

# **SAVITRIBAI PHULE PUNE UNIVERSITY**

## **DETAILED SYLLABUS OF SECOND YEAR**

**[B.ARCH.]**

**TO BE IMPLEMENTED FROM 2016-17**

**BOARD OF STUDIES IN ARCHITECTURE**

**FACULTY OF ENGINEERING**

## DESIGN III

<b>Design III</b>			
Subject Code		2201517	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=8)	11	Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	250
		Total Credits	7

### COURSE OBJECTIVES:

- To comprehend Design as iterative process at various scales/ levels.
- To comprehend relationship between design, visual arts, building construction, climatology, building materials, structure etc and evolve a design solution.

### COURSE OUTLINE:

- Aesthetical, functional (activity, user, space relation) , technical (construction and material) and environmental (climatic, socio-geographic) aspects of architectural design.
- Various sources for inspiration for architectural design such as nature, history, geometry, culture etc.
- Design projects to focus on multi-functional, multi-cellular built environments such as nursery school, library, canteen, house, primary medical centre, cresse, community hall, health club, hobby centre for children etc.

### SESSIONAL WORK:

Minimum two Architectural design assignments with multi-cellular dual level spaces approximately 300-500 sq.m and communicated effectively through architectural graphics, two and three-dimensional sketches, models and narratives. Additional one eskee of short duration.

### REFERENCE BOOKS

1. Antoniades, C. Anthony: Epic Space: Towards roots of Western Architecture.
2. Robert Sommer. -Design Awareness.
3. C.M. Deasy -Design for Human Affairs.
4. Christopher Alexander- Pattern Language.
5. Anthony Sealey, Introduction to Climatology.
6. Karen A. Frank and R. Bianca Lepori, Architecture from the Inside Out.
7. Heller Robert and Salvadori Mario, Structure in Architecture.

## BUILDING TECHNOLOGY AND MATERIALS III

<b>BUILDING TECHNOLOGY AND MATERIALS III</b>			
Subject Code		2201518(SV) 2201519(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	5

## **COURSE OBJECTIVES**

- To study various types of deep and shallow foundations used in various types of soils for framed construction
- To introduce students to medium span timber roofs between 6m to 12m.
- To understand basic principles of RCC construction
- To study other components of a building project

## **COURSE CONTENT**

### Unit 1

- Sheet roof coverings
- Different types of flooring and paving materials and finishes and preformed and in-situ techniques for the same.
- Cement Concrete- ingredients, admixtures and additives, manufacturing/ mixing properties, placing, curing, testing.
- Steel for reinforcement of concrete.
- All tools for reinforced cement concrete construction.

### Unit 2

- Different types of foundations, shallow and deep foundations for different types of soils, foundation on sloping site, failure of foundations
- Introduction to the relevance of soil mechanics to foundation design

### Unit 3

- Causes of dampness and necessity of damp- and water- proofing.
- Different methods or treatments of damp- and water proofing.
- Different materials used in damp- proofing including brick on edge, rough Shahabad stone, bitumen sheets, plastic sheets and other proprietary materials.

### Unit 4

- Various types of sliding and folding doors
- Doors in non- timber materials
- Bay window

### Unit 5

- Fencing and Gates- types, materials and techniques

### Unit 6

- Principles of RCC
- Reinforced concrete construction process with mixing of concrete, transportation, form-work, laying of reinforcement, casting, deshuttering and curing.
- RCC frame structure for smaller spans

## **SESSIONAL WORK**

- Hand drawn drawings on Units 2, 4 and 6; Assignments on units 1, 3, and 5.

## **RECOMMENDED READING**

1. 'Elements of Structure' by Morgan
2. 'Structure in Architecture' by Salvadori
3. 'Building Construction' by Mackay W. B., Vol. 1 – 4
4. 'Building Construction' by Barry, Vol. 1 – 5
5. 'Construction Technology' by Chudley, Vol. 1 – 6
6. 'Building construction Illustrated' by Ching Francis D. K.
7. 'Elementary Building Construction' by Michell

