SOLAPUR UNIVERSITY, SOLAPUR

Scheme of teaching and examinations of Second Year -IIIrd Semester, B.Arch.(w.e.f.2014-15)

Subject Code	Title of Subject	Teaching Scheme period per week (each period 50 minutes)			Examination Scheme							
		Lecture	Studio	Total	Duration In Hrs.	Theory Marks		Sessional Work				Total
								Internal		External		
						Max	Min	Max	Min	Max	Min	
AR3-01	Architectural Design –III	1	7	8	6	100	45	150	75	100	45	350
AR3-02	Architectural Graphics- III	1	3	4	3	50	23	50	25	-	-	100
AR3-03	Bldg. Construction & Material – III	1	5	6	3	50	23	100	50	100	45	250
AR3-04	Theory of Structure- III	3	-	3	3	80	36	20	10	50	23	150
AR3-05	History of Architecture – III	2	1	3	3	80	36	20	10	_	_	100
AR3- 06	Climatology & Env. – I	2	_	2	3	80	36	20	10	_	_	100
AR3-07	Building Services – I	3	_	3	3	80	36	20	10	_	_	100
AR3-08	Surveying & Leveling - I	2	1	3	-	_	_	50	25	_	_	50
AR3-09	Computer Technology and Architecture -III	1	2	3	-	_	_	50	25	_	_	50
	Total			**35**		**520**		**480**		**250**		**1250**

III SEMESTER

AR3-01: ARCHITECTURAL DESIGN - III

Teaching Scheme – Per week	Examination Scheme –	
Lectures – 1	Paper - 1	Internal Marks – 150
Studio – 7	Duration – 6 hr's	External Marks – 100
Total – 8		Theory - 100
		Total – 350

Objective:

Architectural Design as a core subject of Architectural Studies. The objective is to study the fundamentals of design process and application of the knowledge gained in other subjects, towards designing of most human and habitable spaces. The student is expected to collect, analyze the data, learn the process of Design and approach to the Design solution.

Outline:

Design:

1.Identification and Application of elements of design to achieve design principles in Architecture.

2 .Approach to design as a continuous process through function, technology and aesthetics (basic components) of the building and their function.

3.To learn the basics of design e.g. Form, proportion, scale etc to develop design skills with respect to needs, limitations, constraints, usage pattern.

4. Study of groups of objects forms, masses with basic geometric forms, their composition for two and three dimensional study.

Scope of the project

DESIGN 250 to 350 sqm

1. Plot areas can vary from 750 to 1100 sq m.
2. Types of residences, Nursery Schools, small club houses, village library, vegetable market sheds,polyclinics, public toilet complex.
3. Introduction of climatology, different types of climates and applications.
4. Climate selection as per groups.

Design process:

1. Case studies and methodology
2. Circulation and site analysis programme and requirement analysis.
3. Data collection and analysis like circulation, bubble diagram, climatic response
4. Conceptual plans and study models
5. Actual plans and climatological details
6. Floor plans, elevations, sections, views and models

Sketching :

1. Freehand sketching with different medium. Of case studies ,detailing of individual spaces and surfaces, volumetric analysis ,conceptual plans.
2. Sketch book size, papers, to be specified.(Preferable half of A4).

Submission :

1. Sketch file
2. Case study reports and data collection in file form
3. Design port folio (as per choice)
4. Design Models

Reference Books:

1. Man climate architecture
2. Francis D.K. Ching –Elements of Architecture
3. Neuferts Data
4. Walter Gropius – Total Architecture
5. Pramar V.S. – Fundamentals in Architecture

AR3 – 02: ARCHITECTURAL GRAPHICS - III

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 1	Paper - 1	Internal Marks – 50
Studio – 3	Duration – 3 hrs	External Marks – Nil
Total – 4		Theory - 50
		Total - 100

Objectives:

To Introduce the students to the fundamental techniques of Architectural drawings & to enhance their visualization skills.

Outline :

1. Introduction to Perspective drawing
2. Principles of one point, two point, and three point perspective of simple Geometric objects.
3. Perspective of interior and exteriors and building parts etc.
4. Introduction to Sciography, Study of shade and shadows.

Submission :

The Classwork portfolio pertaining to the above topics.

Reference Books :

Engineering Drawing – By N.D. Bhat

AR3 -03 : BUILDING CONSTRUCTION AND MATERIAL –III

Teaching Scheme –Per week	**Examination Scheme**	
Lectures -1	Paper – 1	Internal Marks - 100
Studio – 5	Duration – 3 Hrs.	External Marks - 100
Total - 6		Theory - 50
		Total - 250

Objectives :

To help students understand the basic building elements, their function with specific reference to Load bearing construction and simple RCC frame structure.

