.S.-II	TH				----	100	100
10	213430	Building Services-I	SS	2	0	2	100	100	200
11	213431	Building Services-I	TH				----	100	100
12	213432	Building Sciences	SS	1	3	4	50	50	100
13	213452	Materials Management	SS	1	1	2	50	50	100
		TOTAL		14	22	36	800	1200	2000

STAGE – I - LEGEND - SS- SESSIONAL, V-VIVA VOCE , TH-THEORY PAPER

SUBJECT CODE: 213421		BASIC DESIGN-II (sessional)	
TEACHING SCHEME		EXAMINATION SCHEME	
Lecture Periods (per week.)	1	Paper	nil
Studio Periods (per week)	4	Sessional (Internal) 75 marks per term	150 marks
Total Contact Periods (Per week.)	5	Sessional (External) 75 marks per term	150 marks
		Viva-Voce	nil
		Total Marks for two terms.	300 marks

COURSE OBJECTIVE:

This subject aims to provide the students with a sound background in design skills by treating Design as a basic creative activity. It focuses on improving creativity through practicing certain established methods & exercises in creativity and tries to draw inspiration from and establish analogies between other creative arts and architecture.

COURSE OUTLINE:

1. Creation, Creativity and Motivation for architects
2. Psychological qualities, skills & behavior for creativity
3. Role of Experience and Memory in Design
4. Role of Fantasy, Imagination and Reality in Design
5. Blocks to Creativity: Physical and Mental
6. Techniques for improving Creativity:
 - a. Brainstorming
 - b. Lateral Thinking
 - c. List of Mental Associations
 - d. Random Combinations
 - e. Matrix of Ideas
 - f. Use of Manipulative verbs
 - g. Tree of Possibilities
 - h. Abstraction
 - i. Transformation
 - j. Use of the Ridiculous.
7. Sources of Inspiration for Architectural Creativity:
 - a. Material
 - b. Geometry
 - c. History
 - d. Nature & Climate
 - e. Mimesis
 - f. Paradox & Exotic & Multicultural
 - g. Association with other arts.
 - h. Architectural Biographies.

Sessional work:

- Sufficient number of projects should be undertaken to cover the topics. The nature of projects would vary to suit the topics. Documentation of these exercises will be done in A3 size portfolio.
- Topics 1 to 5 will carry 15% of total marks, topics 6a to 6j will carry 35% of total marks and topics 7a to 7h will carry 50% of total marks. The institutes may take up any 7 topics from 6a to 6j and any 6 topics from 7a to 7h.

REFERENCE BOOKS

1. Graphic Thinking for Architects and Planners by Paul Lassau
2. Poetics in Architecture: Theory of Design by Anthony Antoniadis
3. Architecture: Form Space and Order – Francis D. K. Ching
4. Interior Spaces: Francis D K. Ching
5. Pattern Language – Christopher Alexander
6. Sharpen your team skills & creativity – British Council Library
7. Design of Cities – British Council Library
8. Looking and Seeing Series – British Council Library
9. How architects visualize – SCOA library
10. Art, Architecture Parallels & Connections – SCOA library
11. Design Source Book – BNCA library.

Teaching plan:

Total Number of projects should be between 12 to 15 in a year (3 to 4 Nos. in topics 1 to 5, and 4 to 6 Nos. in topics 6 and 7 each.)

Nature of projects:

Topic numbers 1 to 5 could be in the form of lectures to introduce the subject to the students. They must be documented in form of notes and sketches but may or may not be supported by exercises.

Whereas topic number 6 and 7 should be in the form of exercises followed by documentation in A3 size sheets. The nature of exercises will vary from topic to topic and will be oriented towards exploration of the topic by the students preferably; the analogy or application of each topic towards architecture is to be made explicit.

SUBJECT CODE: 213422		ARCHITECTURAL DESIGN-II (sessional & viva)	
TEACHING SCHEME		EXAMINATION SCHEME	
Lecture Periods (per week.)	2	Paper	nil
Studio Periods (per week)	5	Sessional (Internal) 50 marks per term	100 marks
Total Contact Periods (per week.)	7	Sessional (External) 50 marks per term	100 marks
		Viva-Voce 50 marks per term	100 marks
		Total Marks for two terms.	300 marks

AIM:

To introduce the students to the various approaches to design process and to impart understanding of various design parameters related to climatic sustainability and seismic resistance along with functional, aesthetic and structural aspects.

TERM-I

COURSE OBJECTIVES:

1. Introduction of Architectural spaces for multiple activities.
2. Application of climatic consideration as strategic design parameter with respect to Human comfort and energy consumption.
3. Introduction to various design process like binary, cyclic, intuitive etc and the importance of literature and case studies in the design process.

COURSE OUTLINE:

1. Problem seeking and solving within the framework of the design program requirements, Interrelation of spaces, response to climatic parameters etc by means of cyclic and binary design process.
2. Imbibe understanding of built and open spaces by means of rational analysis and Intuitive perception.
3. Locating and documenting required contextual information from appropriate sources.
4. Introduction to the application of various tools used for design process such as use of grid, regulating lines, modules etc.

Sessional work:

- Sufficient number of projects to be given as assignments to cover the course. Emphasis should be given on the 3-dimensional studies through sketches, study models etc. at various stages of design process. Written description about design should be encouraged as an activity to initiate and sustain a logical and rational thought process for the same.

Teaching plan:

1. At least one project to study, analyze and compare a private residential unit and a small building of public use with respect to the spaces, their inter-relation, scale, ambience, Technology and material for construction, details of doors windows etc.
2. Two projects of six weeks duration for design of building for residential use and small facility of public use. Elements of site planning should be introduced and incorporated in the layout.
3. One Project of one week duration for design of specialized indoor or outdoor space.

