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] Viva	250 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

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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

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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 Super-position 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

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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] Viva	100 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

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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] Viva	50 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). Concpets of Space in Traditional Indian Architecture. Ahmedabad: Mapin Publisihing.
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.

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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.

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WORKSHOP I			
Subject Code 1201908 [SS]			
Teaching Scheme		Examination Scheme	
TotalContact Hours per week= (lectures=1, Studio=2, Total=3)		Sessional [CIA 50+EA50] Viva	100 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

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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] Viva [INT 25+ EXT 25]	200 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*

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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.

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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

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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] Viva	100 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 usingvarious 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

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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] Viva	50 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.

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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

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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 :
Surdents 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

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