Main outline of this study is to develop strong sense of understanding the basic principles of construction and materials ,to develop analytical and logical sequence in thinking.

The emphasis should be on teaching the fundamental principles and constructional details .

Students shall be encouraged to study both in class room and also out side at work-sites in order to get the practical exposure(Construction yard). A specific studio dedicated to integrate design, structure, and technology with the concerned staff to illustrate the relation between wall thickness, forms, volume and technology.

Course outline :

CONSTRUCTION :

1. Doors and Windows:

   All types of heavy TW doors, windows and partitions joinery details.
   Ironmongery and fixtures used.
2. Floorings :

   Method of Construction and laying of flooring with various materials and repairing, skirting, dadooing.
   Waterproofing treatment for toilets blocks and terraces.
   Laying of paving with paving materials.
3. Staircases :

   Types of staircases, construction method of staircases using stone, brick, timber, RCC,steel. Fire escape staircase
   Introduction to escalators.

MATERIALS :

1. Timber :

   Use & application of timber in building construction –Timber- plywood, block boards, hardboards and veneers
   Timber boards and eco- boards.
2. Mortar :

   Lime mortar, Cement mortar, properties,proportion,mixing, application.
   Introduction of mud and surkhi mortar
3. Flooring :

   Natural stones and processed floorings, Artificial flooring materials
   Bitumen and waterproofing materials, Asphalt, various types of asphalt, use of bitumen felt.
   Other waterproofing systems for roofs, walls, plaster etc.
4. Paving materials:

   Properties, types, and application.

Submission :

1. B.T. portfolio with sketch.
2. Files and notes of construction and materials.
3. Actual samples of materials, grades of lime and stone
4. Photos, data, PPT of material usage

Reference books :

For Construction –

1. Building construction – Mc. Kay
2. Building construction – Chudley
3. Building construction – Barry
4. Building construction – Punmia B.C.
5. Building construction – Rangwala
6. Building construction – Mitchell

For Materials –

1. Building Material - Sushilkumar
2. Building Material - Rangwala

AR3-04: THEORY OF STRUCTURES – III

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 3	Paper - 1	Internal Marks – 20
Studio – Nil	Duration – 3 Hrs	External Marks – 50
Total – 3		Theory - 80
		Total - 150

Objectives:

Students completing the course will have:-

1) Ability to employ the knowledge of mechanics to understand the behavior of structure.
2) Ability to identify principal planes and find principal stresses.

Outline :

1. Simple Bending

Moment of inertia and section modulus for various structural shapes. Theory of simple bending: M/I=f/y= E/R application of flexural formula

2. Principal stresses and principal strains

Normal and shear stresses on any oblique plane; Concept of principal planes and principal stresses; Derivation of principal stresses, maximum shear stresses

3. Shear stresses

Shearing stresses in beans – distribution of shear stress over different sections (rectangular,circular I And T)

4. Soil

Concept of soil mechanics and its importance, different types of siols and their properties. Concept of consolidation and compaction Earth Pressure- Concept, Area of application, earth pressure at rest, active and passive condition.

5. Fixed and continuous beam

Concept of fixed and continuous beam. SFD and BMD of simple fixed and continuous beam.

6. Arches and domes

Concept of arches, three hinged arches and chimneys & domes.

Submission

1. Assignments on each topic.
2. Any 4 sheets on above topic.

Reference books:

1. Strength of Materials by R.K.Bansal, Laxmi Publications
2. Strength of Materials by Bhavikatti, Vikas Publications, New Delhi.
3. Strength of Materials by Ramamurtham,Dhanpatrai & Sons, New Delhi
4. Strength of Materials by R.S.Khurmi, S.Chand Pubication, New Delhi
5. Mechanics of Structures (Part I) by S.B.Junnarkar, Charotar Book House,
6. Strength of Materials by R.K.Rajput, S.Chand Pubication, New Delhi
7. Soil Mechanics by B.C. Pummia

AR3–05: HISTORY OF ARCHITECTURE-III

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 2	Paper - 1	Internal Marks – 20
Studio – 1	Duration – 3 Hrs	External Marks – Nil
Total – 3		Theory - 80
		Total - 100

Objectives :

1. Critical appraisal of particular style with respect to various influences like geographical, social, economical, religious, political, cultural, Arts & Crafts, Science and Technology.
2. Study of Architectural Characters in general. Space and form structural system, building materials and constructions, solids and voids, color and texture overall architectural composition with reference to selected example in particular.
3. Critical appreciation with sketches and notes. Exercise – solution of objective and descriptive questions with sketches as sessional work with internal assessment in addition to theory paper.