Sessional Assessment:

1. 15% of the total marks to be allotted for the study and analysis of the architectural spaces.
2. Out of the remaining 85% marks for the Architectural design proposals, the break-up of marks should be as follows:
 - 20% marks to be allotted for evolving a rationale for design.
 - 50% marks to be allotted for development of concept into a workable design
 - 10% marks to be allotted for awareness of climatic design parameters and their application.
 - 20% marks to be allotted for proficiency in Graphical and verbal Communication skills (Drawings, models, sketches, and verbal explanation skills etc.)

TERM-II

COURSE OBJECTIVES:

1. Understanding of the co-relation of **visual aesthetics** study of basic design exercises with architectural building forms and spaces.
2. Application of climatic design parameter with reference to human comfort and energy conservation.
3. Understanding of the context for the design proposals.
4. Introduction and application of planning approaches for site planning and layout of multi-building campus on level and sloping site.
5. Application of the design parameters for earthquake resistant structures of load bearing building construction systems

COURSE OUTLINE:

1. Concept development of a given design program on the basis of the basic design principles using various tools like sketches and models and by means of using cyclic and binary design process.
2. Application of layout principles for an architectural development having more than one building.

3. Detailing the basic services (water supply & drainage) and the structural system for their design proposals with specific emphasis on seismic resistant load bearing structures.
4. Contextual architectural proposal by studying a settlement and working on an architectural program in that settlement.

Sessional work:

Sufficient number of projects to be given as assignments to cover the course. Emphasis should be given on the 3-dimensional studies through sketches, study models etc. at various stages of design process. Written description about design should be encouraged as an activity to initiate and sustain a logical and rational thought process for the same.

Teaching plan:

1. One project of studying a settlement having primary, secondary and tertiary occupational activities and population between 25,000 to 50,000 persons, by means of surveys and analysis.
2. One to two projects of six to eight weeks duration for design of buildings of varied typology. At least one project should be based on the settlement studies. Principles of layout should introduced and incorporated in the layout. Interior furniture layout should be worked out for the proposal.
3. One Project of generating working drawing for their design proposal.
4. One project of detailing the provision of basic services (water supply and drainage) for their design proposal.

Sessional Assessment:

1. 15% of the total marks to be allotted for the study and analysis of the settlement.
2. 20% of the total marks to be allotted for the generation of working drawing and Services layout.
3. Out of the remaining 65% marks for the Architectural design proposals, the break-up of marks should be as follows:
 - 30% marks to be allotted for evolving a rational for design.
 - 60% marks to be allotted for development of concept into a workable design.
 - 10% marks to be allotted for proficiency in Graphical and communication Skills (Drawings, models, sketches, etc.)

RECOMMENDED READING :

- Francis D.K.Ching -Architecture: form space and order
- Paul Lassau -Graphic thinking for Architects and planners
- Anthony Antoniadis -Poetics in Architecture: Theory of design
- A.P. Kanvinde- Campus Planning in India
- Le Corbusier- The Modular.
- Le Corbusier- Towards the new Architecture.

- Watson Donald and Labs Kenneth. -Climatis Design
- John R. Mather -Climatology: Fundamentals and Application
- Maxwell Fry And Jane Drew -Tropical Architecture
- Christopher Alexander- Pattern Language
- Pierre Von Meiss -Elements of Architecture from form to place
- JonathanA. Hale -Building Ideas. An introduction to Architectural Theory.
- Robert Sommer. -Design Awareness
- C.M. Deasy -Design for Human Affairs

SUBJECT CODE: 213423		ARCHITECTURAL DRAWING & GRAPHICS -II (sessional)	
TEACHING SCHEME		EXAMINATION SCHEME	
Lecture Periods (per week.)	1	Paper	nil
Studio Periods (per week)	4	Sessional (Internal) 50 marks per term	100 marks
Total Contact Periods (per week.)	5	Sessional (External) 50 marks per term	100 marks
		Viva-Voce	nil
		Total Marks for two terms.	200 marks

COURSE OBJECTIVES:

To understand and practice the application of the various techniques of perspective, sciography, CAD and advanced presentations in Architectural Design.

COURSE OUTLINE:

Term -I

UNIT I: Perspective Drawing: The topic of perspective drawing will consist of drawing exercises on:

- Understanding the application of principles of perspective drawing.
- Drawing perspective views by one point and two point perspective methods.
- Perspective by measuring point method.
- Perspective views of interior designs by projection / measuring point method.

UNIT II: Sciography: The topic of sciography drawing will consists of drawing exercises on

- Principles of shades and shadows.
- Drawing shades and shadows of lines, planes, solids and architectural

- features in plan, elevations and isometric view
- Shades and shadows of typical building on plan, elevation and perspective.

Term –II

UNIT III: Presentation Drawings:

Complete presentation drawings of architectural design project with plans, elevations, sections and perspective views of building by any method of drawing perspectives showing landscape, human figures, accessories and street furniture etc.

UNIT IV: CAD

All commands in latest version of CAD software in 2D and application to prepare sketch, presentation and working drawings.

Assignments for sessional work:

- A) Adequate number of drawings covering all aspects mentioned in course outline.
- B) A complete presentation including concept sheet, site plan with landscape design, all floor plans, four elevations and appropriate number of sections, part sections and strip sections to explain the building design.
- C) A3 size sketch book with interior and exterior sketches of individual buildings, building complex, streetscapes, vehicles, street furniture and human figures.

