

SAVITRIBAI PHULE PUNE UNIVERSITY

[Formerly the University of Pune]



DETAILED SYLLABUS OF FIRST YEAR B.ARCH

SEMESTER I AND II

FIVE YEAR DEGREE COURSE IN ARCHITECTURE

TO BE IMPLEMENTED FROM 2019-20

**BOARD OF STUDIES IN ARCHITECTURE
FACULTY OF SCIENCE AND TECHNOLOGY**

SEMESTER I

BASIC DESIGN			
Subject Code 1201901[SS]			
TeachingScheme		ExaminationScheme	
TotalContact Hours per week= (lectures=1, Studio=6, Total=7)		Sessional [CIA 125+ EA 125]	250
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	250
		Total Credits	10

COURSE OBJECTIVES:

- To help students understand the basic elements and principles of design
- To introduce the techniques of creativity, observation skills and to improve sensitivity to surroundings
- To sensitize students to the multi-sensory aspect of space.
- To introduce to various sources of inspiration for creativity

COURSE CONTENT:

The course should cover the following aspects of basic design

1. Study of visual elements of design [such as points, lines, planes, shapes, forms, space, color and texture] and Study of principles of design [such as balance, contrast, scale, proportion, pattern, rhythm and emphasis].
2. Introduction to multi-sensory aspects of space.
3. Techniques to improve creativity [such as brainstorming, matrix of ideas, random combinations, use of manipulative verbs, abstraction, transformation, list of mental associations and use of the ridiculous]
4. Space making through basic elements of design and principles of composition.
5. Role of experience, memory, fantasy, reality, imagination in design.
6. Sources of inspiration such as nature, history, material, climate, geometry, paradox, etc. for creativity.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

There should be minimum eight assignments covering all the above course content to include two dimensional as well three dimensional explorations.

OUTCOME:

- Creation using elements and principles of design.
- Synthesis of multi-sensory aspects of space.
- Space making.

RECOMMENDED READINGS:

- Poetics in Architecture : Theory of Design by Anthony Antoniadis
- Operative Design: A Catalog of Spatial Verbs Paperback – 1 Jul 2013 by Anthony di Mari
- Pattern Language – Christopher Alexander
- The Design of Everyday Things by Donald Norman
- Architecture : Form Space and Order – Francis D. K. Ching
- Interior Spaces : Francis D K. Ching
- Universal Principles of Design by William Lidwell, Kristina Holden, Jim Butler
- Graphic Thinking for Architects and Planners by Paul Lassau
- Tim Brown – Change By Design
- Elements of Space Making – Yatin Pandya

BUILDING CONSTRUCTION AND MATERIALS I			
Subject Code 1201902 [THEORY] & 1201903 [SV]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Studio=3, Total=5)		Sessional [CIA 25+EA 25]	50
		Viva [INT 25+ EXT 25]	50
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	07

COURSE OBJECTIVES:

- To develop a fundamental understanding of basic building elements, their function and behaviour under various conditions with specific reference to load bearing construction.
- To study the principles of designing components of load bearing structures – foundation, plinth, wall, openings etc. with study of materials suitable for load bearing construction.

COURSE CONTENT:

UNIT I Introduction to various building elements from foundation to roof and concept of load transfer.

UNIT II Introduction to building materials with characteristics, common tests, market forms and Applications.

- 1) Suitable for load bearing construction such as stone, bricks, concrete blocks, soil stabilized blocks, rammed earth construction etc.

2) Lime mortar; cement mortar; various pointing and plastering techniques and their processes

UNIT III Strip Foundations suitable for load bearing structures in stone and brick up to plinth level including foundation for steps--Plinth formation, DPC-- Introduction to various tools and equipment commonly used in construction.

UNIT IV Load bearing / non load bearing masonry construction using materials such as Stone, bricks, concrete blocks, soil stabilized blocks, rammed earth construction.

UNIT V Introduction to openings, spanning of openings by types of arches and lintels, principles and terminology of arch construction spanning of openings using materials mentioned in unit III.

UNIT VI Introduction to Bamboo as construction material.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK: Hand drawn drawings/Proportionate sketches on Units 4 and 5; Assignments on units 1, 2, 3 and 6 include sketches, notes, market survey and min one model based on unit 4 or unit 5.

OUTCOME: Students will develop a basic understanding of the relationship of materials to construction systems, techniques and methodology with specific reference to load bearing construction

RECOMMENDED READINGS:

- Dr. B.C Punmia (2012) *Building Construction* (10th edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) *Construction principles, Materials and Methods*, John Wiley & Sons, Inc.
- Narayanamurty, D.; Mohan, D (1972) *The use of Bamboo and reeds in building construction* ,UNO Publications
- Roy Chudley, Roger Greeno (2016), *Construction Technology*, 11th Edition Routledge.
- S.C.Rangwala (2013) *Engineering materials* (Fortieth edition),Charotar Publishing pvt.ltd.
- S.K. Duggal(2016) *Building materials* (4th edition) – New age international publishers.
- Willam Morgan (1977) *The elements of structure: An introduction to the principles of building and structural engineering* Distributed by Sportshelf; 2nd edition
- W.B. Mckay (2015) *Building construction Vol. 1* (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
- Bureau of Indian standards - Handbook on Masonry Design and Construction (First Revision);National Building Code of India 2016 (Volume 1) and I.S.I. Specifications

THEORY OF STUCTURES I			
Subject Code 1201904 [THEORY]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Total=2)		Sessional Viva	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	02

COURSE OBJECTIVES:

- To Introduce Applied Mechanics and Theory of Structures and their significance and application for architects.
- To Understand Different Systems of Forces and their Equilibrium and that a Building is a System of Forces in Equilibrium:

COURSE OUTLINE:

Unit 1: Forces:

1. **Applied Mechanics, Statics and Dynamics**, Importance of Study: Force, Definition, Effects of Forces, Different Systems of Forces , Principle of Transmissibility and Superposition of Forces: Resolution and Composition of Forces:
2. **Equilibrium of Concurrent and Non Concurrent Forces**. Conditions of Equilibrium for a System of Concurrent Forces, Parallelogram, Polygonal & Triangular Law of Forces: Lami's Theorem: Resultant and Equilibrant of a System of Concurrent Forces: Moment as an Effect of a Force. Couple and Properties of Couple, Varignon's Principle, Conditions of Equilibrium for a System of Non-Concurrent Forces
3. **Introducing Dead Loads and Live Loads:** Live Loads as concept only. Calculating Total Dead Loads of Walls Slabs etc. from densities.

Unit 2: Simple Stresses and Strains:

1. Linear Stresses and Strains. Hooke's Law. Stress Strain Diagram for Various Materials. Lateral Strain, Poisson's Ratio: Volumetric Strain, and Bulk Modulus. Shear Stress. Modulus of Rigidity. Relationship between various Moduli. Elastic, Plastic Brittle and Ductile Behaviour. Composite Materials,
Modular Ratio and Equivalent Area e.g. R.C.C Column with Steel Reinforcement:

Unit 3: Transfer of Load:

1. Understanding of Transfer of load in a Load bearing Structure and Framed Structure with essential differences. Basic Principles and care to be taken in Load Bearing Structures: Include principles of Earthquake resistant structures with respect to load bearing structures. Introducing Soil Bearing Capacity

Unit 4: C.G and M.I:

1. Concept of C.G and M.I: Formula only of C.G and M.I for rectangular, Triangular, Circular and Semi Circular Shapes. Parallel Axis Theorem and Radius of Gyration: Formula for Radius of Gyration of a Rectangular Shape

Unit 5: Supports and Loads:

1. Supports, Definition, Reactions offered by Simple, Fixed, Hinged and Roller Support.
2. Statically Indeterminate and Determinate Structures and Degree of Indeterminacy. Beams classified as Simply Supported, Cantilever, Over Hanging, Propped Cantilever, Fixed and Continuous:
3. Loads Classified as U.D.L, Point Load & Varying Load.
4. Loads Classified as Dead, Live, Wind, Snow, Seismic.
5. **Understanding Reactions for 5 Standard Cases:**
 1. Simple Supported Beam with full U.D.L
 2. Simple Supported Beam with Central Point Load
 3. Simple Supported Beam with Eccentric point Load
 4. Cantilevered Beam with Full U.D.L
 5. Cantilevered Beam with End Point Load

Unit 6: S.F.D and B.M.D of Simple Supported Beams Only:

1. Definitions of Shear Force and Bending Moment, Point of Zero Shear, S.F max and B.M max, Relationship Between S.F.D and B.M.D
2. S.F.D and B.M.D of 5 Standard Cases as in Point 6 of Unit 5:

NUMERICAL PROBLEMS TO BE SET AS PER FOLLOWING

1. Calculating Resultant, Equilibrant of a system of Concurrent Forces, and of individual force to get a system of forces into equilibrium. Problems to be limited to 4 forces only, Problems on Parallelogram law of Forces and Lami's Theorem. Problems on Resultant of a system of noncurrent forces as a system of forces in a linear horizontal member/beam only (Points of applications are along or perpendicular to the Beam Axis).
2. Calculating Stress, Strain, Change in Length, Young's Modulus, Stress and change in length for members connected along an axis and in equilibrium due to loads at various points on the axis, Calculating Stress and Load taken by individual materials in a composite Material. Bulk Modulus or Shear Modulus problems kept out of the scope of this syllabus.
3. Calculating width of strip Foundations for given load of super structure.
4. Calculating C.G and M.I to be limited to C, L, T and I Sections only: Also of Symmetrical Rectangular Shapes with Symmetrical Circular cut-outs. M.I of Rectangular Shape about Axis passing through base:
5. Support Reactions for Simply Supported Beams and Cantilevered Beams only (No Overhanging Beams or Inclined Roller Support). Loading to be of U.D.L always with one or two point loads. Problem on calculating dead loads and hence reactions on a beam either simple supported or cantilever beam
6. S.F.D and B.M.D of Simple Supported Beam only with full U.D.L and one or two point loads.

Course Outcome: At the end of semester student develops

- The understanding of building/structure as a system of forces and transfer of forces/load from roof to foundation and soil.
- The understanding of various loads acting on a structure
- The understanding of behaviour of elements like walls, beams and columns subjected to tension, compression, shear and bending.

Reference Books

1. Mechanics of Structures Volume 1 and 2 by Dr. H.J.Shah and S.B.Junnarkar
2. Strength of Materials by A.P.Dongre
3. Basic Structures by Phillip Garrison
4. Architectural Engineering Design by Robert Brown Butler
5. Vector Mechanics by Beer and Johnston
6. Applied Mechanics by R.S.Khurmi and N.Khurmi

ARCHITECTURAL GRAPHICS AND DRAWING I			
Subject Code 1201905 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=4, Total=5)		Sessional [CIA 50+EA50]	100
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	03

COURSE OBJECTIVES:

- To introduce students to Architectural Graphics and drawing techniques and aspects of scale, annotations etc.
- To enable students to express simple three dimensional objects and building components Through Technical Drawings, using various graphic projection systems such as orthography, Isometric, Axonometric projections and cut sections.
- To introduce various techniques of sketching for recording, studying and communicating objects, buildings and spaces.

COURSE CONTENT :

Unit 1

- Introduction to Graphics elements (point , line, plane) and concept of scale.
- Introduction to various drawing instruments and methods of employing them for technical drawing and sketching.

Unit 2 -Introduction to technical architectural drawing and its components:

- Various Line types: meaning and application.
- Architectural Lettering and dimensioning techniques.
- Architectural annotations and conventions including representation of various building materials and building components.
- Various Standard and Graphic scales and their application.

Unit 3 Plane (two dimensional) and Solid (three dimensional) geometry:

- Introduction to graphical construction of various plane geometrical shapes and their relevance in Architectural Drawings.
- Introduction to various simple/ Euclidian Three Dimensional Solids 's and their generations

Unit 4 Projection Systems in Drawings and graphics

- Introduction to various projection systems used in Architectural drawing; such as Orthographic, Isometric and Axonometric projections to draw and represent various three dimensional Geometrical solid and hollow objects.
- Introduction to importance, meaning and drawing Section/s of various solid and hollow objects including building components

Unit 5 Scale Drawing

- Introduction to Architectural drawings such as Plans, Sections and Elevations of Building using techniques and skills learnt so far.

Unit 6 Sketching:

- Introduction to architectural sketching using various grades of graphite pencil.
- Principles of free hand sketching such as proportions, with primary thrust on sketching of building elements and built environment (indoor and outdoor).

SUBMISSION REQUIREMENT FOR SESSIONAL WORK :

Minimum eight of Manually drafted A1 size drawings covering units 2 to 5. For unit 6 a sketch book has to be maintained with atleast 15 sketches of various types mentioned in unit 6.

COURSE OUTCOME:

- Students at the end of the Semester should be able to comprehend and express nuances of graphic language through various methods learnt.
- Students should be able to communicate various ideas through Architectural Graphic representations including building plans and sections (drafting and sketching).

RECOMMENDED READINGS :

1. Ching Francis D.K.: Architectural Graphics
2. Kelsey W. E.: Geometrical & Building Drawing
3. Leslie Martin: Architectural graphics:
4. B. James: Essential of Drafting
5. H. Joseph and Morris: Practical plane and solid geometry
6. Gill Robert: Rendering with pen and ink
7. Burden Ernest: Architectural Delineation

HISTORY OF ARCHITECTURE AND CULTURE I			
Subject Code 1201906 V[SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 25+EA 25]	50
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	02

Course Objectives:

1. To introduce students to the developments in architecture through history as a result of the social, political, and geographical contexts.
2. To introduce students to the developments in architecture and its meaning, in the Indian sub-continent until 12th century AD with reference to development of typologies, forms, building techniques and features.
3. To gain an integrated understanding of settlements, landscape, and architecture as a manifestation of culture and geography.

Course Outline:

Unit 1: Architecture of the ancient River Valley Civilizations: Nile, Tigris and Euphrates, Indus.

Unit 2: Introduction to tribal and nomadic architecture of India.

Unit 3: Architecture of the Buddhist faith including development of stupas, chaityas, and viharas including rock cut architecture.

Unit 4: Architecture of the early Hindu temples, rock cut architecture of the Hindus. Architecture during the Maurya, Gupta, and Chalukya period. Architecture including temples, forts, step-wells, palaces, etc. of Northern India including architecture in Gujarat, Orissa, Madhya Pradesh, and Rajasthan.

Unit 5: Architecture of Southern India including development of temples and temple towns. Architecture under the Pallavas, Cholas, Pandyas, Nayaks, Hoysalas, and the Vijaynagar kingdom.

Unit 6: Introduction to the traditional Architecture of India with a focus on Maharashtra.

Sessional Work:

- A3 size sheets with sketches- preferably plans and sections- of various buildings discussed in the above units. A minimum of two sheets per unit are required. Minimum twenty buildings should be represented in the sheets across the semester.
- One tutorial.

Course Specific Outcomes:

1. An understanding of architecture, including settlements, landscapes and buildings as a cultural product shaped by various factors.
2. An understanding of the formal, structural, and stylistic aspects of architectural development.

Recommended Readings:

- Brown, P. (n.d.). Indian Architecture: Buddhist and Hindu. Delhi: Kiran Book Agency.
- Ching, F. D., Jarzombek, M., & Prakash, V. (2011). A Global History of Architecture. New Jersey: John Wiley and Sons Inc.
- Dehejia, V. (1997). Indian Art. London: Phaidon.
- Desai, M. (2018). Wooden Architecture of Kerala. Ahmedabad: Mapin.
- Dhongde, S. R., & Ranade, J. (2009). Aurangabad: Culture, Art, Architecture. Aurangabad: INTACH Aurangabad Chapter.
- Fergusson, J. (1891). History of Indian and eastern Architecture. London: John Murray.
- Jain, K., & Jain, M. (2000). Architecture of the Indian Desert. Ahmedabad: AADI Centre.
- Jain, S. (2004). Havelis: A Living Tradition of Rajasthan. Delhi: Shubhi Publications.
- Joshi, O. P. (2010). Tribal Architecture in India. Ahmedabad: Tribal Research and Training Institute.
- Juneja, M. (2008). Architecture in Medieval India. Delhi: Permanent Black.
- Kanhere, G. K. (1989). Temples of Maharashtra. Mumbai: Maharashtra Rajya Sahitya va Sanskriti Mandal.
- Kanhere, G. K. (2013). Temples, Wadas, and Institutions of Pune: A Legacy and Symbolism in Architecture. Pune: BNCA Publication Cell.
- Kolkman, R., & Blackburn S. (2014). Tribal Architecture in Northeast India. Leiden: Brill.
- Mate, M. S. (2008). Maratheshahi Vastushilpa. Pune: Continental Prakashan.
- Pandya, Y. (2013). Concepts of Space in Traditional Indian Architecture. Ahmedabad: Mapin Publishing.
- Pramar, V.S. (2005). A Social History of Indian Architecture. Delhi: Oxford University Press.
- Pramar, V.S. (1989). Haveli: Wooden Houses and Mansions of Gujarat. Ahmedabad: Mapin.
- Tadgell, C. (1994). The History of Architecture in India. London: Phaidon.
- Taschen, A. (Ed.). (2003). Indian Interiors. Berlin: Taschen.
- Taschen, A. (Ed.). (2008). Indian Style. Berlin: Taschen.

COMMUNICATION SKILLS			
Subject Code 1201907 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Studio=1, Total=3)		Sessional [CIA 25+ EA 25]	50
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

Communication Skills

Objectives: To enhance skills required for effective communication in Architectural education and practice.

Course Content

Unit 1: Introduction to the various modes of communication and their significance.

Unit 2 : **Written communication:** Paraphrasing, Grammar and punctuation. Developing vocabulary pertaining to architecture and design through reading. Introduction to technical writing and forms of writing in architecture discipline such as site visit report, letters, tour reports, appraisals, email etc.. Expressing ideas and concepts through words.

Unit 2: **Verbal communication:** Presenting an idea/ thought, debate, group discussion. And **Nonverbal aspects of communication** such as body language, posture, stance etc.

Unit 3: **Graphical communication:** Analytical diagrams, info graphics, flow charts, mind maps, posters, logo design.

Unit 4: Use of **Digital tools for communication:** Basics of Word based, numerical based software, and visual presentation techniques such as photography, videography etc.

Sessional work: Minimum 6 assignments to cover the aspects mentioned above. Assignments may be tied up with other subjects in the syllabus, wherever relevant. Assignments to be framed focusing on the profession of architecture.

OUTCOME : At the end of the course the student should be able to communicate fluently in English language and also use tools of communication such as written and graphical for effective communication.

WORKSHOP I			
Subject Code 1201908 [SS]			
Teaching Scheme		Examination Scheme	
TotalContact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 50+EA50]	100
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	100
		Total Credits	02

COURSE OBJECTIVES:

- To Introduce students to the Significance of Model making in Architecture in exploring and representing Massing, form of buildings and spaces
- Introduce to various basic model making techniques and materials their relationship.

COURSE CONTENT :

- Introduction to Importance of Model making in process and communication of Architectural design.
- Introduction to various materials (such as various paper, boards, foam board, wood, etc.) tools and techniques of architectural model making through construction of simple three dimensional objects and simple building models.

It is expected that the limitations and advantage of all the materials is explained by demonstration/presentation.

Models should preferably be co-ordinated with other subjects in the curriculum.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK :

Minimum six assignments, with thrust on exploring at least three materials and techniques, understanding their appropriateness for the purpose.

OUTCOME:

Students at the end of Semester should be able to understand relevance of model making both in the process of design and as a Product

RECOMMENDED READINGS :

- John Taylor, Model Building for Architects and Engineers
- Rolf Janke, Architectural Models

SEMESTER II

ARCHITECTURAL DESIGN I			
Subject Code 1201909 [SV]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=6, Total=7)		Sessional [CIA100+EA100]	200
		Viva [INT 25+ EXT 25]	50
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	250
		Total Credits	10

COURSE OBJECTIVES:

- To introduce design as a process of decision making.
- To introduce to the aspects of decision making such as anthropometry, climate, form, function, structure and material.
- To understand experiential quality of space.
- To comprehensively understand the role of socio cultural and geographical factors in shaping of rural settlements and architecture.

COURSE CONTENT:

Unit 1 : Study and analysis of small scale built spaces with respect to its context, comfort, function, anthropometrical data and layout

Unit 2 : Designing of single activity space like a seating area in public space, kiosks, play area, entrance gate etc. demonstrating the application of the design principles and communicated effectively through two and three-dimensional hand drawings, sketches and models.

Unit 3 : Study and analysis of a rural settlement and architecture with respect to lifestyle, climate & social structure etc.

Unit 4 : Designing in the context of the studied settlement.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

- Assignments focusing on each of the four units above and to be presented in various mediums like doodles, sketches, diagrams etc in addition to the architectural drawings and models.

OUTCOME :

The student would be able to analyze simple spaces, identify factors affecting their design and be able to design a simple space for human use.

RECOMMENDED READINGS :

- A Pattern language by Alexander Christopher
- Structure in Nature -Strategy for Design- Peter Pearce
- Patterns in Nature - Peter Streens
- Visual thinking- Arnheim Rudolf
- Architecture: Form Space and order _ Francis D.K. Ching
- Rybczynski, Witold. *How the other half builds*
- Jan A. Silva and Leslie Fairweather. *A.J. Metric Handbook*
- Michael Pause & Roger H. Clark. *Precedents in Architecture*
- Gail Greet Hannah (2002). *Elements of Design*
- Bernard Rudofsky (1964). *Architecture without Architects: A Short Introduction to non-pedigreed Architecture*
- Ching Francis D.K.(1979). *Form, Space and Order*
- Ching Francis D.K.(.). *A Visual Dictionary of Architecture*
- Christopher Alexander (). *A Pattern Language*
- Christopher Alexander(). *The Timeless Way of Building*
- Robert Summer(). *Design Awareness*
- YatinPandya (). *Elements of Space Making*
- Paul Lassau (). *Graphic Thinking for Architects & Planners*
- Rybczynski, Witold. *How the other half builds*
- Jan A. Silva and Leslie Fairweather. *A.J. Metric Handbook*
- Michael Pause & Roger H. Clark. *Precedents in Architecture*
- *Elements of Design*

BUILDING CONSTRUCTION AND MATERIALS II			
Subject Code 1201910 [THEORY] & 1201911 [SV]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Studio=3, Total=5)		Sessional [CIA25+EA25]	50
		Viva [INT25+EXT 25]	50
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	2+5

COURSE OBJECTIVES:

- To develop a fundamental understanding of basic building elements, their function and behaviour under various conditions with specific reference to Timber construction.
- To study the principles of designing components of Timber Structure – Floor, Roofs ,Door, Windows

COURSE CONTENT:

UNIT I Introduction to earthquake, its magnitude and its effects earthquake resistant measures for load bearing construction. Construction of reinforced masonry walls, pillars and lintels; Masonry vaults and domes.