Outline:

Indian Architecture – Eight century to twelfth century.

1. Hindu Temple Architecture : Indo-Aryan, Dravidian, Hoyasala phases of architecture.

Examples- Lingraj Temple at Bhuvaneshwar, Khanderiya Mahadeva Temple at Khajuraho, Brihadeshwar Temple at Tanjore, Minakshi Sundaram Temple at Madurai, Channekeshwar Temple at Belur.

2. **Jain Architecture** – Choumuk Temple of Adinath at Ranakpur,

Western Architecture –

Gothic & renaissance architecture in Europe

Examples - West Minster abbey London, Church of Saint Peter Rome(new) .

Submission :

Files and sketches.

Reference Books:

1. History of Arch. In India – Tadgell christopher
2. Indian Architecture – Buddhist & Hindu period – satish grover
3. Architecture of India – Buddhist & Hindu - Percy Brown
4. History of Arch – Bannister fletcher
5. History of world civilization – J.E. swai
6 world Architecture – G.K. Hiraskar
7. A History of fine Arts in India & West – Tomory Edith.

AR3 – 06: CLIMATOLOGY & ENVIRONMENT-I

Teaching Scheme – Per	**Examination Scheme –**	
Lectures – 2	Paper - 1	Internal Marks – 20
Studio – Nil	Duration – 3 Hrs	External Marks –Nil
Total – 2		Theory - 80
		Total - 100

Objective :

- Study relation between built form & elements of Climate
- Study behavior of built form in different climatic conditions & Design responding to climate
- Study different climate & elements of climate.

Outline:

1. Introduction to climate & Global climate.
2. Elements of Climate
3. All tropical climate
4. Micro climate & macro climate , Micro climate analysis
5. Bio Climate Designs & Bio climatic chart
6. Thermal control factors
7. Sun dial & Sun path dial

Submission :

1. File along with sketches
2. 10 min PPT presentation on any climate responsive building (case study) Book /Live
   OR
   Any Bio-Climatic strategy
   OR
   Any topic from the syllabus

Reference Books

1. Climate Responsive Architecture – Arvind Krishna
2. Hand book : Solar Passive Architecture – M Emanuel levy
3. Climatology & Environment - Manual (IIT)
4. IMD Data

AR3 – 07: BUILDING SERVICES – I

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 3	Paper - 1	Internal Marks – 20
Studio – Nil	Duration – 3 Hrs	External Marks – Nil
Total – 3		Theory - 80
		Total - 100

Sanitation

Objective:

1. Introduction to sanitation & its importance.
2. Planning and layout of sanitary fittings and drainage for a single and multistoried buildings.

Outline:

Systems of sanitation –

1. Methods of collection
2. Sewerage systems
3. Patterns of collection systems
4. Drains and Sewers sections, material used, Pumping of sewage
5. Sewer joints – Types of various joints and methods for making joints.

Sewer appurtenances-

1. Manhole, Drop manhole, Lamp hole, Street inlets, flushing tank, catch basins, Sand, grease and oil traps, Inverted siphon, Storm water relief works etc..
2. Laying of the sewer line
3. Testing of the sewer lines
4. Ventilation of sewer

Maintenance of sewers –

Causes, precautions to be taken

House drainage -

1. Meaning and principles of house drainage systems, drainage systems for residences.
2. Different types of Traps, Inspection chamber, Pipes and fitting, Antisiphonage pipe ventilation of house drainage systems.
3. Sanitary fittings (Ablution fixtures and Soil fixtures)
4. Wash basin, Sinks, Bath tub, Flushing cistern, water closet – Indian type, European type and AngloIndian type.
5. Urinals – Bowl type, Stall type, Squatting plate urinals.
6. Slop sink, Bidet
7. Ventilation of fittings, connections to sewage/ salvage pipes, Materials for these fittings, Testing of fittings and there connections and installation.
8. Systems of plumbing and connection to public system, Intercepting and other types of chambers.