Teaching Plan:

Term -I

1) Perspective drawings:

The topic of perspective drawing will consists of drawing exercises on

- Principles of perspective and terminology
- One point perspective
- Two point perspective
- Measuring point method
- Exterior views of Architectural Design projects
- Interior views of Architectural Design projects. [Approximately 9 sheets]

2) Sciography:

The topic of sciography drawing will consists of drawing exercises on

- Principles of shades and shadows
- Drawing shades and shadows of point, line, plane, solids and building elements in plan, elevation and isometric
- Drawing shades and shadows in site plan, elevations and perspectives of Architectural Design project. [Approximately 10 sheets]

Term –II

3) Presentation drawings:

The submission program will include plan, elevations, sections, exterior and interior perspective [**drawn by any method mentioned above in teaching plan for Perspective Drawings**] drawings of Architectural Design project of second year B. Arch.

4) CAD drawings:

CAD submission will consist of one set of detail drawings of first Architectural Design project of the First Semester including all floor plans, sections, toilet details, staircase, doors and window details.

Sketching:

Submission program will consist A3 size sketch book with individual sketches prepared of building elements, street furniture, landscape elements, Architectural Design settlement study project and study tour.

SESSIONAL ASSESSMENT:

This subject has been allotted 100 marks for sessional work of each term out of which 50 marks have been allotted for Internal and 50 marks for External Marking totaling 200 marks for Term I and Term II together.

RECOMMENDED READINGS:

- | | | |
|---|-----------------------------|--------------------|
| 1 | Architectural graphics: | C. Leslie Martin. |
| 2 | Perspective for Architects: | Themes and Hudson. |
| 3 | Perspective and Sciography: | Shankar Mulik. |
| 4 | Mastering AutoCAD: | George Omura. |
| 5 | Interior design: | Ahmed Kasu. |

SUBJECT CODE: 213424 & 213425		BUILDING TECHNOLOGY AND MATERIALS II (Paper, Sessional & VIVA)	
TEACHING SCHEME		EXAMINATION SCHEME	
Lecture Periods (per week.)	2	Paper	100 marks at the end of Term-II
Studio Periods (per week)	4	Sessional (Internal) 50 marks per term	100 marks
Total Contact Periods (per week.)	6	Sessional (External) 50 marks per term	100 marks
		Viva-Voce 50 marks per term	100 marks
		Total Marks for two terms.	100 marks (Paper) 300 marks (Sessional + Viva)

COURSE OBJECTIVES:

- To introduce students to the structural principles of load bearing construction, with due importance to earthquake resistance, and with thorough knowledge of methodology and material used for such a construction
- To introduce students to the structural principles of RCC frame construction, with due importance to earthquake resistance, and basic knowledge of ferro-crete construction, along with study of reinforcement steel.
- To study about composite type of construction with timber truss roof, structures of temporary nature, and masonry vaults and domes
- To study more about doors, windows, different types of fencing materials, gates and their use in construction
- To study different building materials such as reinforced cement concrete, structural steel, sheet roof coverings, different mortars and pointing & plastering techniques, different flooring materials, along with special construction details for timber flooring.

COURSE OUTLINE:

TERM-I

UNIT-1: SOIL & FOUNDATION

- 1.1: Different types of soils and their bearing capacities.
- 1.2: Concept of bulb of pressure and its significance for site investigation

- 1.3: Different types of foundations, shallow & deep foundation, foundation for Continuous and point load (foundation for load-bearing and frame structure), including eccentric and cantilever footing, foundation on sloping site, along with causes of failure of foundation.
- 1.4: Introduction to relevance of soil mechanics in foundation design, along with necessity of combined footings at certain places
- 1.5: Timbering and strutting for different types of soils.

UNIT-2: LOAD BEARING CONSTRUCTION

- 2.1: Basic fundamentals and principles of load bearing construction for medium-rise structures
- 2.2: Thumb rules for load bearing construction, with respect to thickness of superstructure and foundation wall, strengthening of walls, location & spanning of openings etc., along with earthquake resistant methods and norms..... **Assignment-1**
- 2.3: Use of different materials for load bearing construction including brick, stone and stabilised mud block
- 2.4: Study of manufacturing of solid and hollow concrete blocks, and load-bearing construction with concrete blocks..... **Assignment-2**
- 2.5: Masonry vaults and domes in brick, stone and stabilised mud block

UNIT-3: DAMP- & WATER-PROOFING

- 3.1: Causes of dampness and reasons for damp- & water-proofing
- 3.2: Different methods or treatments of damp- & water-proofing
- 3.3: Different materials, rigid and flexible, used in damp-proofing, including brick on edge, rough Shahabad stone, bitumen sheets, plastic sheets and other proprietary materials
- 3.4: Cavity wall construction

UNIT-4: T.W. DOORS WITH M.S. SAFETY DOOR

- 4.1: Framed and panelled t.w. doors along with revision of solid-core and hollow-core flush doors, with wooden and pressed steel box section door frame
- 4.2: Double-leaf partially glazed and partially panelled t.w. door, with m.s. grill safety door for the same, to understand fixing and working of two doors together.**Assignment-3**

UNIT-5: T.W. WINDOWS

- 5.1: Principles for selection and application of different types of wooden windows, along with introduction to bay windows.
- 5.1: Framed and panelled t.w. windows.
- 5.3: Typical glazed t.w. casement window with movable and fixed shutters and ventilators, along with fixed / movable, glazed / wooden louvers.**Assignment-4**

UNIT-6: T.W. ROOF

- 6.1: Introduction to timber roof truss.
- 6.2: King-post & Queen-post roof truss, with line diagram of trusses and forces in members
- 6.3: Built-up and Composite roof truss. **Assignment-5**
- 6.4: Study of different sheet roof covering material viz. asbestos cement, galvanised iron, aluminum, asphaltic, fiberglass reinforced plastic, polycarbonate and other, along with fixing details.