UNIT II Introduction to materials with characteristics, common tests, market forms and Applications.

- 1) Timber, timber derivatives and Introduction to various tools and equipment commonly used in carpentry work.
- 2) Roofing materials for small span sloping roofs including Mangalore tiles, sheet roof covering.

UNIT III Study of Single and double floor construction for G+1 building; Staircases – terminology and construction in timber.

UNIT IV Introduction to timber panelled and flush doors; various types of timber casement windows along with necessary joinery details, finishes required.

UNIT V Introduction to timber roof truss, forces in truss members; Construction of various types of roofs for spans up to 6m also king post and queen post truss.

UNIT VI Introduction to wooden partition and wall paneling used for interior application along with necessary joinery details, finishes required.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK: Hand drawn drawings on Units 4,5 and 6; Assignments on units 1, 2 and 3 include sketches, notes, market survey and min one model based on unit 1,5 or unit 6.

OUTCOME: Students will expand a basic knowledge about earth quake, understanding of properties, construction techniques of timber with specific reference to use of timber in superstructure (spanning, framing techniques).

RECOMMENDED READINGS:

- Dr. B.C Punmia (2012) *Building construction* (10th edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) *Construction principles, Materials and Methods*, John Wiley & Sons, Inc.
- Roy Chudley, Roger Greeno (2016), *Construction Technology*, 11th Edition Routledge.
- S.C.Rangwala (2013) *Engineering materials* (Fortieth edition),Charotar Publishing pvt.ltd.
- S.K. Duggal(2016) *Building materials* (4th edition) – New age international publishers.
- Willam Morgan (1977) *The elements of structure: An introduction to the principles of building and structural engineering* Distributed by Sportshelf; 2nd edition.
- W.B. Mckay (2015) *Building construction Vol. 1* (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).

- Bureau of Indian standards - Handbook on Masonry Design and Construction (First Revision); National Building Code of India 2016 (Volume 1) and I.S.I. Specifications.

THEORY OF STUCTURES II			
Subject Code 1201912 [THEORY]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Total=2)		Sessional Viva	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	02

COURSE OBJECTIVES:

- To Study S.F.D and B.M.D of Overhanging Beams
- To Introduce Lattice Constructions
- To Study the Effect of Forces on a Spanning Members
- To Understand Compression Members

Unit 1: S.F.D and B.M.D Continued:

1. Overhanging Beams on Both Side, Point of Contra flexure, Negative B.M, Representative S.F.D and B.M.D for Beam with Full U.D.L

Unit 2: Frames and Trusses:

1. Introduction to Plane Lattice Construction. Applications of Frames and Trusses with B.T Terminology of Rafters, Purlins etc.: Different Geometry of Trusses e.g. Howe Truss, Fink Truss, N Girder: Perfect Frames, Imperfect Frames, Redundant and Deficient Frames: Assumptions in the Solution of Frames: Effect of Horizontal and Vertical Forces on Frames.

Unit 3: Effect of Force on Spanning Members:

A. Bending Stresses:

1. Assumptions in the Theory of Simple Bending: The Theory of Simple Bending to create Moment of Resistance: Flexural Formula: Stress Distribution across a Section and across the span of the Beam: Moment of Resistance: Section Modulus and how M.R is proportional to square of depth. Why Beams should be deeper than Wider

B. Shear Stresses:

1. Shear Stress Formula: Stress Distribution across a Rectangular, Circular T, L, I, C Section: Differences between Bending Stress Distribution and Shear Stress Distribution across the Section and across the span: Simplified Formula for Rectangular and Circular Section (Hollow and Solid)

C. Deflection:

1. Definition of Deflection and Slope: Maximum and Minimum Slope and Deflection for Cases 1,2,4,5 as defined in semester 1. Double Integration Method of Calculating Deflection and Slope: Derive Formula for Deflection max and Slope max for a Simple Supported Beam with full U.d.l. Formula only for the remaining 3 cases(Omit case of Simple Supported Beam with eccentric point load)

Unit 4: Understanding the Failure of Compression Members:

a. Eccentric Loaded Columns:

1. Compression Members Subjected to eccentricity of loading about one and both axis. Derivation of Middle third Rule for eccentricity about one axis. Concept of Core or Kernel of a column for eccentricity about both axes. Applying the Middle Third Rule to Brick Pier Foundation.

b. Long Columns: and Short Columns:

1. Euler's Theory, Assumptions, Euler's Formula and its Limitations leading to Rankine's Theory. Long and Short Columns for different Materials: Various End Conditions and their Effective Lengths.

NUMERICAL PROBLEMS TO BE SET AS PER FOLLOWING

1. S.F.D and B.M.D of Over Hanging Beams with over-hang only on one side *with one udl per span and one or two point loads only*
2. Solution of Frames for Simple Supported Frames(with Symmetrical Loading) and Cantilever Frames using Method of Joints and Method of Sections only.
3. Problems based on Flexural Formula and Calculating Stresses at Distances away from the Neutral Axis, Given a section Calculating load or Span or load so that Stresses are not Exceeded.
4. Problems of Shear Stress Calculation for a Rectangular or Circular Section Only
5. Calculating Deflection max and slope max for symmetrically loaded simple supported or cantilever beams by substituting values in the formula and not by double integration
6. Calculating stresses and drawing stress diagrams for Eccentric loading on Compression Members about one axis only:
7. Analytical problems for Euler's Theory and Rankine's Theory. Problems on Rankine's Theory to be based on basic formula and not Rankine's constant.
8. *Note for all Problems: All Problems should be based on realistic material properties and section sizes*

Course Outcome: At the end of semester student develops

- The understanding of effect of various forces in terms of various stresses and deflection for various structural members like beams and columns.
- The understanding of truss as lattice construction and structural actions in it's members.

Reference Books

1. Mechanics of Structures Volume 1 and 2 by Dr. H.J.Shah and S.B.Junnarkar
2. Strength of Materials by A.P.Dongre
3. Basic Structures by Phillip Garrison
4. Architectural Engineering Design by Robert Brown Butler
5. Vector Mechanics by Beer and Johnston
6. Applied Mechanics by R.S.Khurmi and N.Khurmi

ARCHITECTURAL GRAPHICS AND DRAWING II			
Subject Code 1201913 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=4, Total=5)		Sessional [CIA50+EA50]	100
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	03

COURSE OBJECTIVES:

- To enable the students to understand and express Composite three-Dimensional objects and buildings formed by additive and interpenetrated solids using various graphical projection systems including sections.
- To enable the students to communicate an architectural idea / proposal in a legible and effective manner through perspective projections, use of shades and shadows, and various architectural presentation and rendering techniques.

COURSE CONTENT :

Unit 1 Solid Geometry:

- Understanding and drawing of composite and complex three dimensional objects including building components formed by addition and/or interpenetration of various objects. .
- Surface Development of various three dimensional objects.
- Orthographic projections of true shapes of sectional planes.

Unit 2 Perspective Drawing:

- Drawing one-point and two-point perspective of objects and buildings/ building components using various methods including grid method.
- Introduction to concept of bird's eye view, worm's eye view etc

Unit 3 Sciography: Principles of Sciography (shades and shadows) for 3-Dimensional objects and buildings on plans, elevation, isometric and perspective.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK :

- Sessional work should be planned to cover all the units mentioned in course outline with thrust on skill development, accuracy and understanding of the topic.

Unit -1	4 assignments
Unit 2	3 assignments
Unit 3	3 assignments

OUTCOME :

- Students at the end of the Semester should be able to comprehend and express composite solid geometry through sketches and drawings leading to comprehension of building components.

- Students should be able to communicate various ideas through Architectural Graphic representations including building plans and sections (drafting and sketching).

RECOMMENDED READINGS :

1. Ching Francis D.K.: Architectural Graphics
2. Kelsey W. E.: Geometrical & Building Drawing
3. Leslie Martin: Architectural graphics:
4. B. James: Essential of Drafting
5. H. Joseph and Morris: Practical plane and solid geometry
6. Gill Robert: Rendering with pen and ink
7. Burden Ernest: Architectural Delineation

HISTORY OF ARCHITECTURE AND CULTURE II			
Subject Code 1201914 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA25+EA25]	50
		Viva	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	02

Course Objectives:

1. To introduce students to the developments in architecture of the Indian sub-continent after 12th century AD as a result of the social, political, and geographical contexts.
2. To study the development of architecture with specific reference to form, technology, and ornament.
3. To gain an integrated understanding of settlements, landscape, and architecture as a manifestation of culture.

Course Outline:

Unit 1: Islamic principles of architectural form, ornament, and meaning. Early Islamic architecture and its evolution and development. Architecture under the Delhi Sultanate-Slave, Khalji, Tughlaq, Sayyid, and Lodhi dynasties.

Unit 2: Islamic architecture in Gujarat, Bengal, Malwa.

Unit 3: Mughal architecture and urbanism.

Unit 4: Post- Mughal architecture of India till 19th Cent. AD.

Unit 5: Development of architecture in the Deccan since the 12th AD.

Unit 6: Architecture of the Peshwa region and Western Maharashtra.

Sessional Work:

A3 size sheets with sketches- preferably plans and sections- of various buildings discussed in the above units. A minimum of two sheets per unit are required. Minimum twenty buildings should be represented in the sheets across the semester.

One measured drawing of a vernacular / traditional building from the region of the college. This can be undertaken as group work with identifiable individual contribution not less than 1 A2 sized sheet.

Course Specific Outcomes:

1. An understanding of architecture as a cultural product shaped by various factors.
2. An understanding of the formal, structural, and stylistic aspects of architectural development.
3. An understanding of Indian architecture of the twentieth century in the context of its historical precedents.

Recommended Readings:

- Asher, C. B. (1992). Architecture of Mughal India. Cambridge: Cambridge University Press.
- Brown, P. (n.d.). Indian Architecture: Islamic. Delhi: Kiran Book Agency.
- Dehejia, V. (1997). Indian Art. London: Phaidon.
- Dhongde, S. R., & Ranade, J. (2009). Aurangabad: Culture, Art, Architecture. Aurangabad: INTACH Aurangabad Chapter.
- Fergusson, J. (1891). History of Indian and eastern Architecture. London: John Murray.
- Juneja, M. (2008). Architecture in Medieval India. Delhi: Permanent Black.
- Koch, E. (2014). Mughal Architecture. New York: Midpoint Trade Books.
- Mate, M. S. (1961). Islamic Architecture of the Deccan. Pune: Deccan College Research Institute.
- Michell, G., & Pasricha, A. (2011). Mughal Architecture and Gardens. Suffolk: Antique Collectors Club.
- Michell, G., & Zebrowski, M. (1999). Architecture and Art of the Deccan Sultanates. Cambridge: Cambridge University Press.
- Sohoni, P. (2018). The Architecture of a Deccan Sultanate. London: I.B.Tauris.
- Tadgell, C. (1994). The History of Architecture in India. London: Phaidon.
- Taschen, A. (Ed.). (2003). Indian Interiors. Berlin: Taschen.
- Taschen, A. (Ed.). (2008). Indian Style. Berlin: Taschen.
- Tillotson, G. (1999). The Rajput Palaces. Delhi: Oxford University Press.

FUNDAMENTALS OF ARCHITECTURE			
Subject Code 1201915 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=2, Studio=1, Total=3)		Sessional [CIA25+EA25]	50
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

COURSE OBJECTIVES

To introduce the students to the field of architecture ,its scope and fundamentals

COURSE OUTLINE :

Unit 1 : Introduction to the profession of Architecture and its distinguishing characteristics with respect to other professions.

Unit 2 : Scope of architecture as a discipline

Unit 3 : Fundamentals of architecture -function , structure ,culture and environment and their integration into the architectural form

Unit 4 : Factors affecting architectural design- site, context , function, circulation, structural system, materials ,sustainability and aesthetics.

Unit 5 : Concept of Shelter and introduction to various building typologies and their design concerns

Unit 6: Scope and significance of subjects in architectural curriculum.

SESSIONAL WORK :

A Study journal and tutorial covering all the above mentioned units.
Appraisal report of any one building typology.

RECOMMENDED READINGS :

1. Structure in Architecture – Heller Robert and SalvadoriMario
2. Design Fundamentals in Architecture –Pramar
3. Architecture : Form, Space and order – Francis D. K.Ching

WORKSHOP II			
Subject Code 1201916 [SS]			
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 50+ EA 50]	100
		VIVA	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	100
		Total Credits	02

COURSE OBJECTIVES:

- To enable students to make Architectural models with various materials during process of Design and Construction studios and as final presentation to express ideas
- Introduction to Digital modeling with basic softwares

COURSE CONTENT :

- Introduction to advanced materials such as balsa wood, polymers/ plastics, cork and the techniques to make Architectural Models
- Introducing computer aided/ Digital 3D Modeling of simple and composite objects as an exploratory tool.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK :

Minimum six number of assignments with thrust on exploring materials & tools (physical as well as digital), understanding their appropriateness for the purpose. At least one of the assignment should be based on the design project and building technology concepts each.

OUTCOME :

Students at the end of Semester should be able demonstrate sufficient skills in making architectural models.

RECOMMENDED READINGS :

- John Taylor, Model Building for Architects and Engineers
- Rolf Janke, Architectural Models
- Aidan Chopra, Sketchup-2014 for Dummies

Architectural Design II		
Course Code	2201917[SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=6, Total = 7)	Sessional [CIA 100 + EA 100] Viva [Int 25 + Ext 25]	200 50
	In semester exam	NIL
	End Semester exam	NIL
	TotalMarks	250
	Total Credits	10

COURSE OBJECTIVE:

To understand Architectural Design as a process generating design brief and taking design decisions based on the following aspects:

- **Socio-Cultural Aspects:** To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc.
- **Aesthetics:** To understand the Aesthetic aspects of Design (visual and experiential) along with spatial attributes (scale and proportions, volume, texture, light and shadows, etc.) and formal characteristics. (profile, base, corner, termination).
- **Anthropometry & Function:** To address functional aspects of design (activity, use of space, adequacy and efficiency of space for a particular activity, essential adjacencies of spaces, ease and efficiency of circulation, light, ventilation, user-space relationship, vertical connections)
- **Climate:** To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.
- **Building Material and Construction Technology:** To study relevance of various building materials to a project, to get introduced to various expressions of a building material, to introduce a student to the construction technologies relevant to the building materials chosen, to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:** To understand the spatial and structural implications of basic services involved in building design.
- **Site :** To understand the site and its context, both immediate and wider, in order to enable students to take decisions of zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Universal Design:** To understand the concept and principles of universal design.
- **Precedent Studies:** To introduce the students to learn from case, referral, live studies - process of observation, analysis, documentation and deriving inferences.

COURSE OUTLINE:

- Project 1 (Major Project) : A dwelling for a single family or clusters of dwellings for multiple families with area 300 sq.m. to 500 sq.m. The project should explicitly address at least 4-5 aspects of the design decision process from those listed above. The project should be designed without the aid of mechanical means for vertical transportation.
- Project 2 (Minor Project): A time bound assignment Short term project focusing specifically on any one of the aspects mentioned in course objectives/ Hands-on Workshop / Exercise based on detailing any one of the components of Project 1 but with separate deliverables in addition to the deliverable of Project 1.

SESSIONAL WORK:

- Project 1 (Major Project): The student must represent the identification of core design aspect, formulation of design approach and development, and the final design outcome through architectural drawings along with representative details of construction. Along with the drawings, the student must develop the design through a series of models/ 3D visualizations made at various stages.
Design deliverable for Project 1:
 - i. Portfolio A - Architectural drawings and model at an appropriate scale
 - ii. Portfolio B - Process drawings / tracings (Recommended)
 - iii. Study models of various stage (Recommended)
- For Project 2 (Minor Project): The deliverable in case of a time bound assignment or a design exercise should be a portfolio of drawings and / or model. In case of Workshops the deliverable should be a report to be presented on the day of viva.

COURSE OUTCOME:

- At the end of the course the student is equipped to take design decisions by considering various aspects and methodically evolve a design and communicate it in form of 2D and 3D representations.

REFERENCE BOOKS :

1. Antoniadis, A. (1992). The Epic of Gilgamesh: Utility to Metaphor Through the Dawn of Architecture. *IN Epic Space: Towards the Roots of Western Architecture*, 3-18.
2. Sommer, R. (1972). Design awareness.
3. Deasy, C. M. (1974). *Design for human affairs*. Halsted Press.
4. Alexander, C. (1977). *A pattern language: towns, buildings, construction*. Oxford university press.
5. Sealey, A. (1979). *Introduction to building climatology*. Commonwealth Association of Architects.
6. Franck, K. A., Lepori, R. B., & Franck, K. A. (2007). *Architecture from the inside out: from the body, the senses, the site, and the community* (p. 56). London: Wiley-Academy.
7. Salvadori, M. G., & Heller, R. (1963). *Structure in architecture* (No. 624). Prentice-Hall.
8. Pandya, Y. (2005). *Concepts of space in traditional Indian architecture*. Mapin Publishing Pvt.
9. Koenigsberger, O. H. (1975). *Manual of tropical housing & building*. Orient Blackswan.
10. Neufert, E., & Neufert, P. (2012). *Architects' data*. John Wiley & Sons.

11. Chiara, J. D., Panero, J., &Zelnik, M. (1991). *Time-saver standards for interior design and space planning*. McGraw-Hill.
12. Ching, F. D. (2014). *Architecture: Form, space, and order*. John Wiley & Sons.
13. Ching, F. D. (2011). *A visual dictionary of architecture*. John Wiley & Sons.
14. NithyaSrinivasan and KiranVenkatesh., *91 Houses*. InCite
15. Publications by Costford
16. 15a. Laurie Baker. *Brickwork*. Costford
17. 15b. Laurie Baker. *A Manual Of Cost Cuts For Strong Acceptable Housing*. Costford
18. 15c. Laurie Baker. *Houses : How to reduce building costs*. Costford
19. 15d. Laurie Baker. *Mud*. Costford
20. 15e. Laurie Baker. *Rubbish by Baker*. Costford
21. 15f. Laurie Baker. *Earthquake*. Costford
22. 15g. Laurie Baker. *Rural Community buildings*. Costford
23. 15h. Laurie Baker. *Chamoli Earthquake Hand Book*. Costford
24. 15h. Laurie Baker. *Rural House plans*. Costford
25. 15h. Laurie Baker. *Are Slums In-avoidable*. Costford
26. 15h. Laurie Baker. *Alleppey : Venice of the East*. Costford
27. 15h. Laurie Baker. *Rainwater Harvesting*. Costford
28. Arvind Krishnan, (2001) *Climate Responsive architecture*.Tata McGraw Hill
29. It is strongly recommended that students are exposed on the books on works of Master architects

Building Construction and Materials III		
Course Code	2201918 [P]& 2201919 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=3, Total = 5)	Sessional [CIA 25 + EA 25]	50
	Viva [Int 25 + Ext 25]	50
	In semester exam	30
	End Semester exam	70
	TotalMarks	200
	Total Credits	07

COURSE OBJECTIVES:

- To introduce students to soil study, its relevance to foundation.
- To introduce students to different building materials related to RCC construction.
- To understand basic principles of RCC construction w.r.t. smaller spans.

COURSE CONTENT:

UNIT I

- Introduction to Soil study &Foundation - Study of different types of soils and their bearing capacities; Concept of bulb of pressure and its significance for site investigation, Introduction to methods of site and strata investigation

- Introduction to different types of shallow foundations and footings and their application in construction

UNIT II: Reinforced Cement Concrete

- Cement: Composition of cement, properties, grades of cement & various types of cement and their uses
- Introduction to concrete as a material--Study of its ingredients viz. binding material, fine aggregate, coarse aggregate and water cement ratio, storage of materials on site, understanding good quality material; field & lab tests involved
- Various concrete mixes and their application in construction, and workability of concrete, Various types of cement concrete, the properties and application, additives and admixtures used in concrete
- Concreting: form work for concreting, mixing, transporting and placing, consolidating and curing of concrete.
- Reinforcement ---steel, grades of steel and steel-mesh reinforcement; along with role of reinforcement in RCC.
- Introduction to the concept of Precast Concrete.

UNIT III Reinforced Cement Concrete Construction upto plinth

- RCC frame structure for smaller spans generally applicable to residential structures, along with earthquake resistant features, reference of a RCC drawing
- R.C.C structural details up to plinth viz. footings, external and internal plinth beams, with plinth formation, with details for toilet block at plinth level.

UNIT IV Reinforced Cement Concrete Construction in superstructure

- Construction of columns, beams for various types of end conditions
- R.C.C floor slab details, viz. one-way, two-way slabs with different end conditions, column-beam-slab junction with details for toilet block, also lintel & weather-shed

UNIT V Windows in non- timber materials

- Study of non-timber windows with materials like Steel-framed, aluminum, UPVC and their construction details.

UNIT VI Flooring & paving materials

- 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, mosaic cement tiles / blocks, ceramic tiles, vitrified tiles and other modern materials, including the process of providing or laying the flooring and pavement
- Floor finishes of various materials viz. carpet, linoleum, rubber, PVC etc.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

Hand drafted drawings on Units 3 and 4 to cover all the aspects of course outline in sufficient detail; Assignments on units 1, 2, 5 and 6 to include sketches, notes, market survey. Site visits for unit 3 and 4 should be conducted and presented in report form.