Disposal of sewage in unswered areas

1. Different, types of privy's.
2. Designing of septic tanks
3. Layout for public toilet blocks
4. Public toilet - Mallaprapha toilet (Pay and Use)
5. Sulabha shachalaya (Pit latrines)

Treatment of sewage (introductory only)

1. Sewage disposal methods – natural and artificial
2. Sewage treatment plant

Refuse Disposal

Various types of Refuse and their disposal
Refuse disposal in multistorey building

Reference Books

1. Building Services : By S. M. Patil
2. Building Services : By Shubhangi Bhide
3. Water Supply and Sanitation : By G. S. Birde
4. Water Supply and Sanitation : By Rangwala and Punmia and Guracharansingh

AR3-08: SURVEYING AND LEVELLING – I

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 2	Paper - Nil	Internal Marks – 50
Studio – 1	Duration – Nil	External Marks –Nil
Total – 3		Theory -
		Total - 50

Objectives :

1) Theory of measurement errors, accuracies, magnitude of errors and error propagation
2) Level instrument setup, theory, field procedures and computations, for vertical control survey accuracy.
3) Distances, angles, azimuths and bearing measurements
4) Traversing and traverse computations, for horizontal control survey accuracy.
5) Total Station instrument setup, field procedures and computations, including instrument technical specifications and expected survey precision using the instrument.

Outline :

1. Introduction- Aim, Object and importance of subject, scope of subject for Architects.
2. Brief history of land surveys executed by Government Departments with particular reference to land record surveys, Index Map and N. S. sheets.
3. Chain survey and Triangulation.
4. Study of instruments used for chain survey viz. : I) Chains II) Ranging Roads III) Tapes IV) Optical square V) Octagonal Cross Staff VI) Cylindrical Cross staff.
5. Chain Line Ranging, Measurement of offsets, overcoming obstacles.
6. Recording of chain survey measurements in field book.
7. Plotting of chain survey, scales used in plotting
8. Calculation of Area by method of tringles, by simpson Rule, using graph, paper and by planimater, Hacter and Acre.
9. Instruments used Viz.- Prismatic compass, Dumpy level, Theodolite and their temporary adjustments, principles behind working of the instruments only are required.
10. Recording measurements of a Prismatic compass survey, Magnetic Meridian, Back fore and reduced bearing; local attraction and its correction for exact orientation.
11. Plain Table surveying, Advantages and scope
12. Instruments use for plane table surveying viz. (i) Plane Table (ii) Alidada (iii) Plumb work (iv) Trough compass.
13. Methods of plane table surveying viz. (i) Radiation (ii) Inter Section (iii) Resection (iv) Travers.
14. Chain survey about one straight length of 200 mts setting out the line and measuring offsets of natural and artificial features and directed and recording in a field book.
15. Taking reading of any object from a fixed point by prismatic compass and recording it.
16. Location of any point in relation to a fixed base line by method of triangulation

Submission :-

assignments on each topic**.** &.plane table survey of any building as a project survey.

Reference Books

1. Surveying –B. C. Punmia,, S.K.Jain, Vol. I and II, Laxmi Publication, New Delhi
2. Surveying and Leveling – T. P. Kanetkar and S. V. Kulkarni Vol.Iand II , -Pune Vidyarthigriha Publication
3. Surveying – Agor -Khanna Publishers, Delhi
4. Surveying – K. R. Arora Vol. 1 and 2
5. Surveying and Leveling –N.N. Basak, Tata McGraw Hill Publishing Co., New Delhi
6. Surveying –S. K. Duggal Vol. 1and 2 Tata McGraw Hill Publishing Co., New Delhi
7. Plane and Geodetic Surveying – David Clark
8. Surveying - Bannister and Raymond
9. Surveying – Jawaharlal Sharma CBS Publishers, Delhi
10. Plane Surveying - Alok De
11. Text book of Surveying – S.K.Husain, M.S. Nagraj, S.Chand & Co. Ltd.,Bombay

AR3-09 : COMPUTER TECHNOLOGY IN ARCHITECTURE - III

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 1	Paper - Nil	Internal Marks – 50
Studio – 2	Duration – Nil	External Marks – Nil
Total – 3		Theory - Nil
		Total – 50

Objectives:
To develop awareness and familiarity with computer applications in architecture & to equip students with skills required in using computers as a digital media for design.

Outline:

1. Cad and its advance applications
2. Creating and organizing 2-D drawings of buildings
3. Setting for drawing.
4. Line types,
5. Dimensions
6. Introduction to block and its applications
7. Text and fonts
8. Out put of the drawing through printers or plotters. (Print : Plot)
9. Different setting of drawing, snap mode etc.
10. Hatch its patterns.
11. Isometric drawings.

Submission

Minimum one drawing showing plan, elev. Section and isometric view of a project.