UNIT-7: SPECIAL CONSTRUCTION

- 7.1: Purpose of providing specialised timber flooring
- 7.2: Specialised timber flooring for dance hall, sports hall, gymnasium etc.
- 7.3: Study of available market forms of timber flooring along with parquet flooring details.

TERM-II

UNIT-8: REINFORCED CEMENT CONCRETE CONSTRUCTION

- 8.1: Introduction to concrete as a material
- 8.2: Study of its ingredients viz. binding material, fine aggregate, coarse aggregate and water in detail, along with storage of materials on site, understanding good quality material and field & lab tests involved
- 8.3: Reinforcement steel and steel-mesh reinforcement, along with role of reinforcement in RCC
- 8.4: Reinforced concrete construction process with mixing of concrete, transportation, formwork, laying of reinforcement, casting, de-shuttering, curing and further construction to follow
- 8.5: RCC frame structure for smaller spans generally applicable to residential structures, along with earthquake resistant conditions and norms, reference of a RCC drawing and concerned site-visit required for study of elements of RCC frame structure. R.C.C structural details up to plinth .. viz. footings, columns, external and internal plinth beams, with plinth formation, with details for toilet block **Assignment-6**
R.C.C floor slab details ..viz. one-way, two-way and cantilever slabs, column-beam-slab junction, with details for toilet block, also lintel & weather-shed**Assignment-7**
- 8.6: Introduction to ferro-crete as a material and construction method.

UNIT-9: STRUCTURAL STEEL

- 9.1: Introduction to Structural steel as a material in frame construction
- 9.2: Market forms of steel, with reference to Indian Standard Sections
- 9.3: Appropriate use of sections in construction.
- 9.4 Use of structural steel for small shed such as cafeteria, godown, factory shed shall be studied for spans up to 10 mts .using roofing sheets.....
Assignment-8

UNIT-10: M.S. WINDOWS AND DOORS.

- 10.1: M.S. doors such as collapsible gates and rolling shutters..
- 10.2: Other modern steel gates for residential and commercial purpose, and automation / modern technology involved
- 10.3: Steel-framed glazed window using Z-section and pressed steel box frame or wooden frame..... **Assignment-9**

UNIT-11: COMPOUND WALL, FENCING AND M.S GATES.

- 11.1: Compound walls in brick, stone, c.c. blocks, concrete grills or other pre cast elements
- 11.2: Fencing using different materials like wood, bamboo, steel, barbed wire, chain-link, weld-mesh and other available materials in market
- 11.3: Details of construction / erection of compound wall fencing and suitable gate for an open plot, with due consideration to design parameters
The above information will be collected by the students/group of students and one drawing shall be prepared showing typical fencing and m.s gate details..... **Assignment-10**

UNIT-12: TEMPORARY STRUCTURES

- 12.1: Understanding requirements of temporary structures
- 12.2: Study of locally available materials and simple method of construction for these structures through case studies
- 13.3: Temporary structures viz. cow-shed, onion store, grain store, contractor's site office, exhibition pandal or any other multipurpose shedNotes and sketches.

UNIT-13: CEMENT MORTAR, PLASTERING & POINTING

- 13.1: Cement mortar and various additives & admixtures.
- 13.2: Cement lime mortar, and other types of traditional mortars.
- 13.3: Pointing and finishing techniques for exposed masonry work
- 13.4: Plastering including internal plaster finishes viz. neeru-finish plaster, texture plaster & other proprietary types, and external plaster finishes viz. sand-faced plaster, rough-cast plaster, pebble-dash plaster, grit plaster & other proprietary types.

UNIT-14: FLOORING AND PAVING

- 14.1: Different flooring & paving materials
- 14.2: Different flooring & paving types that are cast-in-situ viz. Mud flooring, Brick flooring, Indian Patent Stone finish, Terrazzo flooring etc. and readymade tiles available in market viz. natural stone tiles / slabs, plain & mosaic cement tiles / blocks, ceramic tiles, vitrified tiles and other modern materials, including the process of providing or laying the flooring or Pavement.
- 14.3: Floor finishes of various materials viz. carpet, linoleum, rubber, PVC etc.

RECOMMENDED READING:

To understand basic, fundamental principles in construction, following books are recommended:

1. 'Elements of Structure' by Morgan
2. 'Structure in Architecture' by Salvadori

To study standard building construction:

1. 'Building Construction' by Mackay W. B., Vol. 1 – 4
2. 'Building Construction' by Barry, Vol. 1 – 5
3. 'Construction Technology' by Chudley, Vol. 1 – 6
4. 'Building construction Illustrated' by Ching Francis D. K.
5. 'Elementary Building Construction' by Michell
6. 'Structure and Fabric' by Everet

To study building materials:

1. 'Engineering Materials' by Chaudhary
2. 'Building Construction Materials' by M. V. Naik
3. 'Civil Engineers' Handbook' by Khanna
4. 'Vastu Rachan' by Y. S. Sane
5. National Building Code and I.S.I. Specifications
6. 'Materials and Finishes' by Everet
7. 'A to Z Building Materials in Architecture' by Hornbostle

Teaching plan:

The subject of Building Technology and Materials shall be covered by teaching the fundamental principles and its application in actual construction by conducting sufficient number of site visits and practical at the construction yard. The sessional assignments shall consist of library research, preparing adequate number of drawings based on classroom lectures, market survey and actual visits to the site. Assignments can also be done in groups like models etc.