8. 'Structure and Fabric' by Everet
9. 'Engineering Materials' by Chaudhary
10. 'Building Construction Materials' by M. V. Naik
11. 'Civil Engineers' Handbook' by Khanna
12. 'Vastu Rachan' by Y. S. Sane
13. National Building Code and I.S.I. Specifications
14. 'Materials and Finishes' by Everet
15. 'A to Z Building Materials in Architecture' by Hornbostle

## THEORY OF STRUCTURES III

THEORY OF STRUCTURES III			
Subject Code		2201520	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	Nil
		Sessional (External)	NIL
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	2

### COURSE OBJECTIVES

1. To understand the concept of Buckling and Crushing in Columns.
2. To understand Fixity at supports and Concept of Continuity over supports and Negative Bending Moments
3. To understand the principles of Load Bearing Construction, Use of Arches and Lintels.
4. To Study the strength of one Material - Steel and the use of these material as Beams, and Columns or as members of a Truss.
5. Design By **Working Stress Method**

### COURSE CONTENT

#### Unit 1 - Analysis of Columns

1. Euler's and Rankine's Theory for Buckling and Crushing Failure in Columns. Assumptions and Limitations. Concepts of End Conditions, Slenderness Ratio. No Derivations, Simple Problems only.

#### Unit 2 - Analysis of Fixed Beams and Continuous Beams

1. Fixed Beam as a statically in-determinate structure. Concept of Negative Bending Moment at supports. Fixed End Reactions (No derivations). Simple Problems with full u.d.l and one or two point Loads.
2. Continuous Beams. Concept of continuity over supports and Typical B.M.D to explain the negative B.M.D over supports. Enlist methods for computing B.M.D. Theory only. No problems.

#### Unit 3- Loading on Structures, Transfer of loads, Load Bearing Constructions.

1. Loads classified as Live Loads (as per occupancy), Dead Loads (Densities), Wind Loads (Wind Pressure Tables, Reversal of Stresses), Snow Load, and Seismic Loads. Loads Transfer from Slab to Beam to Columns to Footing. Beam Loads to Include Brick wall Loads.

- Principles of Load Bearing Constructions. Load Transfer in Arches – Different Kinds of Hinged Arches. Load Transfer across Lintels. Theory only – No Problems.

#### Unit 4- Methods of Design –Working Stress Method

- Explanation, Assumptions, Factors of Safety, Limitations. And Advantages.

#### Unit 5- Design of Steel structures

- Introduction to I.S.800. (W.S. Method). Different Grades and Properties of Steel.
- Steel Tables- Different Sections Available and their applications. Reading of Steel Tables.
- Design of Steel Girders – Using I sections.
- Design of Steel Stanchions – Using I Sections and C.
- Design of Compression Member and Tension Members of a Roof Truss Using Angle Sections.

#### Unit 6- Connections in Structural Steel

- Riveting, Welding, Bolting. Advantages and Disadvantages.
- Numerical problems on welding and bolting only.

#### RECOMMENDED READING

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

## BUILDING SERVICES I

BUILDING SERVICES I			
Subject Code		2201521(SS) 2201522(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=2)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	150
		Total Credits	3

#### COURSE OBJECTIVES:

To introduce students to following Building Services in low, medium and high rise buildings and inculcate in them the integration of services in architectural design. This term aims at following two services.

- Commonly used systems for Sewage, Sullage & and Garbage disposal
- Systems for hot and cold water supply in a building premises.

#### COURSE OUTLINE:

To introduce students to drainage systems i.e. collection, conveyance & disposal of sewage, sullage and Effluents from a building premises , including methods and equipments involved.

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

Acquainting students to indoor lighting systems, natural and artificial. Introduction to electrical Installation in a building, from the supply company. Mains to individual outlet points, including all components and systems involved.

### **UNIT I Water supply - I**

- 1.1 Tapping of water mains on street by means of ferrule
- 1.2 Storage and distribution of water in the premises
  - Sump / Suction tank, overhead water storage tank / pressure tanks, community over head water storage tanks.
  - Lifting of water from the sump / suction tank to the overhead water storage tank with the use of Pumps.
- 1.3 Pipes and piping network
  - Pipes made of materials commonly used that is Galvanized Iron , P.V.C., Copper etc.
  - Classification of pipes, specials used in the network , joinery. Installation of the network – open and concealed.
- 1.4 Various control valves

### **UNIT II Water supply - II**

- 2.1 Taps, faucets and other fittings
  - Bib taps (ordinary, Screw down , half turn , quarter turn using ceramic disks ) variations such as pillar taps , angle valves , shower roses etc.
  - Mixing units for wash-hand basins, kitchen sinks, shower units, baths etc. (Both of valve and diverter type and single lever type)
- 2.2 Flushing cisterns and flush valves.