OUTCOME: Students will develop a basic understanding of the relationship of materials to construction systems, techniques and methodology with specific reference to reinforce cement concrete construction; an understanding of the concepts of concrete as a building construction material.

RECOMMENDED READINGS:

- Dr. B.C Punmia (2012) Building Construction (10th edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) Construction principles, Materials and Methods, John Wiley & Sons, Inc.
- Roy Chudley, Roger Greeno (2016), Construction Technology, 11th Edition Routledge.
- S.C.Rangwala (2013) Engineering materials (Fortieth edition), Charotar Publishing pvt.ltd.
- S.K. Duggal (2016) Building materials (4th edition) – New age international publishers.
- Willam Morgan (1977) The elements of structure: An introduction to the principles of building and structural engineering distributed by Sportshelf; 2nd edition.
- W.B. McKay (2015) Building construction Vol. 1 (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
- National Building Code of India 2016 (Volume 1) and relevant I.S.I. Specifications.

Theory of Structures IV		
Course Code	2201920[P]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=2 Studio=0, Total = 2)		
	In semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	02

COURSE OBJECTIVES:

1. *To Understand Fixity and Continuity. To understand the action of Torsion*
2. *To Understand Loading on Buildings and Different Design Methodologies*
3. *To Understand Wood as a Material, as a Structural Material and to Design Wooden Beams*
4. *To Understand Concrete as a Material and To Design small spanned R.C.C Super Structures*

COURSE OUTLINE:

Unit 1: Fixed and Continuous Beams:

1. Fixed Beam as a statically indeterminate structure. Concept of Negative Bending Moment at supports. Advantages and Disadvantages over Simple Supported Beams. Fixed End Reactions for u.d.l, central and eccentric point load (No derivations). Simple Numerical with full u.d.l and one central point load or one eccentric point Load
2. Theory only of Continuous Beams. Concept of continuity over supports and Typical B.M.D to explain the negative B.M.D over supports using I.S.456 coefficients for 3 or more, more or less equal spans. Enlist methods for computing B.M.D. Advantages and Disadvantages over Simple Supported Beams.
3. Theory only to Introduce Torsion and its applications.

Unit 2a: Loading on Buildings and Design Methodologies:

1. Theory only of Listing of all Loads acting on a Structure in single line Definitions. Study of Live Load (as per I.S.875 Part 2), Dead Load, Wind Load and Seismic Load and Snow Load in Detail
2. Theory only of Various Design Methodologies in Brief. Study of **Working Stress Method** in Detail. Understanding the application of Factors of Safety. Advantages and Dis-advantages of W.S.M compared to other methods.

Unit 2b: Wooden Structures:

1. Study of Wood as a Material and as a Structural Material, Its Advantages and Dis-advantages. Theory only of Form Factors
2. Numerical on Design of a Primary Wooden Flexural Member (Without Secondary Beams) either as a Simple Supported Beam or a Cantilever, with Simple Loading and depths limited to 300mm. Theory only Framing of Floors using Secondary and Primary Beams

Unit 3: Concrete Material and L.S.M:

1. Theory only of use of I.S.456. To Understand Concrete as a material, its Grades, all the individual constituents, their sizing, proportioning, Production of Concrete. Testing of Concrete w.r.t. listing various tests and studying Slump and Compressive Strength Test in Detail. Form work and Stripping as per I.S.456
2. Theory only of Steel Used in R.C.C, Why steel only, its properties, forms and suitability in various R.C.C elements.
3. Theory only of Limit State Method – Philosophy, Various Limit States and their care in R.C.C. Span to Depth Ratios for Various R.C.C Elements. L.S.M Flexural Diagram for M25 grade and Fe500 steel. Derivations of Flexural Formula for Balanced Section. Annotations in a Standard R.C.C Flexural Section like Depth Overall, Depth Effective, Cover and its importance and values as per I.S.456

Unit 4: Design of R.C.C Slabs for Small Spans (L.S.M for Flexure only):

1. Concept of One Way – Two-Way Slab, Importance of Distribution Steel and I.S.Provisions.
2. Numerical on Design of One Way Slab and Design of Two Way Slab

3. Numerical on Design of Cantilever Slab resting on a Beam (Beam Torsion in theory only)
4. Numerical on Design of Small Slabs like Toilet Sunken Slabs with Inverted Beams, Passage Slabs, Chajjas with Minimum Depth, Minimum Area of Steel with minimum/ maximum standards of Spacing.

Unit 5: Design of Beams (L.S.M for Flexure and Shear):

1. Numerical on Design of Simple Supported R.C.C Beams including Transfer of Load from Slab to Beam for one way slab only,
2. Theory only for Detailing in for a Beam supporting a Cantilever Porch

Unit 6: Design of Short R.C.C. Columns (L.S.M for Compression):

1. Definition of Short R.C.C. Columns. Various I.S.Provisions for Compression Members.Numerical on Design of Short R.C.C. Columns including Transfer of Load from Beam to Column

Course Outcome:*At the end of semester student develops*

1. *The understanding of the concepts of Fixity, Continuity and Torque*
2. *The Skills to Design small spanned Wooden Beams*
3. *The Skills to Design Small Spanned R.C.C Structure w.r.t Slabs, Beams and Columns and use it for his B.C.M and W.D. subjects*

Reference Books

1. Design of R.C.C. Structures by H.J.Shah
2. Design of R.C.C. Structures by Punmia and A.K.Jain
3. Design of Reinforced Concrete Structures by N.Krishnaraju
4. R.C.C Theory and Design by Dr. V.L.Shah and Dr.S.R.Karve
5. Strength of Materials by A.P.Dongre
6. Design and Analysis of Steel Structures by V.N.Vazirani. M.M.Ratwani and Vineet Kumar (For Wooden Structures Unit 2b)

Computer Aided Drawing and Graphics			
Subject Code		2201921[SS]	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3)	04	Sessional [CIA 25 + EA 25]	50
		In semester exam	
		End Semester exam	
		TotalMarks	50
		Total Credits	02

COURSE OBJECTIVES:

- To enable the students to communicate an architectural idea / proposal in a legible and effective manner through various architectural presentations and rendering techniques.
- To enable the students to generate simple architectural drawings using **Computer Aided Drawing**
- To enable the students to express their design ideas through various sketching techniques

COURSE OUTLINE:

Unit 1 Graphics:

- Introduction to various mediums for architectural presentations in various drawing formats (minimum two mediums)
- It is recommended to work on presentation drawings for any Architectural design project. A set of drawing shall include rendering of Plans, Elevations, Sections with internal and external perspective views.

Unit 2 Computer Aided Drawing:

- Introduction to basics of Computer Aided Drawing with basic commands for Drawing, sufficient to construct simple geometrical shapes and 3D objects.
- Advance commands in CAD such as Setting Drawing parameters, Layer controls, Hatching, Model and paper space settings etc.
- Drafting single building from Semester II Design on CAD.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

Sessional work should be planned to cover all the units mentioned in course outline with thrust on skill development, accuracy and understanding of the topics.

Unit 1	Demonstration of presentation techniques in various drawing formats (minimum two mediums) to include external perspective and internal perspective of students' own architectural design.	2 assignments [hand drawn]
Unit 2	CAD drawings (Plan, Section/s Elevation/s) with layers, hatch and dimensions from Semester II Design project	2 assignments
	CAD Drawings of orthographic solid objects studied in Semester II	2 assignments

OUTCOME :

- Students should be able to comprehend and express nuances of graphic language through various presentation techniques and methods learnt.
- Students should be able to communicate various ideas through architectural graphic representations (drafting and sketching).

RECOMMENDED READING:

Burden, E. E. (1971). *Architectural delineation: a photographic approach to presentation*. McGraw-Hill Companies.

Holmes, J. M. (1954). *Applied perspective;: The theory and application of perspective for architects, painters, and draughtsmen*. s.l.:s.n

Capelle, F. W. (1969). *Professional perspective drawing for architects and engineers*. s.l.:s.n

Schaarwachter, G. (1967). *Perspective for the Architect*. Thames and Hudson.

Sha Publishing Co. Ltd.: Interior perspective in Architectural Design- Japan Graphics

Japan Publishing Co: Modern Architectural Rendering best 180

Japan Publishing Co: Perspective Drawings of Modern Architecture

Japan Publishing Co: Air brushing in rendering

Shankar Mulik: Perspective and Sciography

Course Code		2201922[SS]	
Teaching Scheme		ExaminationScheme	
Total Contact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 25+EA 25] Viva	50 NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	50
		Total Credits	02

Course Objectives:

1. To understand the development of European architecture through the historical period till 17th century AD.
2. To understand the relationship of religion and society with architecture
3. To understand the drivers of change, revival, and evolution of architecture

Course Outline:

Unit 1: Greek architecture including Greek temples, domestic architecture, public architecture, city planning, and the Acropolis.

Unit 2: Roman architecture including domestic architecture, public architecture, architecture of the forums, urban planning, structural innovations, forms, materials and techniques of construction.

Unit 3: Early Christian architecture including adaptation of Roman models, early church prototypes, Byzantine architecture

Unit 4: Early medieval manors, monasteries, Romanesque churches

Unit 5: Gothic architecture and developments therein with reference to church plans, structural techniques, and ornamentation, Gothic churches and cathedrals

Unit 6: Renaissance and resultant architecture including works of Andrea Palladio, Michelangelo, Brunelleschi. Works of Sir Christopher Wren and Inigo Jones. Post-Renaissance and Baroque architecture

Sessional Work:

- Minimum 25 representative buildings of the periods under study should be represented in Plans, sections and views- of various buildings discussed in the above units.
- One measured drawing and digital documentation of any site/ building / or part/features of the building related to the course content studied.. This can be undertaken as group work with identifiable individual contribution.
- One tutorial.

Course Specific Outcomes:

1. An understanding of architecture as a product shaped by various factors like religion and society.
2. An understanding of the formal, structural, and stylistic aspects of architectural development.
3. An understanding of the factors that bring about the processes of change in architectural manifestations and its meanings.

Recommended Readings:

Anderson, Christy. Renaissance Architecture. Oxford University Press, 2013.

Ching, Francis D K, Mark Jarzombek, Vikramaditya Prakash. A Global History of Architecture. John Wiley and Sons, 2011.

Fletcher, Sir Banister and Dan Cruickshank. Sir Banister Fletcher's A History of Architecture On The Comparative Method. Architectural Press, 1996.

Frankl, Paul. Gothic Architecture. Yale University Press, 2001.

Lawrence, A W. Greek Architecture. Yale University Press, 1957.

Summerson, John. The Classical Language of Architecture. Thames and Hudson, 1980.

Ward-Perkins, J B. Roman Imperial Architecture. Yale University Press, 1992.

Building Services I		
Course Code	2201923 [P] & 2201924 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=2 Studio=2, Total =4)	Sessional [CIA 25 + EA 25]	50
	In semester exam	30
	End Semester exam	70
	Total Marks	150
	Total Credits	03

COURSE OBJECTIVES:

To make students understand the Plumbing scope in the MEP services integration. To introduce students to following Plumbing Services in low, medium and high rise buildings and inculcate them the integration of services required in architectural design.

This term aims at following services:

- Systems for hot and cold water supply in a building premises
- Systems for Sewage, Sullage, Storm water & and its disposal within or from building premises.

COURSE OUTLINE:

Introduction to sourcing, storage, and distribution of hot and cold water in building premises including the study of all necessary components involved and their installation.

To introduce students to drainage systems viz. collection, conveyance & disposal of sewage, sullage and Effluents from building premises, including methods, components and apparatus involved.

UNIT I Water supply - I

- 1.1 Principles and techniques of supplying water
 - Treatment of water
 - Concept of Pressure head
 - Flow through pipes
- 1.2 Tapping of water mains on street by means of Ferrule
- 1.3 Requirement, Storage and distribution of water in building premises
 - Sizing of Water tanks
 - Static water storage requirements (Fire Tank)
 - Collection and Storage systems
 - Types of Pumps and applications
 - Storage and Distribution in High rise buildings
- 1.4 Pipes and piping network
 - Materials of Pipes
 - Joinery
 - Installation techniques
- 1.5 Various control valves and their applications

UNIT II Water supply - II

- 2.1 Types of Taps, Faucets, Fittings and advanced proprietary systems used in baths, kitchen and WC units.
- 2.2 Provisions, Installations and applications of above.

UNIT III Hot Water Supply.

- 3.1 Systems of hot water supply using conventional and non-conventional energy sources.
 - Instantaneous and Centralized
 - Direct system and In-Direct system
 - Components and Equipment used for the same.
- 3.2 Piping Insulation, safety and special considerations in piping network.
- 3.3 Failures, precautions, and safety measures
- 3.4 Information on other Circulation systems i.e. ring system, up-feed/ down-feed systems, etc. and its application.

UNIT IV Drainage-I (Vertical Drainage systems)

- 4.1 Introduction to various sanitary fittings with necessary knowledge of provisions to be made and their Installations.
 - Sanitary fittings like Wash basins, Sinks, Bathing units, Water Closets (Indian and European), Urinals
 - Selection criteria and variations in Installing and provisions to be made for same
 - Assembling, combining and coordinating them in washing, bathing and WC units
- 4.2 Study of various Traps, with their working and applications.
 - All types of traps and their installation.

4.3 Pipes and piping network. Techniques of Vertical drainage system in shafts, ducts and external face of **low, medium and high rise buildings.**

- Study of service Shafts, Ducts, Floors
- Single and double stack systems with part and full ventilation.
- Pipe materials, their classification and methods of Installation
- Special fittings used for - Jointing and installations.
- Special fittings for High rise buildings (vent system, Expansion chambers, Pressure relief lines, Bypass Socket etc)
- Anti-Syphonic system of ventilation in drainage system

UNIT V Drainage-II (Horizontal Drainage system)

5.1 Techniques of underground drainage systems for waste water, effluents and sewage. Principle and concept of self-cleansing velocity in flow through pipes. Techniques in laying, leveling, planning, aligning, testing, inspection and maintenance

- Invert levels, Gradients, Access point planning
- Types of Chambers, Sumps, Channels, Shafts, service corridors, catch basins
- Ventilation of drainage system.
- Connection to Main Sewer Drain on Road side

5.2 Rainwater drainage system and surface runoff methods

- Storm water drainage systems.
- Invert levels, Gradients
- Sedimentation tanks and catch basins
- Rainwater harvesting methods

UNIT VI Sewage Treatment and Disposal

6.1 Disposal within the Premises.

- Septic tanks, its function, types and design (Sizing).
- Maintenance of Septic tank.

6.2 Waste Water and Sewage treatment plant (Large and Compact)

- Introduction to Waste water treatment plant
- Introduction to sewage treatment plant
- Decentralized waste water treatment

6.3 Bio-Gas plant and its functioning

SESSIONAL WORK

1. Illustrative Sketches of Installations of Bathroom accessories and Sanitary ware showing water inlet connection and Drain provisions
2. Preparing internal Water supply and Drainage layouts for Residential toilets, Kitchen and Public Toilets
3. Preparing external water supply and drainage layouts for individual Bungalow with septic tank
4. Preparing external water supply and drainage of a building site having more than one building on the site and connectivity to City Municipal Supply and Drain
 - The drawing assignments to be based upon the theory learnt and supported with necessary drawings and calculations (70% weightage).
 - Visits to construction sites and preparing site visit reports, market survey and finding out latest trends and new materials (30% weightage).

RECOMMENDED READING

- NBC 2016 Vol 2, Part 9, Sections (1, 2, 3)
- Handbook on Water supply and Drainage - BIS SP 35 1987
- Building Services Handbook - Fred Hall & Roger Greeno
- Sanitation, Drainage and Water Supply - Mitchell.
- IPC 2018 (International Plumbing Code)
- Plumbing – Design & Practise – S G Deolalikar
- Environment and Services - Peter Burberry.

Climatology		
Course Code	2201925 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=1 Studio=2, Total = 3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	
	End Semester exam	
	Total Marks	50
	Total Credits	02

COURSE OBJECTIVES:

To understand climate as a determinant of architectural design and to enable the students to evolve climate responsive design.

COURSE OUTLINE

Unit I:

1. Understanding the Earth-Sun relation and context of what shapes climate.
2. Elements of climate and understanding climate at different scales ie, global, regional, macro and micro.

Unit II:

1. Global Climate classification
2. Climatic zones of India and its classifications

Unit III:

1. Introduction to passive design strategies at various scales ie urban, building and building component scale.

Unit IV:

1. Introduction to concept of Thermal Comfort in buildings.

Unit V:

1. Introduction to various tools like sun path, bioclimatic chart, site analysis matrix etc that are used to study sun movement, wind and comfort in buildings.

SESSIONAL WORK

- Individual Assignment to apply the various tools like sun path and bioclimatic chart in building element design etc.
 - Group work to study contemporary and vernacular architectural case studies in India with climate responsive architecture and passive design strategies.
 - Minimum two tutorials on all the units.
-

DRAFT

Architectural Design III		
Course Code	2201926 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=6, Total = 7)	Sessional [CIA 100 + EA 100] Viva [Int 25 + Ext 25]	200 50
	In semester exam	NIL
	End Semester exam	NIL
	TotalMarks	250
	Total Credits	10

COURSE OBJECTIVE:

To understand Architectural Design as a process of generating design brief and taking design decisions based on the following aspects:

- **Socio-Cultural Aspects:** To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc.
- **Aesthetics:** To understand the Aesthetic aspects of Design (visual and experiential) along with spatial attributes (scale and proportions, volume, texture, light and shadows, etc.) and formal characteristics. (profile, base, corner, termination).
- **Anthropometry & Function:** To address functional aspects of design (activity, use of space, adequacy and efficiency of space for a particular activity, essential adjacencies of spaces, ease and efficiency of circulation, light, ventilation, user-space relationship, vertical connections)
- **Climate:** To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.
- **Building Material and Construction Technology:** To study relevance of various building materials to a project, to get introduced to various expressions of a building material, to introduce a student to the construction technologies relevant to the building materials chosen, to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:** To understand the spatial and structural implications of basic services involved in building design.
- **Site :** To understand the site and its context, both immediate and wider, in order to enable students to take decisions of zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Universal Design:** To understand the concept and principles of universal design.
- **Precedent Studies:** To introduce the students to learn from case, referral, live studies - process of observation, analysis, documentation and deriving inferences.

COURSE OUTLINE:

- **Project 1 (Major Project):** A design project that introduces the concept of site planning with multiple built spaces with an area 1000 sq.m. to 1500 sq.m.. This project should house a variety of core and allied activities requiring built, open, and transition spaces. The project should explicitly address at least four aspects of the design decision variables from those listed in course objectives.
- **Project 2 (Minor Project):** The students must undergo a Settlement study / study tour in a region with which is different in terms of socio geographic characteristics than the place where the institute is located. A short term project or eskee based in the settlement the students have studied.

SESSIONAL WORK:

- **Project 1 (Major Project):** The student must represent the identification of core design aspect, formulation of design approach and development, and the final design outcome through architectural drawings along with a narrative and representative details of construction. Along with the drawings, the student must develop the design through a series of models/ 3D visualizations made at various stages.
Design deliverables -
 - i. Portfolio A - Architectural drawings and model at an appropriate scale
 - ii. Portfolio B - Process drawings / tracings (Recommended)
 - iii. Study models of various stage (Recommended)
- **Project 2 (Minor Project):** The Study Tour documentation covering details from whole to part and must include narratives, sketches, scale drawings, photographs. It may additionally have information presented in any other formats in addition to the ones mentioned above. The short term project or eskeeto be presented in form of drawings to explain the scheme.

COURSE OUTCOME :

- At the end of the course the student is equipped to take design decisions by considering various aspects and methodically evolve a design where two or more buildings are to be planned on a site and communicate it in form of 2D and 3D representations.

REFERENCE BOOKS

2. Lynch, K., Lynch, K. R., & Hack, G. (1984). *Site planning*. MIT press.
3. Rybczynski W. (1984). *How the Other half builds, Volume 1 : Space*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
4. Carlos Barquin (1986). *How the Other half builds, Volume 2 : Plots*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
5. Vikram Bhatt. (1990). *How the Other half build, Volume 3 : Self selection Process*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
6. Rapoport, A. (1969). *House form and Cultua*. Prentice-Hall of India Private Ltd.: New Delhi, India.
7. Correa, C. (2010). *A place in the shade: the new landscape & other essays*. Penguin Books India.

8. Dave, B., Thakkar, J., Shah, M., & Hāṇḍā, O. (2013). *Prathaa: Kath-khuni Architecture of Himachal Pradesh*. SID Research Cell, School of Interiour Design, CEPT University.
9. Kanvinde, A., & Miller, H. J. (1969). *Campus design in India: experience of a developing nation*. Jostens/American Yearbook Company.
10. Adler, D. (2007). *Metric handbook*. Routledge
11. Neufert, E., & Neufert, P. (2012). *Architects' data*. John Wiley & Sons.
12. Gropius, W. (1956). *Scope of total architecture*. London: G. Allen & Unwin.
13. Giedion, S. (1967). *Space, time and architecture: the growth of a new tradition*. Harvard University Press.
14. Gibbered, Fredrick: *Town Design*.
15. David Gosling, Gordon Cullen – *Visions of Urban Design*.
16. Bawa, G., & Robson, D. (2002). *Geoffrey Bawa: the complete works*. Thames & Hudson..
17. Scheer, B. C. (2017). *The evolution of urban form: Typology for planners and architects*. Routledge.
18. It is strongly recommended that students are exposed on the books on works of Master architects

Building Construction and Materials IV		
Course Code	2201927 [P]& 2201928 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=2 Studio=3, Total = 5)	Sessional [CIA 25 + EA 25]	50
	Viva [Int 25 + Ext 25]	50
	In semester exam	30
	End Semester exam	70
	Total Marks	200
	Total Credits	07

COURSE OBJECTIVES:

- To understand basic principles of RCC construction w.r.t. Cantilever slabs, Staircase.
- To introduce students to vertical transportation systems.