While setting the assignments care shall be taken to link this subject with other subjects especially Architectural Design and not learn in isolation. Assignments will be set only for certain topics as specified in the above-mentioned subunits.

The learning process should give students more exposure to the on-site training, at the same time developing the skills in drafting, sketching and innovative use of computers in preparing 3D animations etc. and use of simple software such as sketch up etc. so as to understand the teaching principles thoroughly.

SESSIONAL ASSESSMENT:

Sessional work will carry 150 marks per term, out of which 50 marks are reserved for internal assessment, 50 marks for external assessment and a joint viva-voce will be conducted and both the examiners will give marks out of 50 for the viva examination.

SUBJECT CODE: 213451		THEORY OF STRUCTURES II (Paper)	
TEACHING SCHEME		EXAMINATION SCHEME	
Lecture Periods (per week.)	1	Paper	100 marks at the end of Term-II
Studio Periods (per week)	1	Sessional (Internal)	nil
Total Contact Periods (per week.)	2	Sessional (External)	nil
		Viva-Voce	nil
		Total Marks for two terms.	100 marks (Paper)

COURSE OBJECTIVES:

1. To understand concept of load bearing and framed construction.
2. To understand the behavior of various structural elements in load bearing and simple framed construction.

COURES OUTLINE:

Unit I: Introduction to principles of load bearing construction and introduction to arches.

Unit II: Analysis and designed of simple beams in timber, steel and introduction to fletched beams (No. calculations).

Unit III: Detailed Analysis of fixed beams, introduction of short and long columns. (No calculation)

Unit IV: I.S. provision for load bearing ,R.C.C. and Reinforced Brick Construction.

Unit V: R.C.C. Analysis and Design.

Unit VI: Design of steel structure with connections.

Note: While teaching the subject of Theory of Structures Limit State Method shall be adopted instead of Working Stress Method.

RECOMMENDED READING:

1. Design of steel structures -Vazirani – Rathwani.
2. Design of steel structures - L.S. Negi.
3. R.C.C. Design – Khurmi, Punmia, Sushilkumar.
4. Elements of Structures – Morgan.
5. Structure in Architecture – Salvadon and Heller.
6. Structure Decisions – F. Rosenthal.

TEACHING PLAN:

1. Introduction to principle of Load bearing construction with relevant clauses from I.S. Code.
2. Study of two hinged and fixed arches. (Without numerical).

SUBJECT CODE: 213428 & 213429		HISTORY OF ARCHITECTURE & HUMAN SETTLEMENTS II (Paper and Sessional)	
TEACHING SCHEME		EXAMINATION SCHEME	
Lecture Periods (per week.)	3	Paper	100 marks at the end of Term-II
Studio Periods (per week)	0	Sessional (Internal) 25 marks per term	50 marks
Total Contact Periods (per week.)	3	Sessional (External) 25 marks per term	50 marks
		Viva-Voce	nil
		Total Marks for two terms.	100 marks (Paper) 100 marks (Sessional)

• **COURSE OBJECTIVES:**

Architectural History is the manifestation of the socio-cultural, intellectual and other factors of the specific time, space and people. It is necessary for students to develop interest in understanding styles, buildings, construction, and special attributing features in those contexts.

• **COURSE OUTLINE:**

The study includes the progressive developments of the requirements, architectural character and technological advancements of each period / style. The analytical study must include examples and sketches with highlighting the relevant features.

• **Term I**

1. Early Christian Architecture:

- Transitional socio-cultural, political and other factors.
- Basilican church typology: planning, construction and other features.
Relevant examples for analytical studies.

2. Byzantine Architecture:

- Influence of socio-political, geo-cultural and other factors.
- Centralized church typology: Spatial planning, construction and other features.
- Relevant examples for analytical studies.

3. Romanesque Architecture:

- Influence of Early Medieval socio-political, cultural and other factors.
- Church and the precinct: Architectural planning, constructional and other

features.

- Elements of special attributes: Campanile, raking arcade, wall-passage, triforium

Relevant examples for analytical studies.

4. Gothic architecture:

- Influence of Late Medieval socio-cultural and other factors.
- Cathedrals, Monastic establishments, Parish churches: spatial planning, construction and other architectural and structural features.
- English and French church planning.
- Secular architecture: Manor houses, castles.
- Town planning principles.
- Elements of special attributes: flying buttress, window tracery, stained glass.

Relevant examples for analytical studies.

5. Renaissance Architecture:

- Influence of socio-cultural and other factors.
- Revivalism and synthesis of classical features.
- Churches, Palazzo, villa: spatial planning, construction and other Architectural features.
- Elements of special attributes: Order, Balustrade, Cornice, rustication
- Town Planning principles.
- Post Renaissance: Baroque architecture.

Relevant examples for analytical studies.

Sessional Work:

The Sessional work shall comprise of individual work of the student completed under the guidance and supervision of the subject teacher as follows:

1. **Journal:** Hand written journal with notes and manually drawn sketches of relevant examples on the above mentioned syllabus contents: **30 marks**
2. **Project work:** a report or graphical representation or a model of any relevant topic from the above mentioned syllabus contents: **20 marks.**

Term II

1. Indus Valley Civilisation:

- Influence of socio-political and geo-climatic aspects.
- Dwellings and Public Buildings: Architectural character, constructional features.
- Town planning principles.

Relevant examples for analytical studies.

2. Vedic Civilisation:

- Influence of socio-political and geo-climatic aspects.

- Architectural and constructional features.
 - Town planning principles.
- Relevant examples for analytical studies.