### **UNIT III Hot Water Supply.**

- 2.1 Systems of hot water supply using conventional and non conventional energy sources.
  - Direct systems, In-direct systems , components and equipments used for the same.
- 2.2 Circulation systems i.e. ring system, up feed systems , drop system etc.]
- 2.3 Insulation of piping and safety devices.

### **UNIT IV Drainage-I**

- 4.1 Sanitary fittings – Water Closets (Indian and European) Wash down, double syphonic , floor mounted , wall hung etc.
  - Bidets
  - Wash hand Basins, Bath- Tubs.
  - Kitchen and laboratory sinks.
  - Urinals.
- 4.2 Traps: their uses and functioning.
  - 'p' , 's' , and 'q' traps for Water Closets.
  - Bottle traps, floor traps, gully traps, grease traps and disconnecting traps.
- 4.3 Pipes and piping network.
  - Single and double stack systems.
  - Materials of pipes – Cast iron , P.V.C. , A.C. Stoneware , R.C.C. etc. and their methods of jointing.
  - Specials- Jointing and installations.
  - Anti- Siphonage Pipes.

### **UNIT V Drainage-II**

#### Underground Drainage

- Locations and use of appurtenances i.e. inspection chambers , manholes, disconnecting chambers, ventilating shafts , light shafts etc.
- Storm water drainage systems- Separate, combined, partially separate.
- Ventilation of building drainage system.
- Self cleansing velocity- Thumb rules for diameters and gradients of pipes in relation to self cleansing velocity.
- Laying of underground drainage systems.
- Testing of building drainage systems.
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### **UNIT VI Sewage Treatment**

#### Disposal within the Premises.

- Septic tanks, its function and design.

- Bio gas plants and their functioning.
- Effluent treatment tanks.
- Introduction to sewage treatment plants

### SESSIONAL WORK

- Preparing drainage and water supply layouts of a building site with more than one building on the site based upon the theory learnt and 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 (30% weightage).

### RECOMMENDED READING

1. Plumbing-Johnson A.
2. Sanitation, Drainage and Water Supply-Mitchell.
3. Environment and Services-Peter Burberry.

## HISTORY OF ARCHITECTURE II

HISTORY OF ARCHITECTURE II			
Subject Code		2201523	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=1)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

### COURSE OBJECTIVE

- To introduce student to architectural development with reference to time, space and people.

### COURSE OUTLINE

- To introduce students to the evolution of architecture of Europe and its immediate surroundings from 1<sup>st</sup> century CE to 18<sup>th</sup> century CE.
  - Religious architecture under Christianity
  - Broad periods of European cultural history including Gothic, Renaissance, Baroque and Revival
- To sensitize students to the linkages between architecture and the socio- cultural, political and economic context of the period.
- To introduce students to the developments in technology and the subsequent effect on architecture.
- To familiarise students with noteworthy architectural productions from the period and their significance.
- To introduce students to the regional and temporal variations in archetypes and the rationale for the same.

### SESSIONAL WORK

Two project based assignments and one tutorial AND.

Measure drawing and documentation of architectural components/ small building dating from the Colonial period in India.

### RECOMMENDED READING

1. History of Architecture by Sir Bannister Fletcher.

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

## ARCHITECTURAL DRAWING AND GRAPHICS III

ARCHITECTURAL DRAWING AND GRAPHICS III			
Subject Code		2201524	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=3)	5	Sessional (Internal)	50
		Sessional (External)	50
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	3

### COURSE OBJECTIVES:

- 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.
- To enable the students to generate simple architectural drawing using **CAD**

### COURSE OUTLINE:

#### Unit 1 Perspective Drawing:

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

**Unit 2 Sciography:** Principles of Sciography (shades and shadows) for 3-Dimensional objects and buildings on plans, elevation, isometric and perspective.