COURSE CONTENT:

UNIT I Cement Concrete types

- Types of special concretes, to include lightweight concrete, ready-mixed concrete, ferro-cement etc; study of its ingredients viz. along with storage of materials on site, understanding good quality material and field & lab tests involved.

UNIT II Damp- & Water-Proofing

- Causes of dampness and reasons for damp- & water-proofing, Different methods or treatments of damp- & water-proofing brick on edge, rough Shahabad stone, bitumen sheets,

plastic sheets, epoxy resins and metallic water proofing materials and other proprietary materials application of the above in construction for terraces, chhajja, toilet slabs etc.

UNIT III Reinforced Cement Concrete Construction

- R.C.C structural details for balcony slabs, canopies and Construction of various types of pre-cast and in-situ RCC stairs, along with earthquake resistant features, reference of a RCC drawing

UNIT IV Vertical Transportation: Lifts, Escalators & Conveyors

- Study of elevators, escalators, conveyors – types, size, capacity, speed and Mechanical safety methods, provisions in civil work for installation of elevators and escalators

UNIT V Sliding & Sliding folding doors, Bay window

- Study of Various types of sliding and folding doors and
- Construction of Bay Window

UNIT VI Glass, Plastics

- Glass as a building material, brief history of its use through examples. Manufacture, properties and uses of glass. Various types of glass and its application in building construction
- Plastic as a building material; its properties, types, uses and application of plastics in building industry.
- Different types of adhesives and sealants used in building construction

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

- Hand drafted drawings on Units 3 and 5 to cover all the aspects of course outline in sufficient detail;; Assignments on units 1, 2, 4 and 6 include sketches, notes, market survey and site visits.

OUTCOME:

- Students will develop an understanding about concrete and its variants and artificial materials such as glass and plastic and their application in construction. Students will be developing knowledge about the vertical transportation systems and their design and construction requirement.

RECOMMENDED READINGS:

- Dr. B.C Punmia (2012) Building construction (10th edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) Construction principles, Materials and Methods, John Wiley & Sons, Inc.
- Roy Chudley, Roger Greeno (2016), Construction Technology, 11th Edition Routledge.
- S.C.Rangwala (2013) Engineering materials (Fortieth edition),Charotar Publishing pvt.ltd.
- S.K. Duggal (2016) Building materials (4th edition) – New age international publishers.

- Willam Morgan (1977) The elements of structure: An introduction to the principles of building and structural engineering Distributed by Sportshelf; 2nd edition.
- W.B. Mckay (2015) Building construction Vol. 1 (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
- Central Public works Department CPWD), IBC, CEAI & CCPS. Guidelines on use of Glass in Buildings - Human Safety.
- National Building Code of India 2016 (Volume 1) and relevant I.S.I. Specifications.

Theory of Structures IV		
Course Code	2201929 [P]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=0, Total = 2)	In semester exam	30
	End Semester exam	70
	TotalMarks	100
	Total Credits	02

COURSE OBJECTIVES:

1. To continue the study of Design of Various Elements of a R.C.C Super Structure.
2. To Study Steel as a Material and get Introduced to various Steel Sections and their appropriate Use
3. To Design Girders and Stanchions in L.S.M as per I.S.800-2007

Unit 1: Design of R.C.C Slabs Continued:

1. Theory only of Different ways of supporting a Balcony
2. Numerical of Design of a Cantilever Slab as an Overhanging Slab

Unit 2: R.C.C Beams Continued:

1. Numerical of Design of Cantilever Beams to support Balcony Slabs
2. Concept of Under Reinforced, Balanced and Over Reinforced Sections. Numerical on Analysis of a Given Beam with Strain Diagrams
3. Audit of a Load Bearing Structure for various Structural and Non-Structural Elements

Unit 3: Design of R.C.C Slabs Continued:

1. Numerical of Design of Dog Legged Staircase with Beams at Various Positions:
2. Theory only on Support Systems and Reinforcement Detailing in the following Cases
 - Stringer Beams - End Stringer Beams with S.S Slabs Treads.
 - Stringer Beams - Central Stringer Beams with cantilever Slab Treads.
 - Folded Plate Staircases.

- Open Well Staircases.
- Dog-legged Staircase with Various Beam Positions.
- Numerical of Design of One Way Continuous Slabs - 3 equal spans using I.S.456 Coefficients.

Unit 4: Introduction to Steel Structures:

1. Theory only of Elements of Steel Structures - Steel Framed Multiple Floors and Buildings with Trusses.
2. Standard Lay Out of Factory or Trussed Buildings in Plan and Section. Plan to include Store Areas, Loading Platforms. Section to Include Cladding.
3. Study of Steel as a Material and Use E250 Steel as Structural Steel. Reading of Steel Tables. Different Structural Steel Sections. Identifying the Sections to be used for Girders, Stanchions, Compound Stanchions, and Struts etc.

Unit 5: Design of Steel Structures:

1. Theory only L.S.M or Plastic Design in steel - Various Limit States, Prevention of Dis-Proportionate Collapse, Development of Plastic Hinges, Plastic Moment, Section Modulus Plastic, Plastic Neutral Axis and Shape Factor, Various Partial Factors of Safety, All as per I.S.800 2007
2. Numerical of Design of Small Span Girders for Lofts and Balconies and Large Spans for creating Floors in Industrial Buildings, including Classification of Sections into Plastic, Compact and Semi Compact.
3. Numerical of Design of Stanchions. Theory only of connections to Girders to Stanchions and Stanchions to Base Pads.

Course Outcome: *At the end of course student develops*

1. *The understanding of supporting Balconies and Staircases*
2. *The Understanding of Dividing Larger Rooms in Smaller One Way or Two Way Slab Units*
3. *The Understanding of Steel as a Material and Various Steel Sections and their use.*
4. *The understanding of using Steel Girders and Stanchions*

Reference Books

1. Design of R.C.C. Structures by H.J.Shah
2. Design of R.C.C. Structures by Punmia and A.K.Jain
3. Design of Reinforced Concrete Structures by N.Krishnaraju
4. R.C.C Theory and Design by Dr. V.L.Shah and Dr.S.R.Karve
5. L.S.Design of Steel Structures by S.K.Duggal
6. Design of Steel Structures By Limit State Method as per I.S.800- 2007 By S.S.Bhavikatti

Environmental Science		
Course Code	2201930 [SS]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=2, Total = 3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	-
	End Semester exam	-
	TotalMarks	50
	Total Credits	02

COURSE OBJECTIVES:

Basic introduction to Multidisciplinary nature of environmental studies with focus on

- Natural Resources
- Eco Systems
- Biodiversity and its conservation
- Environmental Pollution
- Environment Legislation and Social aspects of environment
- Environment friendly buildings

COURSE CONTENT:

Unit I –Natural Resources-Land, water, forest, energy and food

Unit II -Concept of Eco Systems with structure and functions

- Biochemical cycles
- Different ecosystems such as forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystems (ponds, lakes, streams, rivers, estuaries, oceans)

Unit III -Biodiversity

- Value of biodiversity: consumptive, productive use, social, ethical and aesthetic
- Treats to biodiversity and conservation of biodiversity(in-situ and ex-situ)

Unit IV - Environmental Pollution

- Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution noise pollution, thermal pollution and nuclear hazards

Unit IV –Environment Legislation and Social aspects of environment

- Basic Introduction to Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act and Forest Conservation Act
- Environment and human health, human rights and value education for environmental awareness
- Basic introduction to Environment clearance for construction projects
- Brief introduction to the concept of “green buildings” and green building rating systems.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

- Journal on each unit with basic concept, definitions and case studies
- Seminar/essay on any one current environmental issue and its interconnectedness with architecture/development

OUTCOME:

Students should be able to grasp the interdisciplinary nature of environment science and its interdependence on development and society. They should be able to think holistically about environment when taking architectural design decisions

RECOMMENDED READINGS:

1. Textbook for Environmental Studies for undergraduate courses of all branches of higher education, ErachBharucha for University Grants Commission
2. Objective Environmental Science, B.B.Singh
3. Fundamentals of Environmental Studies ,MahuaBasu and S.Xavier
4. Environment and Development,1st Edition, Basic Principles, Human Activities, and Environmental Implications, Editors: Stavros PouloupoulosVassilisInglezakis

HISTORY OF ARCHITECTURE AND CULTURE IV			
Course Code		2201931 [SS]	
TeachingScheme		ExaminationScheme	
TotalContact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 25+EA 25] Viva	50NIL
		In-semester exam	NIL
		End Semester exam	NIL
		TotalMarks	50
		Total Credits	02

Course Objectives:

1. To introduce students to the developments in architecture of the post-medieval Western World as a result of the cultural, political, and economic contexts.

2. To study the development of architecture with specific reference to form, technology, and ornament.
3. To understand contemporary architecture of the world with respect to historical precedents.

Course Outline:

- Unit 1: Industrial revolution and the resulting architecture of eighteenth, and nineteenth century in Europe.
- Unit 2: Revival architecture in Europe and America
- Unit 3: Colonial Architecture in India
- Unit 4: Early Modern movements
- Unit 5: Modernism, International style, and influence of Bauhaus
- Unit 6: Post-independence Architecture in India till 1990.
- Unit 7: Post liberalization Architecture in India.

Sessional Work:

- .Minimum 25 representative buildings of the periods under study should be represented in Plans, sections and views- of various buildings discussed in the above units.
- One measured drawing and digital documentation of any site/ building/ part or features of a building related to the course content studied.. This can be undertaken as group work with identifiable individual contribution.
- One tutorial.

Course Specific Outcomes:

1. An understanding of architecture as a product shaped by various factors like technological developments, colonization, globalization, economy, and urbanization.
2. An understanding of the formal, structural, and stylistic aspects of architectural development.
3. An understanding of contemporary architecture of the world with reference to historical precedents and responses to the same.
4. An understanding of the architecture of colonial and post-independence India.

Recommended Readings:

- Bhatt, Vikram and Peter Scriver. Contemporary Indian Architecture After the Masters. Mapin Publishing Pvt Ltd, 1990.
- Correa, Charles and Kenneth Frampton. The Work of Charles Correa. Thames and Hudson, 1996.
- Curtis, William J R. BalkrishnaDoshi- An Architecture for India. Rizzoli, 1988.
- Curtis, William J R. Modern Architecture Since 1900. Phaidon, 2007.
- Dingle, Narendra. Dialogues with Indian Master Architects. Marg Foundation, 2015.
- Dhongde, Sharvey and ChetanSahasrabudhe (eds). AchyutKanvinde. BNCA Publication Cell, 2009.
- Droste, M and Bauhaus Archiv. Bauhasu 1919-1933. Taschen, 1993.
- Eastlake, Charles Locke. A History of the Gothic Revival. Cambridge University Press, 2012.
- Fletcher, Sir Banister and Dan Cruickshank. Sir Banister Fletcher's A History of Architecture On The Comparative Method. Architectural Press, 1996.

- Hitchcock, Henry Russell and Philip Johnson. The International Style. W W Norton, 1997.
- Kagal, Carmen (ed). Vistara- The Architecture of India. The Festival of India, 1986.
- Lang, Jon. A Consise History of Modern Architecture in India. Permanent Black, 2002.
- The Masters of World Architecture (Series).
- Twombly, Robert (ed). Louis Kahn- Essential Texts. W W Norton, 2003.
- Various monographs on the works of twentieth century Architects.

Building Services II		
Course Code	2201932 [P] & 2201933 [SS]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=2, Total =4)	Sessional [CIA 25 + EA 25]	50
	In semester exam	30
	End Semester exam	70
	TotalMarks	150
	Total Credits	03

COURSE OBJECTIVES:

To introduce students to Building Services in low, medium and high rise buildings and inculcate in them the understanding of integration of services in architectural design. The Building Services will include

- Solid Waste Management
- Lighting –Natural and Artificial
- Electrification

COURSE CONTENT:

Unit I –Solid Waste Management- This unit covers the collection, treatmentand disposal of organic and in-organic waste

- Collection- Garbage chutes and space requirement for manual mechanism
- Treatment and Disposal -Introduction to vermicomposting, organic waste composters, incinerators etc. and space requirements on site and in building

Unit II -Lighting-Natural- Introduction to integrated design approach for daylighting to cover

- Passive design strategies of siting, form, fenestration design,
- Choice of glazing material
- Methods for predicting daylight i.e. daylight factor.
- New technologies to access (light pipes) and control daylight (Lighting Controls)

Unit III -Lighting-Artificial

- Introduction to different sources of light, their characteristics (CRI, Color temperature and lamp life, energy consumption) lighting systems (Direct & Indirect) and their applications in building projects
- Lumen Method for designing appropriate lighting as per NBC 2016

Unit IV - Electrification

- Electrical installations in a building from the supply company mains to individual outlet points including meter board, distribution board, layout of points with load calculations.
- Electrical wiring systems for small and large installations including different materials involved
- Electrical control and safety devices – switches, fuse, circuit breakers, earthing, lightning conductors etc.
- Introduction to alternative sources of energy such as Solar PV, Wind turbines etc. and integration in building design

Unit V-Low Voltage network systems-Introduction to Low Voltage electrical systems and its integration in BMS –

- Wi-Fi and LAN network EPABX & Telecommunication system
- CCTV (Closed circuit TV and camera system)
- FA PA (Fire Alarm and Public address system)
- Access systems (Access control, Tracking, planning and provisions made)

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

- Preparing electrical layout and lighting plan of a building interior supported with necessary calculations (70% weightage).
- Visits to construction sites and preparing site visit reports, market survey and finding out latest trends and new materials for all the units.(30% weightage).

OUTCOME:

Students should be able to understand basic principles of daylight and artificial lighting and should be able to design a lighting plan for a space. They should be able to calculate the energy requirement of building electrical systems. Students should be able to identify space requirements and integration of these systems in architectural design.

RECOMMENDED READINGS:

- National Building Code of India 2016-Volume 2 , Bureau of Indian Standards
- Building Services and Equipments by Ashok L. Chhatre
- Building Services, By Mrs. Shubhangi Bhide
- Building Construction Illustrated by Frances D K Ching

- Basics Lighting Design Ed. by Bielefeld, Bert
- Daylight in Architecture-Benjamin Evans
- Lighting in Buildings-HapkinsenH.D.Kajr
- Lighting in Architectural Design -Derek Philip

SITE SURVEY AND ANALYSIS			
Course Code		2201934 [SS]	
TeachingScheme		ExaminationScheme	
TotalContact Periodsperweek (lectures=1, Studio=3, total=4)		Sessional [CIA 25 + EA 25]	50
			nil
		In-semester exam	nil
		End Semester exam	nil
		TotalMarks	50
	Total Credits	2	

COURSE OBJECTIVES:

- To introduce students to the various factors related to Site Survey and Analysis relevant to Architectural Site Planning
- To enable the students to get conversant with locating the object positions in horizontal and vertical plane
- To prepare and interpret survey drawings.
- To develop understanding of contours and grading for Site development
- To analyze physical, socio-cultural and contextual parameters of the site enabling Site planning

COURSE OUTLINE:

- **Unit 1. 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. Chain Surveying: Base line, tie lines, check lines, Understanding of land demarcation drawings.
- **Unit 2. Directional and Angular Measurements** Magnetic and true meridian, Magnetic and true bearings, use of bearings, use of prismatic compass, calculation of included angles, Fore and back Bearings, declination plotting and adjustment of closed traverse, Uses of Transit Theodolite. Measuring horizontal and vertical angles, calculation height of buildings, use of Theodolite as tachometer, tacheometric tables

- **Unit 3. Levelling** Dumpy level, auto and tilting level, principle lines of levelling instrument, axis of telescope, axis of bubble tube, line of collimation, vertical axis recording by collimation plane, method and rise-fall method, B.S./I.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 4. Plane Table Surveys** Accessories used in plane tabling, methods of locating objects, methods of table orientation, Advantages and disadvantages. Use of Planimeter: Area of zero circle, calculating area of irregular shape figures.
- **Unit 5. Contours** Plotting the contours and profiles, interpolation of contours, contour interval, Characteristics of contours, Profile levelling: Understanding gradient, cut and fill for desired ground level, direct and indirect methods of contouring, block contour surveys
- **Unit 6. Site Analysis and Synthesis** Understanding of Natural and Manmade aspects (such as microclimate, topography, hydrology and vegetation), physical and socio-cultural context of the site. Site Analysis of the above parameters, Site Synthesis and Site Suitability

SESSIONAL WORK:

- 1) Calculation of area of field (Chain and cross staff survey)
- 2) Compass Survey.
- 3) Plane Table Survey.
- 4) Block Contour Survey.
- 6) Slope Analysis and Profile Levelling.
- 7) Site Analysis and Synthesis (Associated with Design Project)

COURSE OUTCOME

- At the end of the course students would be able to comprehend the site characteristics, reading and interpreting survey drawings, understanding equipment and methods of surveying leveling.

REFERENCE BOOKS:

- 1) Basak, N.N, *Surveying and Levelling*, McGraw Hill Education (India) New Delhi, 1994
- 2) Kanetkar, T.P, Kulkarni, S.V, *Surveying and Levelling*, Pune Vidyarthi Griha Prakashan, 2014
- 3) Lynch, K, *Site Planning*, Cambridge: The MIT Press, 1962

Architectural Design IV		
Course Code	3201935 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=6, Total = 7)	Sessional [CIA 100 + EA 100] Viva [Int 25 + Ext 25]	200 50
	In semester exam	NIL
	End Semester exam	NIL
	TotalMarks	250
	Total Credits	10

COURSE OBJECTIVE:

To understand Architectural Design as a process of generating design brief and taking design decisions based on the following aspects:

- **Socio-Cultural Aspects:** To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc.
- **Aesthetics:** To understand the Aesthetic aspects of Design (visual and experiential) along with spatial attributes (scale and proportions, volume, texture, light and shadows, etc.) and formal characteristics. (profile, base, corner, termination).
- **Anthropometry & Function:** To address functional aspects of design (activity, use of space, adequacy and efficiency of space for a particular activity, essential adjacencies of spaces, ease and efficiency of circulation, light, ventilation, user-space relationship, vertical connections)
- **Climate:** To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.
- **Building Material and Construction Technology:** To study relevance of various building materials to a project, to get introduced to various expressions of a building material, to introduce a student to the construction technologies relevant to the building materials chosen, to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:** To understand the spatial and structural implications of basic services involved in building design.
- **Site :** To understand the site and its context, both immediate and wider, in order to enable students to take decisions of zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Universal Design:** To understand the concept and principles of universal design.
- **Precedent Studies:** To introduce the students to learn from case, referral, live studies - process of observation, analysis, documentation and deriving inferences.

COURSE OUTLINE:

1. Designing of progressively complex spaces and buildings in terms of area, a specific community, typology, function etc, with emphasis on either scale or complexity of the project, or both.
2. Project could be evolved based on the current needs of the city and / or context responding to aspects like heritage and conservation, landscape and ecology, image and identity, etc.
3. Development of building design program from not only client or user's requirements but also in response to context specific factors like socio-economic, socio-cultural, environmental etc.
4. Introduction to develop a design philosophy/narrative as a thought process in design.
5. Analysing activities around the buildings within a campus and understand the same in context to relation of built form and open spaces, elements of landscape, pedestrian and vehicular movement, their segregation, managing sloping sites, contours, etc.
6. Introduction to Campus design with reference to design of campuses developed in the past.
7. In case of multiple buildings (existing and/or proposed) to be accommodated within a campus, analyse and understand their relationship with each other in context to establish continuity of form, construction, materials, design theme, climate, etc. and the same should reflect in the drawings and models.
8. Integrating functions, structure and services in a building with relevant structural system and its resultant effect on visual form / character of building
9. To understand various issues and aspects of sustainability, earthquake resistance, construction, universal accessibility, etc. and study how these could be integrated in the architectural design process.
To study a location in urban context preferably in a different socio-geographic setting other than the Institute (not mandatory), and document the study done in the tour in the form of a report with emphasis on relevant aspects like climate, social structure, culture, architectural typology, construction technology, urban fabric, economy, etc or any other issues which need to be considered for envisaging a design project in totality.

SESSIONAL WORK

Assessment Criteria: Major project should have 80% weightage and 20% weightage should be given to the minor project.

A] Major project:

Project based on Campus Design with emphasis on site planning & relationship of built and open spaces, circulation and movement pattern, activity pattern, architectural character, image, identity, philosophy etc.

Deliverables:

- i. Portfolio A - Architectural drawings at an appropriate scale preferably 1:200/1:100. And model to appropriate scale.
- ii. Portfolio B - Process drawings / tracings (Recommended)
- iii. Study models of various stage (Recommended)

B] Minor project:-

A Time Bound Project of 12 hours as a means to gauge students' ability to apply the learning of the design studio and in the process acclimatizing them to work under time constraint and meet deadlines. This project of 12 hrs may be based on the parameters of the Design VI paper such as :

1. The suggested nature of project can be in the form of a social amenity in an urban context. However individual colleges do have freedom to choose a topic.
2. Size of the site given for the design should be such that it fits imperial size sheet.
3. Preferred scale of the drawing would be 1:200.

Deliverables: Architectural drawings in appropriate scale preferably 1:200/1:100. (Model optional).

COURSE OUTCOME:

1] Build competency and ability to make communicative architectural drawings that are of readable scales, preferably in:

1:200 (Site level drawings & Model)

1:100 (Cluster level drawings)

Appropriate details to be explored at 1:50/20/10 etc.

2] Be able to negotiate various scales in drawings and models.

3] Be equipped to resolve structural systems of various construction techniques and services.