3. Buddhist Architecture:

- Influence of socio-cultural aspects.
 - Rock-cut architecture: Hinayana and Mahayana periods.
 - Stupa, Chaitya, Vihara: spatial planning, architectural features.
 - Elements of special attributes: free-standing pillars, railing, torana.
- Relevant examples for analytical studies.

4. Hindu Architecture:

- Temples: spatial arrangements, construction, ornamentation.
- Elements of special attributes: columns, shikharas.
- Temple complex.
- Following styles to be studied with relevant examples:
 - a. Gupta Period.
 - b. Indo-Aryan / Nagara School: Khajuraho, Orissa school.
 - c. Dravidian School: Early Chalukyan, Rashtrakuta, Late Chalukyan.
 - d. Deccan Styles: Pallava, Chola, Pandya, Vijaynara, Madura.

5. Jain Architecture:

- Chaumukh temple, Temple town.

6. Indo-Islamic Architecture:

- Socio-political influence.
- Building Types: Mosques, Tombs.
- Architectural character: Spatial arrangements, structural system, constructional features, surface ornamentations, fenestration details.
- Elements of special attributes: arch, dome.
- Following styles to be studied with relevant examples:
 - a. Delhi-Sultanate / Pathan Imperial.
 - b. Pathan Provincial: Gujrat, Deccan.
 - c. Mughal.
 - d. Post-Mughal: Maratha architecture: forts, temples, wada.

Sessional Work:

The Sessional work shall comprise of individual work of the student completed under the guidance and supervision of the subject teacher as follows:

1. **Journal:** Hand written journal with notes and manually drawn sketches of relevant examples on the above mentioned syllabus contents: **30 marks.**

2. Project work: a report or graphical representation or a model of any relevant topic from the above mentioned syllabus contents: **20 marks.**

• RECOMMENDED READINGS:

1. A History of Architecture by Sir Bannister Fletcher.
2. History of Architecture by Spiro Kostof.
3. The Story of Western Architecture by Bill Risebero.
4. Indian Architecture (Vol. I & II) by Percy Brown.
5. History of Indian and Eastern Architecture by James Fergusson.
6. Hindu India by Henry Stierlin.
7. Islamic Architecture in India by Satish Grover.
8. The History of Architecture in India by Christopher Tadgell.
9. A History of Fine Arts in India and West by Edith Tomory.

SUBJECT CODE: 213430 & 213431		BUILDING SERVICES I (Paper and Sessional)	
TEACHING SCHEME		EXAMINATION SCHEME	
Lecture Periods (per week.)	2	Paper	100 marks at the end of Term-II
Studio Periods (per week)	0	Sessional (Internal) 50 marks per term	100 marks
Total Contact Periods (per week.)	2	Sessional (External) 50 marks per term	100 marks
		Viva-Voce	nil
		Total Marks for two terms.	100 marks (Paper) 200 marks (Sessional)

AIM:

To introduce students to the concepts of water supply, sanitation, electrification and equip them in its application to architectural design, so as to create hygienic and comfortable living conditions.

COURSE OBJECTIVES:

- a. To introduce students to concepts of basic services and its applications.
- b. To equip students with the required information and technologies.
- c. Application of this knowledge in architectural design project.
- d. Evolving understanding in students to choose appropriate systems and integrate the same in their design projects.

TERM I

COURSE OUTLINE:

- Introduction to sources of water. Elements of public water systems, quality of water, pumping and transportation of water, distribution systems, components of water supply network in a building premise, ferrule, water meter, stop cocks, bib cocks and pipe appurtenances. Overhead and underground reservoirs.
- Connections for hot and cold water distribution systems in a building premise, their layouts, fittings, joints, materials and valves. Direct and indirect systems of hot water supply. Solar heating methods. Special installations in multistoried buildings. Types of fixtures and materials.
- Rain water harvesting methods.
- Conditions of flow in building drainage pipes. traps, vents and their material specifications. Design of drainage and vent system for low, medium and high rise buildings. Design of storm water drainage, building drains, sewers, gully traps, inspection chambers, manholes, connection to public sewer.
- Waste water disposal systems, septic tanks, soak pits, on site processing and disposal methods.
- Collection, removal and disposal of solid waste from building premise.

TEACHING PLAN

Unit 1: Water Supply.

- a. Tapping of water.
- b. Storage and distribution of water in premises.
- c. Pipes, piping network, specials, materials, joinery, installation of network both open and concealed.
- d. All appurtenances required for installations e.g. taps, faucets, mixing units, valves, flushing cisterns, flushing valves and other fittings.

Unit 2: Hot water supply.

- a. Direct and indirect systems of hot water supply, their components and equipments used for the same.
- b. Insulation of piping work and safety devices.
- c. Solar heating.

Unit 3: Drainage and sanitation:

- a. Study of sanitary fittings with reference to use, materials and functions.
- b. Traps and their uses. Classification of traps as per use and shape.
- c. Pipes and piping systems, specials, vent and anti-siphonage systems, jointing and installations.
- d. Storm water and roof drainage systems and their installations.
- e. Underground drainage systems with application of ventilation, self cleansing velocity, laying of drains to required gradients and testing of

drains.

- f. Disposal of sewage within the premises using septic tanks, effluent treatment plants, their function and layouts.

Unit 4: Solid Waste disposal:

- a. Collection, treatment and disposal of organic and inorganic waste, like traditional methods, garbage chutes, urban solid waste treatment systems, vermicomposting etc.