**Unit 3 Presentation Techniques:** Introduction to various mediums for architectural presentations in various drawing formats.

**Unit 4 Sketching:** Introduction to Sketching techniques using various mediums to capture spatial character (built or inbuilt)

**Unit 5 Computer Aided Drawing:** Advance commands in CAD such as Setting Drawing parameters, Layer controls, Hatching, Model and paper space settings etc  
Draughting single building from Semester II Design on CAD

### 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.
- Minimum of Eight manually drafted and at least one CAD assignment to cover the course outline and based on the following modules:

a	One-point and two-point perspective (objects and buildings)	3 to 4 Assignments
b	Sciography of objects and buildings/ building components	3 to 4 Assignments
c	Demonstration of Presentation techniques in various drawing formats (Preferably with 'own Design Drawings')	2 to 3 Assignments
d	CAD drawings (Plan, Section/s Elevation/s) with layers and hatch.	1 Assignment

**RECOMMENDED READING:**

- Holmes John M. : Applied Perspective
- Themes and Hudson: Perspective for Architects
- Friedrich W. Capelle: Professional perspective drawing for Architects and Engineers
- 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

**SURVEYING AND LEVELLING**

<b>SURVEYING AND LEVELLING</b>			
Subject Code		2201525	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

**COURSE OBJECTIVES**

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

**DETAILED SYLLABUS**Unit I

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

Unit II

- Chain Surveying: Base line, tie lines, check lines.

Unit III

- 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

Unit IV

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

Unit IV:

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

Unit V:

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

#### Unit VI:

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

#### Unit VII:

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

### SESSIONAL WORK

Based on field measurements sheet entered in field book :

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

## DESIGN IV

Design IV			
Subject Code		2201526	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=8)	11	Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	250
		Total Credits	7

### COURSE OBJECTIVES:

- To comprehend site specific stimuli through responses to physical, climate, visual, cultural contexts through indigenous construction, technology, building materials, structure etc.

### COURSE OUTLINE:

1. Multiple layering of architectural space (without aid of mechanical means of vertical transport), its relationship with structure, technology and resultant built form; Concept of earthquake resilient structural systems for indigenous applications.
2. Attributes of Architectural character through application of indigenous materials, construction methods.
3. Function and space studies; defined user group specific perception of space; Concept of minimum and maximum limits of development wrt to foot print, building heights.
4. Concept of Passive solar responses; fenestration design.
5. Site analysis wrt to surroundings; zoning and activity distribution; Circulation and activity relationships through adjacencies, achieving performance integrity through functional adjacencies and elementary services of water and drainage.
6. Study and analysis of multicellular, multiple level (without aid of mechanical means of vertical transport), spaces by application of principles of functionality, climate, composition, and aesthetics.
7. Study of a Settlement of a semi urban type/ community in an urban location and the analysis and documentation w.r.t. lifestyle of occupants, climatic and topographical response, semipublic built and open spaces, and associated architectural character.

### SESSIONAL WORK:

- Graphic documentation and analysis of the settlement study and along with a short written report with one design assignment related to the settlement studied.
- Minimum one architectural design project (other than the one mentioned above) with multicellular multi-level spaces such as primary school, hostel, sports facility, resorts, medical facility etc. approximately 1000-1200 sq.m. and effectively communicated through architectural graphics, two and three-dimensional sketches, models and narratives.

## REFERENCE BOOKS

1. Jan Bilwa and Leslie Fairweather, editors, A.J. Metric Handbook.
2. DernstNeufert's Architect's data.
3. Walter Gropius, Total Architecture.
4. Giedion, Siegfried; Space, Time and Architecture.
5. Gibbered, Fredrick: Town Design.
6. David Gosling, Gordon Cullen – Visions of Urban Design.
7. David Robso, Geoffrey Bawa – the complete works.
8. Casa Scheer Brenda, The Evolution of Urban Form.