4]

REFERENCE BOOKS

1. Lynch, K., Lynch, K. R., & Hack, G. (1984). *Site planning*. MIT press.
2. Rybczynski W. (1984). *How the Other half builds, Volume 1 : Space*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
3. Carlos Barquin (1986). *How the Other half builds, Volume 2 : Plots*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
4. Vikram Bhatt. (1990). *How the Other half build, Volume 3 : Self selection Process*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
5. Rapoport, A. (1969). *House form and Cultua*. Prentice-Hall of India Private Ltd.: New Delhi, India.
6. Correa, C. (2010). *A place in the shade: the new landscape & other essays*. Penguin Books India.
7. Dave, B., Thakkar, J., Shah, M., & Hāṇḍā, O. (2013). *Prathaa: Kath-khuni Architecture of Himachal Pradesh*. SID Research Cell, School of Interior Design, CEPT University.
8. Kanvinde, A., & Miller, H. J. (1969). *Campus design in India: experience of a developing nation*. Jostens/American Yearbook Company.
9. Adler, D. (2007). *Metric handbook*. Routledge
10. Neufert, E., & Neufert, P. (2012). *Architects' data*. John Wiley & Sons.
11. Gropius, W. (1956). *Scope of total architecture*. London: G. Allen & Unwin.
12. Giedion, S. (1967). *Space, time and architecture: the growth of a new tradition*. Harvard University Press.
13. Gibbered, Fredrick: *Town Design*.
14. David Gosling, Gordon Cullen – *Visions of Urban Design*.
15. Bawa, G., & Robson, D. (2002). *Geoffrey Bawa: the complete works*. Thames & Hudson..
16. Scheer, B. C. (2017). *The evolution of urban form: Typology for planners and architects*. Routledge.
17. It is strongly recommended that students are exposed on the books on works of Master architects

Building Construction and Materials V		
Course Code	3201936[P]&3201937 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=3, Total = 5)	Sessional [CIA 25 + EA 25]	50
	Viva [Int 25 + Ext 25]	50
	In semester exam	30
	End Semester exam	70
	TotalMarks	200
	Total Credits	06

COURSE OBJECTIVES:

- To understand the variations in frame structure with options of different types of slab like flat slab, ribbed and waffle slabs etc. along with pre-stressed RCC technology.
- To understand the construction of single basement along with its waterproofing, provision for access and ventilation details. To understand the construction of different types of retaining walls and the detailing of the same
- To introduce materials and technology of assembling interior elements like partitions, suspended ceiling, furniture units etc.

COURSE CONTENT:

UNIT I Materials for Interior Essentials

Characteristics, Properties and types of following materials and their application for interior essentials.

- Wood, wood derivatives and other panel materials used for interior application.
- Finishing materials like laminates, veneers, plastics and metal sheets.
- Paints and varnishes
- Hardware required for application to interior and furniture elements

UNIT II Foundations, Retaining Wall& single basement construction

- Concept of shallow and deep foundations with respect to basement construction, high rise buildings and different soil conditions
- Study of Single basement construction along with waterproofing details, also study of cast-in-situ and precast Retaining wall and its terminology, proportions and construction details.

UNIT III Reinforced Cement Concrete construction

- Reinforced cement concrete floor construction systems like flat plate, flat slab, ribbed slab, waffle slab, band beam and slab, pre-stressed slabs along with earthquake resistant features, reference of a RCC drawing

UNIT IV Partitions and Paneling

- Study of demountable partition construction using proprietary and non-proprietary systems using non-timber materials
- Proprietary and non-proprietary systems of paneling in various materials

UNIT V Suspended Ceiling

- Study of Suspended ceiling construction using proprietary and non-proprietary systems using various materials

UNIT VI Furniture Design and assembly

- Study of furniture for residential, commercial, office buildings and assembly details using timber and other material along with finishing and upholstery.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK: Hand drafted drawings on Units 4, 5 and 6 to cover all the aspects of course outline in sufficient detail;; Assignments on units 1, 2, and 3 including sketches, notes, market survey.

OUTCOME: Students will understand of the principle, methods, advantages and disadvantages of concrete floor construction systems and single basement construction. Students will get to know the proprietary construction techniques for partition ceilings with latest available materials.

RECOMMENDED READINGS:

- Dr. B.C Punmia (2012) *Building Construction* (10th edition) Laxmi Publications.
- Harold B.Olin, John L. Schmidt (1994) *Construction principles, Materials and Methods*, John Wiley & Sons, Inc.
- Narayanamurty, D.; Mohan, D (1972) *The use of Bamboo and reeds in building construction*, UNO Publications
- Roy Chudley, Roger Greeno (2016), *Construction Technology*, 11th Edition Routledge.
- S.C.Rangwala (2013) *Engineering materials* (Fortieth edition), Charotar Publishing pvt.ltd.
- S.K. Duggal (2016) *Building materials* (4th edition) – New age international publishers.
- Willam Morgan (1977) *The elements of structure: An introduction to the principles of building and structural engineering* Distributed by Sportshelf; 2nd edition
- W.B. Mckay (2015) *Building construction Vol. 1* (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
- National Building Code of India 2016 (Volume 1) and relevant I.S.I. Specifications.

Theory of Structures V		
Course Code	3201938 [P]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=0, Total = 2)		
	In semester exam	30
	End Semester exam	70
	TotalMarks	100
	Total Credits	02

COURSE OBJECTIVES:

- *To Understand Doubly Reinforced Beams, T and L Beams and to adopt span to depth ratios for them*
- *To Understand Design of columns across multiple floors changing grade and percentage of steel and grade of concrete*
- *To understand how to increase M.R of girders and Load carrying capacity of Stanchions. To study alternative methods of spanning vis-à-vis Portal Frames*
- *To introduce lateral pressure and understand the proportioning and stability of a gravity retaining wall*

COURSE OUTLINE:

Unit 1:Design of Beams Continued:

- **Doubly Reinforced Beams:**Concept, Need, Applications. **Numerical** on Design of Doubly Reinforced Beams including calculation of Load and Shear Design
- **T Beams and L Beams:** Theory of Dividing a Large Hall Slab into Smaller one way or Two Way Slab units by using T Beams and L Beams. Concept, Applications and Advantages and Disadvantages. **Numerical** on Design of T Beams and L Beams including calculation of Load and Shear Design.
- Theory only on Design of **Coffered Slab** and **Flat Slab Construction**. Concept of Large Beam less Spaces, Column Capitals, Header Beams. I.S.456 Provisions for Various R.C.C Elements

Unit 2: Design of Columns Continued: Reasons for eccentricity of Load on a Column and I.S.Provision for eccentricity. **Numerical** on Calculation of load from floor to floor (From Slab to Beam to Column, Also load calculations from a given floor plate to be divided equally over columns). **Numerical** on Design of columns changing concrete grade and / or steel percentage and / or size of column.

Unit 3: Foundations:Theory of Shallow and Deep Foundations. Theory of foundations in Soil of Low S.B.C. Study of Isolated Footing, Combined Footing, Strip Foundations, Raft Foundations, Piles and Pile Caps. **Numerical** on Design of Isolated Footing including Single Shear and Double Shear, **Numerical** on design of combined footing in Plan Only.

Unit 4: Design of Girders and Stanchions Continued:

- Theory of Girders with flange plates to increase M.R of Section. **Numerical** on Design and Analysis of Steel Girders with flange plates.
- Extending the above Theory to Study Castellated Beams and Plate Girders. Theory only of Gantry Girders, Functions and Loads acting on each element of a Gantry Girder
- Theory of Stanchions with Flange Plates to increase Load Carrying Capacity. **Numerical** on Design and Analysis of Stanchions with Flange Plates, Finding thickness and size of Connecting Plate to Pad Foundation and Design of Pad.
- Theory only of Portal Frames, Basic Concept - Rigid, Two Hinged and Three Hinged Portal Frames with B.M.D. Advantages and Disadvantages of R.C.C Portal Frame - Detailing of Hinged and Pinned Column to Footing Junction. Advantages and Disadvantages of Steel Portal Frame - Detailing of Hinged and Pinned Column to Footing Junction, Rigidity at Beam to Column Junctions.

Unit 5: Retaining Walls:Retaining Walls - Need, Angle of Repose, Rankine's Theory, Different types of Retaining walls and their Applications, Study of Proportioning and Stability of Gravity Retaining Walls, Weep Holes and Effect of Surcharge. **Numerical** on Stability of Gravity Retaining Walls.

Unit 6: Advanced Structures: Pre-stressed Constructions: Concept and Process of Pre-tensioning and Post-Tensioning. Advantages and Disadvantages over Conventional R.C.C Construction. Use of High Strength Concrete and Steel in Pre-Stressed Elements.Methods of Pre-stressing - Freyssinet System. Numerical on Extreme Fibre Stresses at Mid Span and End Span.

Reference Books

1. Design of R.C.C. Structures by H.J.Shah
2. Design of R.C.C. Structures by Punmia and A.K.Jain
3. Design of Reinforced Concrete Structures by N.Krishnaraju
4. R.C.C Theory and Design by Dr. V.L.Shah and Dr.S.R.Karve

Course Outcome:*At the end of semester student develops*

- *The understanding of larger space spanning both in R.C.C and Steel*
- *The understanding of carrying of vertical loads by R.C.C. Columns and Stanchions*
- *The understanding Lateral pressure and structural principles for overcoming it.*

LANDSCAPE ARCHITECTURE		
Course Code	3201939 [SS]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=1 Studio=3, Total =4)	Sessional [CIA 50 + EA 50]	100
	In semester exam	
	End Semester exam	
	TotalMarks	100
	Total Credits	03

COURSE OBJECTIVES:

- To introduce the students to Landscape Architecture and its scope.
- To understand the elements and principles of landscape design and role of landscape elements in design of outdoor environments on the site.
- To understand the Intent and content of designed landscapes.
- To develop understanding of site analysis and site planning and integrated design of open and built spaces.
- Creating awareness about using Landscape design as a tool to address environmental concerns in Architecture.

COURSE OUTLINE:

- **Unit 1.** Introduction to Landscape Architecture and its scope ,elements(natural and manmade) and their application in achieving functional, aesthetic, environmental and cultural goals.
- **Unit 2.** Principles and approaches in Landscape Design. Illustrations can be from contemporary as well as historic landscapes for understanding various approaches of design.
- **Unit 3.** Study of Hard landscape (civil work) details with respect to materials and construction techniques..
- **Unit 4.** Study of Softscape (plant material), their characteristics and contribution in terms of creating and imparting character to outdoor spaces.
- **Unit 5** Introduction to basics of Site planning and process of site planning.

SESSIONAL WORK:

- Minimum two assignments to expose the students to landscape elements, their application, principles of design and approaches of design.
- Short duration projects such as eskees to allow students to explore the palette of landscape elements in open space creation and design. – Minimum 2.

- One long duration site planning and landscape design project preferably the third year architectural design project. The outcome shall be landscape design drawings, concept generation, site studies, analysis along with constructional details and planting concepts.

REFERENCE BOOKS

- Mcharg, I, *Design with Nature*. John Wiley and co. 1978.
- Jellicoe, G and Jellicoe, S, *The Landscape of Man*, London: Thames and Hudson, 1991.
- Simonds, J. O, *Landscape Architecture: The Shaping of Man's Natural Environment*, N Y: McGraw Hill Book Co. Inc. 1961.
- Lynch, K, *Site Planning*, Cambridge: The MIT Press, 1962.
- Shaheer, M, Wahi Dua, G and Pal A (editors), *Landscape Architecture In India, A Reader: LA*, Journal of Landscape Architecture, 2013.
- Lyall, S, *Designing The New Landscape*: UK: Thames and Hudson, 1998.
- Dee, C, *Form And Fabric In Landscape Architecture: A Visual Introduction*, UK: Spon Press, 2001.
- Eckbo, G, *Urban Landscape Design*, N Y: McGraw hill co. 1961.
- Laurie, M, *An Introduction to Landscape Architecture*, N Y: American Elsevier Pub. Co. Inc. 1975
- Rutledge, A J. *A Visual Approach to Park Design*. New York: John Wiley and Sons, 1985.
- Randhawa, M S, *Flowering Trees*, New Delhi: National Book Trust, 1998.
- Bose, T K and Choudhary, K, *Tropical Garden Plants in Colour*, Horticulture and Allied Publishers, 1991.
- Krishen, P. *Trees of Delhi: A Field Guide*, Penguin India, 2006.
- Mukherjee, P, *Trees of India (WWF Natures Guide)*, Oxford, 2008.
- Sahni, K C, *The Book of Indian Trees (Bombay Natural History Society)*, Oxford, 1998.
- Krishna, N and Amrithalingam, M, *Sacred Plants of India*, Penguin Books Limited, 2014.
- Motloch, J. L, *Introduction to Landscape Design*, US: John Wiley and Sons, 2001.
- Dines, N and Harris, C, *Timesavers Standards for Landscape Architecture*, McGraw Hill Education, 1998.
- Reid, G, L, *Landscape Graphics*, Watson-Guptill, 2002.
- Botkin, D. B and Keller, E. A, *Environmental Science: Earth As a Living Planet*, N Y: John Wiley And Co. 1995.
- Grosholz, E, *The Poetics of Landscape Architecture*, University of Pennsylvania Press, 2010.

ELECTIVE I [CONTEMPORARY ARCHITECTURE]			
Course Code		3201940 [SS]	
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 50+EA 50]	100
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	02

Course Objectives:

- To analyze the contemporary trends/approaches in architectural production in terms of design, practices, its perception, appreciation and critical discourses.
- To critically reflect and comment on contemporary architecture across the world.

Course Outline:

- Unit 1 - Post-Modernism and other movements in Architecture since the second half of 20th century.
- Unit 2 - Post 2000 CE trends in architecture, various critical discourses and current architectural issues
- Unit 3 - Analysis and critical appraisal of Architecture across the world

Sessional Work:

- Book review / article / chapter of a book in 1000 words.
- Unit 3 should be a research essay of about 1500-2000 words on a topic selected by the student and accompanied by an oral presentation of 15 minutes duration and discussion.

Students should be encouraged to follow the formalities of writing a research essay. The submission has to be in hand written format.

Students should be assessed primarily for the identification of issues, ability to take position and development of an argument.

Course Specific Outcomes:

1. Application of the knowledge gained through the study of history of architecture to analyse contemporary architecture.
2. Development of individual view point and construction of an argument to put it across.
3. Skill of orally presenting a topic of choice, and generating a discussion.

REFERENCE BOOKS

- Buchanan, Peter. "The Big Rethink". The Architectural Review (AR), (Articles – December 2011, January to May 2012, July – September 2012, November 2012)
- Correa, Charles. A Place in the Shade: The New Landscape and Other Essays. Penguin Books India, 2010.
- Curtis, William J R. Modern Architecture since 1900. Phaidon, 2007.
- Frampton, Kenneth. Modern Architecture. Thames and Hudson, 1992.
- Hays, K. Michael. Architecture Theory since 1968 (2000). MIT Press., Oct 1997, Feb. 2000.
- Hertzberger, Herman. Lessons for Students in Architecture. 010 Publishers, 1973.
- Jencks, Charles. The New Paradigm in Architecture- The Language of Post-Modern Architecture. Yale University Press, 2002.
- Leach, Neil. Anaesthetics of Architecture, MIT Press, 1999
- Mehrotra, Rahul. Architecture in India: Since 1990. Pictor Publishing, 2007.
- Pallasma, Juhani. The Eyes of the Skin: Architecture and the Senses. Academy Press, 2 edition, 2005
- Smith, Koryden H. Introducing Architectural Theory. Routledge, 2012
- Unwin, Simon. Analysing Architecture. Routledge, 2002.
- Venturi, Robert. Complexity and Contradiction in Architecture. MOMA, 1966.
- Wigley, Mark. The Architecture of Deconstruction- Derrida's Haunt. MIT Press, 1993.

Building Services III	
Course Code	3201941 [P] & 3201942 [SS]

TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=1, Total =3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	30
	End Semester exam	70
	TotalMarks	150
	Total Credits	03

COURSE OBJECTIVES

- To comprehend building services as an integral part of architectural design process
- To obtain knowledge of technical and design aspects of natural ventilation, heating, cooling and HVAC

COURSE OUTLINE

- Principles of working of natural ventilation, heating, cooling and HVAC systems, components, materials and provisions in architectural design
- Functional and aesthetical aspects of building services coordination in architectural design

TEACHING PLAN

Unit I: Natural ventilation

- 1.1 Conditions of human thermal comfort
- 1.2 Factors affecting natural ventilation
- 1.3 Strategies to effect natural ventilation

Unit II: Mechanical ventilation

- 2.1 Systems of mechanical ventilation
- 2.2 Components of mechanical ventilation systems
- 2.3 Mechanical ventilation - Schematic design
- 2.4 Introduction to Psychometric charts

Unit III: Heating and cooling

- 3.1 Passive heating and cooling techniques
- 3.2 Low energy mechanical cooling techniques

Unit IV: Air-conditioning - 1

- 4.1 Principles of air-conditioning systems
- 4.2 Components of air-conditioning systems

Unit V: Air-conditioning - 2

- 5.1 Types of air-conditioning systems

Unit VI: Air-conditioning - 3

- 6.1 Onsite case study of air-conditioning system
- 6.2 Air-conditioning and ducting layout – Schematic calculations and design for a space / part of a building.

SESSIONAL WORK

Tutorials for Units I, II, III, IV and V (50% marks)

Onsite case study report for 6.1 (25% marks)

Schematic air-conditioning calculations and ducting layout for 6.2 (25% marks)

RECOMMENDED READING

- National Building Code of India 2016
- Air Conditioning Principles and Systems – Edward G Pita
- Environmental Science - B J Smith, G M Phillips, M Sweeney
- Building Service Handbook – Fred Hall and Roger Greeno
- Refrigeration and Air Conditioning – Arora Ramesh Chandra
- Fundamentals of Air Conditioning Systems – Billy C Langley
- Basic Refrigeration and Air Conditioning – P N Ananthanarayanan

WORKING DRAWING I			
Course Code		3201943 [SS]	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3, total=4)		Sessional [CIA 50 + EA 50]	100
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	100
		Total Credits	2

COURSE OBJECTIVES

- To enable the students to prepare working drawings of an architectural project and imbibe the significance of working drawings from the point of view of execution of the work on site and as important component of tender documents.

COURSE CONTENT

- Introduction to the concept of working drawings and their importance.
- Graphical presentation of all the components of a building along with dimensioning and annotations.
- Understand and apply IS Codes and internationally accepted norms / conventions / methods of preparing a working drawing along with tabulation of schedules of materials, finishes and hardware.

SESSIONAL WORK

- One working drawing of an architectural design project having load bearing structure with minimum 100 sq. m. carpet area. Manually drafted drawings [minimum 6] sufficiently explaining the building from the execution point of view.
- At least two details related to the design such as doors / windows / railings / kitchen etc. to suitable scale. (1 drawing)

Architectural DesignV		
Course Code	3201944[SV]+3201945[P]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=5, Total = 7)	Sessional [CIA 100 + EA 100] Viva [Int 25 + Ext 25]	200 50
	In semester exam	NIL
	End Semester exam	100
	TotalMarks	350
	Total Credits	10

COURSE OBJECTIVE:

To understand Architectural Design as a process of generating design brief and taking design decisions based on the following aspects:

- **Socio-Cultural Aspects:** To introduce students to socio-cultural aspects like lifestyle, culture, traditions, and their effect on architectural design etc.
- **Aesthetics:** To understand the Aesthetic aspects of Design (visual and experiential) along with spatial attributes (scale and proportions, volume, texture, light and shadows, etc.) and formal characteristics. (profile, base, corner, termination).
- **Anthropometry & Function:** To address functional aspects of design (activity, use of space, adequacy and efficiency of space for a particular activity, essential adjacencies of spaces, ease and efficiency of circulation, light, ventilation, user-space relationship, vertical connections)
- **Climate:** To understand the Climatic aspects those have a bearing on architectural design and address climatic concerns like adequate light, ventilation, protection from rain, insulation, shading, heat gain, through passive strategies.
- **Building Material and Construction Technology:** To study relevance of various building materials to a project, to get introduced to various expressions of a building material, to introduce a student to the construction technologies relevant to the building materials chosen, to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:** To understand the spatial and structural implications of basic services involved in building design.
- **Site :** To understand the site and its context, both immediate and wider, in order to enable students to take decisions of zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Universal Design:** To understand the concept and principles of universal design.
- **Precedent Studies:** To introduce the students to learn from case, referral, live studies - process of observation, analysis, documentation and deriving inferences.

COURSE OUTLINE:

10. Designing of progressively complex spaces and buildings in terms of area, a specific community, typology, function etc, with emphasis on either scale or complexity of the project, or both.
11. Project could be evolved based on the current needs of the city and / or context responding to aspects like heritage and conservation, landscape and ecology, image and identity, etc.
12. Development of building design program from not only client or user's requirements but also in response to context specific factors like socio-economic, socio-cultural, environmental etc.
13. Introduction to develop a design philosophy/narrative as a thought process in design.
14. Analysing activities around the buildings within a campus and understand the same in context to relation of built form and open spaces, elements of landscape, pedestrian and vehicular movement, their segregation, managing sloping sites, contours, etc.
15. In case of multiple buildings (existing and/or proposed) to be accommodated within a site, analyse and understand their relationship with each other in context to establish continuity of form, construction, materials, design theme, climate, etc. and the same should reflect in the drawings and models.
16. Integrating functions, structure and services in a building with relevant structural system and its resultant effect on visual form / character of building
17. To understand various issues and aspects of sustainability, earthquake resistance, construction, universal accessibility, etc. and study how these could be integrated in the architectural design process.
18. To study a location in urban context preferably in a different socio-geographic setting other than the Institute (not mandatory), and document the study done in the tour in the form of a report with emphasis on relevant aspects like climate, social structure, culture, architectural typology, construction technology, urban fabric, economy, etc or any other issues which need to be considered for envisaging a design project in totality.

SESSIONAL WORK

Assessment Criteria: Major project should have 80% weightage and 20% weightage should be given to the minor project.

A] Major project:

System oriented project with emphasis on structural system, vertical and horizontal circulation, services like HVAC, electrical, fire-fighting systems, parking, rules & regulations etc. The project could also be evolved based on the need of the city with socio-economic context, historical context, ecological concerns, etc.

Deliverables:

- i. Portfolio A - Architectural drawings at an appropriate scale preferably 1:200/1:100. And model to suitable scale.
- ii. Portfolio B - Process drawings / tracings (Recommended)
- iii. Study models of various stage (Recommended)

B] Minor project:

Option 1: A Time Bound Project of 12 hours as a means to gauge students' ability to apply the learnings of the design studio and in the process acclimatizing them to work under time constraint and meet deadlines. This project of 12 hrs may be based on the parameters of the Design VI paper such as :

1. The suggested nature of project can be in the form of a social amenity in an urban context.
2. Size of the site given for the design should be such that it fits imperial size sheet.
3. Preferred scale of the drawing would be 1:200.