Reference books:

Autocad 2012 –in simple steps-kogent learning solutions

SOLAPUR UNIVERSITY, SOLAPUR

Scheme of teaching and examinations of IVth Semester B.Arch.(w.e.f.2014-15)

Subject Code	Title of Subject	Teaching Scheme period per week (each period 50 minutes)			Examination Scheme							
		Lecture	Studio	Total	Duration In Hrs.	Theory Marks		Sessional Work				Total
								Internal		External		
						Max	Min	Max	Min	Max	Min	
	Environmental Studies	**2**	**_**	**2**	**2**	**50**	**23**	**_**	**_**	**_**	**_**	**50**
AR4-01	Architectural Design –IV	1	7	8	_	_	_	150	75	100	45	250
AR4-02	Architectural Graphics- IV	1	3	4	3	50	23	50	25	_	_	100
AR4-03	Bldg. Construction & Material – IV	1	5	6	3	50	23	100	50	100	45	250
AR4-04	Theory of Structure- IV	3	_	3	3	80	36	20	10	50	23	150
AR4-05	History of Architecture – IV	2	1	3	3	80	36	20	10	_	_	100
AR4- 06	Climatology & Env. – II	2	_	2	3	80	36	20	10	_	_	100
AR4-07	Building Services - II	3	_	3	3	80	36	20	10	_	_	100
AR4-08	Surveying & Leveling – II	2	1	3	-		-	50	25	-	-	50
AR4-09	Computer Technology in Architecture - IV	1	2	3	_		_	100	50	50	23	150
	Total			**37**		**420**		**530**		**300**		**1250**

IV SEMESTER

AR4-01: ARCHITECTURAL DESIGN - IV

Teaching Scheme – Per week	Examination Scheme –	
Lectures – 1	Paper - Nil	Internal Marks – 150
Studio – 7	Duration – Nil	External Marks – 100
Total – 8		Theory - Nil
		Total – 250

Objectives:

1. The subject leads to a detailed study of process of design with knowledge of construction, structure, materials, and processes and basic principles of design.
2. Scope of Design, considering methods of construction, structure, site conditions socio-economic factors, form, function and their relationship
3. Study of planes, mass, forms and shapes.
4. Study of groups of objects forms, masses with basic geometric forms, their composition for two and three dimensional study.
5. Data collection and analysis including circulation.

Outline:

Design:

1.Identification and Application of elements of design to achieve design principles in Architecture.

2. Approach to design as a continuous process through function, technology and aesthetics (basic components) of the building and their function.

3.To learn the basics of design e.g. Form, proportion, scale etc to develop design skills with respect to needs, limitations, constraints, usage pattern.

4.Study of groups of objects forms, masses with basic geometric forms, their composition for two and three dimensional study.

Scope of the project

DESIGN 350 to 500 sqm

1. Plot areas can vary from 1100 to 1500 sqm
2. Introduction of climatology, different types of climates and applications.
3.Climate selection as per groups.
4.Design problems of medium complex function, low rise buildings with more than one function as Recreational Club, restaurant, Motel, museum, Art Gallery, Auditorium etc.

Design Process:

1.Case studies and methodology

2.Circulation and site analysis programme and requirement analysis.

3.Data collection and analysis like circulation, bubble diagram, climatic response Conceptual plans and study models

4.Actual plans and climatological details

5.Floor plans, elevations, sections, views and models

Sketching :

1.Freehand sketching with different medium. Of case studies ,detailing of individual spaces and surfaces, volumetric analysis ,conceptual plans.

2.Sketch book size, papers, to be specified.(Preferable half of A4).

Submission :

1. Sketch file
2. Case study reports and data collection in file form
3. Design port folio (as per choice)
4. Design Models

Reference Books:

1. Man climate architecture
2. Francis D.K. Ching –Elements of Architecture
3. Neufert architects Data
4. Walter Gropius – Total Architecture
5. Pramar V.S. – Fundamentals in Architecture

AR4-02 : ARCHITECTURAL GRAPHICS- IV

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 1	Paper - 1	Internal Marks – 50
Studio – 3	Duration – 3 hrs	External Marks – Nil
Total – 4		Theory - 50
		Total - 100

Objectives:

To Introduce students the principles of drawing shade & shadow with source of light being sun.

Outline :

1. Perspective Sciography of simple and combination geometrical object.
2. Sciography of building in plan, elevation and in perspective.
3. Introduction of photography, use of wide and normal lenses.
4. Advance photographic technique.

Submission :

The Classwork portfolio pertaining to the above topics.

Reference Books :

Engineering Drawing – By N.D. Bhat

AR4 -03 : BUILDING CONSTRUCTION AND MATERIAL –IV

Teaching Scheme –Per week	Examination Scheme	
Lectures -1	Paper – 1	Internal Marks - 100
Studio – 5	Duration – 3 Hrs.	External Marks - 100
Total - 6		Theory - 50
		Total - 250

Objectives :

To help students understand the basic building elements, their function with specific reference to Load bearing construction and simple non RCC frame structure.