## BUILDING TECHNOLOGY AND MATERIALS IV

BUILDING TECHNOLOGY AND MATERIALS IV			
Subject Code		2201527(SV) 2201528(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	30
		End Semester exam	70
Total Marks		200	
Total Credits		5	

## COURSE OBJECTIVES

- To introduce students further to RCC frame construction and a basic understanding of ferrocement construction.
- To introduce students to different building materials related to RCC construction

## COURSE CONTENT

### Unit 1

- Ready mix concrete, light weight concrete

### Unit 2

- RCC floor slabs: one-way, two way slabs, cantilever slabs, column- beam- slab junctions, toilet slabs, balcony slabs, canopies.
- Construction of various types of pre-cast and in-situ RCC stairs
- Introduction to ferrocement as a material and technique of construction.

### Unit 3

- Types of elevators and escalators- installation process and detail.
- Construction of lift shafts and machine rooms.

### Unit 4

- Windows in non- timber materials
- Water- proofing materials used in basement construction

## SESSIONAL WORK

- Hand drawn drawings on Units 2, 3 and 4; Assignments on unit 1.

## RECOMMENDED READING

16. 'Elements of Structure' by Morgan
17. 'Structure in Architecture' by Salvadori
18. 'Building Construction' by Mackay W. B., Vol. 1 – 4
19. 'Building Construction' by Barry, Vol. 1 – 5
20. 'Construction Technology' by Chudley, Vol. 1 – 6
21. 'Building construction Illustrated' by Ching Francis D. K.
22. 'Elementary Building Construction' by Michell
23. 'Structure and Fabric' by Everet

24. 'Engineering Materials' by Chaudhary
25. 'Building Construction Materials' by M. V. Naik
26. 'Civil Engineers' Handbook' by Khanna
27. 'Vastu Rachan' by Y. S. Sane
28. National Building Code and I.S.I. Specifications
29. 'Materials and Finishes' by Everet
30. 'A to Z Building Materials in Architecture' by Hornbostle

## THEORY OF STRUCTURES IV

THEORY OF STRUCTURES IV			
Subject Code		2201529	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	Nil
		Sessional (External)	NIL
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	100
		Total Credits	2

### COURSE OBJECTIVES

1. To Study Wood as a Material.
2. To Study Limit State Method.
3. To Study Reinforced Cement Concrete as a Material.
4. To Design Simple Compressive and Flexural Members in R.C.C.

### COURSE CONTENT

#### Unit 1. Wood by W.S Method

1. Introduction to I.S.883. Study of Wood as a Material. Different Grades Available
2. Design of a Wooden Flexural Member either as a Simple Supported Beam or a Cantilever with Simple Loading. Depths Limited to 300 mm. Design by Working Stress.
3. Introduction to Modification Factors and Form Factors in Design of Wood.

#### Unit 2 - Concrete Technology

1. Concrete Technology. I.S.456 – Different Grades of Concrete. Different Grades of Cement and Steel Used. Study of Cement, Sand, Aggregate and Water. Process of Concreting, Curing, Form Work and Stripping, Water Cement Ratio, and various other details, tests in brief.
2. Basic R.C.C section and terms like Effective depth, covers, Overall Depth. Covers for different R.C.C members.

#### Unit 3. Limit State Design

1. Concept, Various Limit States, Partial Factors of Safety. Characteristic Stresses and Loads
2. Assumptions, Limitations, Advantages and Disadvantages.
3. Stress Block Diagram for Flexural Members and Derivation of Formulae.
4. Combination of M20 Grade concrete and Fe 500 Steel.
5. Balanced, Under Reinforced, Over Reinforced Sections.

## Unit 4.Design of Various R.C.C Members as per I.S.456

1. Span to Depth Ratios for various flexural members.
2. Concept of one way and two way slab. Importance of distribution steel in one way slab.
3. Design of One Way Slab for different live loads and floor finishes.
4. Design of Two Way Slab using Rankine Gashroff Method of load distribution/constants
5. Design of Singly Reinforced Beam with Shear Reinforcement.
6. Design of Chajja, and Cantilever Slabs.
7. Design of Short R.C.C Columns. Reduction factor for long R.C.C columns. I.S. Provisions. All Answers to include Schedules, and Typical Reinforcement Details.
8. Bond, Lap in Reinforcement, Development Length and Placing of Reinforcement. Theory only.

### RECOMMENDED READING

1. Design of Steel Structures: Vazirani-Rathwani.
2. Design of Steel Structures-Negi.
3. R.C.C.Design –Khurmi, Punmia, Sushilkumar.
4. Elements of Structure –Morgan.
5. Structure in Architecture-Salvadori and Heller.
6. Structural Decisions-F.Rosenthal.