Deliverables: Architectural drawings in appropriate scale preferably 1:200/1:100. (Model optional).

Or

Option 2: Study Tour linked short term project

Deliverables: Study tour documentation must include architectural study supported by drawings, narratives, sketches, photographs and information presented in any other formats deemed suitable by the college and linked short term project.

COURSE OUTCOME:

1] Build competency and ability to make communicative architectural drawings that are of readable scales, preferably in:

1:200 (Site level drawings & Model)

1:100 (Cluster level drawings)

Appropriate details to be explored at 1:50/20/10 etc.

2] Be able to negotiate various scales in drawings and models.

3] Be equipped to resolve structural systems of various construction techniques and services.

REFERENCE BOOKS

18. Lynch, K., Lynch, K. R., & Hack, G. (1984). *Site planning*. MIT press.
19. Rybczynski W. (1984). *How the Other half builds, Volume 1 : Space*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
20. Carlos Barquin (1986). *How the Other half builds, Volume 2 : Plots*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
21. Vikram Bhatt. (1990). *How the Other half build, Volume 3 : Self selection Process*. Centre for Minimum Cost Housing. McGill University. Montreal Canada
22. Rapoport, A. (1969). *House form and Cultua*. Prentice-Hall of India Private Ltd.: New Delhi, India.
23. Correa, C. (2010). *A place in the shade: the new landscape & other essays*. Penguin Books India.
24. Dave, B., Thakkar, J., Shah, M., & Hāṇḍā, O. (2013). *Prathaa: Kath-khuni Architecture of Himachal Pradesh*. SID Research Cell, School of Interior Design, CEPT University.
25. Kanvinde, A., & Miller, H. J. (1969). *Campus design in India: experience of a developing nation*. Jostens/American Yearbook Company.
26. Adler, D. (2007). *Metric handbook*. Routledge
27. Neufert, E., & Neufert, P. (2012). *Architects' data*. John Wiley & Sons.
28. Gropius, W. (1956). *Scope of total architecture*. London: G. Allen & Unwin.
29. Giedion, S. (1967). *Space, time and architecture: the growth of a new tradition*. Harvard University Press.
30. Gibbered, Fredrick: *Town Design*.

31. David Gosling, Gordon Cullen – Visions of Urban Design.
32. Bawa, G., & Robson, D. (2002). *Geoffrey Bawa: the complete works*. Thames & Hudson..
33. Scheer, B. C. (2017). *The evolution of urban form: Typology for planners and architects*. Routledge.
34. It is strongly recommended that students are exposed on the books on works of Master architects

Building Construction and Materials VI		
Course Code	3201946 [SV]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=3, Total = 5)	Sessional [CIA 50 + EA 50] Viva [Int 25 + Ext 25]	100 50
	In semester exam	NIL
	End Semester exam	NIL
	TotalMarks	150
	Total Credits	06

COURSE OBJECTIVES:

- To introduce the design potential of steel as a material in building construction and it's inherent structural benefits.
- To create awareness with the best practices of steel as a construction material.
- To understand the concept of modular co-ordination and industrialized building construction along with precast technology.
- To understand issues and construction of earthquake resistant frame structures.

COURSE CONTENT:

UNIT I Metal and Metal alloys, Sheet roof covering

- Types of steel used in building construction- Use of Structural and non-structural steel for low and medium span building , their properties and advantages of steel in construction.
- Market forms of structural and non-structural steel.
- Use of lightweight steel for building construction.
- Built-up sections for structural purpose.
- Sheet roof coverings --Characteristics, Properties, market forms of sheet roof covering for medium and long spans and their application.

UNIT II Fencing and Gates

- Fencing using different materials like steel, barbed wire, chain-link, weld-mesh and other available materials in market.
- Construction details of fencing and suitable gate with due consideration to design parameters.

UNIT III Steel Trusses

- Understanding concepts of trusses, basic connections for trusses along with earthquake resistant features.
- Construction of trusses for low rise medium span buildings.

UNIT IV Steel structure construction

- Understanding methods of construction of various components of steel structures; steel frame construction for multi-storey steel building.
- Construction details of assembly with stanchion, beams and metal deck flooring along with earthquake resistant features.
- Moisture and fire protections in steel framed buildings

UNIT V Modular co-ordination

- Concept of modular coordination for Industrialized building construction, planning and construction details
- Precast floor and roof construction along with the following systems developed by CBRI:
 - Floor and roof construction using partially precast planks and joist.
 - Floor and roof construction using precast Waffle unit.
 - Introduction to locally available proprietary precast systems

UNIT VI Earthquake resistant frame structures.

- Overview of earthquake resisting structural systems.
- Application of Moment resisting frames, crossed braced frames and shear wall for Earthquake resistance structures.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK: Hand drawn drawings on Units 3,4 and 5 to cover all the aspects of course outline in sufficient detail;; Assignments on units 1, 2,6 include sketches, notes, market survey and case-studies.

OUTCOME: Students will develop an understanding of possibilities of steel as an important building construction material. Understanding of properties of ferrous and non ferrous metals as materials for buildings will able students to use Steel innovatively in building projects.

RECOMMENDED READINGS:

- Central Public Work Department, Indian Building Congress. Handbook on Seismic Retrofit of Buildings. Narosa Publishing House. 2008
- Andrew Charleson. Seismic Design for Architects: Outwitting the Quake. Elsevier Ltd 2008
- Terri Meyer Boake. Understanding Steel Design: An Architectural Design Manual. Birkhauser Basel 2012.
- Stephen Emmitt. Barry's Advanced construction of buildings. Wiley, 2006

- Mackay J.K. Building Construction vol.-1-4. Longman Scientific & Technical, 1988.
- IS 7921 : Recommendations for modular coordination in building industry Horizontalcoordination
- IS 7922 : Recommendations for modular coordination in building industry Verticalcoordination
- M. M. Mistry. Modular coordination & prefabrication, Principles of Modular Coordination in building.
- BMTPC. Standards & Specifications for Cost-Effective Innovative Building Materials and Techniques. BMTPC 1996

Theory of Structures VI		
Course Code	3201947 [P]	
TeachingScheme	ExaminationScheme	
TotalContact Hoursperweek (lectures=2 Studio=0, Total = 2)	In semester exam	30
	End Semester exam	70
	TotalMarks	100
	Total Credits	02

COURSE OBJECTIVES:

- *To the study of effect of Lateral Pressure of Soil and Water for increasing heights.*
- *To Develop in Students the Feel for Structural Principles and their Relates to Building Design*
- *To Develop in Students the Concept that “Every Structure is a System that Forms the Space” and the fact that Architecture and Structure cannot be conceived independently.*
- *To Develop in Students the fact that Structural Engineering is a Specialist Discipline and that the Architect has to appreciate the consultant’s concern and make an informed choice about the most appropriate Structural System for his Building with Reasonable Understanding of its Economic and Operational Implications.*
- *To Develop in Students the Mathematical logic that would enable him to Design the Structural System for Ground +2 Storey R.C.C Structure and a medium span Factory Building in steel.*
- *To in-still in the Students a Confidence that they could develop and explore a Structural System of their own design and execute the same.*

Unit 1: Lateral Pressure and Retaining Walls Continued:

- Theory of **Cantilever Retaining walls**, their Proportioning, Stability, Reinforcement Detailing of Stem and Base, Shear Key. **Numerical** on Stability of Cantilever Retaining Wall, Design of Stem Reinforcement.
- Theory of **Counter Fort Retaining Wall**, Its Parts, Structural Action on Each Part and Reinforcement Detailing
- **Water Tanks in R.C.C:** Joints in Water Tanks, Limit State of Cracking, Minimum Percentage of Steel and Other Standards.
 - R. C.C. Circular Water Tank with Flexible and Rigid Joint between Wall and Base -Concept of Hoop Tension – Reinforcement Detailing.
 - R. C.C. Square and Rectangular Water Tanks -Reinforcement Detailing.
 - R.C.C. Under-Ground Water Tanks - Pressure Conditions -Reinforcement Detailing.
 - Over Head Water Tank - An Intze Tank - Parts and General Detailing

Unit 2: Design of R.C.C Framed Structure:

- **Total review** of design of ground + two storied RCC building. Defining Structural system, different loads, Design sequence, transfer of load, Actual design procedure. Framing of a Given Plan as per constraints on Beam and Slab Depths
- **Understanding Structural Schedules and drawings**, Sketching Based on Given Schedule.

Unit 3: Design of Steel Structures Continued:

- **Compound Stanchions:** Theory of Compound Stanchions. **Numerical** on Design and Analysis of Compound Stanchion. Lateral System Design of Lacing and Battening and other Lateral Systems in Theory Only
- **Trusses:** Truss types, **Numerical** on Design of Purlins and Transfer of Load to Trusses. **Numerical** on Design of Compression and Tension Members with Design of Bolted and Welded Joints. Connections in Structural Steel.

Unit 4: Design of Steel Framed Factory Buildings:

- Total review of design of medium span factory building in steel. Structural systems, different loads, Design sequence, transfer of load, actual design, procedure, Understanding structural drawings.

Unit 5: Understanding Wind Load:

- Factors Affecting Wind Load. Analysis of Win Load for Ground + 9 Storeyed Building.
- Resulting Stresses in Foundations due to Effect of Wind load on Tall Structures
- Effect of Wind Load on Roof.

Unit 6: Advanced Structures:

- **Long span structural systems** in Steel and R.C.C like Domes. Vaults, Folded Plates, and Tensile Structures using Fabric. Advantages and disadvantages of different systems.

- **High Rise Buildings Structural System** like Rigid frame, Moment Resisting Frames, Braced Frames, Shear Walls, Out Rigger Systems, Tube Systems, Tube in Tube, Dia-Grid, Exo- Skeleton. Space Trusses etc. Appropriate System as per height.

Course Outcome: *At the end of semester student develops*

1. *The understanding Effects of Lateral Pressure of Soil and Water*
2. *The sense to frame R.C.C and Steel Buildings*
3. *The Understanding of different Structural Systems for Larger Spans and Tall Buildings with an understanding of Wind Load*

Reference Books

1. Design of R.C.C. Structures by H.J.Shah
2. Design of R.C.C. Structures by Punmia and A.K.Jain
3. Design of Reinforced Concrete Structures by N.Krishnaraju
4. R.C.C Theory and Design by Dr. V.L.Shah and Dr.S.R.Karve
5. L.S.Design of Steel Structures by S.K.Duggal
6. Design of Steel Structures By Limit State Method as per I.S.800- 2007 By S.S.Bhavikatti

RESEARCH IN ARCHITECTURE I		
Course Code	3201948 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week (lectures=1 Studio=2, Total =3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

COURSE OBJECTIVES:

- To introduce students to Research in Architecture and its value in design
- To enable the students to prepare a research proposal.

COURSE OUTLINE:

- Unit I -- Introduction to the meaning and need of research in architecture. Introduction to various concepts such as types of variables, measurement of variables, sample selection, ethics in research.
- Unit II – Process of research – Methodology

- Unit III – Literature study
- Unit IV – Methods of research in architecture. Use of surveys, observations, experiments, secondary sources.

SESSIONAL WORK:

- Tutorial based on all of the above units
- Literature Review of at least 5 papers related to the topic of their choice.
- Research proposal giving details of aims, objectives, scope, limitations, methods, samples selected on the topic approved by the head of the institution.

NOTE:

- The guide must have minimum 5 years of teaching experience. Preferably a guide should not guide more than 8 students.
- It is desirable that the research proposal is presented in front of experts.
- It is beneficial to the students if the topic is related to the architectural design project of semester X.

REFERENCE BOOKS

Babbie, E. *The Practice of Social Research*. third edition. Belmont: Wadsworth Publishing Co., 1983. book.

Cresswell, J.W. *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks: Sage, 1994. Book.

De Vaus, D.A. *Surveys in Social Research*. Jaipur: Rawat Publications, 2003. Book.

Dey, I. *Qualitative Data Analysis: A User Friendly Guide for Social Scientists*. London: Routledge, 1993. Book.

Groat, L. & Wang, D. *Architectural Research Methods*. New York: John Wiley and Sons Inc., 2002. Book.

Kothari, C.R. *Research Methodology: Methods and Techniques*. New Delhi: WishwaPrakashan, 2005. Book.

Michelson, William. *Behavioural Methods in Environmental Design*. Stroudsburg, Pennsylvania: Dowden, Hutchinson and Ross, Inc., 1982.

Nachmias, C.F. & Nachmias, D. *Research Methods in Social Sciences*. Great Britain: St. Martin's Press Inc., 1996. Book.

Patton, M.Q. *Qualitative Evaluation Methods*. Newbury Park: Sage Publications, 1980. Book.

Sanoff, H. *Methods of Architectural Programming*. Vol. 29. Dowden Hutchinson and Ross, Inc., 1977. document.

—. *Visual Research Methods in Design*. USA: Van Nostrand Reinhold, 1991.

ELECTIVE II			
Course Code		3201949 [SS]	
Teaching Scheme		Examination Scheme	
Total Contact Hours per week= (lectures=1, Studio=3, Total=4)		Sessional [CIA 50+EA 50]	100
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	03

Course Objectives:

To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same. As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and *nurture his/her area of interest and develop his/her expertise*. However colleges have to ensure that the student does not repeat a particular elective.

Course Outline:

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well practical aspects are covered linking them to the field of architecture. Apart from lectures delivered by the subject resource persons, self study in form of hands on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

Sessional Work:

The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.

- Field study reports
- Mapping / documentation / photographic / videographic documentation
- Measured drawings
- Computer based assignments
- Tutorials

Course Specific Outcomes:

Building Services IV	
Course Code	3201950[P] & 3201951 [SS]
Teaching Scheme	Examination Scheme

TotalContact Hoursperweek (lectures=2 Studio=1, Total =3)	Sessional [CIA 25 + EA 25]	50
	In semester exam	30
	End Semester exam	70
	TotalMarks	150
	Total Credits	03

COURSE OBJECTIVES

- To comprehend building services as an integral part of architectural design process
- To obtain knowledge of fire safety provisions and aspects of good acoustics in architectural design

COURSE OUTLINE

- Properties of sound, strategies for reducing noise, aspects of treatments for good acoustical conditions
- Provisions for fire prevention, life safety and fire protection as per NBC 2016-Part 4

TEACHING PLAN

Unit I: Acoustics- 1

- 1.4 Generation and propagation of sound, properties of sound, human hearing ranges
- 1.5 Planning and design to control outdoor noise and indoor noise
- 1.6 Materials and construction for acoustical treatment, NRC and STC ratings

Unit II: Acoustics -2

- 2.1 Parameters for good acoustical conditions
- 2.2 Air and structure borne noise control

Unit III: Acoustics- 3

- 2.5 Reverberation time calculation and recommendation for acoustical treatment
- 2.6 Sound amplification systems

Unit IV: Fire prevention

- 4.1 The fire triangle, causes, impacts, basic terminology
- 4.2 Occupancy based classification of buildings, fire zones, construction types, fire rating requirements
- 4.3 Provisions for emergency power, escape lighting and exit signage, fire/smoke dampers
- 4.4 Provisions related to air conditioning, glazing, interior finishes, fire command centre

Unit V: Life safety

- 5.1 Exit requirements, egress components
- 5.2 Compartmentalisation, provision for basements, gas supply, fire detection and alarm

Unit VI: Fire protection

- 6.1 Fire extinguishers/fixed firefighting installations, static water storage tanks, pump house, automatic sprinkler installations, automatic high velocity and medium velocity water spray systems, fixed foam installation, gas-based suppression system, automatic water mist systems

SESSIONAL WORK

- Tutorials for Units I to VI (50% marks)
- Reverberation time calculations and recommendations for acoustical treatment(25% marks)
- Design for provisions for fire prevention, life safety and fire protection (25% marks)

RECOMMENDED READING

- National Building Code of India 2016
- Architectural Acoustics - M. David Egan
- Architectural Acoustics: Principles and Design - Madan Mehta, James Allison Johnson, Jorge Rocafort
- Auditorium Acoustics and Architectural Design - Michael Barron
- Building Services Handbook- Fred Hall, Roger Greeno.

WORKING DRAWING II			
Course Code		3201952 [SS]	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3, total=4)		Sessional [CIA 50 + EA 50]	100
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	100
		Total Credits	2

COURSE OBJECTIVES:

- To Introduce idea of Design Development and detailing and its relevance in converting 'concept design' to working drawing and hence the realization of design on site.
- To imbibe further the importance of working drawings as an essential tool for effective site execution and execution of a building contract.
- To expose to the standard methods, conventions, drawing annotations including International standards, IS codes, its application in working drawing set with material and component and schedules.

COURSE OUTLINE:

- Lecture demonstration/s to elaborate on standard practices, conventions, graphic annotations, sequencing and cross reference systems of a good working drawing set.

- Design development and detailing of own **design** to resolve the design idea to one which can be executed/ constructed, exposing students to construction parameters, limitation and sequencing.
- Generating a working drawing set for the **chosen design/ building** with framed/composite construction including schedules of material, finishes, components and accessories
- Developing and drafting details of Civil work and furniture/ interior design including schedule of finishes

SESSIONAL WORK:

- Preparing a manually drafted/ CAD generated working drawing set of 'own design project' with carpet area not less than 250 Sq. M. and at least Ground plus one storied building having framed/composite construction. The set to also include at least two civil details out of following.
 - I. Façade / skin of the building with fenestration and weather protection.
 - II. Stairway/ staircase
 - III. Public Washroom
- Interior layout of any one space of about 25sq.m. Area showing furniture layout, fittings, lighting, partitions, reflected ceiling plan to a suitably large scale. And any one construction detail related interior finishes/ custom made furniture of following.
 - I. Suspended ceiling
 - II. Paneling or partitions
- A rough folio comprising of design development drawings, sketches supporting the final working drawing set shall be retained by the candidate.

SAVITRIBAI PHULE PUNE UNIVERSITY
[Formerly the University of Pune]



DETAILED SYLLABUS OF FOURTH YEAR B. ARCH.
2019 PATTERN
To be implemented from AY 2022-23

BOARD OF STUDIES IN ARCHITECTURE
FACULTY OF SCIENCE AND TECHNOLOGY

SEMESTER VII

ARCHITECTURAL DESIGN VI		
Course Code	4201953 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 8 (Lectures: 1, Studio: 7)	Sessional [CIA125+EA125]	250
	Viva [INT 25+ EXT 25]	50
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	300
	Total Credits	11

COURSE OBJECTIVES:

To develop to Develop Architectural programming of the entire project for **housing** including the process of generating a design brief, developing design iterations based on issues involved and taking design decisions based on the following aspects

- **Precedent Studies:**
To analyse cases, referral, live studies through the process of observation, survey and documentation and evaluate them for gaining a design approach.
- **Socio-Cultural Aspects:**
To evaluate socio-cultural aspects like lifestyle, cultural beliefs and practices, traditions, etc. and their effect on housing design.
- **Economic aspects:**
To understand the economic concerns with respect to the economic hierarchy of society and the corresponding architectural responses and solutions.
- **Site Context and Analysis:**
To understand and apply the information of site, its location, topography, scale, context – both- immediate and wider, and land-use and understand the potentials, challenges, future requirements of the site to take decisions about design brief development in terms of numbers and types of tenements, ground coverage, building height, density as well as decisions about zoning, circulation within site, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **House Typology:**
To evaluate various housing typologies and their suitability to the project at hand. To explore various adaptations of a typology, clustering possibilities, and resultant built form so as to create a housing design using the relevant explorations.

- **Traffic and vehicular movement:**
To understand and apply ideas about networking, hierarchy of connectivity, pedestrian and vehicular movement within the site and surrounding larger area.
- **Building Material and Construction Technology:**
To study and analyse the relevance of various building materials and technologies to a project, various expressions of a building material and technology relevant to the building and to understand the scope and limitations of a building technique to achieve the desired form and space.
- **Building Services:**
To understand and apply the spatial and structural implications of basic and advanced services involved in building design.
- **Aesthetics:**
Along with the challenges of physical issues, students are also expected to create a spatial and visual language for their project.
- **Rules and Regulations:**
To understand and apply legislative aspects with reference to the housing context and setting of the project site (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.)

COURSE OUTLINE:

1. To design complex housing spaces and buildings in terms of area, user group, typology, function etc, with emphasis on scale or complexity of the project.
2. To understand and analyse housing in urban context, preferably in a different socio-cultural-economic setting than the institute and document the study in the form of a report with emphasis on relevant aspects like density, climate, social structure, culture, architectural typology, construction technology, urban fabric, economy, services, traffic movement, etc. or any other issues which need to be considered for envisaging a design project in totality.
3. To develop a building design program from not only client's or user's requirements but also in response to context specific factors like socio-economic, socio-cultural, environmental etc.
4. To understand the development of a design philosophy/narrative as a thought process in design.
5. To evolve projects that may be based on the current needs of the city and / or context responding to aspects like heritage and conservation, landscape and ecology, image, and identity, etc.
6. To analyse activities around the buildings within the housing projects/ neighbourhoods in relation with built form and open spaces, elements of landscape, pedestrian and vehicular movement and segregation, etc.
7. To analyse and understand the relationship between various typologies of units, their combinations, clustering, and resultant buildings with respect to privacy,

socio-cultural needs, built-form configuration, structural/ service efficiency, density, topography, climate, etc.

8. To design buildings integrating functions, structural system and services and understand its resultant effect on visual form / architectural character of building.
9. To understand various issues and aspects of sustainability, earthquake resistant construction, universal accessibility, etc. and understand how these may be integrated in the architectural design process.
10. To apply relevant legislative provisions (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.) to the design project.