Main outline of this study is to develop strong sense of understanding the basic principles of construction and materials ,to develop analytical and logical sequence in thinking.

The emphasis should be on teaching the fundamental principles and constructional details suitable for Indian condition.

Students shall be encouraged to study both in class room and also outside at work- sites in order to get the practical exposure.(Construction yard). A specific studio dedicated to integrate design, structure, and technology with the concerned staff to illustrate the relation between wall thickness, forms, volume and technology.

Outline

CONSTRUCTION :

1.Framed structure:

Principles and methods of Construction of RCC foundation
Principles and methods of Construction of RCC columns
Principle and methods of construction of beams- cantilever, inverted etc.
Principles and methods of construction of RCC slab- one way, two way, cantilever, sloping, filler and waffle slabs, vaults domes, including formwork (introductory) and reinforcement details.

2.Doors and Windows:

MS doors and windows, joinery details.

MATERIAL

1. Cement :

   Properties, uses, types, field tests, initial and final setting time.

2. Concrete :

   Limeconcrete, Cement Concrete, Properties, Proportion, mixing, application, different sizes of aggregates, water cement ratio, strength of concrete. Ready mix, manufacturing, hoisting, depositing, shuttering and centering, curing etc.
   Introduction to reinforcement used in RCC constructions.

3. Iron :

   Castiron, wroughtiron, and steel with their properties , uses. Types of steel sections.

Submission :

1. B.T. portfolio with sketch.
2. Files and notes of construction and materials.
3. Actual samples of materials, grades of lime and stone
4. Photos, data, PPT of material usage

Reference books :

For Construction –

1. Building construction – Mc. Kay
2. Building construction – Chudley
3. Building construction – Barry
4. Building construction – Punmia B.C.
5. Building construction – Rangwala
6. Building construction – Mitchell

For Materials –

1. Building Material - Sushilkumar
2. Building Material - Rangwala

AR4 -04: THEORY OF STRUCTURES – IV

Teaching Scheme – Per	**Examination Scheme –**	
Lectures – 3	Paper - 1	Internal Marks – 20
Studio – Nil	Duration – 3 Hrs	External Marks –50
Total – 3		Theory - 80
		Total - 150

Objectives :

Students completing the course will have:-

1) Ability to employ the knowledge of mechanics to understand the behavior of structures.
2) Ability to analyze determinate structural members subjected to different types of Loadings.

Outline:

1.Axially loaded Columns and struts

Columns and struts, failure of column, types of end conditions, equivalent length of a column, Euler's Column Theory, Rankine's formula and IS code formula, calculations of critical load.

2. Direct and Bending Stresses

Direct and bending stresses, eccentric loading, columns with eccentric loading, Resultant Stress diagrams due to axial loads, uni axial, and biaxial bending; Concept of core of section for standard symmetrical sections. No tension condition

3. Retaining walls

Retaining walls for water and earth pressures with or without surcharge, Rankines formula, conditions of stability, maximum and minimum pressures at base, conditions of no tension, factors of safely against sliding conceptual effect of water logging.

4. Masonry structures

Masonry Structures : Introduction, Structural property and allowable stresses.

5.Slope and Deflections of the Beam

Slope and Deflection of beams- Concept and definition : cantilevered and simply supported with different loading, relation between slope, deflection and curvature. Simple problems with double integration method.

6.Introduction to Working and limit state method

Concept of Working and limit state method.

Submission

1. Assignments on each topic.
2. Any 4 sheets on above topic.

Reference Books :

1. Strength of Materials by R.K.Bansal, Laxmi Publications
2. Strength of Materials by Bhavikatti, Vikas Publications, New Delhi.
3. Strength of Materials by Ramamurtham,Dhanpatrai & Sons, New Delhi
4. Strength of Materials by R.S.Khurmi, S.Chand Pubication, New Delhi
5. Mechanics of Structures (Part I) by S.B.Junnarkar, Charotar Book House, Anand.
6. Strength of Materials by R.K.Rajput, S.Chand Pubication, New Delhi

AR4-05: HISTORY OF ARCHITECTURE- IV

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 2	Paper - 1	Internal Marks – 20
Studio – 1	Duration – 3 Hrs	External Marks – Nil
Total – 3		Theory - 80
		Total - 100

Objectives:

1. Critical appraisal of particular style with respect to various influences like geographical, social, economical, religious, political, cultural, Arts & Crafts, Science and Technology.
2. Study of Architectural Characters in general. Space and form structure system, building materials and constructions solids and voids, color and texture overall architectural composition with reference to selected example in particular.
3. Critical appreciation with sketches and notes exercise – solution of objective and decretive questions with sketches as sessional work with internal assessment in addition to theory paper

Outline :

Indian Architecture

1. Islamic Architecture in India
2. From 12th Century to 17th Century Imperial style at Delhi, provincial style – Deccan, Moughal,
3. Examples 1) Quwt-ul, Islam – Mosque, Complex at Delhi, Mosque at Gulbarga, Ibrahim Rouza at Bijapur, Fatehapur Shikri Buland Darwaja, Chisthi tomb , Panchamahal, Tajmahal at agra

Colonial Architecture Under British Rule

1. Example Victoria Termina's Station at Mumbai, Rashtrapati Bhavan, Parliament House, Rajpat New Delhi.

Submission :

Files and sketches.

Reference Books

1. History of Arch. In India – Tadgell christopher
2. Indian Architecture – Islamic Architecture – Satish grover
3. Architecture of India – Islamic Architecture - Percy Brown
4. History of Arch – Bannister fletcher
5. History of world civilization – J.E. swai

6 . World Architecture – G.K. Hiraskar

1. A History of fine Arts in India & West – Tomory Edith.

AR4 – 06: CLIMATOLOGY & ENVIRONMENT-II

Teaching Scheme – Per	**Examination Scheme –**	
Lectures – 2	Paper - 1	Internal Marks – 20
Studio – Nil	Duration – 3 Hrs	External Marks –Nil
Total – 2		Theory - 80
		Total - 100

Objective :

- Study relation between built form & elements of Climate
- Study behavior of built form in different climatic conditions & Design responding to climate

Outline:

1) Thermal Design
   A) Heat exchange of Building
      Heat gain in Building – Internal & External
2) Thermal Control
   A)Passive Design Strategies
      Site scale
      Building Scale
      Component Scale
3) Day lighting
   A)Lighting principle/ factors
   B) Day lighting Designs & analysis

Submission :

1. File along with sketches
2. 10 min PPT presentation on any climate responsive building (case study) Book /Live

OR
Any Bio-Climatic strategy
OR
Any topic from the syllabus

Reference Books

1. Climate Responsive Architecture – Arvind Krishna
2. Hand book : Solar Passive Architecture – M Emanuel levy
3. Climatology & Environment - Manual (IIT)
4. IMD Data

AR4 – 07: BUILDING SERVICES - II

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 3	Paper - 1	Internal Marks – 20
Studio – Nil	Duration – 3 Hrs	External Marks – Nil
Total – 3		Theory - 80
		Total – 100

WATER SUPPLY

Objectives:

Introduction to building water supply its importance and basic approach. Factors to be considered for water supply at the planning stage. Planning and layout for water distribution and storage of single and multistoried buildings and connection to sanitary fixtures.

Outline :

Introduction : Importance and Necessity of water supply

Sources of Water : Surface water Sources , Ground water Sources, Rainfall

1. **Collection and conveyance** –
   1. Types of Intakes
   2. Types of water supply and pipe joints.
   3. Laying and joining of pipes.

2.Quality and Quantity of water –

1. Wholesome water, Impurities in water, standards of water quality, per capita consumption.

3.Water treatment process –

1.Basic principles of water purification system.
2.Objectives of treatment
3.Layout for treatment plant and Methods

2. **Conveyance of Water**
   1. Different types of distribution systems. Layout of distribution systems, methods of water supply, storage reservoirs, and pumps used in water supply system.

3. **Service Connections from mains -**
   1. Storage of water, Design of water tank, internal plumbing installations, various types of pipes of fittings. Valves and facets
   2. **Heating of water** (Introductory only)- Boilers, pressure boilers, solar Water Heaters

4.Water supply system for Highrise buildings : (Introductory only)

Reference Books

1. Building Services : By S. M. Patil
2. Building Services : By Shubhangi Bhide
3. Water Supply and Sanitation : By G. S. Birde
4. Water Supply and Sanitation : By Rangwala and Punmia and Guracharansingh

AR4-08: SURVEYING AND LEVELLING - II

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 2	Paper - Nil	Internal Marks – 50
Studio – 1	Duration – Nil	External Marks – Nil
Total – 3		Theory - Nil
		Total - 50

Objectives :

On completion of the course the students will be able to,

1. Plan project survey for bridges tunnels, building, dam , culvert etc.
2. Prepare contour maps and other surveying maps such as longitudinal profile and cross sections for various projects.
3. Work on various application software related to surveying