## BUILDING SERVICES II

BUILDING SERVICES II			
Subject Code		2201530(SS) 2201531(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=2)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	30
		End Semester exam	70
		Total Marks	150
		Total Credits	3

### COURSE OBJECTIVES

To introduce students to following Building Services in low, medium and high rise buildings and inculcate in them the integration of services in architectural design. This term aims at following two services.

- Lighting and electrification.
- Introduction to rainwater harvesting and alternative energy sources.

### COURSE OUTLINE

#### UNIT I Waste Disposal.

- Collection and disposal of organic and in-organic waste
- Sacks, bins, grinders , incinerators , compactors and refuse chutes.
- Vermiculture and composting.

#### UNIT II Lighting:

- Indoor lighting- natural and artificial
  - Systems of lighting such as direct, indirect, diffused.
  - Applications of lighting systems with special reference to levels of illumination for various uses and lumen method calculations.
  - Light fittings.

### UNIT III Electrification.

- Introduction to general distribution of electric power in urban areas, substations for small schemes in industrial units.
- 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.

### 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 (30% weightage).

### RECOMMENDED READING

- Daylight in Architecture-Benjamin Evans.
- Lighting in Buildings-Hapkinsen H.D.Kajr.
- Lighting in Architectural Design.-Derek Philips.
- BBC83 P[art VII, Section I, Lighting and Ventilation.

## HISTORY OF ARCHITECTURE III

HISTORY OF ARCHITECTURE III			
Subject Code		2201532	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=1)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

### COURSE OBJECTIVE

- To introduce student to architectural development with reference to time, space and people.

### COURSE OUTLINE

- To introduce students to the evolution of architecture of the Indian sub-continent from 1<sup>st</sup> century CE to 18<sup>th</sup> century CE.
  - Architecture of the Buddhists, Hindus and Jains and its evolution with reference to regional and stylistic variations.
  - Architecture under Islam.
  - Evolution of form, technique and ornamentation, and regional and stylistic variations in Indian architecture
  - Architecture of Maharashtra in the 18<sup>th</sup> and 19<sup>th</sup> centuries.
- To sensitize students to the linkages between architecture and the socio- cultural, political and economic context of the period.
- To introduce students to the developments in technology and the subsequent effect on architecture.

- To familiarize students with noteworthy architectural productions from this period and their significance.
- To introduce students to the regional and temporal variations in archetypes and the rationale for the same.
- To study in detail extant examples from this period available in the region of the college.

### SESSIONAL WORK

- At least 2 project based assignments and one tutorial AND
- Detailed measured drawing and documentation of one building/ complex dating from the above mentioned period.

## TECHNICAL COMMUNICATION

TECHNICAL COMMUNICATION			
Subject Code		2201533	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	50
		Total Credits	2

### COURSE OBJECTIVES

- To equip the students to communicate effectively using various modes of communication such as graphical, textual, oral and help them to develop various soft skills.

### COURSE CONTENT

- Writing skills : Formal letter writing, job applications, preparing a resume, reporting an event, précis writing, comprehension in English.
- Oral skills : Group discussions, giving a speech, appearing for an interview.
- Presentation skills : Presenting using power point presentation, graphical modes (sketching, 3D views).
- Body language, appearance, gestures, voice modulation, speech organization etc.
- Using various computer applications such as word processing, MS excel, photoshop etc.

### SESSIONAL WORK

- Minimum 10 assignments to cover all the aspects of the course content mentioned above.

## WORKING DRAWING I

WORKING DRAWING I			
Subject Code		2201534	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=3)	5	Sessional (Internal)	50
		Sessional (External)	50
		Viva (Internal)	NIL
		Viva (External)	NIL
		In-semester exam	NIL
		End Semester exam	NIL
		Total Marks	100
		Total Credits	3

## **COURSE OBJECTIVES**

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

## **COURSE CONTENT**

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

## **SESSIONAL WORK**

- One working drawing of an architectural design project having load bearing structure with minimum 100 sq. m. carpet area. (4 to 5 drawings).
- At least two details such as doors / windows / railings / kitchen otah etc. (1 drawing)