SESSIONAL ASSIGNMENT:

Assignments shall consists of

1. Designing of toilet blocks in residential and public buildings and preparation of Working drawings of the same, showing complete details of fittings and plumbing required for water supply and drainage.
2. Designing and preparing a complete water supply and drainage layout of an academic architectural design project, with all required calculations.
3. Compiling of required information collected from site visits, market surveys and other sources.

SESSIONAL ASSESMENT:

1. 40% marks will be allotted for compilation of literature, brochures, material/product specifications, market surveys etc.
As per assignment no.3 above.
2. 60% marks shall be allotted for service layout, with details. As per assignment nos. 1&2 above

TERM- II

COURSE OUTLINE:

- Introducing students to different illumination systems; light sources; daylight; incandescent; fluorescent; arc lamps and lasers; luminaries; wiring; switches and control circuits.

- Laws of illumination; illumination from point, line and surface sources. Environment and glare, general illumination design; interior lighting- industrial, office, residential, commercial etc; exterior lighting- flood, street, transport, lighting for displays, neon signs, LED-LCD displaybeacons.

- Layout of different meters and protection units. Different type of electrical loads and hazard prevention . Selection of cable/wire sizes; emergency supply-stand by and UPS.

TEACHING PLAN:

Unit 5: Lighting

- a. Indoor lighting- natural and artificial.

- b. Systems of lighting such as direct, indirect, diffused.
- c. Applications of lighting systems with reference to levels of illumination for various uses and lumen method calculations.
- d. Light fittings/ luminaries-All types of energy efficient lamps, optic fiber, led etc.

Unit 6: Electrification

- a) Introduction to generation and distribution of electric power in urban areas, substations for small schemes in industrial units.
- b) Electrical system installations in a building from the supply mains to individual outlet points, including meter board, distribution board and layout of points with load calculations.
- c) Electrical wiring systems for small and large installations including different material specification.
- d) Electrical control and safety devices- switches, fuse, circuit breakers, earthing, Lightning conductors etc.

SESSIONAL ASSIGNMENT:

Assignments shall consists of

- a. Preparing an electrical layout for part of design project, with load calculations. .
- b. Compiling of required information collected from site visits, market surveys and finding out latest trends and materials for the same.

SESSIONAL ASSESMENT:

- 1. 40% marks will be allotted for compilation of literature, brochures, material/product specifications, market surveys etc.
- 2. 60% marks shall be allotted for service layout, with details.

• RECOMMENDED READING:

- a. Johnson A- Plumbing
- b. Mitchell-Sanitation, Drainage, and Water Supply
- c. Peter Burberry-Environment and Services
- d. E.H.Blake-Drainage and Sanitation
- e. Kshirsagar-Water Supply and Sanitation Engineering
- f. Woolley Leslie-Drainage Details
- g. National Building Code 2005

SUBJECT CODE: 213432		BUILDING SCIENCES (Sessional)	
TEACHING SCHEME		EXAMINATION SCHEME	
Lecture Periods (per week.)	1	Paper	nil
Studio Periods (per week)	3	Sessional (Internal) 25 marks per term	50 marks
Total Contact Periods (per week.)	4	Sessional (External) 25 marks per term	50 marks
		Viva-Voce	nil
		Total Marks for two terms.	100 marks (Sessional)

TERM I: CLIMATOLOGY:

AIM:

To help students understand the methods of passive climatic control of the surrounding and energy efficiency in habitable spaces and integrating this in their architectural design process.

COURSE OBJECTIVES

- To understand the different climatic zones of world and evolution of traditional architecture In response to the same.
- To enable the students to read and interpret climatological data of the different climatic zones.
- Role of site planning and orientation in their architectural design.
- The role of landscape elements and paved areas in site planning and its impact on microclimate.
- Role played by building elements such as shading devices, fenestrations and its application to achieve comfort in building.

COURSE OUTLINE:

Introduction to Climatology: To make application of climatology an integral part of their design. To make students aware of solar passive strategies, the principles of daylight and natural ventilation. To introduce ECBC rules and concept of green buildings.

COURSE OBJECTIVE:

To help students understand the use of surrounding environment as a strategic design parameter with respect to human comfort and energy conservation.

UNIT-1

- a) Introduction to climate as a factor of human shelter, comfort and environment.

- b) Its classification as global, macro and micro climate. Preparation of sketches showing earth-sun relationship and atmospheric depletion.
- c) Understanding maps showing ocean currents, wind pattern and wind shifts with respect to seasonal changes.
- d) Study of climatic zones along with traditional dwelling units.

UNIT-2

- a) Study of analysis of climatic zones (Hot –dry, Hot-Humid, Composite, Cold-dry, Cold-humid) in India along with data analysis.
- b) Study measurement and analysis of micro climatic elements and its use for a Designer.

UNIT-3

- a) Study of heat exchange process between human body and its surroundings with respect to criteria of comfort.
- b) Study of heat exchange processes between building along with periodic change and the calculations required for heat exchange.
- c) Study of bio-climate charts its analysis and extension of comfort zone with respect to given data and relating this with (b) of unit 2.

UNIT-4

- a) Design strategies for Indian climate zones with respect to various climate zones.
- b) Study of solar control with references to solar charts.
- c) Methods of calculating and designing of shading devices.
- d) Introduction to concepts of solar energy utilization in heating water such as Flat Plate collectors.
- e) Introduction to use of Solar energy in lighting in buildings such as Photovoltaic cells.
- f) Solar passive strategies-Principals of natural light and natural ventilation.
- g) Introduction to ECBC rules, Energy audit and Green buildings rating eg. TERI Griha, LEED etc.