SESSIONAL WORK

- **Unit 1:**
Case studies and analysis of housing design typology as identified by the institute and the presentation of its findings.
- **Unit 2:**
A well resolved and communicated architectural design for a multi-family, multi-typology residential development of 100 to 200 tenements evolving out of aspects like mixed-use development, development of communities, addressing issues of social stratification v/s inclusiveness, identification of target group/ end-user's requirements, relation of location/ land values on defining the housing product, typological innovations, context, green initiatives, etc.

DELIVERABLES

The design must be communicated through architectural drawing and graphics, two and three-dimensional sketches, models/ visualisation, and narrative. Emphasis shall be given to the preparation of self-explanatory drawings, as in an Architectural Competition.

It is recommended that:

- 3- or 4-unit types/ sizes be explored in the project.
- The student be able to demonstrate his/her understanding about building technology and spatial provision for services
- The student should be able to demonstrate his/her design response to climate, and an understanding of suitable Landscape ideas.

RECOMMENDED READINGS:

1. The Architecture of Rasem Badran: Narratives on People and Place. James Steele. Thames and Hudson. London, 2005.
2. The Housing Design Handbook: A Guide to Good Practice. David Levitt, Jo McCafferty. Routledge. London, 2019.
3. Atkins: Architecture and Urban Design. Atkins. Images Publishing Group. 2011.

4. Designing for Modern India. Vikram Bhat. Mapin Publishing Pvt Ltd. Ahmedabad, 2016.
5. Missing Middle Housing: Thinking Big and Building Small to Respond to Today's Housing Crisis. Daniel G. Parolek. Island Press. 2020.
6. Housing and Urbanisation. Charles Correa. UDRI. Mumbai, 2000.
7. Residential Districts. Jorg C Kirschenmann, 1980.
8. Wohnungsbau The Dwelling L' habitat. Herald Deilmann D, Jorg Kirschenmann, Herbert Pfeiffer. Stuttgart, 1974.
9. In the Name of Housing: A Study of 11 Projects in Mumbai. Sameep Padora (curator). UDRI. Mumbai, 2016.

ADVANCED BUILDING CONSTRUCTION AND SERVICES I		
Course Code	4201954 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lecture: 1, Studio: 2)	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	25
	Viva (external)	25
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	150
	Total Credits	04

COURSE OBJECTIVES:

To educate students regarding implementation of advanced structural systems, materials and services required in buildings with complex and special requirements and enable the students to integrate the same in Architectural design.

COURSE OUTLINE:

- **Unit 1: Multi-basements**

Designing and construction of multi-basements giving constructional details required for services lighting, mechanical ventilation and surface water disposal. Study of various methods of access to parking areas other than ramps like car lift etc.

Assignment will be to prepare drawings based on above study which include application of all required services with total coordination of entire MEP services. [Minimum four A1 drawing sheets]

- **Unit 2: Swimming pools**

Design and construction of swimming pools – leisure / competition types with situations such as, at ground / podium/upper / roof top level with reference to all constructional and services details. Assignment will be on the same. [Minimum two A1 drawings sheets]

- **Unit 3: Long span structures**

Study of long span steel structures [indoor stadia, railway / metro stations, shopping malls, sky walks, Multi-functional building etc] to understand structural behaviour.

Assignment would be in report form comprising of Case study and sketches of construction details.

OR

- **Unit 3: Industrial structures**

Design and construction of medium scale industrial structures with reference to all architectural, constructional details.

Assignment will be on the same. [Minimum two A1 drawings sheets]

RECOMMENDED READINGS:

1. Tricomi, Ernest. ABC of Air-conditioning.1970
2. Smith, Philips & Sweeney. Environmental Science
3. Daniels, Klaus. Advanced Building Systems – A Technical Guide for Architects and Engineers. Birkhauser, Boston. 2003
4. National Building Code of India ,5. PEB manufacturer’s details Advanced Building Construction by MACKAY Stadia by John Geraint

URBAN STUDIES I		
Course Code	4201955 [SS]	
Teaching Scheme	Examination Scheme	
<p style="text-align: center;">Total Contact Hours per week: 4 (Lectures: 2, Studio :2)</p>	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	100
	Total Credits	03

COURSE OBJECTIVES:

- To enable students to understand the urban context of an Architectural Project beyond the site and understand the implications of various factors (such as traffic-transportation, socio economics, urban landscape, spatial and visual aspects etc.) influencing the development of an urban area.
- To introduce the students to urban studies and relevance of its learning in Architecture profession; various theories and concepts, facilitating the undertaking of planning and design of large-scale land development.

COURSE OUTLINE:

- **Unit 1**

The meaning of town planning, urban planning, urban design and context of architectural project beyond site; Principles and theories of Urban Planning and Urban Design and relevance in the context of globalization.

- **Unit 2**

Various aspects of urban land. understand the implications of various factors such as traffic-transportation, socio- economic, urban landscape etc. influencing the development, rationale of urban regulatory controls.

- **Unit 3**

Urban residential developments such as neighbourhood planning, high-rise housing, slum rehabilitation, public housing, town planning schemes etc.

- **Unit 4**

Affordable housing: introduction and concepts; Contemporary problems of settlements, towns, cities impact of unplanned growth.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

Handwritten journal based upon the theory syllabus as above.

ASSIGNMENTS:

1. Subdivision of land for residential development (approx. area 4Ha) –Individual submission (40 marks).
2. Study of housing typologies as mentioned in course outline, study of the same from urban planning and design perspective. - Case study in a group of maximum 5 students (30 Marks).
3. Two Tutorials based upon course outline (15marks each total 30 marks).

OUTCOME:

Students will develop a basic understanding of urban planning, urban design, studying urban planning principles and application of the same. Students will know about housing types, concerns & issues related to it and strategies to resolve issues.

RECOMMENDED READINGS:

1. Gallion, Arthur. The Urban Pattern. New Delhi: CBS Publishers and Distributors, 2003
2. Bacon, Edmund. Design of Cities London: Thames and Hudson, 1974
3. Paddison, Ronan. Handbook of Urban Studies. London: sage Publications, 2001
4. Correa, Charles. Housing and Urbanisation. London: Thames and Hudson, 2000.
5. Mohanty, Swati. Slum in India. New Delhi: APH Publishing Corp., 2005.
6. Jagdale, Rohit. Slum Rehabilitation Schemes in Mumbai. University of Texas 2014
7. Coordinates (is an exclusive monthly magazine on positioning, navigation, associated technologies, and applications.

8. Down to Earth (magazine edited by Sunita Narain)
9. My Liveable City (magazine co-founded by ShyamKhandekar& Shashikala Venkatraman)

RESEARCH IN ARCHITECTURE II		
Course Code	4201956 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lecture: 1, Studio :2)	Sessional (internal)	25
	Sessional (external)	25
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

COURSE OBJECTIVES:

- To enable students to carry out research focused on an issue related to the built environment
- To prepare students to write a technical research paper
- To train students to present their research paper in front of an audience

COURSE CONTENT:

- **Unit 1**
Qualitative and Quantitative Data Collection and Analysis
- **Unit 2**
Presentation of qualitative and quantitative data using various techniques (visual, graphical, numerical, etc.)
- **Unit 3**
Technical Writing
- **Unit 4**
Presentation of research paper in a seminar

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

- Tutorials/ Assignments based on each of the four units
- A Research Paper of minimum 3000 words (maximum 10 pages) excluding bibliography based on original research proposal prepared in Semester VI

NOTE:

- The guide must have minimum five years of teaching experience. The guide shall not guide preferably more than eight students.
- It is desirable that the research paper is presented in a seminar, in front of experts.

- It is beneficial to the students if the topic is related to their architectural design project.

RECOMMENDED READINGS:

1. Babbie, E. 1983. *The Practice of Social Research*. Third edition. Belmont: Wadsworth Publishing Co.
2. Creswell, J.W. 1994. *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks: Sage.
3. De Vaus, D.A. 2003. *Surveys in Social Research*. Jaipur: Rawat Publications.
4. Dey, I. 1993. *Qualitative Data Analysis: A User Friendly Guide for Social Scientists*. London: Routledge.
5. Groat, L. & Wang, D. 2002. *Architectural Research Methods*. New York: John Wiley and Sons Inc.
6. Kothari, C.R. 2005. *Research Methodology: Methods and Techniques*. New Delhi: Wishwa Prakashan.
7. Michelson, William. 1982. *Behavioural Methods in Environmental Design*. Stroudsburg, Pennsylvania: Dowden, Hutchinson and Ross, Inc.
8. Nachmias, C.F. & Nachmias, D. 1996. *Research Methods in Social Sciences*. Great Britain: St. Martin's Press Inc.
9. Patton, M.Q. 1980. *Qualitative Evaluation Methods*. Newbury Park: Sage Publications.
10. Sanoff, H. 1977. *Methods of Architectural Programming*. Vol. 29. Dowden Huthinson and Ross, Inc.
11. Sanoff, H. 1991. *Visual Research Methods in Design*. USA: Routledge Revivals.
12. ** Research papers published in journals from UGC-CARE list may be referred for understanding the overall structure and style of technical writing.

ELECTIVE III		
Course Code	5201970 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 4 (Lecture: 1, Studio :3)	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	100
	Total Credits	03

COURSE OBJECTIVES

To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same

As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and nurture his/her area of interest and develop his/her expertise.

However, colleges have to ensure that the student does not repeat a particular elective.

COURSE OUTLINE:

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well as practical aspects are covered linking them to the field of architecture.

Apart from lectures delivered by the subject resource persons, self-study in form of hands-on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

SESSIONAL WORK:

The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.

- Field study reports
- Mapping / documentation / photographic / video graphic documentation
- Measured drawings
- Computer based assignments
- Tutorials

QUANTITY SURVEYING & SPECIFICATION WRITING I		
Course Code	4201958 [THEORY]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 4 (Lectures: 2, Studio :2)	Sessional Viva	NIL
	In-semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	03

COURSE OBJECTIVES:

- To Introduce Estimation as an important Subject for Architecture.
- To Understand Different methods of Computing Quantities for items of work in a structure.
- To acquaint students with methodology of writing specifications with reference to building trades, materials, workmanship & performance of different items of work.

COURSE OUTLINE:

- To enable students in working out quantities of various items of work for simple load bearing and R.C.C. framed structure and acquaint them with various types of estimates including standard method of measurement on building works and mode of measurements as adopted by I.S 1200.
- Techniques, Importance & methods of writing different types of specifications of different items of works in construction
- **Unit 1: Introduction to Quantity Surveying**
Introduction to Quantity Surveying and Estimating, Data for Estimate, Purpose of Estimating, Accompaniments of an Estimate, Qualities of an Estimator, Terminologies in estimation. Different types of Estimate their uses & Characteristics, Schedule of Quantities, Schedule of Rates & its uses, Stages of work, Complete Estimate of a Project, Methods of taking out Quantities, Measurement Sheet, Abstract Sheet, Bill of Quantities.
- **Unit 2: Introduction to Specification**
Definition, need & importance of Specification writing. Relation with working drawing, bill of quantities, schedule of rates. Specification as an integral part of contract document. Types and Classification of Specifications. Use of manufacturers guide (With emphasize on Market survey)
- **Unit 3: IS Code**
Study of mode of measurement as stipulated in IS-1200, Classification of strata as per IS-1200, Trial pit data, Lift and Leads , Unit of Measurement.
- **Unit 4: Working out quantities for Load-bearing structure**
Working out quantities for load bearing structure (below plinth only) of approximately 15-30 Sqm by offset and centre-line method illustrating L and T junctions and preparing measurement sheet and abstract for all items of work.
- **Unit 5: Working out quantities for RCC structure**
Working out quantities for R.C.C. G+1 structure of approximately 100-150 sqm, along with quantities for plumbing and sanitation items and preparing measurement sheet and abstract for all items of work.
- **Unit 6: Specification writing (Workmanship)**
Item-wise detailed specifications including methods. Forms of writing descriptive notes on material and workmanship based on working drawing

RECOMMENDED READINGS:

1. B.I.S 1200- Part-I 1992. n.d.
2. Prof. B.N. Dutta, Estimating and Costing in Civil Engineering.
3. B. S. Patil. Civil Engineering Contracts and Estimates.
4. Dr. Roshan Namavati. Professional Practice.
5. Rangawala. Estimating Costing and Valuation.
6. Indian Standard specifications
7. C.P.W.D. Specifications and schedule of rates

8. Specification Writing for Architects & Engineers, By Donald A. Watson
9. Specification Writing for Architects & Surveyors, By Arthur J. Wills
10. Estimating, Costing, Specification & Valuation, By M. Chakraborty
11. Reference drawings from offices of MEP consultants

PROFESSIONAL PRACTICE		
Course Code	4201959 [THEORY]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lectures: 2, Studio :1)	Sessional Viva	NIL
	In-semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	03

COURSE OBJECTIVE:

- To acquaint the student with the role & stature of the Architect in the society and understand duties, liabilities, responsibilities & ethics as a professional.
- To acquaint the student with the scope & avenues of Professional Architectural services and the demands & mode of Professional Practice field.
- To familiarize & prepare the student with the adequate knowledge of an Architect's office administration, documentation, banking, taxation & other procedures of office along with the Laws applicable to Architects.
- To familiarize the student with the Council of Architecture, Architect's Act, Architectural competitions & other allied professional organizations.

COURSE CONTENT:

- **Unit 1**
Introduction to the nature, scope and avenues of service and **professional practice as an Architect**, Role of an Architect as a **technical professional**. Illustrate the changing nature of the Architects.
- **Unit 2:**
The Architects Act 1972, The Council of Architecture, its composition, legal status, and mandate for to Registration of Architects and for monitoring the Academics and Profession of Architecture, Rules and Regulations of the Council regarding Professional Liabilities & Code of Conduct. Introduction to Architectural Competitions, its Pros and Cons, Rules and Regulations as per Council of Architecture
- **Unit 3**
Avenues of professional service and mode & nature of professional practice - Types of Organizations, Scope of comprehensive Services, Scale of Fees, and Site supervision, Documentation, Introduction to Office Management, & International practice.
- **Unit 4**

Taxation (Income tax, Goods & Service Tax and Professional tax), Banking, Insurance, and laws applicable to architects.

Unit 5

Introduction to the Role and Legal duties of Architects in Arbitration and Valuation.

Unit 6

Introduction to IIA, IIID, IUDI, ITPI, ISOLA and such professional organizations. Understanding the need for Architects to be aware, sensitive and active in Social and Civic issues in Urban context.

RECOMMENDED READINGS:

1. Latest published Handbook of Professional Document: Council of Architecture Publication
2. The Architect's Act, 1972: Govt. of India Publication
3. Professional Practice by Roshan H. Namawati
4. Professional Practice in India by Madhav G. Deobhakta
5. Architectural Practice & Procedure by Vasant S. Apte

SEMESTER VIII

ARCHITECTURAL DESIGN VII		
Course Code	4201960 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 8 (Lectures: 1, Studio: 7)	Sessional [CIA125+EA125]	250
	Viva [INT 25+ EXT 25]	50
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	300
	Total Credits	11

COURSE OBJECTIVE

To develop architectural interventions as part of a process to understand complex issues of an urban context, generating design brief and taking design decisions based on the following aspects:

- **Precedent Studies:**
To introduce the students to Urban spaces from cases, referral, live studies through the process of observation, survey and, documentation and evaluate them for gaining a design approach.
- **Socio-Cultural Aspects:**
To evaluate socio-cultural aspects like lifestyle, cultural beliefs and practices, traditions, and their effect on urban spaces and architectural design etc.
- **Site Context and Analysis:**
To understand and apply information about the site, its scale, location, topography, context- both, immediate and wider, and complexity of existing functions, and understand the potentials, challenges, and future requirements of the site to take decisions of design-brief development in terms of types of buildings in urban complexes, multiple functions, multifunctional space typologies, area requirements, as well as decisions about zoning, circulation, distribution of built and open spaces, activity relationships and adjacencies, and views.
- **Traffic and vehicular movement:**
To understand and apply ideas about networking, hierarchy of connectivity, pedestrian and vehicular movements within the masterplan and the surrounding context of site.
- **Building Material and Construction Technology:**

To analyze and evaluate the relevance of various building materials and technologies to a project, various expressions of a building material and technology relevant to the building and to understand the scope and limitations of a building technique to achieve the desired form and space.

- **Building Services:**

To understand and apply the spatial and structural implications of basic and advanced services involved in building design.

- **Aesthetics:**

Along with the challenges of physical issues, students are also expected to create a spatial and visual language for their project.

- **Rules and Regulations:**

To understand and apply relevant legislative aspects governing building design with reference to the urban context and setting of the site (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.)

COURSE OUTLINE:

1. To design complex urban spaces and buildings (***other than housing***) in terms of area, function, specific community, typology, context etc, with emphasis on scale and / or complexity of the project.
2. To understand and analyse a location in an urban context, preferably in a different socio-cultural-economic setting than that of the institute and document the study in the form of a report with emphasis on relevant aspects like climate, social structure, culture, architectural typology, construction technology, urban fabric, economy, services, traffic movement, etc. or any other issues which need to be considered for envisaging a design project therein in totality.
3. To evolve projects that may be based on the current needs of the city and / or context responding to aspects like heritage and conservation, landscape and ecology, image and identity, etc.
4. To develop a building design program from not only client or user's requirements but also in response to context specific factors like socio-economic, socio-cultural, environmental etc.
5. To understand the development of a design philosophy/narrative as a thought process in design.
6. To analyse activities around the buildings within a complex/ campus and understand the same in context of the built form and open spaces, elements of landscape, pedestrian and vehicular movement, their segregation, managing sloping sites, contours, etc.
7. To analyse and understand the relationship between multiple (existing and/or proposed) buildings to establish continuity of form, construction, materials, design theme, climate, etc.
8. To design buildings integrating functions, structural system, and services and their resultant effect on visual form / architectural character of building.

9. To understand various issues and aspects of sustainability, earthquake resistant construction, universal accessibility, etc. and understand how these may be integrated in the architectural design process.
10. To apply relevant legislative provisions (Building byelaws, GDCR, CRZ, EPA, ECBC, GRIHA etc.) to the design project.

SESSIONAL WORK - ONE OF THE TWO OPTIONS

PROJECT TYPE 1

- **Unit 1:**

Identification and analysis of issues related to various aspects mentioned above including mobility, networks, inclusiveness, built-form disposition, architectural character, identity, activities, community participation, etc. at an urban neighbourhood level of area (***other than housing***) @ 2-3 hectares with an aim to evolve a design brief and a design solution including a neighbourhood level master- plan and/or intervention guidelines in the context for the same.

 - The Architectural project should evolve from the study of the Area and be an outcome of issues identified, Development Plan proposals for the area if any and a subset of the overall Master Plan for the Area.
- **Unit 2:**

A well resolved and communicated architectural design of a component/s of the neighbourhood studied as mentioned in Unit 1 above, with a total carpet area of not less than 6000 sqm and not more than 20000 sqm area of Functional Space depending on context and complexity of the project.

OR

PROJECT TYPE 2

- **Unit 1:**

Study of an urban area (***other than housing***) including aspects like mobility, movement networks, built form disposition, character, identity, activities, open space networks, walkability, inclusiveness, etc. as relevant to the area selected and the design brief proposed as in Unit 2 below.
- **Unit 2:**

Development of Master Plan area of 2- 3 Ha in a group of three students maximum.
- **Unit 3:**

Development of Design proposals individually for the area of any and a subset of the overall Master Plan.

 - A well resolved and communicated architectural design for a multi-functional building complex or a specialty building of a total carpet area not less than 6000 sqm and not more than 20000 sqm in an urban context with substantial complexity addressing Issues of architectural character, identity, built form, contextuality, structural system, advanced

services, green initiatives, landscape integration, traffic management, etc.

- Suggested typologies may include but not limited to: Healthcare facility, Educational Institution, 5 Star Hotel, Convention Centre, Multimodal Transport Hub, shopping mall and Multiplex, Redevelopment Project etc.
- An understanding of the project's impact on the surrounding area and vice-versa is suggested.

DELIVERABLES

The design must be communicated through architectural drawings and graphics, two and three-dimensional sketches, models/ visualization, and narrative. Emphasis shall be given to the preparation of self-explanatory drawings, Master Plan for the Area, Designing of Multiple user spaces, Imageability and Identity, Structural Details and Services as in an Architectural Competition.

RECOMMENDED READINGS:

1. All available books on Architectural Design.

ADVANCED BUILDING CONSTRUCTION AND SERVICES I		
Course Code	4201961 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lecture: 1, Studio: 2)	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	25
	Viva (external)	25
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	150
	Total Credits	04

COURSE OBJECTIVES:

To help students to understand advanced structural systems, materials and services required in buildings with complex and very specific requirements. Students should be able to comprehend the special requirements of high rise or multi storied and modern buildings and be able to integrate the same in design.

COURSE OUTLINE

- **Unit 1: Auditoriums / Multiplex**

Design and construction of Auditorium (minimum capacity 350 with provision of a balcony and projector room in case of multiplex) along with required services.

Assignment will be on preparing of drawings containing plans and sections, showing all services and constructional details [minimum four A1 drawing sheets]

- **Unit 2: Building elements & Elevation treatments**

Construction and architectural details of Building elements of design projects (previous semester/ previous year) For example—pergola, porches, atriums, façade, curtain wall, podium (with different use such as parking / landscape) etc.

Assignment will be based on preparing of drawings with complete details. [Minimum three A1 size drawing sheets].

- **Unit 3: High rise buildings.**

Introduction to construction of high-rise buildings with RCC as a material. Study of Council Norms with NBC Rules & analysis of structural system behaviour in high rise / super high-rise structures under different loading conditions.

Assignment will be in form of compiled notes and sketches.

