

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 Sportshel; 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.
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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