SESSIONAL WORK (Total 50 Marks at the end of Term I)

- 01) Assignments based on analysis and design.
 - a. Analysis of bio-Climatic Charts.
 - b. Identification of climatic zones from given data.
 - c. Suggestions to extend comfort zone.
- 02) Site analysis with respect to micro-climatic elements.
 - a. Analysis of site and identification of suitable zone for building site for the first assignment done in Arch. Design
- 03] Design of appropriate shading devices for given openings for different orientation for the 2nd assignment done in Arch. Design. Sessional work for 2 & 3 may be assessed in Arch Design III giving an allocation of 10% of the total marks allotted for Arch Design III

- 04] Study and analysis of an existing structure with respect to:
a) Orientation
b) Opening size and shading devices.
c) Walls and roofs.
d) Internal space distribution with respect to activity Preparation of report in groups consisting of not more 10 students.
- 05) Journal with class notes and tutorials.

RECOMMENDED READING

- Climatology Fundamentals and application – John R Mather
- Introduction to Climatology – Anthony Sealey.
- Climatologically & Solar data for India – T. N. Seshadry.
- Climatic Design – Watson Donald.
- Manual of tropical housing and building – Koenigsberger & Ingersol.
- Tropical Architecture – Maxwell Fry & Jane Drew
- Design Primer for Hot Climate – Allan Konya
- Sun, Wind and Light by G. Z. Brown.
- Energy Efficient Housing by Mili Majumadar, Published by TERI.
- Climatically Responsible Energy Efficient Architecture by Arvindkrishnan.
- Housing Climate and Comfort by Martin Evans.

TERM II: SURVEYING AND LEVELLING:

AIMS AND OBJECTIVES:

- To enable the students to get conversant with locating the object positions in horizontal and vertical plane with desired accuracy as needed for architectural profession.
- To prepare and interpret survey drawings. Every effort will be made to relate the practical and field work and make it appropriate for the profession of Architecture and execution of building projects. Students should be exposed to latest modern gadgets available for precise work in the field and also use of computer software in this subject.

DETAILED SYLLABUS:

Unit I: Linear Measurements: Measurements in horizontal plane, survey stations, survey lines open and closed traverse, locating objects by chaining and offsetting, direct and indirect ranging, locating field boundaries and working out area of field, measuring distances with chain, tapes, ODM's ,EDM's, introduction to Total Station, survey accessories, measurements along sloping ground.

Unit II: Chain Surveying: Base line, tie lines, checks lines.

Unit III: Directional and Angular Measurements: Magnetic and true meridian, Magnetic and true bearings, use of prismatic compass, calculation of included angles, Fore and back Bearings, declination plotting and adjustment of closed traverse.

Unit III: Leveling: Dumpy level, auto and tilting level, principle lines of leveling instrument, axis of telescope, axis of bubble tube, line of collimation, vertical axis recording by collimation plane method and rise-fall method, B.S/J.S/F.S, change point, level surface, horizontal surface, datum, Reduced Level/ elevation of a point, Bench Marks, GTS,PBM/ABM/TBM. Temporary Adjustments.

Unit IV: Contours: Characteristics, contour interval, direct and indirect methods of contouring, block contour surveys, profile leveling, longitudinal and cross sections, plotting the contours and profiles, gradient.

Unit V: Uses of Transit Theodolite. Measuring horizontal and vertical angles, calculation height of buildings, use of Theodolite as technometer, techeometric tables, interpolation of contours.

Unit VI: Plane Table Surveys; Accessories used in plane tabling, methods of locating objects, methods of table orientation, Advantages and disadvantages.

Unit VII: Use of Planimeter: Area of zero circle, calculating area of irregular shape figures.

SUBMISSION ASSIGNMENT DETAILS.

Based on field measurements sheet entered in field book,

- 1) Calculation of area of field (Chain and cross staff survey)
- 2) Compass Survey.
- 3) Plane Table Survey.
- 4) Block Contour Survey.
- 5) Profile Leveling.

SUBJECT CODE: 213452		MATERIALS MANAGEMENT (Sessional)	
TEACHING SCHEME		EXAMINATION SCHEME	
Lecture Periods (per week.)	1	Paper	nil
Studio Periods (per week)	1	Sessional (Internal) 25 marks per term	50 marks
Total Contact Periods (per week.)	2	Sessional (External) 25 marks per term	50 marks
		Viva-Voce	nil
		Total Marks for two terms.	100 marks (Sessional)

COURSE OBJECTIVES:

To make the students aware of the role of Materials Management in construction, since Materials form the largest single expenditure item in construction.

COURSE OUTLINE:

TERM-I

Unit I: Importance, Need, definition, scope and advantages of Integrated Materials Management. Scope of corporate policy, make or buy decision, quality & quantity requirements, cost aspects.

Unit II: Organizing & control of Materials Management, Materials Research: its need, importance, scope, techniques and reporting.

Unit III: Materials Planning & Budgeting, ABC Analysis, Codification & Standardization: its nature, need, process, systems, advantages. Source selection.

TERM-II

Unit IV: Legal aspects of Buying: Law of Agency, Law of Contract.

Unit V: Stores Management: Purpose, location, layout, cost aspect, problems and new developments. Stores systems and Procedures:

Unit VI:

Stores Accounting, Costing of Receipt of materials & Issues to production, stock verification, process of verification: continuous, periodic. Obsolete, Surplus and scrap management.

SESSIONAL WORK:

Sufficient number of projects to cover the topics mentioned above should be worked in class with sketches, notes, tutorials and tests.

RECOMMENDED REFERENCE BOOKS:

1. Materials Management. - Gopal Krishnan & Sundaresan.
2. Construction Engineering & management. - S. Seetharaman.