OR

- **Unit 3: Industrial structures**

Design and construction of medium scale industrial structures with reference to all services details. Assignment will be on the same. [Minimum two A1 drawings sheets]

RECOMMENDED READINGS:

1. Tricomi, Ernest. ABC of Air-conditioning. 1970
2. Smith, Philips & Sweeney. Environmental Science
3. Daniels, Klaus. Advanced Building Systems – A Technical Guide for Architects and Engineers. Birkhauser, Boston. 2003
4. National Building Code of India
4. Advance building construction by MACKEY High Rise Buildings by Jaswant Mehta Theatres and Auditoriums by Harold Burris- Meyer & Edward Cole. Architects Working Details

URBAN STUDIES II		
Course Code	4201962 [SS]	
Teaching Scheme	Examination Scheme	
<p style="text-align: center;">Total Contact Hours per week: 4 (Lectures: 2, Studio :2)</p>	Sessional (internal)	50
	Sessional (external)	50
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	100
	Total Credits	03

COURSE OBJECTIVES:

- To introduce the students to the process of planning and urban development and associated legislation.
- To understand the fundamental concepts and theories of urban design and apply them in their design projects.
- To introduce the students to urban economics.

COURSE OUTLINE:

- **Unit 1**
Study of planning process in detail --- (Survey, analysis, proposals and development) for various urban issues. A brief introduction to urban renewal and re-development; study and analysis of urban spaces, people centric designs etc.
- **Unit 2**
Conservation and related Urban Design controls.
- **Unit 3**
Planning and Urban Design legislation --- introduction and relevance.
Unified Building bye laws and Development Control rules of local authorities.
- **Unit 4**
Urban economics: introduction and concepts (demand and supply, housing finance, Government schemes and various bodies) etc.

SUBMISSION REQUIREMENT FOR SESSIONAL WORK:

Handwritten journal based upon the theory syllabus as above.

ASSIGNMENTS

1. Reading of Urban fabric: Study of existing town and town planning proposals for municipal council level town– (group work in a group of 5 students) (40 marks).
2. Identification of urban issues related to various aspects such as environment, society, traffic and transportation, hills and hill slopes, riverfront development,

urban heritage conservation through primary surveys (group work in a group of 5 students) (30 marks) –

3. Two Tutorial based upon course outline (15marks each total 30 marks).

OUTCOME

Students will develop a basic understanding Planning and Urban Design legislation; studying planning process, survey, and application of the same to know about issues like urban economics, transportation.

RECOMMENDED READINGS:

1. Gallion, Arthur. The Urban Pattern. New Delhi: CBS Publishers and Disrtibuters, 2003
2. Bacon, Edmund. Design of Cities London: Thames and Hudson, 1974
3. Paddison, Ronan. Handbook of Urban Studies. London: sage Publications, 2001
4. Spreriegen, Paul. Urban Design: The Architecture of Town and Cities.
5. Malabar, FL-USA Krieger Publishing Co., 1967 Lynch, Kevin. The Image of The City London: The MIT Press, 1960
6. Book of Development Control Regulations by Local Municipal Corporation (latest edition available)
7. Book of AITP Exam study material: 'Planning Law and Legislation' by ITPI New Delhi Guide to Planning Surveys including Landuse Classification: TCPO, Govt of India: 2004
8. Correa, Charles. Housing and Urbanisation. London: Thames and Hudson, 2000.
9. Howard, Ebenezer. Garden Cities of Tomorrow, 1902
10. Maharashtra Regional and Town Planning Act, 1966
11. Traffic and Transportation Planning by L.R. Kadiali
12. Coordinates (is an exclusive monthly magazine on positioning, navigation, associated technologies and applications.
13. Down to Earth (magazine edited by Sunita Narain)
14. My Liveable City (magazine co-founded by Shyam Khandekar & Shashikala Venkatraman)

ELECTIVE IV		
Course Code	4201963 [SS]	
Teaching Scheme	Examination Scheme	
<p style="text-align: center;">Total Contact Hours per week: 3 (Lecture: 1, Studio :2)</p>	Sessional (internal)	25
	Sessional (external)	25
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

COURSE OBJECTIVES

To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same

As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and nurture his/her area of interest and develop his/her expertise.

However, colleges have to ensure that the student does not repeat a particular elective.

COURSE OUTLINE:

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well as practical aspects are covered linking them to the field of architecture.

Apart from lectures delivered by the subject resource persons, self-study in form of hands-on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

SESSIONAL WORK:

The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.

- Field study reports
- Mapping / documentation / photographic / video graphic documentation
- Measured drawings
- Computer based assignments
- Tutorials

ELECTIVE V		
Course Code	4201964 [SS]	
Teaching Scheme	Examination Scheme	
<p style="text-align: center;">Total Contact Hours per week: 3 (Lecture: 1, Studio :2)</p>	Sessional (internal)	25
	Sessional (external)	25
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

COURSE OBJECTIVES

To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same

As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and nurture his/her area of interest and develop his/her expertise.

However, colleges have to ensure that the student does not repeat a particular elective.

COURSE OUTLINE:

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well as practical aspects are covered linking them to the field of architecture.

Apart from lectures delivered by the subject resource persons, self-study in form of hands-on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

SESSIONAL WORK:

The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.

- Field study reports
- Mapping / documentation / photographic / video graphic documentation
- Measured drawings
- Computer based assignments
- Tutorials

QUANTITY SURVEYING & SPECIFICATION WRITING II		
Course Code	4201965 [THEORY]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 4 (Lectures: 2, Studio :2)	Sessional Viva	NIL
	In-semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	03

COURSE OBJECTIVES:

- To enable students in preparation of rate analysis & indent preparation along with the concepts.
- To enable students in working out quantities of various items of work for an Industrial structure
- To acquaint students with methodology of writing specifications with reference to service installations of different items of work in construction.
- To enable students in different building trades & content, checklist.

COURSE OUTLINE:

- **Unit 1: Rate Analysis**
Introduction to Analysis of Rate, Factors affecting Rate of any Item of work, Importance of Rate Analysis, Essentials of Rate Analysis. Studying and Working out rate Analysis of standard items of work based on prevailing market rates. (Minimum 20 numbers)
- **Unit 2: Building trades & checklist**
Different Building trades scope & contents. Checklist preparations for different works in constructions.
- **Unit 3: Indent of materials:**
Unit Rate, Direct Cost, Indirect Cost, Overhead Charges, Day Work, Task Work, Piece work, Indent of Material, preparation of Indent of Material of standard items of work based on prevailing market rates. (Minimum 20 numbers)
- **Unit 4: Working out quantities for Steel Structures**
Working out quantities for Industrial structure of approximately 200-300 sqm with steel Truss and sheet roofing and preparing measurement sheet and abstract for all items of work. (Including footing)
- **Unit 5: Specification for Building Services:**
 - Water Supply & Drainage,
 - Acoustics,
 - Electrification,
 - HVAC installation
- **Unit 6: Broad outline specification for miscellaneous service installations**
 - Communication systems- elevators, escalators

- Fire fighting
- Accessibility- arrangements for disabled persons

RECOMMENDED READINGS:

1. B.I.S 1200- Part-I 1992. n.d.
2. Prof. B.N. Dutta, Estimating and Costing in Civil Engineering.
3. B.S.Patil. Civil Engineering Contracts and Estimates.
4. Dr. Roshan Namavati. Professional Practice.
5. Rangawala. Estimating Costing and Valuation.
6. Indian Standard specifications
7. C.P.W.D. Specifications and schedule of rates
8. Specification Writing for Architects & Engineers, By Donald A. Watson
9. Specification Writing for Architects & Surveyors, By Arthur J. Wills
10. Estimating, Costing, Specification & Valuation, By M. Chakraborty
11. Reference drawings from offices of MEP consultants

PROJECT MANAGEMENT		
Course Code	4201966 [THEORY]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 3 (Lectures: 2, Studio :1)	Sessional Viva	NIL
	In-semester exam	30
	End Semester exam	70
	Total Marks	100
	Total Credits	03

COURSE OBJECTIVE

- Students need to understand reality of modern-day Project environment which is getting more complex and more collaborative due to ever demanding requirements of creative and unique design concepts and importance of Project Management to manage this dynamic environment
- Introducing to the students “Management Concepts “and the Role of an Architect as Project Manager in executing a project from conceptualization, design stage through the documentation and construction stage.
- This course will be an introduction to basics of Project Management framework and Knowledge areas giving glimpses on best practices to manage collaborative project environment and roles and responsibilities of various stakeholders of Project and how Project manager leads to successful project completion within cost and time and meets or exceeds project quality standards.

COURSE OUTLINE

- **Unit 1: Introduction Project and Project environment**

Project and Project Environment. Traditional organization structure vs modern project management structure, Importance of Project Manager & role of an Architect as a Project Manager who integrates everyone. Collaborative project environment with multiple stakeholders and need to manage. PMBOK Environment, Concept of Project- Program- Portfolio and Processes / Policies / Procedures to manage these project environments.

- **Unit 2: Project Phases and Stages**

Importance of Project Phase: Concept and Feasibility, Planning and Design, Construction and Close-out and within each phase of project role of key processes – Initiating, Planning, Execution, Control & Monitoring and Close-out. Difference between Project Management and Construction Management.

- **Unit 3: Tenders and Contracts**

Definition and Types of tenders, Systems of Tendering - Open and Invited, Process of tendering. Tenders - Pre-Qualification and Empanelment procedures - Selection of Contractors. Tender documents, Terms of Reference - Specifications - Bill of Quantities - Billing, Introduction to Contracts - Articles of Agreement and Conditions of Contract (IIA document)

- **Unit 4: Project Management Knowledge Areas Part 1**

Key concept introduction to various knowledge areas as defined in PMBOK to understand how various knowledge areas work in relationship with each other. Knowledge areas Integration management, Scope management, Schedule management, Cost management, Quality management

- **Unit 5: Project Management Knowledge Areas**

Resource management, Communication management, Risk management, Procurement management and Stakeholder management. Awareness and Introduction to Computer applications for effective Project Management.

- **Unit VI : Specialized Project Management Themes**

Importance of specialized themes in addition to knowledge areas: Project Finance management, Construction Safety management, Facilities management, Design management. Awareness and Introduction to Computer applications for effective Project Management. (not to be included for SPPU examinations)

COURSE SPECIFIC OUTCOMES

After completing this course student will be exposed to basic key concepts of Project Management and its importance in managing Project. The student should be competent enough to handle and manage a small-scale project from conceptualization to completion (hand over).

Subject knowledge gain may help few of the students to pursue master's education in the field of Project Management.

RECOMMENDED READINGS:

1. PMBOK by PMI

2. Design management for Architects - by Stephen Emmitt
3. Project Management Concepts, Methods, and Techniques - by Claude H. Maley · 2012
4. Construction Project Management Planning, Scheduling and Controlling – by Chitakara.
5. Reference drawings and reports from offices of projects to understand the concepts.

SAVITRIBAI PHULE PUNE UNIVERSITY
[Formerly the University of Pune]



DETAILED SYLLABUS OF FINAL YEAR B. ARCH.
2019 PATTERN
To Be implemented from AY 2023-24

BOARD OF STUDIES IN ARCHITECTURE
FACULTY OF SCIENCE AND TECHNOLOGY

SEMESTER IX

PRACTICAL TRAINING		
Course Code	5201967 [SV]	
Teaching Scheme	Examination Scheme	
Six months or One semester of approximate 16 working weeks [minimum 90 working days]	Sessional [CIA100+EA100]	200
	Viva [INT 25+ EXT 25]	50
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	250
	Total Credits	14

COURSE OBJECTIVES:

- To undertake practical training under the guidance of experts / professionals.
- To Learn about architect's office management and learn about the process of design, execution, and management of a project.

COURSE CONTENT:

- Students should work in office of an architect or organization operating in an allied field of practice or research duly approved by the institution, under the mentorship of a registered architect having experience of minimum five years.
- The Practical training should be supervised and evaluated through periodic assessment by the mentoring architect.
- The students should periodically report to the coordinating teachers from the institute and keep the institute informed about his/her training.
- End semester viva voce would be conducted by the examiners appointed by the University.
- Training in foreign country shall be done under the registered architect of that country and to be approved and monitored by the Head of Institute.

SUBMISSION REQUIREMENT:

- Prepare a separate report along with formal log book & work diary.
- Student should maintain week wise work record in a diary to summarize the work done in the office, site visits, meetings with clients, agencies, interaction with principal architect. This diary should be authenticated by the architect every month.
- Professionals should issue a certificate of performance to the student with respect to the work quality, overall approach, attitude towards work.

- Students should produce report, log book, work diary & some sample drawings with permission from the employer [to indicate the kind of work s/he has carried out] at the time of sessional -viva voce examination.

OUTCOME :

Ability to understand real life situation of Professional Practice and to work with ethical and professional responsibilities.

SEMESTER X

ARCHITECTURAL DESIGN PROJECT		
Course Code	5201968 [SV]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 13 (Lectures: 3, Studio: 10)	Sessional [CIA225+EA225]	450
	Viva [INT 50+ EXT 50]	100
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	550
	Total Credits	18

OBJECTIVE

To provide an opportunity to the students to apply the knowledge and skills gained in earlier years to a full-fledged Architectural Design project of student's choice with a holistic approach including background research, programme formulation, site selection investigations and design demonstration.

COURSE OUTLINE

The Architectural Design Project shall consist of Design Demonstration i.e. formulation of design programme, site investigation and selection, and culmination in architectural design proposal.

TOPIC FOR ARCHITECTURAL PROJECT

The topic for the project shall be approved by the Institute and guided by the Faculty. The student may consult external resource persons specializing in the chosen topic, but the assessment shall be done by the faculty. A guide may guide up to EIGHT students during the session. In order to qualify to work as a Guide, the faculty must possess a minimum of TEN YEARS of teaching / professional experience.

SUGGESTED CATEGORISATIONS OF THE TOPICS ARE AS UNDER:

1. Institutional Buildings
2. Infrastructural Buildings
3. Work places
4. Commerce and Trade buildings
5. Habitats
6. Healthcare

7. Hospitality
8. Religious Buildings,
9. Recreational Buildings
10. Industrial Buildings
11. Cultural Buildings
12. Urban Design project / Urban Design Insertions of suitable scale.
13. Conservation including Rejuvenation, Revitalisation of suitable scale.

Number of subcategories is possible under the above main categories as per the discretion of the Faculty Member.

The students may link the topic of the thesis to earlier explorations through Research in Architecture done in previous years or explore new concern as per his/her choice.

The scale of the project must do justice to the depth of involvement, (e.g., in case of very small projects in-depth design demonstration is expected)

However very large projects in specialized branches of architecture may not be encouraged and if taken up scope & scale needs to be limited as mentioned below.

The built up area & the scope of a project (in particular in urban design, conservation, revitalisation etc) should be chosen such that the same can be handled at the B. Arch. level and involves a demonstration of a solution involving Architectural Design in particular.

SESSIONAL WORK

The portfolio of the final work submitted by the student shall contain MANUALLY LABOURED / COMPUTER GENERATED drawings of sheet sizes as per international standards and a PHYSICAL MODEL explaining the architectural proposal. The portfolio of process drawings and models must also be submitted separately for establishing continuous monitoring and progressive assessments, not to be marked separately. Along with the drawings A4 / A3 size bound report consisting of the background and rationale of the project, the methodology and the prints of the final proposal shall be submitted after the oral examination, to be kept in the library of the college. The choice of the size and format of the report is left to the institute, however, within one institute report size should be constant. In addition, the student may show other presentations like 3D views, walkthroughs etc.

SESSIONAL ASSESSMENT:

The Internal assessment of the architectural project shall be carried out STAGE WISE as decided by the college. The final assessment in the examination shall be done by both Internal and External examiner in which the student shall display the work on the space allotted to him/her and explain his work and answer all the queries raised by the examiner.

The external examiner shall be a professional, not teaching at any institute as visiting or core faculty and shall have minimum 10 years of professional experience.

The examiners shall assess the work done and presented by the student, duly approved by the Faculty. The drawings and models duly stamped and signed by the Faculty shall be treated as authentic work done by the student under the guidance of the Faculty. The student may submit a sufficient number of drawings required to satisfactorily explain the project. The student shall also present a separate portfolio of study & process sheets, study models etc.

ORAL EXAMINATION

The oral examination shall be held in the physical presence of the student in the examination centre of the candidate jointly and exclusively by the internal and external examiners. The student shall be allowed to present his project for a minimum 10 minutes without any interruption. The student shall be judged for the depth of understanding of the subject and clarity of graphical presentation of the project.

RECOMMENDED READING:

All books, Research Articles relevant to the topic of the architectural project. Appropriate case studies of architectural projects of similar nature to the chosen topics must form part of the report on the thesis.

ENTREPRENEURSHIP DEVELOPMENT		
Course Code	5201969 [SS]	
Teaching Scheme	Examination Scheme	
Total Contact Hours per week: 4 (Lectures: 2, Studio: 2)	Sessional	100
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	100
	Total Credits	03

COURSE OBJECTIVE:

- To develop a spirit of entrepreneurship amongst budding architects, and empower and encourage students to be “**Archipreneurs**”
- To impart knowledge of the basics of entrepreneurship, management and legal aspects related to creation of new ventures
- To equip students with basic skills and competencies needed for ~~enterprise-oriented~~ professional development in architecture.
- To explore new vistas of entrepreneurship in the 21st century environment to generate innovative business ideas.

COURSE OUTLINE:

- **Unit 1**
Developing the mind-set of being an entrepreneur

- **Unit 2**
Basic knowledge of Entrepreneurship, business management, finance and Law
- **Unit 3**
Basic Entrepreneurial skills - Lateral thinking, problem solving, Oratory, Human Resource Management, Time management, Finance management, Office Administration and essential Software skills, etc.
- **Unit 4**
New vistas of Architectural entrepreneurship in the 21st century environment to generate innovative business models

COURSE DETAILS:

- **Unit 1: Developing the mind-set of being an entrepreneur**
 - Meaning and concept of entrepreneurship, ~~history of entrepreneurship development~~, role of entrepreneurship in economic development, factors affecting entrepreneurship, Types of entrepreneurs, examples & barriers to entrepreneurship. Skills of leadership, leaving the 'employee mentality' & developing the entrepreneur mindset.
 - Introduction to the concept of "*Intrepreneurship*"

Assignment 01: Essay writing (1500 - 2000 words)

- **Unit 2: Basics of Business Management**
Entrepreneurship, business management, finance and IPR
 - Fundamentals of Business - types of professional organizations -
 - Basics of Accountancy and Finance Management, & Investment planning
 - Introduction to business planning, understanding market needs, gaining marketing intelligence, survey and analysis of efficiency and productivity, market analysis, risk assessment, managing competition, etc.
 - Introduction to Intellectual Property Rights
- **Unit 3: Basic Entrepreneurial Skills Development**
 - Need to practice: Why practice? Where to start? Who to look at? What to look for?
 - Introduction to the changing face of Architectural Practice & the scope of diversification into activities allied to Architecture
 - Introduction to Lateral thinking and developing problem solving approach
 - Basics of People (HR) Management -
 - Importance and ways of Team Building
 - Importance of Time management
 - Need for developing Software skills
- **Unit 4: Developing a Business Model**
New vistas of architectural entrepreneurship in the 21st century environment to generate innovative business models

- Developing a Business Model: Understanding the importance of Team, steps to create Business Models, types of Models and finally creating a product that is market ready.
- Exposure to Case Studies of Entrepreneurs and their journeys

SESSIONAL WORK

- Totally 3 assignments to be done for this course.
- One assignment to mandatorily cover two Case Studies of entrepreneurs (One Architectural and the other allied) done individually and to be presented as seminar to the class
- Choice of other two assignments can be done individually or in a group of two (as per Units) is left to the discretion of the individual college. Considering this is a Semester X subject, the faculty is expected to set out the broad contour and sub-aspects (including basic principles, role play, case studies, application in Professional Field, etc.) of the said subject of Entrepreneurship Development
- The students are expected to present the work done in an A4 report format of minimum 25 pages, to include summary of interactions, essays, Class notes, Case Studies and Sessional work prescribed by the faculty with a signed certificate from the concerned Teacher / Expert stating that the study was carried out under his /her guidance, and countersigned by the Principal / Academic coordinator

RECOMMENDED READINGS:

1. **Manual of Architectural Practice** – Council of Architecture publication- Vol 1&5
2. How to Win Friends and Influence People by Dale Carnegie
3. Who Moved My Cheese? by Spencer Johnson
4. Thinking, Fast and Slow by Daniel Kahneman
5. The 4-Hour Workweek by Timothy Ferriss
6. The Art of Non-Conformity by Chris Gillebeau
7. The Entrepreneur Mind by Kevin D. Johnson
8. Design-Centered Entrepreneurship By Min Basadur, Michael Goldsby
9. Architect and Entrepreneur: A Field Guide to Building, Branding, and Marketing
10. Jab, Jab, Jab, Right Hook: How to Tell Your Story in a Noisy Social World by Gary Vaynerchuk
11. Lateral Thinking - Edward De Bono
12. Fundamentals of Intellectual property Rights- Ramkrishna B and Anilkumar H.S

ELECTIVE VI		
Course Code	4201957 [SS]	
Teaching Scheme	Examination Scheme	
<p style="text-align: center;">Total Contact Hours per week: 3 (Lecture: 1, Studio :2)</p>	Sessional (internal)	25
	Sessional (external)	25
	Viva (internal)	NIL
	Viva (external)	NIL
	In-semester exam	NIL
	End Semester exam	NIL
	Total Marks	50
	Total Credits	02

COURSE OBJECTIVES

The elective is offered preferably as an open elective but if it is not possible to offer an open elective the colleges may offer an elective which the student has not undertaken earlier.

To allow the students to study a subject of their interest and develop theoretical as well as practical understanding of the same

As mentioned in the course structure of 2019 pattern syllabus [Appendix B] a student may adhere to a particular stream of elective of his/her choice and nurture his/her area of interest and develop his/her expertise.

However, colleges have to ensure that the student does not repeat a particular elective.

COURSE OUTLINE:

Colleges have to develop course outline for the elective they wish to offer such that theoretical as well as practical aspects are covered linking them to the field of architecture.

Apart from lectures delivered by the subject resource persons, self-study in form of hands-on workshop / field work/ review of literature / seminar or any suitable format of learning may be adopted.

SESSIONAL WORK:

- The submission to be devised by the colleges in form suitable to the elective offered. The format could be [but not limited to] as following.
- Field study reports
- Mapping / documentation / photographic / video graphic documentation
- Measured drawings
- Computer based assignments
- Tutorials