Outline:

1. Levelling and its principles.
2. Level line and horizontal line, line of collimation, Bench Mark (Temporary and permanent), Datum, Reduced level.
3. Instrument used for leveling, Dumpy level, Levelling staff, etc.
4. Reading of levels, back, intermediate and Foresight.
5. Recoding of leveling survey, finding reduced levels by Rise and Fall and also collimation. Methods, their advantages and disadvantages.
6. Contours, Definition and purpose, Properties and behavior of Contours in case gentle and steep slope, ridges and Valleys, Hill and pond, vertical and overhanging Cliff.
7. Methods of contouring-direct and indirect; Radial and square system.
8. Plotting of contours. Interpolation, their use in architecture.
9. Sessional work based on above.
10. External assessment of sessional work shall consist of
11. Assessment of internal sessional work
12. Setting of dumpy level, taking and recording back inter and fore readings and recording and calculating reduced levels. To read a contour map, to draw on contour line based on grid readings.
13. Various uses of Theodolite, finding out heights of distant or inaccessible points, lining out of large factory type buildings and roads, advantages over prismatic compass.
14. Introduction to Total Station.

TERM WORK

A) Field book containing the following experiments

1) Levelling

a) Revision of differential leveling

b) Reciprocal leveling

c) Sensitiveness of bubble tube

d) Permanent adjustments of dumpy level

e) Auto level and tilting level

2) Study of Theodolite

a) Measurement of horizontal angle by various methods,

b) Measurement of magnetic bearing and

c) Vertical angle by Theodolite

d) Trignometrical leveling

3) Giving lineout for small residential plan
4) Minor instruments
a) Hand Level
b) Abney Level
c) Box sextant
d) Ghat tracer

Reference Books :

1. Surveying –B. C. Punmia,, S.K.Jain, Vol. I and II, Laxmi Publication, New Delhi
2. Surveying and Leveling – T. P. Kanetkar and S. V. Kulkarni Vol.Iand II , -Pune Vidyarthigriha Publication
3. Surveying – Agor -Khanna Publishers, Delhi
4. Surveying – K. R. Arora Vol. 1 and 2
5. Surveying and Leveling –N.N. Basak, Tata McGraw Hill Publishing Co., New Delhi
6. Surveying –S. K. Duggal Vol. 1and 2 Tata McGraw Hill Publishing Co., New Delhi
7. Plane and Geodetic Surveying – David Clark
8. Surveying - Bannister and Raymond
9. Surveying – Jawaharlal Sharma CBS Publishers, Delhi
10. Plane Surveying - Alok De
11. Text book of Surveying – S.K.Husain, M.S. Nagraj, S.Chand & Co. Ltd.,Bombay
12. Surveying- Narinder Singh – Tata McGraw Hill Co. Ltd,

AR4 - 09: COMPUTER TECHNOLOGY AND ARCHITECTURE – IV

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 1	Paper - Nil	Internal Marks – 100
Studio – 2	Duration – Nil	External Marks – 50
Total – 3		Theory - Nil
		Total – 150

Objectives :

Outline:

1. Application of blocks and concept of symbols library
2. Drawing at different scale
3. Dimension styles and variable
4. Attributes
5. Data extraction
6. All display command

Concept of 3d work and UCS

1. 3-dimensional drawings – primitives, mesh, surfaces, etc.
2. Viewing commands and view points.
3. Slides.
4. Introduction to shading and rendering
5. Data extraction in the format of dxf., dxb.
6. Introduction of other drafting and presentation software's like auto Architect. 3d- studio, Revit, Archicad, Google Sketch up and their applications.

Submission

3D-presentation drawings with the use of above software's shall be done as a sessional work.

Reference books:

Autocad 2012 –in simple steps-kogent learning solutions

ENVIRONMENTAL STUDIES

Teaching Scheme – Per week	**Examination Scheme –**	
Lectures – 2	Paper - 1	Internal Marks – Nil
Studio – Nil	Duration – 2 Hrs	External - Nil
Total – 2		Theory - 50
		Total – 50

Objectives:

1. Nature of Environmental Studies
2. Natural Resources and Associated Problems
a) Forest resources:
b) Water Resources:
c) Mineral resources
d) Food resources:
e) Energy Resources:
f) Land resources:
3. Eco System
4. Bio Diversity and its conservation
5. Environmental Pollution
6. Social issues and the Environment
7. Environmental Protection
8. Field Work

Reference book :

Environmental Studies – by Ninad .C. Shah